THE INTERNATIONAL TRADE AND FISHERY MANAGEMENT OF SPINY DOGFISH (*SQUALUS ACANTHIAS*) IN LIGHT OF CITES LIST INSERTION: ALTERNATIVE MANAGEMENT STRATEGIES FOR THE U.S. NORTH ATLANTIC STOCK

by

Andrea Dell'Apa

December 2013

Director: Roger A. Rulifson

Coastal Resources Management Ph.D. Program

Abstract

The spiny dogfish (*Squalus acanthias*) is a commercial shark species that was recently considered, unsuccessfully, for inclusion in trade-regulation lists due to international concern about its conservation status. The major commercial demand for the species is from Europe, where the Northeast Atlantic stock has been managed unsuccessfully because of dysfunctionalities of EU fishery governance. The demand from the EU market is primarily for adult females, with the U.S. North Atlantic stock being one of the major contributors to this market. This primarily female fishery has led to overexploitation and a drastic reduction in both adult female biomass and juvenile recruitment in the U.S. Atlantic stock, forcing the adoption of a Fishery Management Plan (FMP) under the requirements of the U.S. fishery management system. The stock is now considered rebuilt and the U.S. Atlantic spiny dogfish fishery was recently certified as sustainable. However, new management strategies are needed to maintain fishery sustainability in the long-term. The first objective of this study was to analyze the EU trade dynamic changes associated with the introduction of the FMP by employing social network analysis. Results indicate that the EU market demand favoured the development of dogfish fisheries in several countries in order to supply to the decrease in U.S. export, eventually affecting the global conservation status of the species. Moreover, the species listing for trade regulation would benefit the U.S. and will enhance the conservation of other regional stocks worldwide. The second objective of this study was to investigate on the sex ratio changes in fishery-dependent surveys conducted off Cape Cod, Massachusetts; and to evaluate these results in light of the sexual segregation occurring in the species. Results support the development of a male-only directed fishery off the northeast portion of the Cape Cod peninsula, based on season (summer and early fall) and time of the day (early morning). This fishery would likely enhance the sustainability of the local spiny dogfish populations by reducing fishing pressure on the adult female component. Finally, results suggest that sexual segregation in *S. acanthias* off Cape Cod corresponds to female avoidance of males, coupled with specific mating and/or feeding behavior by males.

THE INTERNATIONAL TRADE AND FISHERY MANAGEMENT OF SPINY DOGFISH (*SQUALUS ACANTHIAS*) IN LIGHT OF CITES LIST INSERTION: ALTERNATIVE MANAGEMENT STRATEGIES FOR THE U.S. NORTH ATLANTIC STOCK

A dissertation

Presented to the Faculty of the Institute for Coastal Science and Policy

East Carolina University

In partial fulfilment of the requirements for the degree of

Doctor of Philosophy

Coastal Resources Management

By

Andrea Dell'Apa

December, 2013

THE INTERNATIONAL TRADE AND FISHERY MANAGEMENT OF SPINY DOGFISH (*SQUALUS ACANTHIAS*) IN LIGHT OF CITES LIST INSERTION: ALTERNATIVE MANAGEMENT STRATEGIES FOR THE U.S. NORTH ATLANTIC STOCK

by

Andrea Dell'Apa

APPROVED BY:

DIRECTOR OF DISSERTATION:____
Roger A. Rulifson, PhD

COMMITTEE MEMBER:____
David G. Kimmel, PhD

COMMITTEE MEMBER:____
Jeffrey C. Johnson, PhD

COMMITTEE MEMBER:____
Lisa Schiavinato, PhD

COMMITTEE MEMBER:____
John Boreman, PhD

CHAIR OF THE DEPARTMENT OF
COASTAL RESOURCES MANAGEMENT:________________________________
Hans Vogelsong, PhD

DEAN OF THE GRADUATE SCHOOL:___________________________________
Paul J. Gemperline, PhD

ACKNOWLEDGEMENTS

I owe thanks to the Commercial Fisheries Research Foundation (CFRF) and the Institute for Coastal Science and Policy (ICSP) at East Carolina University (ECU), who all provided support for this research. Thanks go to all the people who assisted me throughout this process. Special thanks are due to Jennifer Cudney-Burch, Lyndell Bade, Evan Knight, Chuck Bangley, and Gary Weaver for helping in field work data recording, and special thanks go to commercial fishers Mike Pratt, Tom Bell, and Ian Parente for taking us out to sea and for providing inestimable local ecological knowledge of dogfish behavior and distribution in the Cape Cod area. I am very grateful to ECU Captain Eric Diaddorio and commercial fisher Chris Hickman who assisted me while studying the spiny dogfish distribution and behavior in North Carolina waters. I am particularly grateful to my supervisor Dr. Roger Rulifson, and all my committee members, Dr. David Kimmel, Dr. Lisa Schiavinato, Dr. Jeff Johnson, and Dr. John Boreman, who provided helpful editorial comments and guidance throughout the development of this dissertation project. I thank the ICSP's faculty and staff for all their support, Dr. Hans Vogelsong, Dr. John Rummel, Kay Evans, and Cindy Harper. Finally, I am especially thankful to my family for their continuous support in my academic and life accomplishments and to all my friends for all these years of inestimable friendships and encouragement.

TABLE OF CONTENTS

List of tables

List of figures

PREFACE

Statement of the problem

Management of elasmobranch species (sharks, rays, and skates) and their fisheries is particularly complex, due to the migratory behaviour of the majority of the shark species, their lower economic value and appeal to the public compared to other fish species, and their high levels of relatively common unregulated bycatch (Musick et al., 2000; Fordham, 2005; Herndon et al., 2010). Despite these challenges and limitations, considerable effort has been devoted to foster conservation of elasmobranchs and to try enhancing the management of shark resources in the search for sustainability (Stevens et al., 2000; Cortès, 2002; Prince, 2005; Zhou and Griffiths, 2008). In order to be successful, this effort has to integrate the different disciplines that an effective fishery management agenda should attain: the biological, social, economic, and political aspects associated with fishery exploitation.

In 1999 the Food and Agriculture Organization of the United Nations (FAO) prepared an International Plan of Action on the Conservation and Management of Sharks (IPOA-Sharks) within the framework of the FAO Code of Conduct for Responsible Fisheries (IPOA, 1999). Although based on a voluntary participation, the IPOA-Sharks encourages all nations taking sharks directly or indirectly in their jurisdictions to develop and adopt similar management plans on a national basis (NPOA-Sharks). Other international bodies, such as the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), the International Commission for the Conservation of Atlantic Tuna (ICCAT), the Inter-American Tropical Tuna Commission (IATTC), and the Convention on the Conservation of Migratory Species of Wild Animals (CMS) have being actively involved in the effort of addressing the international management, exploitation, and conservation of sharks (Forham and Dolan, 2004; ICCAT, 2005, IATTC, 2005; CMS, 2010), with some authors calling for the establishment of an international commission to manage and conserve shark resources (Herndon, 2010).

The existence of these plans, resolutions, and initiatives indicate the need for a more effective integration of the knowledge on the international management and conservation of shark resources, their trade, and species biological and life history characteristics. This goal necessitates the use of a multidisciplinary approach in the fishery management process.

The primary purpose of this study is to provide recommendations for the national and international management of different spiny dogfish (*Squalus acanthias*) stocks through understanding and integrating the knowledge on the trade and species exploitation, effectiveness of national fishery policy, and species biological and life cycle characteristics. The integration of this knowledge is instrumental for the achievement of a more effective management and conservation of the Northwest Atlantic and other spiny dogfish stocks at the international level.

The spiny dogfish is a small coastal shark widely distributed in all major temperate ocean waters (Compagno et al., 2005). Because of its wide distribution, the spiny dogfish is one of the most commercialized shark species in the world, and this exploitation is mainly driven by the European Union (EU) market demand for meat consumption (Lack, 2006).

Despite its wide distribution and abundance, the spiny dogfish is also one of the most vulnerable of the shark species to excessive or unregulated fisheries exploitation because of its biology and life cycle characteristics. The species, as the majority of shark species, is characterized by slow growth rate, late maturity, relatively long life span, low fecundity, and long gestation period (Nammack, 1985; Compagno et al., 2005). These characteristics make dogfish populations particularly susceptible to overexploitation and also make it difficult for them to recover from depletion, which is a critical challenge for shark-fishery managers (Camhi et al., 1998; Fordham, 2009).

Consequently, international concern over the species conservation status has been increasing, leading to recent attempts to list spiny dogfish under Appendix II of CITES. An Appendix II listing does not restrict the species trade, as long as the fishery at hand is certified to not be detrimental to the species survival. Most CITES members (Parties) agree that spiny dogfish appears to meet the biological criteria to get listed, but the proposal has yet to receive the required level of support.

The EU, whose fishery management is under the governance of the Common Fishery Policy (CFP), has recently initiated conservation measures to protect the species in the Northeast Atlantic, from the Bay of Biscay to the Barents Sea. After several attempts since 2005, the Council of the European Community (EU Council) eventually followed the advice of the European Commission (EU Commission), a direct result of the scientific advice of the International Council for the Exploration of the Sea (ICES), ending fishing for spiny dogfish in the Northeast Atlantic in 2011 (Council Regulation 57/11). This regulation was further amended in 2012 (Council Regulation 43/12). However, this fishery regulation does not provide to manage the conservation status of spiny dogfish populations in the Mediterranean and Black Seas, where EU Commission views the state of fisheries resources particularly critical and the scientific advice on its fisheries as insufficient (Markus, 2009). The situation for elasmobranch species in those regions may likely be even more critical, as they are usually considered bycatch, and insufficient data exist to quantify their exact level of exploitation (Castro et al., 1999; Ferretti et al., 2005).

The U.S. is actually the only country in the world that has developed a Fishery Management Plan specific to a spiny dogfish stock (U.S.-FMP or FMP), which was adopted in 1999 by the National Marine Fisheries Service (NMFS) after the stock was declared overfished (MAFMC, 1999). This FMP is jointly managed by the Mid-Atlantic (MAFMC) and the New England Fishery Management Councils (NEFMC), under the requirements of the Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA, or the Act), for the management of dogfish in federal waters (3-200 miles offshore). The FMP was adopted in 2002 by the Atlantic States Marine Fisheries Commission (ASMFC) to manage spiny dogfish in state waters (0-3 miles offshore).

In 2010, the Northwest Atlantic stock was considered no longer overfished by the NMFS, suggesting the effectiveness of the national fishery management in managing this resource. To avoid possible reoccurrence of overfishing, the Councils recommended setting a quota that would allow for more stability in future landings in this fishery. The higher landings limit will allow a larger harvest while still accounting for concerns about relatively low numbers of mature females expected to enter the spawning population in the next few years (Waters, 2010).

The depletion of European spiny dogfish stocks in the early 1980s enhanced the development of new fisheries in the U.S., Canada, New Zealand, and Argentina. Due to the strong European market demand, new spiny dogfish fisheries are now developing in other coastal areas around the world (Lack, 2006). The lack of specific stock assessment and management regulation for spiny dogfish populations inhabiting these coastal areas call for more attention to the conservation status of these regional spiny dogfish stocks and for a more thorough understanding of the complexity of the species fishery management process at the international level.

Recent closure of the Northeast Atlantic spiny dogfish fisheries means that the majority of future demand for spiny dogfish meat in this coastal area will need to be supplied by imports (Lack, 2006). Considering the possible addition of spiny dogfish to the CITES lists, and the recognized current status of the Northwest Atlantic stock as not overfished, changes in the global trade dynamic and export trade toward European countries can be easily predicted. In this scenario, the Northwest Atlantic fishery could take advantage of the CITES

Appendix II insertion, as its fishery would be the only one in the world that is able to prove its sustainability. In addition, the likely development of new, unexploited fishing grounds worldwide to satisfy the EU market demand, coupled with possible development of a black-market, raise concern for the inception of unmanaged fisheries, even in countries that are signatory members of CITES. Therefore, a careful analysis of possible changes in the EU import of spiny dogfish, as a consequence of the species insertion in the CITES list, is needed for designing broader successful management strategies at the global level.

In 2005, 95% of U.S. exports of spiny dogfish were destined to the EU market, which favors large individuals (Lack, 2006). As a result, the U.S. commercial fisheries have targeted predominately adult females. Between 1998 and 2002, 93% of the U.S. spiny dogfish landings were female (NEFSC, 2003), and female dogfish constituted about 76% of the estimated dead discards between 1989-2000 (Rago and Sosebee, 2010). Given the species long gestation period (~ 2 years), late age of sexual maturation, and slow growth rate, this practice impacts the species stock, favoring an unsustainable fishery if not otherwise regulated.

In the current U.S. fishery management system, the sustainability of the spiny dogfish fishery is measured in terms of fishing mortality (F) and the spawning stock biomass (SSB), for which adult female biomass (i.e., ≥ 80 cm TL) is used as a biological reference point (ASMFC, 2002).

Although the U.S. North Atlantic stock was considered no longer overfished in 2010, concerns still remain for the expected low numbers of adult females recruiting in the next few years (Waters, 2010). In light of this concern for large spawners, a male-only directed fishery is a possible management option to preserve female stocks. Although juvenile survival is important for natural populations to persist, shark population demography suggests that protecting the adult reproductive component is more effective for enhancing and maintaining a positive intrinsic rate of population increase (Kinney and Simpfendorfer, 2008). Therefore, female stock preservation will also possibly promote the sustainability of the fishery by enhancing future juvenile recruitment to reach a level resistant to fishing pressure.

Description of dissertation chapters

This dissertation is divided into 7 chapters. Chapter 1 introduces the spiny dogfish biology and life history characteristics, which constitute the fundamental knowledge for fishery managers in order to achieve a sustainable exploitation of the resource in the long-term. This chapter provides information on the species distribution, reproduction, behavior, food habits, and major threats by fisheries. Chapter 2 describes the CITES role as a conservation instrument for wildlife species and its framework in the regulation of trade of commercial shark species, followed by the history of the discussion to include spiny dogfish in the CITES lists and the U.S. political maneuvers within this discussion. Chapter 3 consists of the description and critical overview of the fishery management system in the EU (the Common Fisheries Policy, CFP), and the regulations pertaining to the conservation of European spiny dogfish stocks. Chapter 4 provides a description and critical overview of the fishery management system adopted by the U.S. (the Magnuson-Stevens Fishery Conservation and Management Act, MSFCMA or the Act), and the specific regulations adopted to manage the Northwest Atlantic spiny dogfish stock. Chapter 4 was published in a slightly different version in the peer-reviewed scientific journal *Marine Policy* as: “Dell’Apa, A., Schiavinato, L., and Rulifson, R.A. 2012. The Magnuson–Stevens act (1976) and its reauthorizations: failure or success for the implementation of fishery sustainability and management in the US? *Marine Policy* 36: 673-680”. Chapter 5 presents the analysis of the international trade of spiny dogfish by virtue of a social network analysis approach of available data. This chapter was published in the peer-reviewed scientific journal *Ocean & Coastal Management* as: “Dell’Apa, A., Johnson, J.C., Kimmel, D.G., and Rulifson, R.A.

2013. The international trade and fishery management of spiny dogfish: a social network approach. *Ocean & Coastal Management* 80: 65-72”. Chapter 6 presents the results of fishery-dependent surveys in Cape Cod, Massachusetts, based on local fishermen ecological knowledge (LEK) on the species, and which suggest alternative management strategies for the local fishery that could potentially foster sustainability. Finally, Chapter 7 summarizes the information provided in previous chapters in a comprehensive discussion of the findings, and provides recommendations to enhance the sustainability of the Northwest Atlantic spiny dogfish fishery and the conservation status of other international dogfish populations.

LITERATURE CITED

ASMFC. 2002. Interstate Fishery Management Plan for Spiny dogfish. Fishery Management Report #40, Atlantic States Marine Fisheries Commission, Washington, D.C. Available at www.asmfc.org (February 2013).

Camhi, M., Fowler, S.L., Musick, J.A., Bräutigam, A., and Fordham, S.V. 1998. Sharks and their relatives-ecology and conservation. IUCN/SSC Shark Specialist Group. IUCN, Gland, Switzerland and Cambridge, UK. iv+39 pp.

Castro, J.I., Woodly, C.M., and Bredek, R.L. 1999. A preliminary evaluation of the status of shark species. *FAO Fishery Technical Papers* 380, FAO, Rome.

CMS. 2010. Convention on the Conservation of Migratory Species of Wild Animals. Third meeting on international cooperation on migratory sharks under the convention on migratory species. Revised draft of proposed non-legally binding instrument on migratory sharks. Manila, Philippines, 10-12 February. UNEP/CSM/MS3/Doc.4.

Compagno, L., Dando, M., and Fowler, S. 2005. Sharks of the World. Princeton University Press, Princeton, NJ.

Cortès, E. 2002. Incorporating uncertainty into demographic modeling: application to shark populations and their conservation. *Conservation Biology* 16: 1-15.

Council Regulation (EC) N° 57/2011 of 18 January 2011 on fixing for 2011 the fishing opportunities for certain fish stocks and groups of fish stocks, applicable in EU waters and, for EU vessels, in certain non-EU waters. *Official Journal of the European Communities* L24/1.

Council Regulation (EC) N° 43/2012 of 17 January 2012 on fixing for 2012 the fishing opportunities available to EU vessels for certain fish stocks and groups of fish stocks which are not subject to international negotiations or agreements. *Official Journal of the European Communities* L25/1.

Dell'Apa, A., Schiavinato, L., and Rulifson, R.A. 2012. The Magnuson-Stevens act (1976) and its reauthorizations: failure or success for the implementation of fishery sustainability and management in the US? *Marine Policy* 36: 673-680.

Dell'Apa, A., J.C. Johnson, D.G. Kimmel, and Rulifson, R.A. 2013. The international trade and fishery management of spiny dogfish: a social network approach. *Ocean & Coastal Management* 80: 65-72.

Ferretti, F., Myers, R.A., Sartor, P., and Serena, F. 2005. Long term dynamics of the Chondrichthyan fish community in the upper Tyrrhenian Sea. *ICES CM Documents* 2005/N:25.

Fordham, S., and Dolan, C. 2004. A case study in international shark conservation: the Convention on International Trade in Endangered Species and the spiny dogfish. *Golden Gate University Law Review* 34: 531-572.

Fordham, S. 2005. Spiny dogfish. In Fowler, S.L., Cavanagh, R.D., Camhi, M., Burgess, G.H., Cailliet, G.M., Fordham, S.V., Simpfendorfer, C.A., and Musick, J.A. (Eds.), Sharks, rays and chimaeras: the status of the chondrichthyan fishes. International Union for the Conservation of Nature (IUCN) status survey. IUCN, Gland, Switzerland.

Fordham, S. 2009. Conservation of Atlantic spiny dogfish under U.S. Law and CITES. In Gallucci V.F., McFarlane, G.A., and Bargmann, G.G. (Eds.), Biology and management of dogfish sharks, pp. 411-423. American Fisheries Society, Bethesda, Maryland.

Herndon, A., Gallucci, V.F., DeMaster, D., and Burke, W. 2010. The case for an international commission for the conservation and management of sharks (ICCMS). *Marine Policy* 34: 1239-1248.

IATTC. 2005. Resolution on the conservation of sharks caught in association with fisheries in the eastern Pacific Ocean. Resolution C-05-03. 73rd Meeting of Inter-American Tropical Tuna Commission. Lanzarote, Spain, 20-24 June.

ICCAT. 2005. Recommendations by ICCAT to amend recommendation [Rec. 04-10] concerning the conservation of sharks caught in association with fisheries managed by ICCAT. Recommendation 05-05. 19th Regular Meeting of the International Commission for the Conservation of Atlantic Tunas. Seville, Spain, 14-20 November.

IPOA. 1999. International Plan of Action for the conservation and management of sharks. Food and Agriculture Organization of the United Nations, Rome. Available at http://www.fao.org/docrep/006/x3170e03.htm (January 2013).

Kinney, M.J., and Simpfendorfer, C.A. 2008. Reassessing the value of nursery areas to shark conservation and management. *Conservation Letters* 2: 1-8.

Lack, M. 2006. Conservation of spiny dogfish *Squalus acanthias*: A role for CITES? TRAFFIC International. Available at http://www.traffic.org/species-reports/traffic_species_fish5.pdf (July 2013).

MAFMC. 1999. Mid-Atlantic Fishery Management Council. Spiny Dogfish Fishery Management Plan. MAFMC, Dover, Delaware.

Markus, T. 2009. European fisheries law: from promotion to management, Europa Law Publishing, 390 p.

Musick, J.A., Burgess, G., Cailliet, G., Camhi, M., and Fordham, S. 2000. Management of sharks and their relatives (Elasmobranchii). *Fisheries* 25: 9-13.

Nammack, M.F., Musick, J.A., and Colvocoresses, J.A. 1985. Life history of spiny dogfish off the Northeastern United States. *Transactions of the American Fisheries Society* 114: 367-376.

NEFSC. 2003. Northeast Fisheries Science Center. Report of the 37th Northeast Regional Stock Assessment Workshop (37th SAW): spiny dogfish advisory report. US Department of Commerce, National Oceanic and Atmospheric Administration, Northeast Fisheries Science Center, Reference Document 03-17, Woods Hole, Massachusetts.

Prince, J.D. 2005. Gauntlet fisheries for elasmobranchs-the secret of sustainable shark fisheries. *Journal of Northwest Altlantic Fishery Science* 35: 407-416.

Rago, P.J., and Sosebee, K.A. 2010. Biological reference points for spiny dogfish. Northeast Fisheries Science Center Reference Document 10-06; 52 p.

Stevens, J.D., Bonfil, R., Dulvy, N.K., and Walker, P.A. 2000. The effects of fishing on sharks, rays, and chimaeras (chondrichthyans), and the implications for marine ecosystems. *ICES Journal of Marine Science* 57: 476-494.

Waters, J.D. 2010. The biology and socio-political culture of the spiny dogfish fishery in North Carolina. M.Sc. thesis Duke University, NC, 137 pp.

Zhou, S., and Griffiths, S.P. 2008. Sustainability assessment for fishing effects (SAFE): a new quantitative ecological risk assessment method and its application to elasmobranch bycatch in an Australian trawl fishery. *Fisheries Research* 91: 56-68.

Chapter 1

SPINY DOGFISH BIOLOGY AND SPECIES DESCRIPTION

Geographical distribution and life history

The spiny dogfish (*Squalus acanthias*) is a small coastal shark species with a cosmopolitan distribution in all major temperate ocean waters up to 900 m depth (Compagno, 1984, Compagno et al., 2005). It can be found in water temperatures from 1 to 20 °C, but the preferred range is between 6-15 °C (Jensen, 1966; Sheperd et al., 2002; Stehlik, 2007). The species has been reported in the east and west North Atlantic, the Mediterranean and Black Seas, the east and west North Pacific, the Pacific and the Atlantic coasts of South America, the Cape coast of South Africa, and the southern coasts of Australia and New Zealand (Fowler et al., 2004; IUCN, 2006). Recent research on the genetic structure of actual populations indicates that spiny dogfish originated in the Pacific, then colonized the North Atlantic region by an expansion that occurred along the South American coasts (Verissimo et al., 2010). Results also strongly suggest a taxonomic distinction between two genetically distinctive groups: one in the North Pacific, and one including populations from the South Pacific and the Atlantic regions (Verissimo et al., 2010).

These results are in accordance with reported differences in life histories between the North Pacific and Atlantic spiny dogfish populations. In the North Pacific, the species reaches sexual maturity between 29-35 years and 92-100 cm in total length for females, and between 16-19 years and 70-80 cm in total length for males, with maximum reported sizes and ages of 130 cm and 81 years (Ketchen, 1972; 1975; Jones and Geen, 1977a; Saunders and McFarlane, 1993). In the North Atlantic region the species is characterized by earlier age and smaller sizes at sexual maturity, between 10-16 years and 72-82 cm in total length for females, and between 6-10 years and 60-64 cm in total length for males, with maximum reported sizes and ages of 117 cm and 40 years (Holden, 1965; Nammack et al., 1985; Campana et al., 2007; Ellis and Keable, 2008). These marked differences in life histories led to recent resurrection of the Northeast Pacific spiny dogfish (*Squalus suckleyi*) as a species different from *S. acanthias* (Ebert et al., 2010).

The spiny dogfish is a highly mobile species, with some regional populations characterized by extensive seasonal migrations either north-south or inshore-offshore. In the Northwest Atlantic the species is distributed between Greenland and Florida (Collette and Klein-MacPhee, 2002), but it is most commonly found between Newfoundland and North Carolina (McMillan and Morse, 1999). In these regions, spiny dogfish populations are known to undergo both north-south and inshore-offshore seasonal migrations, mainly triggered by changes in water temperature (Burgess, 2002; Sheperd et al., 2002; Campana et al., 2007). Recent results from tag-recapture studies suggest the presence of multiple stocks along the Northwest Atlantic coast, with a distinction between the U.S. and Canadian stocks and limited intermixing along the New England coast (Campana, 2010; Rulifson, 2010). The north-south seasonal migration is a characteristic of the U.S. Atlantic stock, which overwinters in North Carolina waters and then migrates northward during the spring to remain in New England and Gulf of Maine waters during summer and until fall, when the stock migrates again southward (Rulifson, 2010). The Canadian stock is more heterogeneous, with the likely presence of four different components between Newfoundland and the Gulf of St. Lawrence undergoing seasonal inshore-offshore migrations, and the Newfoundland component undergoing north-south migration down to New England waters (Campana, 2010).

The Northeast Pacific populations consist of a major residential stock in the Strait of Georgia that shows some intermixing with other, less abundant coastal stocks in Puget Sound and British Columbia waters (McFarlane and King, 2003; 2009). These coastal stocks are considered migratory and can travel considerable distances along the coast both north and south of the San Juan Archipelago to Japan and Mexico (McFarlane and King, 2003; 2009; Taylor et al., 2009). Although infrequent, westward-eastward transoceanic movements have been reported both between the Northwest and Northeast Atlantic regions (Holden, 1965; Templeman, 1976; Rulifson, unpublished data) and between the Northwest and Northeast Pacific regions (McFarlane and King, 2003). These results suggest the possibility of a certain level of intermixing between trans-Atlantic and trans-Pacific populations, respectively, although the actual intermixing rates are unknown.

Reproduction

The spiny dogfish is an aplacental ovoviviparous species, the young feeding at the initial yolk sac in the mother’s womb until parturition occurs (Jensen, 1966; Nammack et al., 1985; Hanchet., 1988; Jones and Ugland, 2001; Campana et al., 2009; Tribuzio et al., 2009). The number of pups at birth differs by geographic region, mainly due to aforementioned differences in the life histories between regional populations. Litter sizes vary between 3 and 25 in the Northwestern Pacific (Kaganovskaia, 1933); from 2 to 17 in the northeastern Pacific (Bonham et al., 1949); between 2 and 15 in the northeastern Atlantic (Ford, 1921); up to 32 in the Aegean and Black Seas (Kirnosova, 1989); and up to 11 in the northwestern Atlantic (Jensen, 1966). The fertilization is internal and the gestation period lasts between 18-24 months, which is the longest among all the vertebrate species (Ketchen, 1972; Nammack et al., 1985; Jones and Ugland, 2001).

The reproductive cycle in this species begins with mature females bearing large yellow eggs (20-45 mm in diameter), that pass through the shell gland where they are fertilized. Following fertilization the eggs become enclosed in a capsule (candle stage) and pass through the uterus, where the embryos develop by feeding off the yolk sac (Jones and Ugland, 2001; Campana et al., 2009). According to Jones and Geen (1977a), pups are provided with an additional internal yolk sac that can provide them nourishment for up to 2 months after birth. In spiny dogfish, mating commonly occurs immediately after parturition. Jensen (1966) reported that mating can also occur while developing young from the previous year's mating are being carried inside the mother's uterus. Multiple paternity has been reported in spiny dogfish populations sampled along the Northwest Atlantic coast, although at a small frequency of occurrence (30% in Lage et al., 2008; 17% in Verissimo et al., 2011).

The time of parturition varies according to geographic regions: between October and December in British Columbia (Ketchen, 1972); between November to January in the Northwest Atlantic (Nammack et al., 1985); between September to December in waters near Sweden and Norway (Jones and Ugland, 2001; Stenberg, 2002); between August and September in the southeastern Black Sea (Demirhan and Seyhan, 2006); and between April to September in the Southwest Pacific (Hanchet, 1988). However, the timing of pupping may not be consistent, given that in the majority of studies females carrying full term pups have been used as a proxy for assessing time and area of parturition (Sulikowski et al., 2013). Other studies indicate discordance between recent and previous reported timing of pupping in Puget Sound, suggesting the existence of local and regional variation in pupping season (Tribuzio et al., 2005; Tribuzio et al., 2009).

Behavior

Spiny dogfish aggregate in large schools, with juveniles segregating by size, and adults segregating by size and sex. Juveniles, medium-sized fish (including immature females and mature males), and large mature females occur in distinctive groups that travel separately from each other (Ford, 1921, Nammack et al., 1985; Sheperd et al., 2002; Stenberg, 2005; Stehlik, 2007). In the Northwest Atlantic, adult females are most commonly found inshore in shallower less saline waters, while adult males dominate offshore areas in deeper and more saline waters (Sheperd et al., 2002).

This group aggregation is the result of sexual segregation, which is a commonly reported behavior in sharks (Springer, 1967; Pratt and Carrier, 2001). Although the spiny dogfish was the first shark species for which sexual segregation was observed (Ford, 1921), there is a paucity of studies addressing the causes of this behavior in the species. More studies are available that investigated the occurrence of this phenomenon in other shark species, such as the scalloped hammerhead shark (*Sphyrna lewini*) (Klimley, 1987), the grey reef shark (*Carcharhinus amblyrhynchos*) (Economakis and Lobel, 1998), the nurse shark (*Ginglymostoma cirratum*) (Pratt and Carrier, 2001), the lesser spotted dogfish (*Scyliorhinus canicula*) (Sims et al., 2001), and the leopard shark (*Triakis semifasciata*) (Hight and Lowe, 2007). Results from these studies help to shed light on the possible causes of sexual segregation in sharks. Male shark courtship and mating is particularly aggressive, with several males surrounding a female and biting her pectoral fins prior to initiating copulation, leaving clearly visible wounds on her pectoral fins and body (Tricas and Le Feuvre, 1985; Pratt and Carrier, 2001). Therefore, as a strategy to avoid males and mating, adult females may possibly prefer to hide in inshore shallower waters where adult males are less abundant (Pratt and Carrier, 2001; Sims et al., 2001). Resulting from theoretical frameworks, sexual segregations in sharks may also be the cause of differential needs in energy requirements by the two sexes, a phenomenon also reported in some species of ungulates (Main et al., 1996). According to this theory, in animals characterized by sexual dimorphism (as the majority of shark species are), the differences in body size between the sexes lead to different physiological requirements evolving in differences in their specific diet and prey preferences (Klimley, 1987; Ruckstuhl and Neuhaus, 2000; Ruckstuhl and Clutton-Brock, 2005). Because of these dietary divergences, the two sexes in shark species may occupy distinct areas characterized by different prey compositions so to reduce intraspecific competition (Sims, 2005). Finally, sexual segregation in sharks may be caused by adult females actively seeking warmer waters, usually located inshore, as a strategy to optimize physiological processes related to growth (i.e., sexual maturity) and reproduction (i.e., egg production and gestation) (Sims, 2005). For example, a 1 °C increase in water temperature was determined to reduce gestation time in pregnant females of Atlantic stingrays (*Dasyatis sabina*) by as much as 10 days (Wallman and Bennett, 2006). A similar strategy for optimizing female growth rate and embryos development was suggested for the grey reef shark (Economakis and Lobel, 1998) and for the leopard shark (Hight and Lowe, 2007).

Results from these studies indicate the need for more detailed information on the causes of sexual segregation in spiny dogfish, which can possibly foster the management of this important commercial species through the adoption of differential exploitation strategies by sex.

Food habits

The spiny dogfish is considered an opportunistic feeder, and its diet is mainly based on fish, crustaceans, squid, and ctenophores (Jones and Geen, 1977b; Alonso et al., 2002; Stehilik, 2007). As for the majority of elasmobranch species, the diet in spiny dogfish varies by age, size, geographic area, and season, although still holding a certain level of preference for pelagic species (Alonso et al., 2002; Link et al., 2002; Stehilik, 2007; Bangley, 2011). Ontogenetic change in food habits is common in sharks, and it is related to increase in size, associated changes in jaw and tooth sizes, habitat occupied, movement patterns, energy requirements, and experience in avoiding predators and capture prey items (Wetherbee and Cortés, 2004). Also, the presence of sexual segregation in elasmobranch species can cause the sexes to feed on significantly different marine species (Wetherbee and Cortés, 2004).

In British Columbia waters, small and medium-sized (< 79 cm) dogfish prey mainly upon euphausiids, other crustaceans, squid, and fish, while larger adults consume primarily fish, such as herring (*Clupea* spp.) and hake (*Merluccius* spp.), with smaller abundance of the other taxa (Jones and Geen, 1977b; Tanasichuk et al., 1991). Ellis et al. (1996), investigating the feeding habits of spiny dogfish in the Ireland Sea, reported a predominance of crustaceans in the stomach contents of smaller dogfish (< 60 cm) and fish for larger specimens (> 60 cm), mainly Atlantic herrings (*Clupea harengus*), whiting (*Merlangius merlangus*), Norway pout (*Trisopterus esmarkii*), poor cod (*Trisopterus minutus*), Atlantic mackerel (*Scomber scombrus*), and species of the family Gadidae. In Argentina, immature dogfish prey upon pelagic species, mostly ctenophores, while adult consume primarily squid and teleost fishes, such as Argentine hake (*Merluccius hubbsi*) and longtail southern cod (*Patagonotothen ramsayi*) (Garcìa de la Rosa and Sànchez, 1997; Alonso et al., 2002). In New Zealand, diet analysis indicated a preference for crustaceans (60%) with fish constituting a smaller portion (13%) of the diet in all size classes. Among crustaceans, Squat Lobster (*Munida greguria*) postlarvae (30%), and the euphausiid *Nyctiphanes australis* (20%) were the prevalent species preyed upon (Hanchet, 1991). In the Black Sea, individuals of all age classes consume a wide range of taxa and species, such as whiting, red mullet (*Mullus barbatus*), black goby (*Gobius niger*), sprat (*Sprattus sprattus*), brown shrimp (*Crangon crangon*), and other crustaceans (Avsar, 2001).

In the Northwest Atlantic there are more studies that investigated the diet of spiny dogfish, particularly in the Gulf of Maine and Georges Bank (Bowman et al., 1984; Spencer and Collie, 1996; Bowman et al., 2000; Overholtz et al., 2000; Link and Garrison, 2002). A temporal comparison of results from these studies indicates that spiny dogfish have become more pelagic than in the past, and that the fish composition portion of their diet has changed over the last fifty years. During the 1960s, haddock (*Melanogrammus aeglefinus*) and Atlantic herring were the major prey, then shifting to Atlantic mackerel in the early 1970s, and again in the 1990s, and Northern sand lance (*Ammdodytes dubius*) in the late 1970s to 1980s. Herring abundance increased again in the late 1980s through the 1990s (Stehlik, 2007). Furthermore, occurrence of ctenophores in dogfish diets has increased over the last decade, most likely a reflection of their increased abundance in the Georges Bank coastal area (Link and Ford, 2006).

These temporal changes in prey species composition are associated with changes in environmental factors, mainly temperature, and fishing pressure that ended up in altering the species composition in Georges Bank (Stehlik, 2007). However, this correlation does not necessarily reflect a direct relationship between the most abundant prey in the habitat and the most frequently consumed fish in the dogfish diet. For example, the abundance of Atlantic herring peaked in the 1990s, but this did not correspond to increased abundance of this prey item in dogfish stomach contents (Overholtz et al., 2000). This is due to dogfish likely eating smaller individuals that may not have being sampled adequately by trawling (Link and Garrison, 2002).

Threats from and susceptibility to fisheries

Although commonly considered a demersal species, recent studies indicate that the spiny dogfish moves vertically throughout the water column daily and it can also be found at the surface (Sulikowski, et al., 2010; Rulifson et al., 2012). It is distributed between the coastline and the continental shelf (Compagno, 1984), and therefore is mainly exploited by fisheries operating inside the 200-nautical mile Exclusive Economic Zones (EEZ) of coastal nations. The differential use of the habitat by sexes is a characteristic that can negatively affect the conservation of spiny dogfish populations, due to larger females inhabiting inshore coastal waters where fishing pressure is commonly higher than offshore deeper waters. Therefore, the presence of sexual segregation in the species may contribute to differential exploitation between sexes that can lead to skewed sex ratio, as it was recently reported for the U.S. Northwest Atlantic population (SAW, 2006). Because of excessive targeting of adult females and bycatch discard of other coastal fisheries, the male:female ratio increased to 7:1 along the Northwest Atlantic in recent years (SAW, 2006), although it is now reported to be between 3 and 4 (Rago and Sosebee, 2013).

Furthermore, the species annual population growth-rate is very low: 2.3-3.5% in the Northwest Atlantic, 4-7% in the Northeast Atlantic, and 1.7% in the North Pacific

(Compagno, 1984; Heesen, 2003). These low growth rates, coupled with long gestation period and low fecundity, make the spiny dogfish one of the shark species that can be most negatively affected by intense fishing pressures or by excessive levels of bycatch.

In the *red list of threatened species* of the International Union for Conservation of Nature and Natural Resources (IUCN), spiny dogfish is classified as *Vulnerable* (VU) globally and in the Northwest Atlantic, and *Endangered* (EN) in the Mediterranean (IUCN, 2006; Cavanagh and Gibson, 2007; IUCN, 2012).

Despite concerns for the spiny dogfish susceptibility to fisheries, recent research indicates a higher survival rate in specimens encountering fishing gears (Rulifson, 2007), with a 100% survival rate among spiny dogfish caught in trawls pulled for 90 minutes, and an initial mortality of 17.5% for dogfish caught in gillnets of different mesh sizes set for up to 24-h periods. In the latter case, after the 48-h holding period, the mortality rate of sharks increased to 33% for an overall mortality of 55% in gillnets. Many of the dogfish caught in the study showed scars and abrasions that were reported as evidence of frequent encounters with fishing gear, suggesting that the species interacts frequently with fishing gears (Rulifson, 2007). In addition, a recent study focusing on the dogfish physiological status and mortality associated with trawl fisheries indicates that the species holds a fairly high level of resilience and it can survive at high rates of fishing pressure (Mandelman and Farrington, 2007). These findings suggest that, contrary to what could be expected, the spiny dogfish can potentially withstand significant levels of fishing pressure associated with bycacth.

LITERATURE CITED

Alonso, M.K., Crespo, E.A., Garcia, N.A., Pedraza, S.N., Mariotti, P.A., and Mora, N.J. 2002. Fishery and ontogenetic driven changes in the diet of the spiny dogfish, *Squalus acanthias,* in Patagonian waters, Argentina. *Environmental Biology of Fishes* 63: 193-202.

Avsar, D. 2001. Age, growth, reproduction and feeding of the spurdog (*Squalus acanthias* Linnaeus, 1758) in the South-Eastern Black Sea. *Estuarine, Coastal and Shelf Science* 52: 269-278.

Bangley, C.W. 2011. Food and feeding habits of spiny dogfish *Squalus acanthias* overwintering off the coast of North Carolina and the effects on the marine community. M.Sc. thesis, East Carolina University, Greenville, North Carolina.

Bonham, K., Sandford, F.B., Clegg, W., and Bucher, G.C. 1949. Biological and vitamin A studies of dogfish landed in the State of Washington (*Squalus suckleyi*). Washington Department of Fisheries Research Bulletin 49A: 83-113.

Bowman, R., Eppi, R., and Grosslein, M. 1984. Diet and consumption of spiny dogfish in the Northwest Atlantic. ICES C.M. 1984/G: 27. 16 p.

Bowman, R.E., Stillwell, C.E., Michaels, W.L., and Grosslein, M.D. 2000. Food of Northwest Atlantic fishes and two common species of squid. NOAA Technical Memorandum NMFS-NE-155, Woods Hole, Massachusetts.

Burgess, G.H., 2002. Spiny dogfish *Squalus acanthias* Linnaeus 1758. In Collette, B.B., Klein-MacPhee, G. (Eds.), Bigelow and Schroeder's fishes of the Gulf of Maine, third ed. Smithsonian Institution Press, Washington, pp. 54-57.

Campana, S.E., Gibson, J.F., Marks, L., Joyce, W., Rulifson, R., and Dadswell, M. 2007. Stock structure, life history, fishery and abundance indices for spiny dogfish (*Squalus acanthias*) in Atlantic Canada. Canadian Science Advisory Secretariat, Research Document 2007–2089.

Campana, S.E., Joyce, W., and Kulka, D.W. 2009. Growth and reproduction of spiny dogfish off the eastern coast of Canada, including inferences on stock structure. In Gallucci, V.F., McFarlane, G.A., and Bargmann, G.G. (Eds.), Biology and management of dogfish sharks, pp. 195-207. American Fisheries Society, Bethesda, Maryland.

Campana, S. 2010. Tagging studies. Proceedings of the Transboundary Resources Assessment Committee (TRAC): Spiny Dogfish Review. Woods Hole, Massachusetts, pp. 17-19.

Cavanagh, R.D., and Gibson, C. 2007. Overview of the conservation status of cartilaginous fishes (Chondrichthyans) in the Mediterranean Sea. IUCN, Gland, Switzerland and Malaga, Spain. vi + 42 pp.

Collette, B.B., and Klein-MacPhee, G. 2002. Bigelow and Schroeder's Fishes of the Gulf of Maine, 3rd edition. Smithsonian Institution Press, Washington.

Compagno, L.J.V. 1984. FAO species catalogue. Sharks of the world. An annotated and illustrated catalogue of shark species known to date. Part 1 - Hexanchiformes to Lamniformes. FAO Fisheries Synopsis Vol. 4, Pt. 1., pp. 1-249. Food and Agriculture Organization of the United Nations, Rome. Food and Agriculture Program of the United Nations, Rome.

Compagno, L., Dando, M., and Fowler, S. 2005. Sharks of the World. Princeton University Press, Princeton, NJ.

Demirhan, S.A., and Seyhan, K. 2006. Seasonality of reproduction and embryonic growth of spiny dogfish (*Squalus acanthias* L., 1758) in the eastern Black Sea. *Turkish Journal of Zoology* 30: 433-443.

Ebert, D.A., White, W.T., Goldman, K.J., Compagno, L.J.V., Daly-Engel, T.S. and Ward, R.D. 2010. Resurrection and redescription of *Squalus suckleyi* (Girard, 1854) from the North Pacific, with comments on the *Squalus acanthias* subgroup (Squaliformes: Squalidae). *Zootaxa* 2612: 22-40.

Economakis, A.E., and Lobel, P.S. 1998. Aggregation behavior of the grey reef shark, *Carcharhinus amblyrhynchos*, at Johnston Atoll, Central Pacific Ocean. *Environmental Biology of Fishes* 51: 129-139.

Ellis, J.R., Pawson, M.G., and Shackley, S.E. 1996. The comparative feeding ecology of six species of shark and four species of ray (Elasmobranchii) in the north-east Atlantic. *Journal of the Marine Biological Association of the United Kingdom* 76: 89-106.

Ford, D. 1921. A contribution to our knowledge of the life-histories of the dogfishes landed at Plymouth. *Journal of the Marine Biological Association of the United Kingdom* 12: 468-505.

Fowler, S., Raymakers, C., and Grimm, U. 2004. Trade in and conservation of two shark species, porbeagle (*Lamna nasus*) and spiny dogfish (*Squalus acanthias*). CoP13 Inf.16. BFN Skripten 118, Bonn; 58 p.

Garcìa de La Rosa, S.B., and Sànchez, F. 1997. Alimentación de *Squalus acanthias* y predación sobre merluza *Merluccius hubbsi* en el Mar Argentino entre 34°47'–47°S. *Revista de Investigación y Desarrollo Pesquero* 11: 119-133.

Hanchet, S. 1988. Reproductive biology of *Squalus acanthias* from the east coast, South Island, New Zealand. *New Zealand Journal of Marine and Freshwater Research* 22: 537-549.

Hanchet, S. 1991. Diet of the spiny dogfish, *Squalus acanthias* Linnaeus, on the east coast, South Island, New Zealand. *Journal of Fish Biology* 39: 313-323.

Heessen, H.J.L. 2003. Development of elasmobranch assessments DELASS. European Commission DG Fish Study Contract 99/055, Final Report, January 2003.

Hight, B.V., and Lowe, C.G. 2007. Elevated body temperatures of adult female leopard sharks, *Triakis semifasciata*, while aggregating in shallow nearshore embayments: evidence for behavioral thermoregulation? *Journal of Experimental Marine Biology and Ecology* 352: 114-128.

Holden, M.J. 1965. The stocks of spurdogs (*Squalus acanthias* L.) in British waters, and their migrations. *Fishery Investigations* 24: 1-19.

IUCN. 2006. The International Union for Conservation of Nature. *Squalus acanthias*. The IUCN Red List of Threatened Species. Available at http://www.iucnredlist.org/apps/redlist/details/39326/0 (February 2013).

IUCN. 2012. The International Union for Conservation of Nature. The Conservation Status of North American, Central American, and Caribbean Chondrichthyans. Kyne, P.M., Carlson, J.K., Ebert, D.A., Fordham, S.V., Bizzarro, J.J., Graham, R.T., Kulka, D.W., Tewes, E.E., Harrison, L.R., and Dulvy, N.K. (Eds). IUCN Species Survival Commission Shark Specialist Group, Vancouver, Canada, pp 148.

Jensen, A.C. 1966. Life history of the spiny dogfish. Fishes of the Gulf of Maine. *Fishery Bulletin* 65: 527-553.

Jones, B.C., and Geen, G.H. 1977a. Reproduction and embryonic development of spiny dogfish (*Squalus acanthias*) in the Strait of Georgia, British Columbia. *Journal of the Fisheries Resource Board of Canada* 34: 1286-1292.

Jones, B.C., and Geen, G.H. 1977b. Food and feeding of spiny dogfish (*Squalus acanthias*) in British Columbia waters. *Journal of the Fisheries Resource Board of Canada* 34: 2067-2078.

Jones, T.S., and Ugland, K.I. 2001. Reproduction of female spiny dogfish, *Squalus acanthias*, in the Oslofjord. *Fishery Bulletin* 99: 685-690.

Kaganovskaia, S. 1933. A method of determining the age and catch composition of the spiny dogfish (*Squalus acanthias* L.). USSR Academy Scientific, Far Eastern Branch, Bulletin 1-3:130-141. (Translated from Russian: *Fisheries Research Board of Canada Translation Series* 281, Ottawa, Canada.).

Ketchen, K.S. 1972. Size at maturity, fecundity, and embryonic growth of the spiny dogfish (*Squalus acanthias*) in British Columbia waters. *Journal of the Fisheries Research Board of Canada* 29: 1717-1723.

Ketchen, K.S. 1975. Age and growth of dogfish *Squalus acanthias* in British Columbia waters. *Journal of the Fisheries Research Board of Canada* 32: 43-59.

Kirnosova, I.P. 1989. Reproduction of spiny dogfish, *Squalus acanthias* in the Black Sea. *Journal of Ichthyology* 29: 21-26.

Klimley, P. 1987. The determinants of sexual segregation in the scalloped hammerhead shark, *Sphyrna lewini*. *Environmental Biology of Fishes* 18: 27-40.

Lage, C.R., Petersen, C.W., Forest, D., Barnes, D., Kornfield, I., and Wray, C. 2008. Evidence of multiple paternity in spiny dogfish (*Squalus acanthias*) broods based on microsatellite analysis. *Journal of Fish Biology* 73: 2068-2074.

Link, J.S., and Garrison, L.P. 2002. Changes in piscivory associated with fishing induced changes to the finfish community on Georges Bank. *Fisheries Research* 55: 71-86.

Link, J.S., Garrison, L.P., and Almeida, F.P. 2002. Ecological interactions between elasmobranchs and groundfish species on the northeastern US continental shelf. I. Evaluating predation. *North American Journal of Fisheries Management* 22: 550-562.

Link, J.S., and Ford, M.D. 2006. Widespread and persistent increase in Ctenophora in the continental shelf ecosystem off NE USA. *Marine Ecology Progress Series* 320: 153-159.

Main, M.B., Weckerley, F.W., and Bleich, V.C. 1996. Sexual segregation in ungulates: new directions for research. *Journal of Mammalogy* 77: 449-461.

Mandelman, J.M., and Farrington, M.A. 2007. The physiological status and mortality associated with otter-trawl capture, transport, and captivity of an exploited elasmobranch, *Squalus acanthias*. *ICES Journal of Marine Science* 64: 122-130.

McFarlane, G.A., and King, J.R. 2003. Migration patterns of spiny dogfish (*Squalus acanthias*) in the North Pacific Ocean. *Fishery Bulletin* 101: 358-367.

McFarlane, D.G., and King, J.R. 2009. Movement patterns of spiny dogfish within the Strait of Georgia. In Gallucci V.F., McFarlane, G.A., and Bargmann, G.G. (Eds.), Biology and management of dogfish sharks, pp. 77-87. American Fisheries Society, Bethesda, Maryland.

McMillan, D.G, and Morse, W.W. 1999. Essential fish habitat source document: spiny dogfish, *Squalus acanthias*, life history and habitat characteristics. NOAA Technical Memorandum NMFS-NE-150, Woods Hole, Massachusetts.

Nammack, M.F., Musick, J.A., and Colvocoresses, J.A. 1985. Life history of spiny dogfish off the Northeastern United States. *Transactions of the American Fisheries Society* 114: 367-376.

Overholtz, W.J., Link, J.S., and Suslowicz, L.E. 2000. Consumption of important pelagic fish and squid by predatory fish in the northeastern USA shelf ecosystem with some fishery comparisons. *ICES Journal of Marine Science* 57: 1147-1159.

Pratt, H.L., and Carrier, J.C. 2001. A review of elasmobranch reproductive behavior with a case study on the nurse shark, *Ginglymostoma cirratum*. *Environmental Biology of Fishes* 60: 157-188.

Rago, P., and Sosebee, K. 2013. Update on the status of spiny dogfish in 2013 and projected harvests at the Fmsy proxy and Pstar of 40%. Mid Atlantic Fishery Management Council Scientific and Statistical Committee, September 12, 2013. 51 pp.

Ruckstuhl, K.E., and Neuhaus, P. 2000. Sexual segregation in ungulates: a new approach. *Behaviour* 137: 361-377.

Ruckstuhl, K.E., and Clutton-Brock, T.H. 2005. Sexual segregation and the ecology of the two sexes. In Ruckstuhl, K.E., and Neuhaus P. (Eds.), Sexual segregation in vertebrates: ecology of the two sexes, pp. 3-10. Cambridge University Press, Cambridge, UK.

Rulifson, R. 2007. Spiny dogfish mortality induced by gill-net and trawl capture and tag and release. *North American Journal of Fisheries Management* 27: 279-285.

Rulifson, R.A. 2010. Tagging spiny dogfish overwintering in North Carolina, and summering in Bay of Fundy, Canada. Proceedings of the Transboundary Resources Assessment Committee (TRAC): Spiny Dogfish Review. Woods Hole, Massachusetts, pp. 15-17.

Rulifson, R.A., Wright, G., and Hemilright, D. 2012. Gillnet calibration for spiny dogfish abundance assessment. North Carolina Sea Grant: Fisheries Resource Grant Program. Project no. 08FEG11. North Carolina Sea Grant, Raleigh, NC.

Saunders, M.W., and McFarlane, G.A. 1993. Age and length at maturity of the female spiny dogfish, *Squalus acanthias*, in the Strait of Georgia, British Columbia, Canada. *Environmental Biology of Fishes* 38: 49-57.

SAW 2006. Stock Assessment Workshop. 43rd Northeast Regional Stock Assessment Workshop (43rd SAW), Northeast Fisheries Science Center Reference Document 06-25; 400 p.

Shepherd, T., Page, F., and MacDonald, B. 2002. Length and sex-specific associations between spiny dogfish (Squalus acanthias) and hydrographic variables in the Bay of Fundy and Scotian shelf. *Fisheries Oceanography* 11: 78-89.

Sims, D.W., Nash, J.P., and Morritt, D. 2001. Movements and activity of male and female dogfish in a tidal sea lough: alternative behavioural strategies and apparent sexual segregation. *Marine Biology* 139: 1165-1175.

Sims, D.W. 2005. Differences in habitat selection and reproductive strategies of male and female sharks. In Ruckstuhl, K.E., and Neuhaus, P. (Eds.), Sexual segregation in vertebrates: ecology of the two sexes, pp. 127-147. Cambridge University Press, Cambridge.

Spencer, P.D., and Collie, J.S. 1996. A simple predator-prey model of exploited marine fish populations incorporating alternative prey. *ICES Journal of Marine Science* 53: 615-628.

Springer, S. 1967. Social organization of shark populations. In Gilbert, P.W., Mathewson, R.F., Rall, D.P. (Eds.), Sharks, Skates and Rays. Johns Hopkins University Press, Baltimore, Maryland, pp 149-74.

Stehlik, L.L. 2007. Essential fish habitat source document: spiny dogfish, *Squalus acanthias*, life history and habitat characteristics, 2nd edition. NOAA Technical Memorandum NMFS-NE-203, Woods Hole, Massachusetts.

Stenberg, C. 2002. Life history of the piked dogfish (*Squalus acanthias* L.) in Swedish waters. Northwest Atlantic Fisheries Organization (NAFO) Science Committee Research Document SCR 02/91, Dartmouth, Nova Scotia, Canada.

Stenberg, C. 2005. Life history of the piked dogfish (*Squalus acanthias* L.) in Swedish waters. *Journal of Northwest Atlantic Fishery Science* 35: 155-164.

Sulikowski, J.A., Galuardi, B., Bubley, W., Furey, N.B., Driggers III, W.B., Ingram Jr., G.W., and Tsang, P.C.W. 2010. Use of satellite tags to reveal the movements of spiny dogfish *Squalus acanthias* in the western North Atlantic Ocean. *Marine Ecology Progress Series* 418: 249-254.

Sulikowski, J.A., Prohaska, B.K., Carlson, A.E., Cicia, A.M., Brown, C.T., and Morgan A.C. 2013. Observations of neonate spiny dogfish, *Squalus acanthias*, in Southern New England: A first account of a potential pupping ground in the Northwestern Atlantic. *Fisheries Research* 137: 59-62.

Tanasichuk, R.W., Ware, W.M., Shaw, W., and McFarlane, G.A. 1991. Variations in diet, daily ration, and feeding periodicity of Pacific hake (*Merluccius productus*) and spiny dogfish (*Squalus acanthias*) off the lower west coast of Vancouver Island. *Canadian Journal of Fisheries and Aquatic Sciences* 48: 2118-2128.

Taylor, I., Lippert, G., Bargmann, G.G., and Gallucci, V.F. 2009. Movement patterns of spiny dogfish from historical tagging experiments in Washington States. In Gallucci V.F., McFarlane, G.A., and Bargmann, G.G. (Eds.), Biology and management of dogfish sharks, pp. 67-76. American Fisheries Society, Bethesda, Maryland.

Templeman, W. 1976. Transatlantic migrations of spiny dogfish (*Squalus acanthias*). *Journal of the Fisheries Research Board Canada* 33: 2605-2609.

Tribuzio, C.A., Gallucci, V.F., and Bargmann, G. 2005. Timing of parturition and management of dogfish in Puget Sound. In Kruse, G.H., Gallucci, V.F., Hay, D.E., Perry, R.I., Peterman, R.M., Shirley, T.C., Spencer, P.D., Wilson, B., and Woodby, D. (Eds.), Fishery assessment and management in data-limited situations, pp. 177-193. Proceedings of the 21st Lowell Wakefield Symposium. Assessment and management of new and developed fisheries in data-limited situations. University of Alaska, Alaska Sea Grant Publication AKSG-05-21, Fairbanks.

Tribuzio, C.A., Gallucci, V.F., and Bargmann, G.G. 2009. Reproductive biology and management implications for spiny dogfish in Puget Sound, Washington. In Gallucci V.F., McFarlane, G.A., and Bargmann, G.G. (Eds.), Biology and management of dogfish sharks, pp. 181-194. American Fisheries Society, Bethesda, Maryland.

Tricas, T.C., and Le Feuvre, E.M. 1985. Mating in the reef white-tip shark *Triaenodon obesus*. *Marine Biology* 84: 233-237.

Verissimo, A., McDowell, J.R., and Graves, J.E. 2010. Global population structure of the spiny dogfish *Squalus acanthias*, a temperate shark with an antitropical distribution. *Molecular Ecology* 19: 1651-1662.

Verissimo, A., Grubbs, D., McDowell, J., Musick, J., and Portnoy, D. 2011. Frequency of multiple paternity in the spiny dogfish *Squalus acanthias* in the Western North Atlantic. *Journal of Heredity* 102: 88-93.

Wallman, H.L., and Bennett, W.A. 2006. Effects of parturition and feeding on thermal preference of Atlantic stingray, *Dasyatis sabina* (Lesueur). *Environmental Biology of Fishes* 75: 259-267.

Wetherbee, B.M., and Cortés, E. 2004. Food consumption and feeding habits. In Carrier, J.C., Musick, J.A., and Heithaus, M.R. (Eds), Biology of sharks and their relatives, 223-235. CRC Press, Boca Raton, FL.

Chapter 2

CITES: ITS FRAMEWORK AND ROLE IN THE INTERNATIONAL TRADE AND SUSTAINABLE USE OF SPINY DOGFISH

Introduction

The conservation of commercially important species has to deal inevitably with the concept of sustainable exploitation, which can be extracted from the definition of sustainable development. Although "sustainable" is a common term within natural resources policy agenda, it lays itself open to possible misinterpretations and ambiguous uses. The Brundtland Report from the United Nations World Commission on Environment and Development (WCED) defines sustainable development as ''*development that meets the needs of the present without compromising the ability of future generations to meet their own needs*'' (Brundtland, 1987). This definition considers the interlinking of planning and economic development of species exploitation by providing that the species exploitation rate is set at a level for which long-term maximum benefits are not compromised.

In line with this concept, in 1998 the Food and Agriculture Organization of the United Nations (FAO) adopted its own definition of sustainable development as "*The management and conservation of the natural resource base, and the orientation of technological and institutional change in such a manner as to ensure the attainment and continued satisfaction of human needs for present and future generations. Such development conserves land, water, plant genetic resources, is environmentally non-degrading, technologically appropriate, economically viable and socially acceptable*" (FAO, 1989).

Accordingly, in 1995 the concept was extended to fisheries resources with the adoption of the Code of Conduct for Responsible Fisheries (FAO, 1995). This non-binding document provides an internationally recognized instrument from which to draw the criteria to determine a sustainable framework for fisheries.

Garcia (2000) recognized that within the FAO definition of sustainable development, arguably also reflected in the provisions of the FAO Code of Conduct for Responsible Fisheries, there are three principles of sustainability related to different needs: *i)* to conserve (and sustain) the resource in its environment; *ii)* to satisfy the socio-economic needs of human beings; and *iii)* to guide the management toward the required changes in institutions and technology.

Putting aside the third principle, a further examination of the link between the first two principles of sustainability brings to light the existing philosophical discrepancy between the concepts of preservation versus conservation of natural resources. Following Norton's (1986) definition: "*To conserve a resource or the productive potential of a resource generating system is to use it wisely, with the goal of maintaining its future availability or productivity. To preserve is to protect an ecosystem or a species, to the extent possible, from the disruptions attendant upon it from human use*". It follows that a conservationist policy aims at conserving the resource for future consumption or other alternative uses, while a preservationist policy seeks to maintain the resource in an unaltered state by excluding destructive human activities (Passmore, 1974; Norton, 1986).

The FAO Code of Conduct for Responsible Fisheries, according to the first of the three principles of sustainability, implies that the fishery resource should be exploited at a level that can maintain its natural renewal, by preventing overfishing and overcapacity, protecting juveniles and spawning stages, and rehabilitating depleted populations (Garcia, 2000). Thus, it can be argued that the principle is framed within a conservation oriented policy intended to provide the maintenance and protection of biodiversity and fisheries habitats for exploitative purposes. In addition, according to the second principle of sustainability, the exploitation level should satisfy human needs and the economic conditions contributing to sustainability (Garcia, 2000). This includes also avoiding the negative impacts of species trade, including endangered species. However, the non-binding nature of the FAO Code of Conduct for Responsible Fisheries does not guarantee the international constituency will control the detrimental effects of species trade, which is the specific management activity pertinent to the authority of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES).

The CITES framework

The CITES Convention was concluded and adopted on March 3, 1973, and came into force in June 1975 (CITES, 1973). The CITES treaty was the result of an international agreement process started in 1963 after the General Assembly of the International Union for the Conservation of Nature and Natural Resources (IUCN) expressed the necessity for an international convention to protect vulnerable species that may be affected by international trade. Signatory members of CITES number 177 nations (CITES, 2013a), and the Convention covers the international trade of over 5,000 animal and 28,000 plant species (CITES, 2013b).

The role of CITES is to regulate and monitor the international trade in wild species, which includes “export, re-export, import, and introduction from the sea”, by means of specific permits (CITES, 2013c). The preamble of the CITES convention states that “*international co-operation is essential for the protection of certain species of wild fauna and flora against over-exploitation through international trade*” (CITES, 1973). Therefore, the aim of CITES is to prevent species from becoming threatened by international commercial demand while ensuring their sustainable exploitation (Wells and Bardzo, 1999).

The species trade is regulated by a permit system in which endangered species are listed in one of three different appendices, according to the level of threat experienced: Appendix I, II, and III (CITES, 1973). Criteria for the inclusion of a species in Appendix I and II were set under Resolution 9.24 at the ninth meeting of the Conference of the Parties to the Convention (CoP) in 1994 in Fort Lauderdale, Florida, USA (CoP9, 1994), and were developed in co-operation with IUCN. These listing-criteria, also known as the Fort Lauderdale Criteria (FLC), were deemed necessary to revise the early listing criteria set under the first CoP in Bern, Switzerland, in 1976, which are known as the Bern Criteria (BC) (Goho, 2001; Gehring and Ruffing, 2008). The BC did not provide adequate and reliable standards to list a species without preventing possible subjective interpretation by decision-makers. Consequently, the lack of reliability in the listing-criteria led to a crisis of the trustworthiness in the CITES decision-making process, with many species-listing considered politically driven instead of being supported by scientifically-objective data (Goho, 2001; Gehring and Ruffing, 2008). The FLC were intended to limit discretion in the listing process, with listing-criteria pertaining exclusively to the biological status of a species and not to the magnitude of the trade or the economic value (Goho, 2001; Ruffing, 2005).

In accordance to Article II, paragraph 1, of the Convention (CITES, 1973), Appendix I includes species threatened with extinction for which the trade must be prohibited, except under very limited circumstances for non-commercial purposes.

In accordance to Article II, paragraph 2, of the Convention (CITES, 1973), a species qualifies for listing in Appendix II if "*It is known, or can be inferred or projected, that the regulation of trade in the species is necessary to avoid it becoming eligible for inclusion in Appendix I in the near future*", or "*It is known, or can be inferred or projected, that regulation of trade in the species is required to ensure that the harvest of specimens from the wild is not reducing the wild population to a level at which its survival might be threatened by continued harvesting or other influences*". Listing for Appendix II also has criteria for "look-alike" species, which can be listed when "*The specimens of the species in the form in which they are traded resemble specimens of a species included in Appendix II under the* *provisions of Article II, paragraph 2, or in Appendix I, such that enforcement officers who encounter specimens of CITES-listed species, are unlikely to be able to distinguish between them*". To export an Appendix II species, the exporter country has to obtain a permit issued by the governmental "Management Authorities" (MA) and "Scientific Authorities" (SA) elected in each signatory country, certifying that the export of the species will not be detrimental to the survival of the wild population (CITES, 1973). For an Appendix I species, the importing country needs an import permit, but for an Appendix II species the importer is only required to present either the exporter permit or a re-export certificate (CITES, 1973; Fordham and Dolan, 2004).

Criteria for listing a species in Appendix III were set under Resolution 9.25 at the ninth CoP in 1994 (CoP9, 1994). In accordance to Article II, paragraph 3, of the Convention (CITES, 1973), Appendix III includes species that are regulated by individual country jurisdiction for preventing or restricting exploitation, and for which individual countries seek international cooperation in control and regulation. Compared to Appendix I and II, Appendix III contains limited permit requirements.

The CITES listing procedure

The listing procedure of a species within CITES consists in two separate decision stages, which can be followed by a further decision stage by each Party in case of disagreement with the listing adoption (Figure 2.1). Each listing proposal begin with the *Scientific Assessment Stage*, in which one or more Parties develop a proposal to list a species that is submitted to the CITES's Secretariat for discussion (Figure 2.1). In order for all other Parties to be able to review the proposal in a timely manner, and to eventually collect their own information, the proposal must be submitted to the Secretariat at least 150 days before the next meeting of the CoP. The Secretariat then consults with its own scientific committees, namely the Animals Committee and the Plants Committee, and other Non-Governmental

Organizations (NGOs) and Intergovernmental Organizations (IOs) for all proposals submitted by Parties.

For the listing of marine species, CITES signed a Memorandum of Understanding (MoU) with FAO in 2006 (CITES, 2006). In compliance with this MoU, FAO convenes a FAO Ad Hoc Expert Advisory Panel (EAP, or the Panel) that is devoted to review each proposal against the scientific information collected and provide recommendations for a possible species listing to the Secretariat accordingly. In this stage, all information collected on the conservation status of the species are purely biological and do not include the magnitude of the trade and associated economic aspects (Goho, 2001). The only criteria considered to support a species listing are the CITES's FLC. This means that, based exclusively on the scientific information provided in the original listing proposal, the participants are only requested to judge the proposal against the listing criteria (Gehring and Ruffing, 2008). Therefore, in the scientific assessment stage the role of the Secretariat is, at first, merely to coordinate and to assist Parties, NGOs and IOs as an impartial third party. This stage is concluded with the paramount role of the Secretariat as the only body responsible to evaluate the information provided by all parties and to elaborate recommendations for the ensuing final decision stage of the listing procedure that will take place at the meeting of the CoP. Until the listing discussion proceeds to this next stage, Parties and other stakeholders involved in the listing procedure are deprived of any possibility to influence the Secretariat decision, which is the exclusive product of the evaluation of the biological information provided against the listing criteria (Gehring and Ruffing, 2008). If this information is considered to meet the criteria for listing, the Secretariat will likely recommend the species listing for discussion and eventual adoption at the CoP.

The scientific assessment stage is followed by the *Final Decision Stage* (Figure 2.1). Approximately every two years, the Secretariat convenes a CoP to amend species appendices from listing proposals and to propose to list, down-list, or de-list species in Appendix I or II (Figure 2.1). In order for a species to be officially listed, each proposal needs two-thirds of majority vote of all members present, with abstentions excluded from the count.

At this stage, the final decision whether to list a species is entirely in the hand of Parties, which have to make a choice based on the Secretariat's recommendations. When voting on controversial listings, the vote is often conducted through a secret ballot, which is adopted if a Party's request for secrecy is supported by ten other Parties (Hickey, 1999; Fordham and Dolan, 2004). In principle, the use of a secret ballot during the final decision stage can potentially reduce the pressure on any single Party, particularly in light of the asymmetrical distribution of costs and benefits associated with a species listing. The presence of this asymmetry suggests that Parties, which are the final rulers for evaluating and deciding the listing decision at this final stage, are still allowed room for bargaining processes and political maneuvers to convince other Parties to support or not a specific listing. As indicated by Gehring and Ruffing (2008), voting on a controversial proposal during the final decision stage may increase the possibility of bringing in power-based interactions among the Parties instead of reason-based arguments.

Another important aspect within the Secretariat recommendation process is the possible adoption of a "split-listing", a possibility that was introduced in CITES with the FLC (Annex 3 of Resolution 9.24). Split-listing consists in placing only some populations of a species discussed for inclusion in the Appendices, leaving out the rest of the population or other stocks, based on the conclusion that only the formers are threatened. The FLC, however, caution that such measure "*should be avoided in general in view of the enforcement problems it creates and should generally be done on the basis of national or continental populations, rather than subspecies*" (CoP9, 1994).

The listing decision is concluded with the inclusion of a species in the Appendices if such decision is reached by a two-thirds majority of the Parties present and voting, with abstentions excluded from the count.

Eventually, Parties in disagreement with the listing decision may opt out (reservation) of the commitment for specific species listed within 90 days of its adoption (Figure 2.1). If that is the case, the nation opting for reservation will be treated as a State instead of a Party. Consequently, it can trade the listed species only with states that are not member Parties of CITES.

The history of spiny dogfish and other shark species discussion in CITES

The discussion for proposing spiny dogfish for inclusion in Appendix II began in 2004 after Germany, on behalf of the EU, took the lead in preparing a formal proposal for the 13^{th} CoP held in Bangkok, Thailand. Germany also proposed porbeagle shark (*Lamna nasus*) for Appendix II, and Australia proposed white shark (*Carcharodon carcharias*) for Appendix I (Fordham and Dolan, 2004). Despite the fact that a majority of the members of the Shark Working Group of the CITES Animals Committee concluded that all three shark species appeared to meet the listing-criteria for Appendix II (CITES, 2004), Germany's 2004 spiny dogfish and porbeagle proposals did not receive sufficient support from the EU for submission to the CITES's Secretariat, and therefore were not inserted for discussion in the 13^{th} CoP's agenda of 2004. Meanwhile, Madagascar and Australia submitted a proposal to list white shark in Appendix II (CoP13 Prop. 32, 2004), which was passed during the voting process (Fordham and Dolan, 2004). The white shark was not the first shark species successfully added to CITES's lists. At the 12^{th} CoP in 2002 held in Santiago, Chile, the basking shark (*Cethorinus maximus*) and the whale shark (*Rhincodon typus*) were both proposed for addition to Appendix II. For the basking shark, the listing was proposed by the United Kingdom of Great Britain and Northern Ireland, while the listing for the whale shark was proposed by India, the Philippines, and Madagascar. The two proposals were marginally adopted with a few votes over the two-third majority (Fordham and Dolan, 2004).

However, the white shark listing provides a clear example of a species for which no convincing data on exploitation were available, so that the species adoption in CITES's list was considered problematic by some Parties (Ruffing, 2005). Assessment by the EAP concluded that it was not possible to confirm or exclude the possibility that the white shark met the criteria for listing in Appendix II. In light of this conclusion, the Secretariat recommended the species for inclusion in Appendix II, but this recommendation was extraordinarily cautious (Gehring and Ruffing, 2008). The proposal was discussed and finally adopted at the CoP by a secret ballot, with 87 votes in favor, 34 against and 9 abstentions. Japan, Iceland, Norway and Palau entered reservations (CoP13 Comm.I Rep.15, 2004). The white shark listing case clearly shows that if information is limited and unreliable, stakeholder parochial interests dominate, and Parties can easily enter reservations virtually affecting the CITES control mechanism (Ruffing, 2005; Gehring and Ruffing, 2008). Some experts (Fordham and Dolan, 2004; Fordham, 2009) reported concern that in spite of spiny dogfish stocks declining, calls to list the species under CITES Appendix II were passed over for proposals of other large, more "charismatic", but less important commercial species.

In 2006, Germany developed an updated proposal to list spiny dogfish and porbeagle sharks under CITES Appendix II. Both proposals were favorably supported by the CITES Secretariat and submitted for consideration at the 14th CoP held in The Hague, Holland, in 2007 (CoP14 Prop.16, 2007, for spiny dogfish, and CoP14 Prop.15, 2007, for porbeagle shark). In March 2007, the FAO convened an EAP to review all proposals for listing aquatic species in CITES Appendix at the 14th CoP. The Panel concluded that, based on the available evidence presented in the proposal, inclusion of spiny dogfish in Appendix II was not supported. The Panel stated that, globally, the species does not meet the biological decline criteria for listing, although the Northeast Atlantic stock and the Northwest Atlantic stock, when mature females alone are considered, both met the declining criterion for listing in Appendix II (FAO, 2007). In light of those findings, the Panel considered the option of a split-listing for the species, with the Northeast Atlantic stock alone being listed in Appendix II. However, given that EU members were both the main harvesters and consumers of this population, it was concluded that development and implementation of effective management measures would have a far greater positive impact on the sustainability of the population (FAO, 2007). Moreover, the Panel considered the technical problems for the implementation of such a measure. Previous advice of the FAO Expert Panel on Implementation Issues related with CITES Appendix listing (FAO, 2004) urged strict adherence to the CITES preference to avoid split-listings so that stocks not otherwise qualified for listing would not be placed in Appendix II. In addition, the Panel considered that split-listing could facilitate illegal, unwanted, unregulated (IUU) fishing for spiny dogfish (FAO, 2007). After considerable discussion, the proposal received 62% of the votes in committee, without reaching the 66.67% required for adoption, with Canada, Norway, New Zealand, Japan, and China opposing the proposal citing FAO’s assessment, which concluded that dogfish decline outside the North Atlantic was not evident (Shark Alliance, 2007).

In 2009, Sweden and Palau jointly developed proposals for spiny dogfish and porbeagle sharks under CITES Appendix II, and both species received sufficient support by the CITES Secretariat to be submitted for discussion at the 15th CoP held in Doha, Qatar, in March 2010 (CoP15 Prop.18 for spiny dogfish, and CoP15 Prop.17 for porbeagle shark). Meanwhile, the U.S. and Palau jointly developed and submitted proposals to list in Appendix II the scalloped hammerhead shark (*Sphyrna lewini*) (CoP15 Prop. 15) and the oceanic whitetip shark (*Carcharhinus longimanus*) (CoP15 Prop. 16). All four proposals were rejected (CITES, 2010). In December 2009, FAO convened an EAP to review all proposals to list aquatic species in CITES Appendix at the 15th CoP. For spiny dogfish, the Panel concluded (similarly to the 2007 EAP) that the available evidence did not support the inclusion of the species as a whole, although Mediterranean and Northeast Atlantic populations were considered to meet the extent of the decline criterion (FAO, 2009). The Panel reported that the information presented did not change substantially from those reported in the 2007 EAP (FAO, 2007), with the exception of the Northwest Atlantic stock, for which recent assessments suggested a recent increase in female spawning biomass (ASMFC, 2008). However, the same assessment report projected a decline in abundance of the Northwest Atlantic population beginning in 2011 at the current level of fishing mortality rate of 0.117, to a minimum level in 2017, as a result of low recruitment to this population (ASMFC, 2008). Moreover, the Panel cited results provided by the MAFMC that the 2007-09 estimates showed much larger numbers of juveniles less than 50 cm than those observed in over a decade (FAO, 2009). During the CoP debate, several Parties conveyed that their internal management measures for dogfish were sufficient and that populations remained stable (Sky, 2010). Those conclusions were likely related to the new additional information provided by the EAP of 2009, compared with those presented by the 2007 Panel, which included evidence of improved management actions in the Northeast Atlantic (adoption of total allowable catch by the EU, see chapter 3) and updated stock assessments for the Northwest Atlantic (see chapter 4); both indicated an improved stocks prognosis due primarily to reduced fishing mortality and recovering recruitment (FAO, 2009).

In 2012, six proposals were developed for discussing the inclusion of ten different elasmobranch species in Appendix II at the 16th CoP held in Bangkok, Thailand, in March 2013. Brazil, Colombia and the U.S. proposed oceanic whitetip shark (CoP16 Prop.42); Brazil, Colombia, Costa Rica, Denmark (on behalf of the EU), Ecuador, Honduras and Mexico proposed scalloped hammerhead shark, great hammerhead shark (*Sphyrna* *mokarran*), and smooth hammerhead shark (*Sphyrna zygaena*) (CoP16 Prop.43); Brazil, Comoros, Croatia, Denmark (on behalf of the EU) and Egypt proposed porbeagle shark (CoP16 Prop.44); Brazil, Colombia and Ecuador proposed manta ray (including giant manta ray - *Manta birostris* and reef manta ray - *Manta alfredi*) (CoP16 Prop.46); Colombia proposed Ceja river stingray (*Paratrygon aiereba*) (CoP16 Prop.47); and Colombia and Ecuador proposed ocellate river stingray (*Potamotrygon motoro*) and rosette river stingray (*Potamotrygon schroederi*) (CoP16 Prop.48). Surprisingly, all proposals for shark species received the two-third vote majority for adoption, with rejection for the two proposals on stingrays. These species represent the first commercial shark species included in CITES Appendices.

Table 2.1 summarizes the historical discussion of shark species included in CITES's lists since 2002. This table does not include the discussion for sawfishes (*Pristis* spp., Superorder Batoidea). Sawfishes are a family of elasmobranch species that were first proposed, and rejected, by the U.S. for listing at the 10th CoP held in Harare, Zimbabwe, in 1997. In 2006, the U.S. submitted again a proposal to list all species of sawfishes in Appendix I. The proposal was discussed at the 14th CoP held in The Hague, Holland, in 2007. After discussion and voting, three of the four species were listed in Appendix I and one in Appendix II.

The U.S. procedural maneuvering in the spiny dogfish discussion

In general, the position held by the U.S. within the constituency of the Parties involved in the discussion to list spiny dogfish in Appendix II can be considered lukewarm at least, if not unresolved. This U.S. indecision on spiny dogfish dates back to 1996, when the U.S. government rejected a proposal from the Ocean Wildlife Campaign for listing dogfish and dusky shark (*Carcharhinus obscurus*) in Appendix II (Fordham and Dolan, 2004). The decision was justified by concern about the complexity of implementing the management of landings, import, and export of the species in a reasonable time frame, claiming that seeking more international coordination and cooperation between CITES and international fishery management bodies would have been more effective (Fordham and Dolan, 2004).

In 1999, the U.S. government was prompted by the Humane Society of the United States and International Coalition to propose spiny dogfish for inclusion in Appendix II at the 11th CoP. The U.S. declined the investiture, claiming that the newly-created federal U.S. Fishery Management Plan for the Northwest Atlantic stock (see chapter 4), will be sufficient for rebuilding this stock over a 10-year time frame (Fordham and Dolan, 2004).

Despite reluctance to develop a proposal for including spiny dogfish on the CITES's list, the U.S. government declared to be supportive in case other Parties take the lead in proposing a dogfish listing (Fordham and Dolan, 2004). As a result, in 2004 Germany took the lead in preparing a formal proposal to include spiny dogfish in Appendix II for discussion at the 13th CoP. Although the U.S. government publicly demonstrated interest in Germany's proposal, conflicting feedbacks were reported among several U.S. agencies. The Commonwealth of Massachusetts and the State of Washington expressed their opposition, whereas the National Marine Fisheries Service – Southeast Fisheries Science Center (NMFS-SEFSC) Director stated that there was adequate information to support the listing proposal (Fordham and Dolan, 2004; Fordham, 2009). The reason for such contrasting views probably is due to the fact that spiny dogfish is an important commercial species for both the Northwest Atlantic region, especially Massachusetts, and the Northeast Pacific region, while it is absent from the area of NMFS-SEFSC jurisdiction. As mentioned above, the 2004 German proposal for listing spiny dogfish was not inserted in the 13th CoP's agenda.

In 2006, after Germany again proposed to list spiny dogfish in Appendix II, representatives from the U.S. fishing industry (the Massachusetts Division of Marine Fisheries – MDMF) submitted comments to the U.S. Fish and Wildlife Service (USFWS) opposing the proposal (Fordham, 2009). Before the 14th CoP started, the U.S. government was still undecided whether to support the proposal to list spiny dogfish (USOFR, 2007), eventually supporting the proposal after much consultation at the meeting (Fordham, 2009). The proposal failed in receiving the required majority votes for adoption (Fordham, 2009).

In 2009, representatives from the U.S. fishing industry opposed the proposal for listing dogfish in Appendix II, as evidenced by a letter written to the U.S. Secretary of Interior Ken Salazar and the U.S. Secretary of Commerce Gary Locke signed by nine U.S. Senators and 12 U.S. Congressmen (Snowe et al., 2009). It is worth mentioning that despite its disinclination for a dogfish listing, the U.S. decided to take the lead with Palau in developing two proposals to list the scalloped hammerhead shark and the oceanic whitetip shark in Appendix II that were submitted to the 15th CoP, although in the end both proposals were rejected.

Finally, in 2012 the U.S. government declared its intention to not submit a proposal for considering spiny dogfish at the 16th CoP held in Bangkok in March 2013, unless significant additional information was produced that supported the necessity for such an action (USOFR, 2012). Inevitably, no Parties developed a proposal to discuss the possibility to list the species in Appendix II at the 16th CoP. However, the U.S., in collaboration with Brazil and Colombia, proposed to discuss the listing of oceanic whitetip shark in Appendix II (Cop16. Prop.42).

Discussion

To date, CITES is the only international treaty that can manage protection of plant and animal species from unregulated worldwide trade. The text of the Convention was originally framed within a preservationist philosophy aimed at protecting wild species from the negative effects of international trade. Over the years, however, CITES has been implemented more and more by conservationist intents, mainly because the original underlying preservationist approach did not help CITES in reaching its targets, particularly in developing countries (Barnes, 1996; Young, 2003). However, the CITES listing is framed in such a way that either preservationist or conservationist views by member countries can be represented, with no single underlying environmental philosophies preferred. In fact, each of the three Appendices reflects the decision to ban (Appendix I), regulate (Appendix II) or monitor (Appendix III) the international trade in the species. It follows that an Appendix I listing, and up-listing from Appendix II to Appendix I, would be likely supported by Parties more guided by a preservationist policy agenda, while a species listing in Appendix II and III, and a de-listing from Appendix I to Appendix II or from Appendix II to Appendix III, would likely accomplish objectives of more conservationist policy oriented Parties. This means that CITES, by virtue of its listing-criteria framework, can withstand its role of international management authority for trade regulation with a *super partes* role, especially in consideration of the fact that Parties hold the final decision power within the CITES's listing procedure (Krieps, 1996; Goho, 2001). This is likely the main reason for countries supporting the Treaty over the years, as suggested by the ever increasing number of countries signing the Convention. The appeal for countries to join CITES likely relies on the fact that the listing decision-making procedure does not overtake each country's sovereignty over wild species conservation within its national borders. This idea is further supported by the preamble of CITES, which it recognizes that the "*people and States are*... *the best protectors of their own wild fauna and flora*" (Hickey, 1999). In fact, during the scientific assessment stage the role of the CITES's Secretariat is pivotal as being the only authority that can evaluate the conservation status of a proposed species against the Convention listing criteria. On the other hand, CITES's Parties are, in essence, the ultimate rulers during the final decision stage for species listing. Therefore, in order to convince the Parties to vote favorably for a species listing, each proposal must be based on solid and reliable information that can strongly support an effective conservation program to the proposed species so that, in turn, the final recommendation of the Secretariat will result in an assessment based on scientifically reliable information that would be more difficult for Parties to challenge the listing criteria. If information is limited and scientifically unreliable, Parties are allowed more room for their parochial interests to prevail and challenge the Secretariat recommendations without violating the listing criteria (Gehring and Ruffing, 2008).

It can also be argued that the actual lack of decisional power by the Secretariat during the final decision stage weakens the Secretariat recommendation and the whole listing procedure, because at this stage Parties will still engage in bargaining or political compromises in contrast to the Secretariat recommendations, eventually compromising otherwise scientifically sound listings. Some authors (Sky, 2010) believe that, for commercially exploited species, there would likely be resistance to limit their trade, at the very least from those Parties more actively involved in the species trade. For example, listing of the Atlantic bluefin tuna (*Thunnus thynnus*) for Appendix I dates back to 1992. Despite unanimous scientific agreements of a rapid decline in the population over the last decades, including FAO-EAP recommendations, the proposal has always been rejected (Safina, 1993; Sky, 2010). The most recent decision in 2010 to not support such a listing, which clearly met the listing criteria, mostly relied on the existence of management regulations that were supposed to allow the population of tuna to recover, the most important being the adoption of Total Allowable Catches (TAC) by the International Commission for the Conservation of Atlantic Tunas (ICCAT). However, this quota level has being frequently judged as unsustainable even by ICCAT’s scientific experts (Sky, 2010). This example shows that, even when listing criteria are clearly met, countries involved in the commercial trade of highly lucrative species still have the possibility to openly reject a listing within the CITES framework, so to ensure their continued benefit from the commercialization of a threatened species (Safina, 1993; Milius, 2010).

The situation for sharks may be slightly different, as the type of discussion to list shark species seems to delve more on the charismatic “feature” of each of the species proposed, and also because sharks, in general, are considered a less valuable species (with the exception of pelagic species recently exploited for the shark-fin demand from Asian markets in China and Hong Kong). Among the elasmobranch species discussed for listing in CITES, eight species of sharks were successfully included in Appendix II. The common thread for all these shark species (perhaps with the exclusion of spiny dogfish) is that they are generally considered as “charismatic” megafauna, and therefore they have always been more successful in attracting attention from the general public for their conservation. However, at least for the white shark, the adoption of its listing in Appendix II was considered problematic, as the scientific information at hand was not clearly supporting the listing according to the CITES’s criteria. In addition, the listing of more charismatic species, or “keystone” species capable of attracting people’s attention and environmental organizations efforts, has been a frequent criticism of the CITES’s listing procedure (Hickey, 1999; Goho, 2001).

The spiny dogfish, and in large part the porbeagle shark, can be considered the more important shark species for commercial exploitation purposes, with higher international commercial interests at stake for inclusion in Appendix II. The spiny dogfish is highly commercialized and traded for meat consumption on a global scale, with the EU market demand as the main driver for this exploitation to continue. Despite being unanimously considered a species endangered by international trade for which reliable and strong scientific information were provided that meet the CITES’s criteria for listing (although based on regional stocks; e.g., Mediterranean and Northeast Atlantic stocks), the species has yet to reach international consensus for listing approval. The recent history of the spiny dogfish listing also underlines that, within the CITES's listing framework, bargaining and backroom politics may still ensure that a scientifically sound proposal will not proceed to a vote, nor reach the necessarily vote majority to be adopted. In this regard, frequent use of secret ballots and Parties entering reservations likely exacerbated this scenario and undermined the conservation efforts of the Convention (Goho, 2001; Fordham and Dolan, 2004).

Overall, the prolonged spiny dogfish discussion process, compared to the less controversial insertion of other more charismatic but less commercially valuable shark species, leads to a twofold consideration: *i)* it illustrates that the decision-process for listing commercially exploited species often have more to do with economic, social, and political factors than with science (Gehring and Ruffing, 2008; Sky, 2010); and *ii)* the U.S. indecision to support the species listing, although the Mediterranean and Northeast Atlantic stock were considered to meet the extent of the decline criterion (FAO, 2009), has likely reduced the success for listing (Fordham and Dolan, 2004; Fordham, 2009).

The lack of strong U.S. support for spiny dogfish listing may be a direct consequence of the U.S. fishing industry efforts to avoid the adoption of stricter regulations in species trade because of associated concern on the viability of dogfish fishery exploitation. This is supported by a historical opposition by several U.S. fishery agencies since 2004 to list dogfish, and by the fact that even prior to 2004 several conservation organizations calling for the U.S. to take the lead for a dogfish proposal saw their requests rejected (Fordham and Dolan, 2004; Fordham, 2009). On the other hand, it may be that the U.S. believes that fisheries management within national borders, rather than a CITES's listing, can be more effective in achieving sustainability for this species.

Regardless of the reasons, the characteristics of spiny dogfish international exploitation suggest that the achievement of sustainable use cannot rely merely on national management regulations, particularly in consideration of the migratory behavior and life history of the species, the specific characteristics of the species international trade, and national fishery management regulations. In fact, although national fishery regulations may help in maintaining the fishery sustainability (i.e., in the U.S., see chapter 4), the primary driver for the species exploitation is the EU market demand, where the spiny dogfish population has being drastically reduced so that new management regulations have been adopted to rebuild the stock (see chapter 3). Overall, these results indicate the urgent need for a more comprehensive and integrated approach to the management of the spiny dogfish international trade, and a more thorough comparative analysis of the U.S. and EU fishery management systems. This analysis can provide valuable insight into the potential role of the U.S. for the discussion of the species listing in CITES's Appendix II that can eventually foster the international conservation of spiny dogfish.

LITERATURE CITED

ASMFC. 2008. Atlantic State Marine Fisheries Commission, Overview of stock status – Spiny dogfish, *Squalus acanthias*. Available at www.asmfc/org (February 2013).

Barnes, J.I. 1996. Changes in economic use value of elephant in Botswana: the effect of international trade prohibition. *Ecological Economics* 18: 215-230.

Brundtland, G. 1987. Our common future: the World Commission on Environment and Development. Oxford University Press, Oxford, UK.

CITES. 1973. Convention on International Trade in Endangered Species of Wild Fauna and Flora. Text of the Convention, 27 U.N.T.S. 243. Available at http://www.cites.org/eng/disc/E-Text.pdf (February 2013).

CITES. 2004. Convention on International Trade in Endangered Species of Wild Fauna and Flora. Report of the Working Group , Animals Committee, CITES. Biological and trade status of sharks (Resolution Conf. 12.6 and Decision 12.47). March 29-April 2, 2004.

CITES. 2006. Convention on International Trade in Endangered Species of Wild Fauna and Flora. Memorandum of Understanding between the Food and Agriculture Organization of the United Nations (FAO) and the Secretariat of the Convention on International Trade in Endangered Species (CITES). Available at http://www.cites.org/eng/disc/sec/FAO-CITES-e.pdf (February 2013).

CITES. 2013a. Convention on International Trade in Endangered Species of Wild Fauna and Flora website. Available at http://www.cites.org/eng/disc/parties/chronolo.php (February 2013).

CITES. 2013b. Convention on International Trade in Endangered Species of Wild Fauna and Flora website. Available at http://www.cites.org/eng/disc/species.php (February 2013).

CITES. 2013c. Convention on International Trade in Endangered Species of Wild Fauna and Flora website. Available at http://www.cites.org/eng/disc/how.php (February 2013).

CoP9. 1994. Conference of the Parties to the Convention: Resolution 9.24. Convention on International Trade in Endangered Species of Wild Fauna and Flora. Available at http://www.cites.org/eng/res/09/09-24R15.php (February 2013).

CoP13 Prop. 32. 2004. Conference of the Parties to the Convention 2004: Proposal 32. Convention on International Trade in Endangered Species of Wild Fauna and Flora. Available at http://www.cites.org/eng/cop/13/prop/E13-P32.pdf (February 2013).

CoP14 Prop. 15. 2007. Conference of the Parties to the Convention 2007: Proposal 15. Convention on International Trade in Endangered Species of Wild Fauna and Flora. Available at http://www.cites.org/eng/cop/14/prop/E14-P15.pdf (February 2013).

CoP14 Prop. 16. 2007. Conference of the Parties to the Convention 2007: Proposal 16. Convention on International Trade in Endangered Species of Wild Fauna and Flora. Available at http://www.cites.org/eng/cop/14/prop/E14-P16.pdf (February 2013).

CoP15 Prop. 15. 2010. Conference of the Parties to the Convention 2010: Proposal 15. Convention on International Trade in Endangered Species of Wild Fauna and Flora. Available at http://www.cites.org/eng/cop/15/prop/E15-P15.pdf (February 2013).

CoP15 Prop. 16. 2010. Conference of the Parties to the Convention 2010: Proposal 16. Convention on International Trade in Endangered Species of Wild Fauna and Flora. Available at http://www.cites.org/eng/cop/15/prop/E15-P16.pdf (February 2013).

CoP15 Prop. 17. 2010. Conference of the Parties to the Convention 2010: Proposal 17. Convention on International Trade in Endangered Species of Wild Fauna and Flora. Available at http://www.cites.org/eng/cop/15/prop/E15-P17.pdf (February 2013).

CoP15 Prop. 18. 2010. Conference of the Parties to the Convention 2010: Proposal 18. Convention on International Trade in Endangered Species of Wild Fauna and Flora. Available at http://www.cites.org/eng/cop/15/prop/E15-P18.pdf (February 2013).

CoP16 Prop. 42. 2012. Conference of the Parties to the Convention 2012: Proposal 42. Convention on International Trade in Endangered Species of Wild Fauna and Flora. Available at http://www.cites.org/eng/cop/16/prop/E-CoP16-Prop-42.pdf (March 2013).

CoP16 Prop. 43. 2012. Conference of the Parties to the Convention 2012: Proposal 43. Convention on International Trade in Endangered Species of Wild Fauna and Flora. Available at http://www.cites.org/eng/cop/16/prop/E-CoP16-Prop-43.pdf (March 2013).

CoP16 Prop. 44. 2012. Conference of the Parties to the Convention 2012: Proposal 44. Convention on International Trade in Endangered Species of Wild Fauna and Flora. Available at http://www.cites.org/eng/cop/16/prop/E-CoP16-Prop-44.pdf (March 2013).

CoP16 Prop. 46. 2012. Conference of the Parties to the Convention 2012: Proposal 46. Convention on International Trade in Endangered Species of Wild Fauna and Flora. Available at http://www.cites.org/eng/cop/16/prop/E-CoP16-Prop-46.pdf (March 2013).

CoP16 Prop. 47. 2012. Conference of the Parties to the Convention 2012: Proposal 47. Convention on International Trade in Endangered Species of Wild Fauna and Flora. Available at http://www.cites.org/eng/cop/16/prop/E-CoP16-Prop-47.pdf (March 2013).

CoP16 Prop. 48. 2012. Conference of the Parties to the Convention 2012: Proposal 48. Convention on International Trade in Endangered Species of Wild Fauna and Flora. Available at http://www.cites.org/eng/cop/16/prop/E-CoP16-Prop-48.pdf (March 2013).

FAO. 1989. Food and Agriculture Organization of the United Nations. Sustainable development and natural resources management. FAO Conference Twenty-fifth Session, Rome 11–30 November 1989. C89/2-Supp. 2, Rome.

FAO. 1995. Food and Agriculture Organization of the United Nations. Code of Conduct for Responsible Fisheries, Rome.

FAO. 2004. Food and Agriculture Organization of the United Nations, Report of the expert consultation on implementations issues associated with listing commercially-exploited aquatic species on CITES Appendices, FAO Fisheries Report 741: vi, FIMF/R741, Rome.

FAO. 2007. Food and Agriculture Organization of the United Nations, Report of the second FAO Ad Hoc Expert Advisory Panel for the assessment of proposals to amend Appendices I and II of CITES concerning commercially-exploited aquatic species, FAO Fisheries Report N° 833, FIMF/R833, Rome.

FAO. 2009. Food and Agriculture Organization of the United Nations, Report of the third FAO Ad Hoc Expert Advisory Panel for the assessment of proposals to amend Appendices I and II of CITES concerning commercially-exploited aquatic species, FAO Fisheries Report N° 925, FIMF/R925, Rome.

Fordham, S., and Dolan, C. 2004. A case study in international shark conservation: the Convention on International Trade in Endangered Species and the spiny dogfish. *Golden Gate University Law Review* 34: 531-572.

Fordham, S. 2009. Conservation of Atlantic spiny dogfish under U.S. Law and CITES. In Gallucci, V.F., McFarlane, G.A., and Bargmann, G.G. (Eds.), Biology and management of dogfish sharks, pp. 411-423. American Fisheries Society, Bethesda, Maryland.

Garcia, S.M. 2000. The FAO definition of sustainable development and the Code of Conduct for Responsible Fisheries: an analysis of the related principles, criteria and indicators. *Marine and Freshwater Research* 51: 535-541.

Gehring, T., and Ruffing, E. 2008. When arguments prevail over power: the CITES procedure for the listing of endangered species. *Global Environmental Politics* 8: 123-148.

Goho, S.A. 2001. The CITES Fort Lauderdale Criteria: the uses and limits of science in international conservation decision making. *Harvard Law Review* 114: 1769-1792.

Hickey, M.J. 1999. Acceptance of sustainable use within the CITES community. *Vermont Law Review* 23: 861-882.

Krieps, C.L. 1996. Sustainable use of endangered species under CITES: is it a sustainable alternative?. *University of Pennsylvania Journal of International Law* 17: 461-504.

Milius, S. 2010. Wildlife trade meeting disappoints marine scientists. Science News, 26 March 2010, Web edition; Available at www.sciencenews.org/view/generic/id/57679 (March 2013).

Norton, B.G. 1986. Conservation and preservation: a conceptual rehabilitation. *Environmental Ethics* 8: 195-220.

Passmore, J. 1974. Man's responsibility for nature: ecological problems and western traditions. Charles Scribner's Sons, New York.

Ruffing, E. 2005. Reasonable decisions within CITES: which role for procedures? Berlin Conference on Human Dimensions of Global Environmental Change, International

Organizations and Global Environmental Governance, 2-3 December 2005. Available at http://userpage.fu-berlin.de/ffu/akumwelt/bc2005/papers/ruffing_bc2005.pdf (February 2013).

Safina, C. 1993. Bluefin tuna in the West Atlantic: negligent management and the making of an endangered species. *Conservaton Biology* 7: 229-234.

Shark Alliance. 2007. A dark day for dogfish: CITES fails to safeguard sharks from unsustainable trade [press release], Brussels (15 June 2007).

Sky, B.M. 2010. Getting on the list: politics and procedural maneuvering in CITES Appendix I and II decisions for commercially exploited marine and timber species. *Sustainable Development Law and Policies* 10: 35-40.

Snowe, O., Kerry, J., Collins, S., Shaheen, J., Burr, R., Hagan, K., Kirk, P., Gregg, J., Warner, M., Jones, W.B., Frank, B., Delahunt, B., Wittman, R., Pallone, F., LoBiondo, F., Bishop, T., Pingree, C., McIntyre, M., Adler, J., Shea-Porter, C., and Tierney, J. 2009. Letter to the US Department of the Interior Sec. Ken Salazar and US Department of Commerce Sec. Gary Locke. October 9, 2009. Available at http://ahabsjournal.typepad.com/ahabs_journal/2009/10/jones-spearheads-letter-opposing-spiny-dogfish-cites-listing.html (February 2013).

USOFR. 2007. U.S. Office of the Federal Register. Conference of the Parties to the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), fourteenth regular meeting, tentative U.S. negotiating positions for agenda items and species proposals submitted by foreign governments and the Cites Secretariat, Federal Register 72(105): 30606-30623.

USOFR. 2012. U.S. Office of the Federal Register. Conference of the Parties to the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), sixteenth regular meeting, taxa being considered for amendments to the CITES Appendices. Federal Register 70(77): 21798-21802.

Wells, S.M., and Bardzo, J.G. 1999. International trade in marine species: is CITES a useful control mechanism?. *Coastal Management* 19: 135-154.

Young, S. 2003. Contemporary issues of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) and the debate over sustainable use. *Colorado Journal of International Environmental Law and Policy* 14: 167-189.

Table 2.1: History of shark species discussion for listing under CITES since 2002. CoP = CITES Conference of the Parties.

Year	Proposer	Elasmobranch species and proposition	Final Decision
2002	United Kingdom and Ireland	Basking shark (*Cethorinus maximus*) in App. II	Recommended for listing and discussed at 12th CoP Majority of votes reached at 12th CoP; species listed in App. II
	India, Philippines and Madagascar	Whale shark (*Rhincodon typus*) in App. II	Recommended for listing and discussed at 12th CoP Majority of votes reached at 12th CoP; species listed in App. II
2004	Germany	Spiny dogfish (*Squalus acanthias*) in App. II	Not supported by the EU and not submitted for discussion
	Germany	Porbeagle shark (*Lamna nasus*) in App. II	Not supported by the EU and not submitted for discussion
	Madagascar and Australia	White shark (*Carcharodon carcharias*) in App. I	Proposition changed to App. II; recommended for listing and discussed at 13th CoP Majority of votes reached at 13th CoP; species listed in App. II
2007	Germany	Spiny dogfish (*Squalus acanthias*) in App. II	Recommended for listing and discussed at 14th CoP Majority of votes not reached at 14th CoP; species not listed
	Germany	Porbeagle shark (*Lamna nasus*) in App. II	Recommended for listing and discussed at 14th CoP Majority of votes not reached at 14th CoP; species not listed
2010	Sweden and Palau	Spiny dogfish (*Squalus acanthias*) in App. II	Recommended for listing and discussed at 15th CoP Majority of votes not reached at 15th CoP; species not listed
	Sweden and Palau	Porbeagle shark (*Lamna nasus*) in App. II	Recommended for listing and discussed at 15th CoP Majority of votes not reached at 15th CoP; species not listed
	U.S. and Palau	Hammerhead shark (*Sphyrna lewini*) in App. II	Recommended for listing and discussed at 15th CoP Majority of votes not reached at 15th CoP; species not listed
		Oceanic whitetip shark (*Carcharhinus longimanus*) in App. II	Recommended for listing and discussed at 15th CoP Majority of votes not reached at 15th CoP; species not listed
2013	Brazil, Colombia and U.S.	Oceanic whitetip shark (*Carcharhinus longimanus*) in App. II	Recommended for listing and discussed at 16th CoP Majority of votes reached at 16th CoP; species listed in App. II
	Brazil, Colombia, Costa Rica, Denmark, Ecuador, Honduras and Mexico	Scalloped hammerhead shark (*Sphyrna lewini*), great hammerhead shark (*Sphyrna mokarran*) and smooth hammerhead shark (*Sphyrna zygaena*) in App.II	Recommended for listing and discussed at 16th CoP Majority of votes reached at 16th CoP; species listed in App. II
	Brazil, Comoros, Croatia, Denmark and Egypt	Porbeagle shark (*Lamna nasus*) in App. II	Recommended for listing and discussed at 16th CoP Majority of votes reached at 16th CoP; species listed in App. II
	Brazil, Colombia and Ecuador	Manta spp. including giant manta ray (*Manta birostris*) and reef manta ray (*Manta alfredi*) in App. II	Recommended for listing and discussed at 16th CoP Majority of votes reached at 16th CoP; species listed in App. II
	Colombia	Ceja river stingray (*Paratrygon aiereba*) in App. II	Recommended for listing and discussed at 16th CoP Majority of votes not reached at 16th CoP; species not listed
	Colombia and Ecuador	Ocellate river stingray (*Potamotrygon motoro*) and rosette river stingray (*Potamotrygon schroederi*) in App. II	Recommended for listing and discussed at 16th CoP Majority of votes not reached at 16th CoP; species not listed

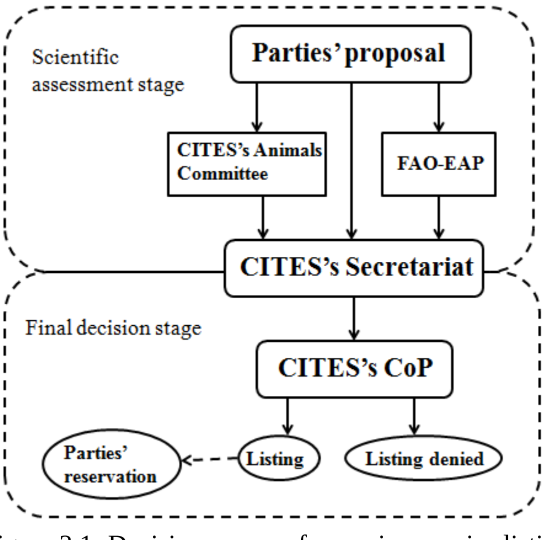

Figure 2.1: Decision process for marine species listing in CITES. Dashed arrow indicates possible decision made by Parties after listing occurred.

Chapter 3

THE EUROPEAN FISHERY MANAGEMENT SYSTEM AND THE SUSTAINABLE USE OF SPINY DOGFISH IN EU WATERS

Abstract

The Common Fisheries Policy (CFP) is the fishery governance system in play for European fishery resources, and it was first adopted in 1983 to reach the twofold objectives of maintaining the sustainability of resources while providing for the economic efficiency and competitiveness of the European Community fishing sector. Despite significant effort and resources devoted to enhance its performance, this fishery management system proved to be ineffective for resources conservation and economically inefficient. The aim of this chapter is twofold. The first objective is to provide a review of the causes that led to a failure in fulfilling the objectives of two out of three of the benchmarks of the CFP: the conservation policy; and the structural policy. A thorough analysis of possible causes for the failure points to the adoption of the principle of relative stability and the lack of effective power at the hand of the European Commission. The solution for the major issues within the framework of the CFP would be the complete restructuring of the fishery governance in order to attain more harmonious development of the conservation and economic objectives. However, in order to reach these objectives a strong political willingness to alter long-term historical socio-economic equilibriums is needed. Considering the current economic recession affecting the world and the political and socio-economic differences among European countries, this path seems infeasible at the moment. The second objective of this chapter is to discuss the management of European spiny dogfish populations, particularly the Northeast Atlantic stock, in light of the discussed inadequacies of

the CFP as fishery regulatory system. The management of this important commercial stock has been widely deficient in term of sustainability, for the same reasons described above. Therefore, the CFP seems not to be an effective management system to provide sustainable exploitation for European spiny dogfish populations, which has further affected their conservation status over the last decades.

Introduction

The international state of fishery resources is alarming, with signs of serious problems continuously reported (Cochrane, 2000). Globally, about 75% of all commercial stocks are estimated to be fully exploited, overused, or collapsed and in a state of recovery (FAO, 2004), while most of the stocks of the top ten commercial species, accounting for about 30% of the reported total world marine catch production in terms of quantity, are considered fully exploited (FAO, 2010). In addition, employment in fishing is decreasing in the more capital-investing countries, particularly in Europe and North America, as the result of decreased catches, adoption of management regulations to reduce fishing capacity, and increased productivity by means of technical progress (FAO, 2010).

The reasons for the problems currently affecting the effectiveness of fisheries management throughout the world have being widely recognized and extensively discussed, and can be placed into four categories: *i*) high biological uncertainty; *ii*) the conflict between ecological constraints and socio-economic priorities; *iii*) poorly defined objectives; and *iv*) institutional weaknesses, particularly in achieving co-responsibility between management authorities and individuals (Cochrane, 2000).

Among the most debated fisheries management systems, the Common Fisheries Policy (CFP) of the European Union (EU) probably represents the one that has been studied the most, but also the one that has been questioned the most in terms of success. Fishery statistics reported in 2009 by the Green Paper (EC, 2009), which aims at promoting the reform of the CFP after 2013, stated that 88% of the European stocks were overfished and profit margins of the fishing industry were continuously declining.

The CFP is seen by most as a practical failure in terms of biological conservation, economic, legal, and political perspectives (Morin, 2000; Daw and Gray, 2005; Khalilian et al., 2010). The aim of this chapter is twofold. The first objective is to review the most clearly identified causes for the lack of CFP effectiveness in achieving sustainable fishery exploitation and economic efficiency in the use of resources. The second objective is to discuss the weaknesses of the CFP framework with regard to the management of European spiny dogfish populations. This information is intended to provide a sound background for assessing whether the European fishery management system has been effective in providing the sustainability of its spiny dogfish fisheries. An introductory description of the concept of fishery governance and the different strategies most commonly employed to managing fishery resources is followed by a detailed description of the fishery governance in force for the EU-CFP, for which a more thorough analysis of the two major historically recognized issues within the CFP provision, the quota allocation system, and the presence of economic incentives or subsidies, is further developed. The management of European spiny dogfish populations, particularly for the Northeast Atlantic stock, is further discussed based on the inadequacies of the CFP identified here. Finally, ideas are summarized with suggestions to solve or ameliorate the governance problems discussed.

Fishery Governance and management objectives

In general terms, *Governance* is the institutional process of making decisions for the collectivity by implementing binding relationships between and among individuals (Shafritz, 1988; Williamson, 1994). Accordingly, the *Fishery Governance* consists of the legal, social, economic, and political arrangements employed by institutions to manage fishery resources (FAO, 2005a), which is accomplished through the use of *government* and *control* (Hanna, 1999).

This term has recently regained momentum in the realm of natural resources management, as governance incorporates the concepts of transaction costs and behavior connecting institutions to individuals, which remains external to the narrower terms of government and control (Hanna, 1999).

The challenge of fishery governance is that, in order to be effective, it must accommodate the best trade-off among different biological, ecological, social, economic and political components, which are dynamic and conflicting over time, but nevertheless naturally intertwined. This "bundle of sticks" has the characteristic of a food recipe, with each of the components representing a specific ingredient. Although each consumer may be induced to adjust proportions among ingredients based on personal taste, each of the ingredients must be included in the basket to obtain the right final product. On the contrary, fishery managers, as pointed out by Hanna (1999), have typically selected specific items (e.g., objectives) from a "cafeteria" list in response to immediate sources of political or economic pressure. This approach has allowed fishery managers to have a short-term flexibility in achieving some specific political objectives, but has failed in the long-term to account for community and ecosystem complexities and their requirements in response to changes. The result so far has been that fishery managers have been unable to integrate these components effectively and, more importantly, they have been unsuccessful in working with the interrelationships across all components in a systematic (and perhaps unbiased) fashion. This further amplifies the level of uncertainty associated with the information used and eventually undermines the accountability and objectivity of the whole fishery management decision-making process.

Fishery resources are considered as a "natural capital" (Pearce, 1988; Harris, 2006), for they are a stock of natural ecosystems that yields a flow of valuable goods and services that can potentially be indefinitely sustainable into the future (Costanza and Cleveland, 2008). Consequently, fishery governance must regulate the human exploitation of this natural capital at a level that will ensure the persistence of the stock and the flow of ecosystem goods and services for future generations.

Historically, two main classes of fishery management measures have been employed worldwide to manage fishery resources: biological and economic (Figure 3.1). Biological methods, such as mesh size restrictions, minimum size for individuals to be caught, total allowable catches (TACs), area closures, season closures, protection of nursery grounds, etc., are often considered to be effective in conserving fish stocks, but have commonly failed to improve fishery economic standards because they do not apply appropriate shadow cost of harvesting on the fishing firms (Arnason, 2000).

Economic fishery management methods can be divided into direct restrictions and indirect restrictions (Figure 3.1). Direct restrictions, such as limitations on days at sea, fishing times, engine size, vessel size, holding capacity of vessels, etc., have also being failing in imposing appropriate shadow cost of harvesting on fishing firms, as fishers are still encouraged to exploit the fish stock until all economic marginal profits in the fishery have been used (Arnason, 2000). In theory, indirect restrictions such as taxes, subsidies, and property rights-based instruments (e.g., individual transferable quotas - ITQs) have been identified to be more successful in improving both conservation and economic objectives of a particular fishery management governance (Arnason, 2000). Among these measures, ITQs have been recently expanded worldwide as a form of management, particularly in New Zealand, Iceland, Canada, and Australia (Sanchirico et al., 2006). Some researches have shown that ITQs, depending on the specific fishery governance at hand, can be effective in achieving sustainability and profitability of fisheries (Newell et al., 2005; Sanchirico et al., 2006), although it might be more challenging to achieve these objectives in multispecies fisheries (Copes, 1986).

The EU fishery management system

The Common Fisheries Policy (CFP) is the EU's instrument to manage fishery resources, and it aims to enhance fishery sustainability and economic competitiveness of the fishing industry. The general objectives of the CFP, which originated from the Treaty of Rome (1957), are specified in Article 39: *i*) to increase productivity; *ii*) to improve fishing communities standards of living; and *iii*) to stabilize market supply and prices to the benefit of the consumers. The first council regulations specific for fisheries were developed in October 1970, and they were meant to address the structural policy (Council Regulation 2140/70) and the market policy (Council Regulation 2142/70) within the EU's fishery governance. At the same time, European fishery authorities did not consider addressing fish stock conservation measures in a conservation policy, likely because they did not believe commercial stocks were in need of protections. The final version of the CFP was finally drawn and adopted on 25 January 1983. It contained 12 regulations incorporating the three benchmarks of the CFP system: structural policy, market policy, and conservation policy. The most important of these regulations was Council Regulation 170/83 establishing a Community system for the conservation and management of fishery resources, which constitutes the basis for the conservation policy within the CFP regulatory system.

The CFP adopts two types of instruments to conserve fish stocks within its jurisdiction: Total Allowable Catches (TACs), which set the total amount of a fish stock that can be landed in a particular area; and technical measures including gear regulations, closed seasons, closed areas, and minimum sizes for individuals to be caught (Daw and Gray, 2005). In considering the inherent difficulties of allocating fish stocks among member states, policy makers decided to adopt TACs as they are easier to negotiate, simple to define, and more straightforward to predict for the fishing industries (Gezelius, 2008). The allocation for each European country was considered based on three main points: *i*) historic catches by member states within the period 1973-1978; *ii*) preferences favoring Ireland, the UK and Greenland (because those areas were heavily dependent on fisheries); and *iii*) losses of fishing opportunities suffered particularly by Germany and UK in the course of the creation of the Exclusive Economic Zone (EEZ) (Holden, 1994). The direct consequence of these decision criteria is that the TAC distribution of fisheries resources has been built on the principle of *relative stability*: a system assuring to each EU member state that its future plans on fishing industry' specific tonnages would not be infringed upon. This principle provides to the fleet of each member state the same percentage of the TAC for each type of stock over the years, and it was maintained unaltered in Council Regulation (CR) 3760/92 and CR 2371/02.

Within the CFP, the precautionary biomass limit B_{pa} has being most commonly used as a management target. This represents the stock size below which the reproductive capacity of the stocks may be reduced. Because of greater uncertainties regarding a species stock size, B_{pa} is set at higher levels than the traditional biomass limit $B_{lim,}$ and usually at a value of 30% of the unexploited stock size biomass level $B_{0.}$ The status of the European stocks, relative to their B_{pa}, is based on scientific stock assessments conducted by the International Council for the Exploration of the Sea (ICES). Results from those assessments are discussed by the ICES Advisory Committee on Fishery Management (ACFM), and reported as scientific advice to the European Commission (EU Commission). The EU Commission then develops a proposal based on that advice including discussions with the Scientific, Technical and Economic Committee on

Fisheries (STECF) and the European Parliament Fisheries Committee (EPFC). This proposal is finally discussed by the European Council (EU Council), which is formed by national ministers from each member state. The EU Council has the final authority in setting TACs for the upcoming year for each stock (Figure 3.2). Each member state has the responsibility to manage its own quotas as it wishes, as long as it does not exceed the quotas. Therefore, the EU fishery management policy is based on the division of responsibility between the EU and the member states (Frost and Andersen, 2006).

The ineffectiveness of the EU's TAC system

With regard to setting TACs, the scientific advice being ignored by the EU Council is viewed as one of the major causes of failure of the CFP in relation to fishery stock conservation (Daw and Gray, 2005). Karagiannakos (1996) analyzed trends from 1980 until 1994, for which TACs were reported to be frequently set higher than the levels recommended by scientists. This pattern continued even after the reform of the CFP in 2002. For example, in 2002, ICES advice for the North Sea cod (*Gadus morhua*) fishery was for a complete moratorium on all cod catches whether targeted or as bycatch. The Commission's STECF accepted the advice but the EU Commission opted to propose an 80% reduction in the cod TAC. The final decision of the EU Council was for a 45% reduction in TAC in conjunction with effort limitation (Daw and Gray, 2005). The EU Council has been highly criticized for systematically watering down scientific advice, which reduces the effectiveness of conservation measures and effort proposed by the EU Commission under ICES stock assessment advice. In addition, according to Da Rocha et al. (2012), the level of compliance of the TAC regulation by each member state is also low. By combining data of the ICES scientific recommendations, TACs approved, and reported landings, authors described the lack of a regular pattern between TACs proposed and TACs approved

(Figure 3.3a), while the presence of a regular pattern between TACs approved and reported landings (Figure 3.3b). In fact, reported landings were almost always above the limit representing total agreement between TACs approved and reported landings. Authors interpreted these results as an indication of the persistence of a regular lack of enforcement at the national level (Da Rocha et al., 2012).

According to Froese (2011), the lack of success of the EU-CFP in managing fishery resources sustainably is a desired outcome of the CFP, due to collusion between fishery managers and the fishing industry, which has allowed the fishing lobby to infiltrate the EU's political system. The author noticed that it is up to member states to make and implement the decisions made by the EU Council and to control compliance by fishers. In most member states, this power is held by the Ministry of Agriculture, and many of these ministries have close relationships with the fishing lobby. This inevitably brought to most of those ministers protecting the rights of their national fishing sector, perpetuating the rights to obtain subsidies and to overfish (Froese, 2011). The result is that the majority of the most important European commercial stocks are overfished and profit margins for the fishing industry have been continuously declining (EC, 2009).

The weakness of the TAC allocation system in the EU-CFP has been regarded as a socio-political issue that does not solve the inevitable negative externalities that are associated with problems related to "common pool" resources, such as fisheries (Franchino and Rahming, 2003). The framework of the TAC's system in the context of the CFP fishery governance (Figure 3.2) simply transfers a market problem into a political setting, leading to the familiar "Tragedy of the Commons" scenario described by Hardin (1968).

Gezelius et al. (2008) described the institutional failure of the CFP as an example of the "principal-agent" approach, in which two actors, a principal and one or several agents, are at work. The principal delegates tasks to other agents, while making sure that they perform the requested delegated tasks according to the principal agent's requirements. Applying this approach to the CFP institutional framework, the EU Commission is the principal and each of the member states are the agents performing the specific delegated tasks for the conservation policy (Gezelius et al., 2008).

Criminal drift is a drift that is directly against the rules, while non-criminal drift is a drift that is not directly against the rules but it presents a conflict with the original intention of the rules or its overall objectives. When looking at the CFP, the TAC system is an example of non-criminal drift for the conservation policy, for which TAC shares allocated to each EU member state are stable in time under the principle of "relative stability". Consequently, each state is caught in a "prisoner's dilemma" in relation to resource exploitation and their conservation (Raakjær, 2011). The result is that agents (EU states) have strong incentives for drifting toward national priorities at the expense of the principal (European Community) priorities and conservation concerns (Raakjær, 2011).

This political and economic conundrum can be represented as a game of distributive politics characterized by a specific preference configuration. Franchino and Rahming (2003) adapted the formulation developed by Lohmann and O'Halloran (1994) for the American trade policy specifically for the EU-CFP. They described the utility function of each government i as:

$$U_i(p_1, \ldots, p_n) = ßp_i - p_i^2 - \gamma \Sigma j\epsilon_{N/i}\, p_j^2 \qquad \text{[Eq.1]}$$

Where p_i is the country-specific fishery measure (e.g., the country's TAC quota under the relative stability allocation) for $i \epsilon N = \{1, \ldots, n\}$, *ß* is a weight representing the fishery-specific conditions, γ measures the negative cross-country effect of setting the measure (Franchino and Rahming, 2003). According to this equation each member state considers the benefits $ßp_i$ and the costs p_i^2 accruing to itself in setting TAC, but also, more importantly, the utility of each state is a function of the decisions taken by each of the other states $j_{th}(\gamma\Sigma\, p_j^2)$. The utility of each state is maximized for $p_i = ß/2$, meaning that this measure is a function of the fishery specific-conditions, but leads to inefficiency. The reason is that, for country i, the effect of setting this specific measure (e.g., a specific TAC for a stock) on other member states is not part of its utility function (Franchino and Rahming, 2003). This economic problem for the TAC allocation system within the CFP framework then transfers to the political setting, as the EU Commission has a wide constituency that is more independent from short-term political pressure than the EU Council. Despite scientific advice, the EU Council has a long history of decisions to set higher quota limits for important commercial stocks, including cod, haddock (*Melanogramus aeglefinus*), whiting (*Merlangius merlangus*), and plaice (*Pleuronectes platessa*). The level of TACs set by the EU Council is mainly determined by political decisions pertaining to each member state, as no fisheries minister aims at losing votes by raising discontent within his/her national electorate as a consequence of losses due to quota reductions (Holden, 1994; Markus, 2009).

Clearly, there is a disconnect between the EU Commission and the EU Council for determining which TAC value should be set for each stock, although the information available to the former are based on scientific assessment provided by ICES. Furthermore, final decision ruling pertains to the EU Council, which indicates the presence of a top-down decision making process for the TAC allocation system, with effective lack of decisional power for the EU Commission limiting its scope and authority. Therefore, the TACs within the CFP fishery governance are actually affected by political (the principle of relative stability) and socio-economic (the prisoner dilemma for each country) issues that undermine its overall effectiveness in reaching purported conservation and economic objectives for the European fisheries.

Another relevant deficiency of the TAC allocation system is that a set amount of quota is assigned to only specific ICES marine areas, with no provision for other important Community fishing areas, such as the Mediterranean and Black Seas, where a scientific board advisor similar to ICES is not in force. Therefore, the Mediterranean Sea is actually lacking any form of TAC for any of its fisheries (except for tuna), although the area is technically under the CFP governance. For this area the EU Commission relies on information provided by local national fishing authorities, which may all be using different standards and stock assessment procedures, virtually complicating the EU Commission's work in developing proposed quotas. As a consequence, the EU Commission views the current scientific advice on Mediterranean fisheries as insufficient (Markus, 2009). The state of fisheries resources in the Mediterranean is considered particularly critical, with most of the demersal, small pelagic, and highly migratory species considered overexploited (FAO, 2005b).

The role of subsidies in the EU fishery regulation system

Another failure of the CFP, which has contributed to the depletion of fishery resources and to weakening of the economic objectives of the CFP governance, was the use of financial subsidies provided by EU and member states to commercial fishermen, which resulted in overcapitalization. The EU Commission (EC, 2009), recognized the contradictory aspect of this practice within the policy objectives, noting that public financial support to the EU's fisheries sector was substantial, but at the same time incompatible with the need to reduce overcapacity (Markus, 2010).

The long-term objective of the structural policy, since its first adoption in 1983, was to maintain the economic viability of the fishing industry, while enhancing the sustainable exploitation of fishery resources (Holden, 1994). To strike the balance between these two main objectives, under the provision of the structural policy, a series of four Multi-Annual Guidance Programs (MAGPs) were introduced between 1983 and 2002. The purpose of the MAGPs was to adjust the European fishing fleet capacity in order to reach specific targets for sustainability and economic efficiency, for which vessel decommissioning and effort reduction measures were employed. In 1997, it was reported that of the US$ 310 million of decommissioning subsidies, 99% were accounted for by the EU (Munro and Sumaila, 2002).

The first series of these programs, the MAGP-I, was adopted between 1983 and 1986, for which an integrated program was further adopted specifically for the Mediterranean area in 1985. The second version, the MAGP-II, was adopted between 1987 and 1991. The third version, the MAGP-III, was issued for the period 1993-1996; and, finally, the last version, the MAGP-IV, was in force between 1997 and 2002, for twenty years of total extent for the MAGP's provision (Markus, 2009).

For each of these programs, a series of multi-annual capacity targets were created specifically for each EU member state in order to remove excess fishing capacity of the European commercial fishing fleet. Despite all the effort devoted to increase the performance of the MAGPs, during the reform for the CFP in 2002, the EU considered this system too complex to effectively limit fishing capacity as it was divided up into different sectors for each of many fleet segments, and it proved to be particularly difficult to administer and enforce (EC, 2002). Therefore, it was substituted with a simplified system of "entries and exits" that lasted until 2007. In this new system a new entry into the fishing fleet must be accompanied by the withdrawal of a vessel with equivalent capacity in order to maintain an entry/exit ratio of 1 to 1 (Frost and Andersen, 2006).

During the above-mentioned period (1983-2007) the main goal of the EU in adopting the MAGPs was to reduce the number of fishing vessels, the number of crew members, the vessel gross tonnage (GT), and the overall power (kW) of the fishing fleet. Results for the period between 1990 and 2007 indicate that the number of fishing vessels decreased by 28.4%, the number of crew members fell by 54.5%, the GT decreased by 25.4% and the power in kW of the EU fleet was reduced by 26%, which indicate that the overall proposed targets were reached (Perez-Labajos, 2012). However, compared to the past, the new “average fishing-vessel” was more technologically advanced (less crew members required to operate), was of greater size, greater fishing capacity, and greater autonomy, as the more technologically-advanced engines consumed less (Perez-Labajos, 2012). A historical analysis on the evolution of the EU fishing fleet between 1993-2000 for the 11 countries facing the Atlantic Ocean reported that, although the fleet was effectively reduced by almost 8,500 vessels and 800,000 in kW power, the mean fleet capacity increased by 44,000 t, for an average of 44 t per country (Surìs-Regueiro et al., 2003). Overall, the result of large subsidization helped fishermen to bypass changes in management regulations that were implemented originally to reduce fishing effort. On the contrary, subsidies actively contributed to maintain the level of fishing effort causing overcapitalization and unsustainable exploitation of fishery resources.

Commercial fishers who decided to remain in the fishery were largely supported by financial aid provided by the EU and each member state for vessel renewal and modernization in order to restructure the remaining fishing fleet. The main objective of the financial aid was to improve catch quality and safety at sea for commercial fishermen and vessel operators (Lindebo, 2005). According to the original intention of managers, vessels remaining in the fishery should have benefited from an improvement in the economic viability of the fishery, due to improved quality of catches, a reduction in fixed costs, and an overall achievement of more secure economic and social conditions for the European fishing sector (Lindebo, 2005). However, the adoption of subsidies in various forms (e.g., direct financial aid, tax exemption, fuel subsidies, etc.) worked against the objective of vessel decommissioning regulations in the first place and fostered overcapitalization of the fishing sector, which further enhanced inconsistency between the objectives of the structural policy and the conservation policy of the CFP.

Although fisheries are no longer subsidized in a direct way, indirect subsidies have been allowed, such as tax exemptions for fuel or for modernization of fishing fleets. Those forms of subsidies can either induce further market entry, or maintain the fleet capacity at excessively high levels (Khalilian et al., 2010). For example, fuel subsidies granted by governments to the fishing sector can significantly reduce overall fishing costs and the benefit of other management measures adopted to regulate the fishing effort, particularly when adopted after increases in fuel prices (Milazzo, 1998; Sumaila et al., 2008). The profit function for a fisherman without fuel price increase and no fuel subsidies, π_0, can be expressed by the following equation representing the difference between total revenue (TR) and total costs (TC) (Sumaila et al., 2008):

$$\pi_0 = \mathrm{TR} - \mathrm{TC} = pH(x, E) - C\,(E(f,o)) \qquad \text{[Eq. 2].}$$

In this equation, p is the profit price from the catch (H), x is the stock size, and E is the fishing effort. The first part of the equation represents TR. The second part of the equation represents TC, which is a function of the fishing effort E depending on fuel costs (f) and other costs (o). According to this equation, the higher the f, the lower the profit for the fisherman, other things being equal. When the fuel price increases from f to f', with $f' > f$, the profit will be less. In the case of fuel subsidies (s), $0 < s \leq (f' - f)$, the effect of the increase price in fuel cost is reduced or completely negated (Sumaila et al., 2008). Using the Gordon-Schaefer model (Gordon, 1954), Figure 3.4 illustrates the possible consequences for an increase in fuel prices to fishing effort in an open-access fishery (Sumaila et al., 2008). In the basic model (Figure 3.4a) the TR and the total cost function TC_0 find a natural equilibrium for the fishing effort E. With the increase in fuel price, the TC_0 curve shifts to a higher value TC_0' with a higher value of the slope line, which causes the fishing effort at the equilibrium to decrease from E_0 to E_0' (Figure 3.4b). With the adoption of fuel subsidies, and depending largely on their magnitude, the TC_0 curve function can swing anywhere between TC_0', with a reduction in fishing effort at equilibrium E_0', and TC_{0f2}, with an increase in fishing effort at equilibrium E_{0f2} (Figure 3.4c and 3.4d) (Sumaila et al., 2008). Fuel subsidies provided by the EU could have had the effect of negating the expected sustainability value of a fuel price increase. For example, in October 2005, the Spanish government increased fuel subsidies up to 60% after local fishers blocked normal operations in several Mediterranean ports (Sumaila et al., 2008). This example reveals that political and social concerns, rather than sustainability in resource exploitation, may influence the decision to provide fuel subsidies (Sumaila et al., 2008).

The consequent overcapitalization experienced by the European fishery sector led to continued exploitation of fishery resources at unsustainable levels, and this result was further amplified by the constantly large gap between TACs proposed by the EU Commission and the TACs adopted by the EU Council for the most important commercial stocks. Consequently, the economic benefit of the fishery sector has being continuously declining, along with the conservation status of fish stocks and their ecosystems.

The negative effects of overcapitalization generated during the aforementioned period did not only affect the conservation status of the most important commercial stocks, but also harmed conservation of less important commercial species holding a central ecological role for the ecosystem, such as sharks and rays. For example, in Italy the adoption of the law 41/82 in 1983, which is a direct consequence of the adoption of the CFP in 1983, led to an unpredicted increase in the exploitation of elasmobranchs (sharks and rays) in Italian waters as a consequence of changes in the fishery management system (Dell'Apa et al., 2012). The introduction of management changes lead to a reduction in the fishing effort on target species after 1983, but also to an increase in elasmobranch landings to values that were never recorded in the previous period and that lasted for almost a decade. The result was that the annual landings for elasmobranchs between 1997 and 2004 decreased 77% compared with the period 1959-1982 (Dell'Apa et al., 2012). Authors suggest that fishing activities were subject to increased management restriction for area and species, which in turn incentivized fishermen to shift their effort on non-target species such as sharks and rays (Figure 3.5a and 3.5b). In addition, during the period of maximum elasmobranch exploitation, fishermen were receiving subsidies from the EU Community that helped in enhancing overcapitalization. In fact, between 1985 and 1992 the fishing effort remained stable, indicating that the objective of vessel decommissioning was not fulfilled as expected (Figure 3.5a) (Dell'Apa et al., 2012).

The management of European spiny dogfish stocks within the CFP framework

Based on tagging studies, and results from both fishery-dependent surveys and commercial landing statistics, the Northeast Atlantic spiny dogfish population is actually considered as a single unit stock distributed from the Bay of Biscay to the Norwegian Sea (Pawson et al., 2009). Spiny dogfish (called spurdog in Europe) are also the most commercially important shark species in the Northeast Atlantic, and this stock has been widely exploited for commercial purposes (Hammond and Ellis, 2005). With the expansion of commercial fisheries after the Second World War, elasmobranch landings increased, particularly for spiny dogfish. Historical data on spiny dogfish landings started to be collected by ICES in the early 1900s, although they were included in the generic category of dogfish, for which other Squalidae (e.g., *Squalus blainvillei*), Triakidae (e.g., *Mustelus* spp., and *Galeorhinus galeus*) and Scyliorhinidae (e.g., *Scyliorhinus canicula*) shark species may have been included (Pawson et al., 2009). These historical landings data indicate that spiny dogfish exploitation increased during the 1920s and late 1930s, expanded further after the Second World War to reach a peak of almost 60,000 mt at the end of the 1960s, and then consistently declined (ICES, 2005). Over the last 20 years, difficulties in determining the total landings of spiny dogfish in the Northeast Atlantic resulted from several countries continuing to pool together different shark species and some illegal misreporting of teleost species as spiny dogfish in order to circumvent restricting quotas (ICES, 1997). Historical landings for spiny dogfish consistently declined between the 1970s and mid-1990s, with a decline of more than 50% between 1987 (43,000 mt) and 1994 (less than 20,000 mt). Interestingly, a recent review paper on the evolution of spiny dogfish fisheries in the Northeast Atlantic (Pawson et al., 2009) indicate that, in a nation-by-nation analysis, spiny dogfish landings consistently decreased in each of the countries considered (from Portugal to Norway from west to east, including Ireland, UK, and Iceland), between the late 1990s and the present. This consistent decrease in spiny dogfish commercial landings was also confirmed from fishery-independent trawl surveys (Jones et al., 2005), which indicated a greater than 75% decrease in survey CPUE since 1985, and from a Bayesian-Schaefer-model stock assessment of the Northeast Atlantic stock (Hammond and Ellis, 2005), which suggested that the stock was depleted to about 2-9% of its virgin biomass. These results suggest that the Northeast Atlantic stock is severely depleted, and its conservation status may be further exacerbated by the fact that spiny dogfish represent a commonly reported bycatch species from fisheries targeting teleost species, mainly otter trawls and seines targeting whitefish (gadoids and flatfish) (Pawson et al., 2009), and longline and gillnet fisheries (Fahy and Gleeson, 1990; Fahy, 1992).

Despite these consistently reported decreases in landings for the Northeast Atlantic spiny dogfish stock since the 1960s, only recently did the EU insert the stock in the TAC system within the framework of the CFP. The North Sea (ICES area IV) spiny dogfish stock has been under TAC management since 1988, with TAC reductions in 2002 and annually since 2004, although not based on scientific evidence (Pawson et al., 2009; CoP15 Prop.18, 2010). In 1998, Norway (which is not an EU member) introduced a minimum landing size (70 cm), and in 2007 banned fishing and landings of spiny dogfish in the Norwegian EEZ and international waters in ICES areas I-XIV (CoP15 Prop.18, 2010). No regulations were in force for the species in other EU areas. The EU Commission first started to request advice on the conservation status of the Northeast Atlantic spiny dogfish stock by ICES back in 2005, and the scientific advice received was alarming. ICES-WGEF (2006) concluded that depletion levels ranged from 5.2–6.6% relative to 1905 and from 5.2–7.1% relative to 1955, and warned that the stock was in danger of collapse. Given this concern, in 2006 the advice was (ICES, 2006) that: "*The stock is depleted... The frequency of the occurrence of spurdog in trawl surveys has declined... Survey CPUE also indicates a declining trend. The absolute level of exploitation is unknown but the trends in fishing mortality and the continuous decline in landings indicates that exploitation has been, and continues to be well above sustainable levels... Targeted fisheries should not be permitted to continue, and by-catch in mixed fisheries should be reduced to the lowest possible level. The*

TAC should cover all areas where spurdog are caught in the northeast Atlantic and should be set at zero for 2007". However, as for the majority of other important commercial stocks in the Northeast Atlantic, the EU Council continued to set higher limits for the TACs, watering down and ignoring the EU Commission's recommendations (Markus, 2009). For example, the 1999 TAC was set at 8,870 mt, more than twice the total reported landings for the ICES North Sea area for the previous year (3,288 mt were taken in 1998). In 2002, the TAC was reduced by 36% to 5,640 mt, yet was still nearly five times the total North Sea and UK reported landings for the previous year (1,795 mt and 1,006 mt for 2001, respectively) (Fordham and Dolan, 2004). After repeated attempts, in 2010 the EU Council followed ICES scientific advice proposed by the EU Commission and closed the fishery in the Northeast Atlantic (although still allowing a 10% by-catch) for 2011 (Council Regulation 57/11). This regulation was further amended in 2012 (Council Regulation 43/12). Surprisingly, in 2012, the EU Commission declared the Northeast Atlantic spiny dogfish stock as no longer overfished (EC, 2012). However, this decision was part of a consultation process in which the EU Commission was asking for the views of each member state and stakeholder in setting TACs for the following years, and therefore has not yet been used to reopen the direct fishery for the Northeast Atlantic spiny dogfish stock.

Considering the species life history characteristics (see chapter 1), which make it particularly susceptible to overfishing, and the long history of commercial exploitation on the Northeast Atlantic spiny dogfish stock, it is questionable whether those measures will be effective in rebuilding the stock. However, as the species has yet to be inserted in CITES's Appendix II for trade regulation purposes, EU member states do not have to depend on the Northeast Atlantic stock any longer. The EU is the main key driver of international trade, and the closing of the important EU fishery in the Northeast Atlantic region will likely shift the exploitation (and the associated trade) to other countries, and possibly enhance the development of other fisheries worldwide (Lack, 2006). The majority of those new potential countries (e.g., Morocco, South Africa, and Brazil) do not have a management plan for the species or detailed assessments on the conservation status of their spiny dogfish stocks, potentially affecting the conservation status of the species worldwide.

Another important contributor to the depletion of EU's spiny dogfish stocks in the Northeast Atlantic and in the Mediterranean Sea was the aforementioned excessive use of commercial fishery subsidies provided to fishers between 1992 and 1997, which caused overcapitalization. For example, within the shark species included in Dell'Apa et al. (2012) that were affected by the introduction of the law 41/82 in Italy in 1983, spiny dogfish was on the list. In addition, other research brought attention to the recent decreases of spiny dogfish (Ferretti et al., 2013) and Squalidae (Gristina et al., 2006) in Italian waters. Interestingly, a recent paper by Barbuto et al. (2010) employing DNA barcoding on blind samples of shark species sold in different Italian fish markets as "palombo" (the Italian vernacular term for smooth-hound shark, *Mustelus* spp.), reported that about 50% of the sharks were actually spiny dogfish. Authors reported as the main reason for this fraudulent practice the existence of significant differences in prices, for smooth-hounds are sold at a price almost double that of spiny dogfish (Barbuto et al., 2010). This finding also suggests that spiny dogfish could have been misleadingly reported in smooth-hound landings over the last decade, adding further to the difficulties in assessing the actual exploitation status of spiny dogfish in the Mediterranean Sea and its conservation status.

In light of these results, it is reasonable to treat with suspicion the effectiveness of the CFP, the European tool for fishery governance, in maintaining both the sustainability of the spiny dogfish fishery and its conservation status within European waters in the long-term.

Discussion

Since its first adoption in 1983, the CFP has been a weak instrument for EU fisheries management despite significant effort and resources devoted over the years to improve its performance in connection with policy revisions in 1992 (CEC, 1991), in 2002 (CEC, 2001), and for the planned revision in 2012-13 (CEC, 2009). According to a recent report, in Europe 88% of fish stocks are being fished beyond Maximum Sustainable Yield (MSY) and 30% of stocks are considered outside of safe biological limits due to overfishing and overcapacity (EC, 2011).

The CFP has failed as the EU fishery governance system in several aspects. An ideal fishery governance program should promote the sustainable exploitation of fishery resources and foster the economic profitability of the fishing industry. These objectives should be achieved by means of coherent laws and regulations that can provide harmonized management. The CFP has not met these requirements, as it has failed to provide a sustainable exploitation of all the major important commercial stocks, including the Northeast Atlantic spiny dogfish stock (and likely also the Mediterranean and Black Seas dogfish stocks), while also potentially harming the conservation status of other non-target species. It has also failed to maintain the competitiveness of the European fishing industry and, finally, it has not succeeded in achieving economic efficiency for the fishing sector in the long-term.

The biological explanations for this failure have not been proposed and discussed in this chapter, as they represent the symptoms and not the real causes of the problem. European commercial fish stocks are in decline due to overfishing that originated from political and socio-economic inadequacies deeply rooted within the original fishery governance system. These system inadequacies prevented the attainment of harmonious trade-offs between conservation and economic objectives, and systematically weakened the effectiveness and consistency of the conservation policy and the structural policy.

The effectiveness of the conservation policy is hindered by the application of the principle of relative stability when it comes to setting TACs, for it does not provide the necessary flexibility in the quota allocation among member states that is required to achieve sustainable exploitation. Within this framework, the TAC's allocation has been ineffective in achieving conservation objectives, and it seems implausible for these objectives to be fulfilled until the principle of relative stability serves as the main pillar for the conservation policy. However, it is likely that this principle will remain unaltered within the management framework for the CFP revision in 2013, as its elimination would require drastic changes in political and socio-economic equilibriums that have been maintained over the last thirty years. A strong political will is needed in order to abolish this principle or to provide for its fundamental reshaping, which at the moment seems to be unlikely.

The effectiveness in achieving sustainable exploitation is also hampered by the presence of a top-down management decision framework that limits the power of the EU Commission and ICES scientific advices (although provided just for the North Atlantic stocks) when final TACs are set. The European fishery governance system gives advantage to national priorities by means of a final decision power residing in the hand of each national fishery minister within the EU Council. In light of these limitations, common measures employed to foster conservation in a TAC system would likely fail. For instance, the introduction of a property-rights regime, such as ITQs, would likely not be effective because the annual quota for each specific stock historically was set too high to ensure sustainable exploitation. In order for ITQs to be effective, the original TAC for the specific fishery should not been set too high (Sinclair et al., 1999). Within the framework of the CFP, a global allocation of ITQs would be required. This global allocation will likely not be effective, particularly for multi-species fisheries (e.g., the Mediterranean and Black Seas). However, some ITQs could effectively be adopted by each member state to manage their specific national quotas, which is a management measure that started to be adopted by some countries such as Denmark, UK, and the Netherlands to manage some of their smaller scaled fisheries (Frost and Andersen, 2006). Additionally, the lack of effective decisional power in the hand of the EU Commission is seriously undermining the effectiveness of the CFP. The belief that each minister within the EU Council will promote the Community instead of national interests is naïve, and it dangerously overlooks the fact that the term “Common Fisheries Policy” has not been truly transferred in common community interests for fishery resources and their management. Therefore, the decisional power should be transferred to the EU Community, as compared to the EU Council can provide, in theory, for a more transparent and unbiased management-decision process.

The large use of subsidies employed in Europe between 1983 and 2002 enhanced the overcapitalization problem and favored the lack of equity in their distribution, so that those countries receiving the subsidies were better off at the expense of all other countries, with associated consequences for distributional equity. Although direct subsidies have not been provided since 2007, other forms of subsidies do exist (e.g., fuel subsidies) which revert or negate the benefit of the structural policy and conservation policy for sustainability and economic efficiency of the European fishing sector. It may be that the adoption of a property-rights system in a “common pool” fishery, such as the European fishery, could remove the negative effects of subsidies. However, not all subsidies can have a negative impact. For example, a recent analysis for the Northeast Atlantic fishery found that, for the year 1997, 48%

of subsidies were neutral or benign, while 46% were damaging for fishery resources management and sustainability, with the remainder (about 6%) not classifiable on the basis of available information (Munro and Sumaila, 2002).

Finally, the CFP has not effectively promoted harmonious development among all European fishing areas. Hadjimichael et al. (2010) reported geopolitical inequalities in the number and distribution of fishery regulations, with fishers in the Northeast Atlantic and Baltic Sea having to cope with more regulations than fishers from the Mediterranean Sea. One of the reasons given by the authors is that policy effectiveness and complexity increase with provided risk assessments (Hadjimichael et al., 2010). The majority of Mediterranean countries are lagging behind in conducting adequate scientific stock assessments compared to the Northern European countries because a scientific board such as ICES is not present in this area. Therefore, a scientific board is needed in the Mediterranean in order to conduct extensive and accountable scientific stock assessments for target and non-target species. Results from these assessments can provide information on the real conservation status of local fishery resources and ecosystems, which will enhance the objectives of the CFP for conservation and economic efficiency.

All of the aforementioned inadequacies and limitations of the CFP, which have prevented this fishery governance system from attaining purported conservation goals for the majority of commercial species, can be translated into ineffective conservation measures for the European spiny dogfish stock as well. In particular, the TACs for the Northeast Atlantic stock were constantly set too high by the EU Council for almost a decade, although scientific advice was calling for a fishery closure. In addition, overcapitalization and subsidies to the fishing sectors in the Mediterranean Sea have likely contributed to the excessive exploitation of spiny dogfish populations in these waters as well. Therefore, it can be concluded that the CFP has not been successful in providing for the sustainability of European spiny dogfish stocks, further questioning the effectiveness of recent management regulations in the Northeast Atlantic that were supposed to rebuild the stock.

In conclusion, one solution to the complex management scenario of the European fishery governance system would call for a radical restructuring of the CFP in a new harmonized fishery governance capable of effectively placing Community interests and priorities before national ones. This would result in a beneficial realignment of the objectives of the conservation and structural policies that will provide consistency in achieving efficient trade-offs between ecological and economic objectives. However, considering the political and socio-economic differences between European states, and the current financial recession affecting the majority of countries in the world, such a path appears to be impractical at the moment.

LITERATURE CITED

Arnason, R. 2000. Economic instruments for achieving ecosystem objectives in fisheries management. *ICES Journal of Marine Science* 57: 742-751.

Barbuto, M., Galimberti, A., Ferri, E., Labra, M., Malandra, R., Galli, P., and Casiraghi, M. 2010. DNA barcoding reveals fraudulent substitutions in shark seafood products: the Italian case of ‘‘palombo” (*Mustelus* spp.). *Food Research International* 43: 376-381.

CEC. 1991. Commission of the European Communities. SEC (91) 2288 final: Report 1991 from the Commission to the Council and the European Parliament on the Common Fisheries Policy. Commission of the European Communities, Brussels.

CEC. 2001. Commission of the European Communities. COM (2001) 135 final: The Green Paper, Volume 1: The Future of the Common Fisheries Policy. Commission of the European Communities, Brussels.

CEC. 2009. Commission of the European Communities. COM (2009) 163: Green Paper-Reform of the Common Fisheries Policy. Commission of the European Communities, Brussels.

Cochrane, K.L. 2000. Reconciling sustainability, economic efficiency and equity in fisheries: the one that got away? *Fish and Fisheries* 1: 3-21.

CoP15 Prop. 18. 2010. Conference of the Parties to the Convention 2010: Proposal 18. Convention on International Trade in Endangered Species of Wild Fauna and Flora. Available at http://www.cites.org/eng/cop/15/prop/E15-P18.pdf (February 2013).

Copes, P. 1986. A critical review of the individual quota as a device in fisheries management. *Land Economics* 62: 278-291.

Costanza, R., and Cleveland, C.J. 2008. Natural capital. In Cleveland, C.J. (ed), Encyclopedia of Earth. Environmental Information Coalition, National Council for Science and the Environment, Washington, D.C.

Council Regulation (EC) N° 57/2011 of 18 January 2011 on fixing for 2011 the fishing opportunities for certain fish stocks and groups of fish stocks, applicable in EU waters and, for EU vessels, in certain non-EU waters. *Official Journal of the European Communities* L24/1.

Council Regulation (EC) N° 43/2012 of 17 January 2012 on fixing for 2012 the fishing opportunities available to EU vessels for certain fish stocks and groups of fish stocks which are not subject to international negotiations or agreements. *Official Journal of the European Communities* L25/1.

Da Rocha, J.M., Cervino, S., and Villasante, S. 2012. The Common Fisheries Policy: an enforcement problem. *Marine Policy* 36: 1309-1314.

Daw, T., and Gray, T. 2005. Fisheries science and sustainability in international policy: a study of failure in the European Union's Common Fisheries Policy. *Marine Policy* 29: 89-197.

Dell'Apa, A., Kimmel, D.G., and Clò, S. 2012. Trends of fish and elasmobranch landings in Italy: associated management implications. *ICES Journal of Marine Science* 69: 1045-1052.

EC. 2002. European Commission. European Commission communication from the Commission on the reform of the Common Fisheries Policy, Roadmap. Office for Official Publications of the European Communities, Luxemburg.

EC. 2009. European Commission. Green Paper: Reform of the Common Fisheries Policy, COM 2009, 163 final, Brussels.

EC. 2011. European Commission. Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions, Reform of the Common Fisheries Policy. Brussels, 13.7.2011 COM 417 final.

EC. 2012. European Commission. Fishing opportunities for 2013: improvements for some fish stocks. European Commission, press release, 8 June, Brussels. Available at http://europa.eu/rapid/press-release_IP-12-584_en.htm?locale=en (May 2013).

FAO. 2004. Food and Agriculture Organization of the United Nations. The State of World Fisheries and Aquaculture. Rome.

FAO. 2005a. Food and Agriculture Organization of the United Nations, Fisheries and Aquaculture topics. What is governance?. Topics Fact Sheets. In *FAO Fisheries and Aquaculture Department* [online]. Rome. Available at http://www.fao.org/fishery/topic/12271/en (October 2012).

FAO. 2005b. Food and Agriculture Organization of the United Nations. Fisheries laws and regulations in the Mediterranean: a comparative study. General Fisheries Commission for the Mediterranean, Rome.

FAO. 2010. Food and Agriculture Organization of the United Nations. The State of World Fisheries and Aquaculture. Rome.

Fahy, E. 1992. The western spurdog *Squalus acanthias* L. fishery in 1989 and 1990, with observations on the further development of the gillnet fishery directed on the species. *Irish Fisheries Bulletin, Department of the Marine* 11: 1-11.

Fahy, E. and Gleeson, P. 1990. The post-peak-yield gill-net fishery for spurdog *Squalus acanthias* L. in western Ireland. *Irish Fisheries Investigations Series B, Department of the Marine* 35: 1-13.

Ferretti, F., Osio, G.C., Jenkins, C.J., Rosenberg, A.A., and Lotze, H.K. 2013. Long-term change in a meso-predator community in response to prolonged and heterogeneous human impact. *Scientific Reports* 3: 1-11.

Fordham, S., and Dolan, C. 2004. A case study in international shark conservation: the Convention on International Trade in Endangered Species and the spiny dogfish. *Golden Gate University Law Review* 34: 531-572.

Franchino, F., and Rahming, A. 2003. Biased ministers, inefficiency and control in distributive policies: an application to the EC fisheries policy. *European Union Politics* 4: 11-36.

Froese, R. 2011. Fishery Reform Slips Through the Net. *Nature* 475: 7.

Frost, H., and Andersen, P. 2006. The Common Fisheries Policy of the European Union and fisheries economics. *Marine Policy* 30: 737-746.

Gezelius, S.S. 2008. The problem of implementing policies for sustainable fishing. In Gezelius, S.S., and Raakjaer, J. (Eds.), Making fisheries management work. Implementation of politics for sustainable fishing, 9-10. Springer, Dordrecht.

Gordon, H.S. 1954. The economic theory of common property resource: the fishery. *Journal of Political Economy* 62: 124-143.

Gristina, M., Bahri, T., Fiorentino, F., and Garofalo, G. 2006. Comparison of demersal fish assemblages in three areas of the Strait of Sicily under different trawling pressure. *Fisheries Research* 81: 60-71.

Hadjimichael, M., Edwards-Jones, G., and Kaiser, M.J. 2010. Distribution of the burden of fisheries regulations in Europe: the north/south divide. *Marine Policy* 34: 795-802.

Hammond, T.R., and Ellis, J.R. 2005. Bayesian assessment of Northeast Atlantic spurdog using a stock production model, with prior for intrinsic population growth rate set by demographic methods. *Journal of Northwest Atlantic Fishery Science* 35: 299-308.

Hanna, S.S. 1999. Strengthening governance of ocean fishery resources. *Ecological Economics* 31: 275-286.

Hardin, G. 1968. The Tragedy of the Commons'. *Science* 162: 1243-1248.

Harris, J.M. 2006. Ecological economics: basic concepts. In *Environmental and Natural Resource Economics*, 2nd ed. Houghton Mifflin Publishing Company, Boston, Massachusetts.

Holden, M. 1994. The Common Fisheries Policy, Oxford, 274 p.

ICES. 1997. International Council for the Exploration of the Sea. Study Group on Elasmobranch Fishes. 26-30 May 1997, Copenhagen, Denmark. ICES CM 1997/G:02.

ICES. 2005. International Council for the Exploration of the Sea. Working Group on Elasmobranch Fishes (WGEF). 14-21 June 2005, Lisbon, Portugal. ICES CM 2006/ACFM:03.

ICES. 2006. International Council for the Exploration of the Sea. Spurdog in the Northeast Atlantic, in Report of the Working Group on Elasmobranch Fishes (WGEF), ICES Advisory Committee on Fisheries Management, ICES CM 2006/ACFM31: 19-76.

Jones, E., Beare, D., Dobby, H., and MacKenzie, K. 2005. Comparison of trends in long term survey data for *Squalus acanthias* with a preliminary stock assessment for this species. International Council for the Exploration of the Sea (ICES), ICES Document CM 2005/N:01.

Khalilian, S., Froese, R., Proelss, A., and Requate, T. 2010. Designed for failure: a critique of the Common Fisheries Policy of the European Union. *Marine Policy* 34: 1178-1182.

Karagiannakos, A. 1996. Total allowable catch (TAC) and quota management system in the European Union. *Marine Policy* 20: 235-248.

Lack, M. 2006. Conservation of spiny dogfish *Squalus acanthias*: A role for CITES? TRAFFIC International. Available at http://www.traffic.org/species-reports/traffic_species_fish5.pdf (July 2013).

Lindebo, E. 2005. Role of subsidies in EU fleet capacity management. *Marine Resources Economics* 20: 445-466.

Lohmann, S., and O'Halloran, S. 1994. Divided government and US trade policy: theory and evidence. *International Organization* 48: 595-632.

Markus, T. 2009. European fisheries law: from promotion to management, Europa Law Publishing, 390 p.

Markus, T. 2010. Towards sustainable fisheries subsidies: entering a new round of reform under the Common Fisheries Policy. *Marine Policy* 34: 117-1124.

Milazzo, M. 1998. Subsidies in world fisheries: a re-examination. World Bank Technical Paper 406, Fisheries Series. The World Bank, Washington, DC, 86 pp.

Morin, M. 2000. The fisheries resources in the European Union. The distribution of TACs: principle of relative stability and quota-hopping. *Marine Policy* 24: 265-273.

Munro, G., and Sumaila, U.R. 2002. The impact of subsidies upon fisheries management and sustainability: the case of the North Atlantic. *Fish and Fisheries* 3: 233-250.

Newell, R.G., Sanchirico, J.N., and Kerr, S. 2005. Fishing quota markets. *Journal of Environmental Economics and Management* 49: 437-462.

Pawson, M.G., Ellis, J.R., and Dobby, H. (2009). The evolution and management of spiny dogfish (spurdog) fisheries in the Northeast Atlantic. In Gallucci, V.F., McFarlane, G.A., and Bargmann, G.G. (Eds), Biology and management of dogfish sharks, pp. 373-390. American Fisheries Society, Bethesda, Maryland.

Pearce, D.W. 1988. Economics, equity and sustainable development. *Futures* 20: 598-605.

Perez-Labajos, C.A. 2012. Analysis of inequalities between the fishing capacities of the fleets of the European Union. *Marine Policy* 36: 630-635.

Raakjær, J. 2011. The EU Common Fisheries Policy – a fisheries management system that has failed. *Food Economics – Acta Agriculturae Scandinavica*, Section C, 8:2, 105-113.

Sanchirico, J.N., Holland, D., Quigley, K., and Fina, M. 2006. Catch-quota balancing in multispecies individual fishing quotas. *Marine Policy* 30: 767-785.

Shafritz, J.M. 1988. The Dorsey dictionary of American government and politics. The Dorsey Press, Chicago.

Sinclair, M., O'Boyle, R.N., Burke, D.L., and Peacock, F.G. 1999. Groundfish management in transition within the Scotia-Fundy area of Canada. *ICES Journal of Marine Science* 56: 1014-23.

Sumaila, U.R., Teh, L., Watson, R., Tyedmers, P., and Pauly, D. 2008. Fuel price increase, subsidies, overcapacity, and resource sustainability. *ICES Journal of Marine Science* 65: 832-840.

Surìs-Regueiro, J.C., Varela-Lafuente, M.M., and Iglesias-Malvido, C. 2003. Effectiveness of the structural fisheries policy in the European Union. *Marine Policy* 27: 535-544.

Williamson, O.E. 1994. Transactions cost economics and organization theory. In Smelser, N.J., and Swedberg, R. (Eds.), The Handbook of Economic Sociology. Princeton University Press, Princeton, NJ, pp. 77–107.

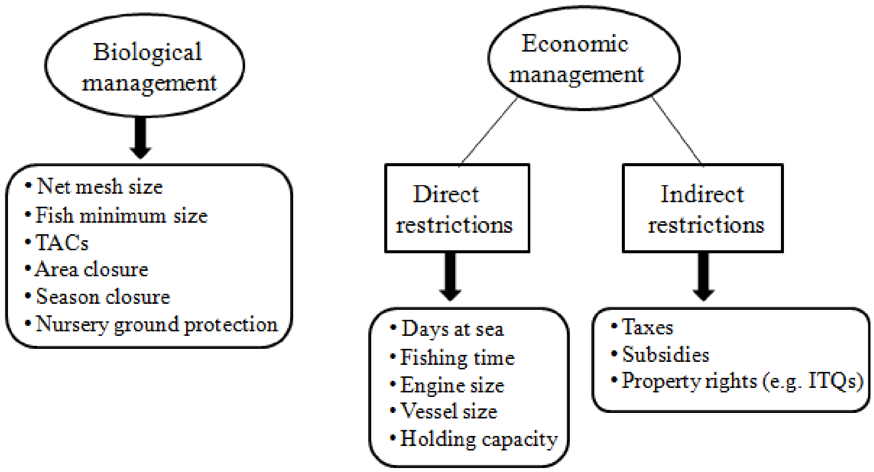

Figure 3.1: Classification of main fishery management methods (adapted from Arnason, 2000).

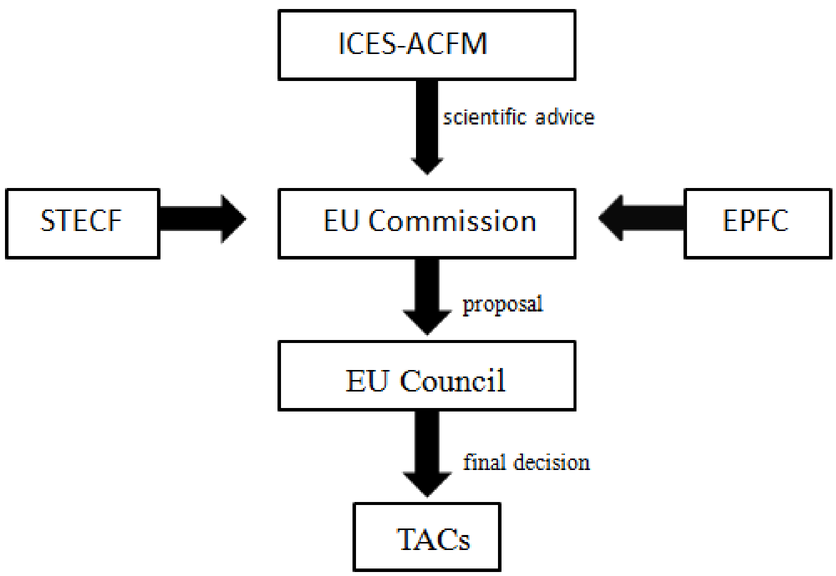

Figure 3.2: TACs allocation system under the EU's Common Fisheries Policy provision.

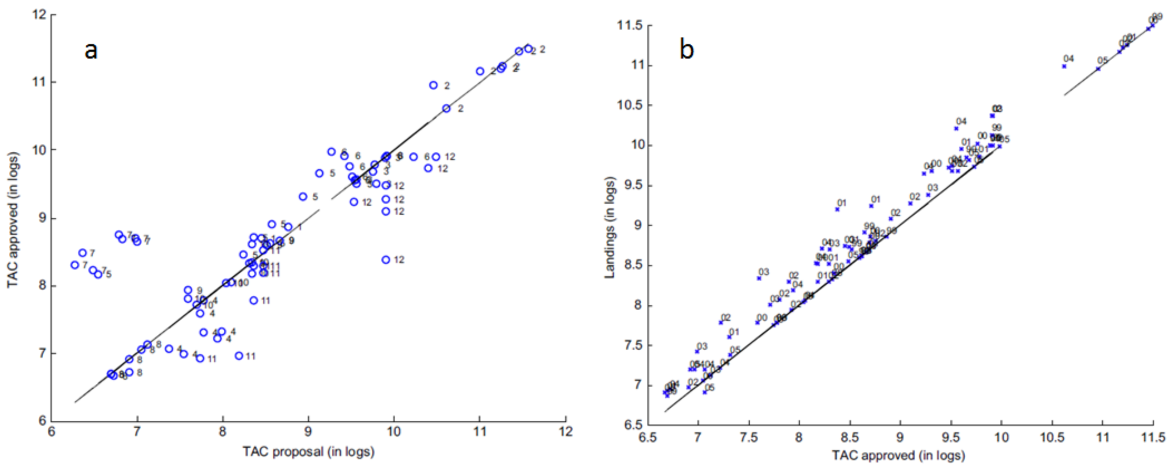

Figure 3.3: TAC proposal vs. TAC approved (a) and TAC approved vs. reported landings (b). Reprinted from Da Rocha et al. (2012) with permission.

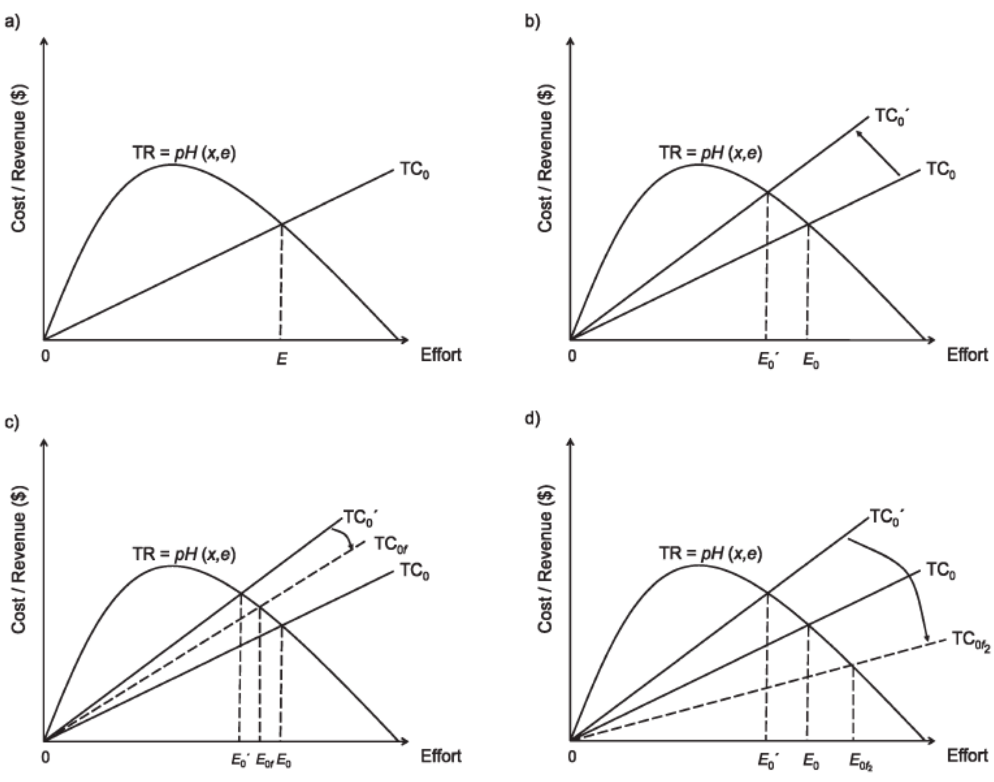

Figure 3.4: (a) Standard model with TR curve and the initial total linear cost function (TC_0). (b) The swing in the TC curve from TC_0 to TC_0'. Depending on the size of fuel subsidies, TC_0' can swing to (c) anywhere between TC_0 and TC_0', or (d) TC_{0f2}. Reprinted from Sumaila et al. (2008) with permission.

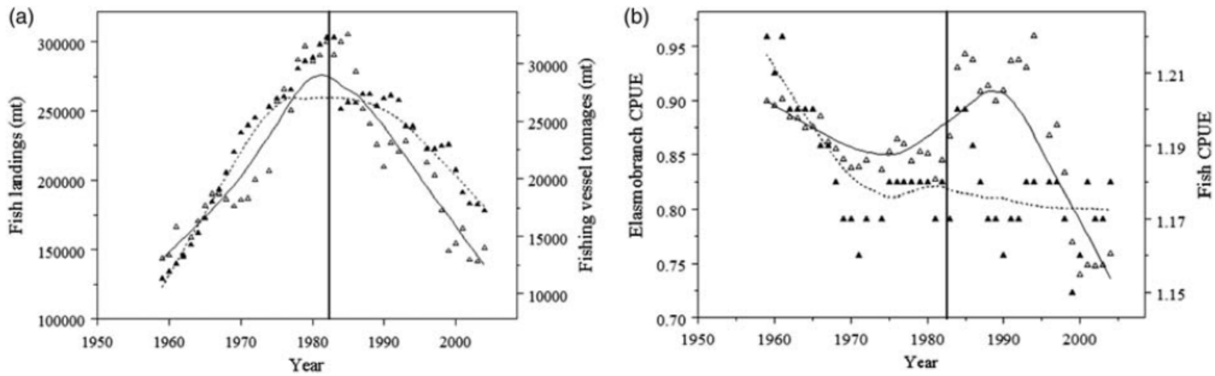

Figure 3.5: Annual fishing vessel tonnages (solid triangles) from 1959 to 2004 (data missing for 1973 and 1995) with a relative trend expressed as LOESS (dashed line) at tension of 0.05, and annual fish landings (open triangles) in tonnes with a relative trend expressed as LOESS (solid line) at tension of 0.05 from ISTAT data (a). Annual elasmobranch CPUE (open triangles) with a relative trend expressed as LOESS (solid line) at tension of 0.05, and annual fish CPUE (open triangles) with a relative trend expressed as LOESS (dashed line) at tension of 0.05 from 1959 to 2004 (data missing for 1973 and 1995) from ISTAT data. CPUEs are expressed as log landings/log vessel tonnages (b). Black solid vertical line indicates the introduction of the law 41/82. Reprinted from Dell'Apa et al. (2012) with permission.

Chapter 4

THE U.S. FISHERY MANAGEMENT SYSTEM AND THE SUSTAINABLE USE OF THE U.S. NORTH ATLANTIC SPINY DOGFISH STOCK

Originally published as: “Dell’Apa, A., Schiavinato, L., and Rulifson, R.A. (2012). The Magnuson–Stevens act (1976) and its reauthorizations: failure or success for the implementation of fishery sustainability and management in the US? *Marine Policy* 36: 673-680”.

Abstract

The Magnuson-Stevens Fishery Conservation and Management Act (1976) opened a new era of federal fishery management in the United States. It was enacted primarily to establish a system for conserving and managing fisheries in the new 200-mile offshore U.S. Exclusive Economic Zone (EEZ). The U.S. assumed exclusive authority for managing all fisheries within the EEZ, except for highly migratory species such as tunas and billfishes. Within the framework of the Act, eight Regional Fishery Management Councils (Regional Councils) were created, which are responsible for preparing Fisheries Management Plans (FMPs) in federal waters under their jurisdiction. Each FMP must meet a series of National Standards (NSs) for conservation and management. The U.S. North Atlantic spiny dogfish stock has been managed under a specific FMP since 1999, after the stock was declared overfished. In 2010, the stock was declared rebuilt, and this can be considered, from a conservationist perspective, a success of the U.S. fishery governance system, which also helped the U.S. North Atlantic spiny dogfish fishery to be certified for sustainability in 2012. The Act was reauthorized in 1996 with the passage of the Sustainable Fisheries Act (SFA), which aimed at fine tuning the fishery regulatory apparatus that was established under the original Act. This “fine tuning” involved increased attention to biological concerns, and removal of language ambiguities within the Act. In 2007, the Act was reauthorized again, mainly to provide for more clear directives and regulations to end

overfishing. After more than thirty years since the Act was passed into law, the debate among conservationists, commercial and recreational fishery representatives, and politicians on the effectiveness of the Act in achieving its purported goals still continues. The aim of this chapter is to provide a critical analysis and discussion of these criticisms to the Act, to provide management recommendations, and to discuss the effectiveness of the FMP, and thus of the U.S. fishery management system, for the Northwest Atlantic spiny dogfish stock.

Introduction

The environment is a prime site of conflict among competing values and interests (O'Neil, 1997). Thus, managers of natural resources have to strike the balance between highly political, economic, and conservationist lobbying pressures, which complicate their jobs of providing the most efficient management design for resource sustainability. Some experts (Hardin, 1968) assert that central governments should control the management of most natural resource systems. Others see resource privatization as the only way to save common resources (Ostrom, 1990).

The Magnuson-Stevens Fishery Conservation and Management Act (hereinafter referred to as the MSFCMA or the Act), Public Law 94-265 as amended, provides for the conservation and management of fisheries resources within the U.S. Exclusive Economic Zone (EEZ). The EEZ extends from the seaward boundary of three nautical miles from each of the coastal States (nine nautical miles for Texas, Puerto Rico, and the Gulf of Mexico coast of Florida) to 200 nautical miles from shore. In order to hold its validity as a tool to ensure and promote the fishery sustainability in the U.S., it has been the object of further reauthorizations, which redefined its objectives under more conservative political influence (Ward and Kelly, 2009). However, the belief that a complete understanding of the complex interrelationships in an ecosystem would improve the management, with no regard to the socio-economic aspects of those decisions, is naïve and ineffective (Ward and Kelly, 2009). In fact, all interactions among species in an ecosystem are difficult to be understood and require consistent investments for their research (Ward and Kelly, 2009). This misleading strategy resulted in the erroneous conclusion that the Act failed to deliver its conservation promises, shifting the search for problem solutions to the symptom instead of the real causes of the problem, that is the “open access” nature of the fisheries in U.S. waters.

Giving the possibility that fisheries resources protection issues have at least a partial non-anthropocentric ethical dimension for a significant portion of the American public (Schug, 2008), what are the implications for the concerns of different parties involved? What are their different values, priorities, and needs in the current institutional arrangements for the U.S. fisheries management, namely the MFCMA? Is the Act delivering on its promises? Are the National Standards reflecting the most important priorities for the U.S. fisheries resources conservation and sustainable exploitation? Do the Regional Councils represent all parties that should be involved in the management of fisheries resources? The primary objective of this chapter is to provide a critical analysis to answer those questions, and to suggest management recommendations. In addition, the second objective is to provide a critical discussion to determine whether the U.S. fishery management system has proved successful for the sustainable exploitation of spiny dogfish, specifically for the U.S. North Atlantic stock. The chapter begins with an introduction of the U.S. fishery management system and its reauthorizations. This is followed by a description of the specific management measures adopted for the U.S. North Atlantic spiny dogfish stock, and an analysis of compliance to National Standard 2 for the management of this stock in the United States. Then, an analysis of the Act’s benefits and flaws in light of the most relevant criticisms raised by a diverse set of stakeholders is provided. Finally, suggestions for the implementation of its structure are provided.

The U.S. fishery management system, its structure, and implementation through time

Passed into law in 1976, the Act was a direct answer to the increasing level of exploitation on the fish stocks off the U.S. coasts caused by foreign fishing fleets, which were perceived as a threat to both the U.S. fishing industry and the resource itself. In 1975, foreign fishing took 6.4 billion lb of the 7 billion lb catch from the waters 12-200 miles off the U.S. coast (Committee on Commerce, 1976). This foreign fishing effort was identified as the primary cause of the depletion of many coastal species at the time (Cloutier, 1996). The Act was reauthorized and amended in 1996, with the enactment of the Sustainable Fisheries Act (SFA), as an answer toward increasing concern on conservation and ecosystem preservation. Provisions of the SFA included: *i*) the removal of discretion over the definition of overfishing, and the required rebuilding of overfished stocks within a specified time period (usually 10 years); *ii*) new requirements to reduce bycatch and waste; and *iii*) provisions protecting essential habitat for fisheries systems (Hsu and Wilen, 1997). The Act was reauthorized in 2007 to: 1) mandate the use of annual catch limits and accountability measures to end overfishing (it is declared that each State had to define its annual catch limits for each specific fishery and that overfishing had to be stopped for 2011); 2) provide for widespread market-based fishery management through limited access privilege programs; and 3) call for increased international cooperation (NMFS-NOAA, 2007).

The Act established eight Regional Fishery Management Councils (Regional Councils), which are responsible for preparing their own Fishery Management Plans (FMPs) for the fisheries within their EEZ sub areas of jurisdiction. FMPs include the detail status of a particular fishery and recommendations for maintaining its sustainability (Hoss et al., 1999). Each FMP must meet a series of 10 National Standards (NS) for conservation and management, as set forth in the Act (Table 4.1), in order for these recommendations to be approved by the Secretary of Commerce and codified into regulations, which are enforced by the NOAA National Marine

Fisheries Service (NMFS), U.S. Coast Guard, and the state enforcement agencies (Hoss et al., 1999).

Membership in each Regional Council consists of a set size of voting and nonvoting members. The voting members are: the principal State officials with marine fishery management responsibilities, the regional director of the NMFS, and up to 13 “qualified members” (the total number varies depending on the number of states and territories within the specific Regional Council) that are appointed by the U.S. Secretary of Commerce from a list of individuals nominated by the Governor of each State, with knowledge or expertise in fishery management, conservation, or recreational harvest of the relevant fisheries. The nonvoting members include: the regional or area director of the U.S. Fish and Wildlife Service for the geographical area concerned, the commander of the relevant U.S. Coast Guard district, the executive director of the Marine Fisheries Commission of the concerned region, if any, and a representative of the U.S. State Department (Pontecorvo, 1977; Cloutier, 1996; Hoss et al., 1999).

The NMFS is the agency responsible for managing the fisheries under U.S. jurisdiction. The NMFS is an office within the National Oceanic and Atmospheric Administration agency (NOAA), which is housed within the U.S. Department of Commerce (DOC). The Secretary of the DOC and the Director of the NMFS are appointed by the U.S. President. The mission of NMFS is: 1) to rebuild and maintain sustainable fisheries; 2) to promote the recovery of protected species; and 3) to protect and maintain the health of coastal marine habitats (Okey, 2003).

The mission of the DOC is: 1) to build for the future and promote U.S. competitiveness in the global marketplace by strengthening and safeguarding the Nation’s economic infrastructure; 2) to keep America competitive with cutting-edge science and technology and an unrivaled information base; and 3) to provide effective management and stewardship of the nation's resources and assets to ensure sustainable economic opportunities (Okey, 2003).

The goals of the National Fishery Management Program (NFMP), as listed in the MSFMCA Section 2(a)(6), are to: 1) prevent overfishing; 2) rebuild overfished stocks; 3) ensure conservation; 4) facilitate long-term protection of essential fish habitats; and 5) realize the full potential of the Nation's fishery resources (NMFS, 1996). The NFMP was premised on the conclusion "*that fishery resources must be conserved and managed in such a way as to assure that an optimum supply of food and other fish products, and that recreational opportunities involving fishing, are available on a continuing basis and that irreversible or long-term adverse effects on fishery resources are minimized*" (Cloutier, 1996).

The management of the U.S. North Atlantic spiny dogfish stock

One recognized success of the U.S. fishery management system is the Northwest Atlantic spiny dogfish stock, which the NMFS declared overfished in 1998 as a consequence of an intense directed fishery. An interstate (3-200 miles offshore) FMP for the species was jointly prepared in 1999 (MAFMC, 1999) by the New England (NEFMC) and Mid-Atlantic Fishery Management Councils (MAFMC). An interstate FMP was further developed in 2002 (ASMFC, 2002) by the Atlantic States Marine Fisheries Commission (ASMFC) to manage spiny dogfish in state waters (0-3 miles offshore). This measure was adopted to protect dogfish out of the federal waters, as several states, mostly Massachusetts, shifted their fishery into state waters in order to land quotas that could exceed those set by the federal FMP (Fordham and Dolan, 2004). Before the closure of the spiny dogfish fishery in the Northeast Atlantic by the EU in 2011 (see chapter 3), this was the only management regulation developed specifically for the spiny dogfish worldwide.

An important aspect of the ASMFC management plan was the adoption of a semi-annual quota allocation in consideration of the migratory behaviour of the species along the Northwest Atlantic coast, with the stock migrating north in the summer and south in the winter. Two periods were identified, with Period I lasting from May 1st to October 31st and Period II from November 1st to April 30th. A percentage of the total allowable quota (TAQ) was allocated to each period, based on the historical commercial landings recorded between 1990-1997, with 57.9% allocated to Period I and 42.1% to Period II (ASFMC, 2002).

The FMP in state waters was first modified with Addendum I in November 2005 (ASMFC, 2005), which was developed to specify TAQs for the Northwest Atlantic spiny dogfish fishery for up to five years in order to improve the stock management (ASMFC, 2005). In addition, it was declared that adopted TAQ measures should not be considered constant year to year, but be based upon expectations for future stock condition in accordance with National Standard 2 (NS2) of the Act requiring that conservation and management measures be based on the best scientific information available (ASMFC, 2005).

With Addendum II, adopted in October 2008, the semi-annual quota allocation was modified, as it proved to be ineffective and inequitable at regional scale (ASMFC, 2008). Within this allocation scheme, northern fishers had more opportunities to land dogfish because the stock resided within northern fishing areas for a longer period of time. When the stock migrated south, fishers in the southern-most states, mostly from North Carolina, could begin landing dogfish at the same time when the fishery quota for Period II was approaching closure. As a result, landings since 2001 showed a percent shift of the annual harvest with the northern states landing more than 57.9% and the southern states landing below 42.1% (ASMFC, 2008). The semi-annual quota allocation was replaced with the introduction of new quota allocations among the Northern

Region (Maine, New Hampshire, Massachusetts, Rhode Island, and Connecticut), the Southern Region (New York, New Jersey, Delaware, Maryland, and Virginia), and North Carolina. Under the new quota system the annual quota was allocated to each of these management units according to the following shares: Northern region 58%, Southern Region 26%, and North Carolina 16%.

With Addendum III, adopted in April 2011, new provisions for quota allocations were introduced as a consequence of a perceived limited flexibility for states to modify their spiny dogfish possession limits (most states set a daily 3,000 lb possession limit for the entire fishing season, with landings reflecting fish availability rather than market demand or price) to maximize benefit to their fishers (ASMFC, 2011). Under the new annual specification process, quota allocation for the Northern Region was not changed (58%), and North Carolina was included in the Southern Region. The new South Region allocation was set according to the following shares: New York 2.707%, New Jersey 7.644%, Delaware 0.896%, Maryland 5.920%, Virginia 10.795%, and North Carolina 14.036% (ASMFC, 2011). Table 4.2 provides a summary of the historical changes in the semi-annual quota allocation for each Addendum.

In 2010, after 12 years of FMP management, the U.S. North Atlantic stock was considered rebuilt by the NMFS, which allowed total allowable catch (TAC - the equivalent of TAQs) to increase to 15 million pounds for the 2010/11 and to 20 million pounds for the 2011/12 fishing seasons. Annual coastwide commercial quotas were increased each year since 2012, reaching 41.578 million lb for 2015. In addition, commercial possession limit was increased from 3,000 (established as a limit in 2010/11) to 4,000 lb per trip, effective from May 1, 2013 (NOAA, 2013).

Therefore, considering the actual status of the stock as rebuilt and no longer overfished, the FMP of the Northwest Atlantic spiny dogfish stock represents a management success for the U.S. national fishery authorities. Accordingly, the U.S. Atlantic spiny dogfish fishery was certified as sustainable by the Marine Stewardship Council (MSC) in August 2012 (http://www.msc.org/track-a-fishery/fisheries-in-the-program/certified/north-west-atlantic/us_atlantic_spiny_dogfish). This certification provides further evidence for the success of the U.S. fishery management system in achieving effective sustainable exploitation of the U.S. Atlantic spiny dogfish stock.

The compliance to NS2 for the management of the U.S. North Atlantic spiny dogfish stock

The process for applying a FMP to a stock, from development to adoption, consists of five phases: 1) development of draft documents; 2) public review and Regional Council adoption; 3) final review for compliance by NOAA-NMFS; 4) approval by the Secretary of Commerce; and 5) implementation (NRC, 2004). The Secretary of Commerce's approval is based on compliance of the proposed FMP to each NS contained in the Act (Figure 4.1). The most controversial of these NSs, which frequently brought to litigation between several conservationist groups and the DOC, is NS2. This National Standard requires that: "conservation and management measures shall be based on the best scientific information available" (Table 4.1). The scientific information used to develop a FMP has become a target of lawsuits because the Act requires management of fisheries in such a way that overfishing is avoided while optimum yield (OY) is achieved, based on the "best scientific information available" (NRC, 2004). Therefore, if the scientific information available indicates that the stock is overfished, the Act requires the enactment of compulsory actions in order to reduce the fishing effort on the stock and to allow for its recovery (NRC, 2004).

The majority of members of the Regional Councils are not fishery scientists, and this apportionment characteristic among Regional Council memberships has been commonly reported since the first adoption of the Act and its reauthorizations (Pontecorvo, 1977; Okey, 2003). For example, in 2002/03 about 83% of council members were from the fishing industry (NOAA-NMFS, 2004). In general, each Regional Council has its own advisory committee that can provide scientific recommendations. However, for the scientific and technical expertise necessary to develop a FMP, Regional Councils rely upon scientific information provided by stock assessments conducted by NOAA Regional Fisheries Science Centers (RFSC). These stocks assessments are also accompanied with social and economic impact analyses for the different fisheries in order to help Regional Councils assess the fishery sustainability from a more holistic approach that considers both biological and socio-economic aspects (NRC, 2004).

In the current U.S. fishery management system, the sustainability of the spiny dogfish fishery is measured in terms of fishing mortality (F) and the spawning stock biomass (SSB), for which adult female biomass (i.e., ≥ 80 cm TL) is used as a biological reference point (ASMFC, 2002). At the time of the interstate FMP adoption the female SSB was set at SSB_{Target} = 167,000 mt, with a threshold at SSB = 83,500 mt. In order to reach this value of SSB, the fishing mortality was initially set at $F_{Rebuild} = 0.03$, with a threshold set at $F_{Threshold} = 0.11$. Based on 1999-2001 survey data, it was also predicted that maintaining such a value for $F_{Rebuild}$, both in federal and state waters, would result in a 50% probability that the spiny dogfish population will rebuild to the SSB_{Target} (167,000 mt) by 2016 (ASMFC, 2002).

Those fishing mortalities values were updated after the Northeast Regional Stock Assessment Workshop – Stock Assessment Review Committee (SAW-SARC) 43 Report, where estimated spiny dogfish SSB was 106,180 mt in 2005 (72,600 mt in 2002), setting the new fishing mortality target $F_{Rebuild}$ at 0.11, and the new fishing mortality threshold $F_{Threshold}$ at 0.39 (SAW, 2006).

Although the U.S. North Atlantic stock was considered no longer overfished in 2010, and although it was MSC-certified in 2012, careful attention should be taken into account for the expected low numbers of adult females recruiting in the next few years (Waters, 2010). In fact, results from the recent stock assessment conducted by the Northeast Fisheries Science Center indicate that, due to a series of years of poor recruitment between 1997 and 2003, maintaining the fishing mortality threshold $F_{Threshold}$ at 0.24 will lead to a predicted decline of the SSB below SSB_{Target} for 2017 (Rago and Sosebee, 2013). Nevertheless, the same projection predicts that the SSB is not going to decline below the thresholds, at which point the stock would be considered again overfished (Rago and Sosebee, 2013). This predicted scenario indicates that, assuming constant selectivity patterns over time for the stock, there is a relatively low likelihood that the SSB will fall below the threshold that require the stock being declared overfished again (Rago and Sosebee, 2013).

In light of these concerns, conservationist groups have manifested their disagreement for MSC certification of the U.S. Atlantic spiny dogfish fishery and the considerable magnitude of increase in TAC since 2008 (Shark Advocates International, 2012). Therefore, it seems reasonable to predict that the increase in TAC for the U.S. Atlantic spiny dogfish stock adopted since 2010 could be questioned under the requirements of NS2 of the Act. The bone of contention would be the adoption of an unprecedented increase in annual quotas for the U.S. Atlantic spiny dogfish stock within just five years after the stock was declared rebuilt (+177% between 2011 and 2015 TACs), despite the scientific information used to delimit these quotas suggests a possible reoccurrence of SSB decline for 2017.

It should be pointed out that uncertainty is an inherent characteristic of scientific information because of the complexity of natural ecosystems, the time required to conduct experiments and surveys in the natural world, and, most of the time, limited budgets for research (Rice and Richards, 1996; Francis and Shotton, 1997; NRC, 2004). Therefore, there is no specific standard to assess an acceptable level of uncertainty in the scientific information used to approve a FMP, although at least a 50% chance of achieving the target for sustainability has been recently reported as the desired result (Natural Resources Defense Council vs. Daley, 209F.3d747, 2000). In addition, it is unrealistic to require a specific level of certainty in scientific information used in fisheries because of the unavoidable uncertainties characterizing fisheries and the interrelationship between complex ecosystem and the human dimension aspects of the fishery. Accordingly, as outlined by the National Research Council of the National Academies (NRC, 2004), "*A statutory definition of what constitutes best scientific information available for fisheries management is inadvisable because it could impede the incorporation of new types of scientific information and would be difficult to amend if circumstances warranted changes*".

In light of these results, the management of the U.S. Atlantic spiny dogfish stock seems to have complied in full with the requirements of the FMP, from development to adoption, and, consequently, with the requirements of the Act. To wit, management measures adopted to prevent overfishing of the stock were taken, based on the "best scientific information available" (NS2), and were successful in maintaining the sustainability of the spiny dogfish in the Northwest Atlantic waters in the long-term. What is debatable next is the possibility that at the current level of allowed fishing effort, the stock may again be declining in future years; a result that will certainly compromise the success of the U.S. fishery management system for the

Northwest Atlantic spiny dogfish stock. However, this does not preempt fishery managers to consider updated scientific information on the status of the stock that may become available in the future.

The Act: management success or failure?

Traditionally, the success of the MFCMA has been determined within the framework of biological stock conservation criteria, which led in some cases to accomplishment (e.g., Atlantic herring, Atlantic striped bass, and spiny dogfish along the U.S. Atlantic coast) and in some other cases to a failure in rebuilding stocks (e.g., bluefish, and summer flounder along the U.S. Atlantic coast) (Hoss et al., 1999; Waters, 2010) (At the time of writing: bluefish, and summer flounder stocks were considered rebuilt by NMFS; NMFS, 2012). However, lack of recognition of the purpose for which it was issued brought some critics to the conclusion that the Act has failed in delivering on its conservation promises (Fleming et al., 2003). An assessment of the fishery stocks managed under the Act was made nine years following enactment of the Act in 1976 (Finch, 1985). This comparison provided some index of how successful the Act was in conserving and managing the fishery resources found off the coast of the United States. Results showed that, among the 25 species stocks managed under the Act, eight species groups (32%) were unchanged, eleven species groups (44%) were in an improved condition, and six species groups (24%) were in a deteriorated condition (Finch, 1985). Authors concluded that, despite some losses, the stocks as a whole were probably in significantly better condition than they would have been without management under the Act. However, in 1999, 46% of the 158 federally-managed fish stocks in U.S. waters were estimated to have stock levels below those that would produce Long Term Potential Yield (LTPY) (maximum long-term average catch that can be achieved), and 36% were estimated to be over-utilized (existing fishing effort is too high to achieve LTPY) (NMFS, 1999). Of the stocks for which the status was known in 2012, 10% were subject to overfishing (stock size below a prescribed threshold), and 19% were overfished (harvest rate above a prescribed threshold) (NMFS, 2013).

At first blush, one may conclude that the Act failed in delivering its expectations for conserving fish stocks through time, but closer scrutiny reveals that this is a misleading conclusion characterized by confusion over the basic goals and objectives that guided the issuing and further reauthorizations of the Act, as expressed in the NS requirements developed under the MFCMA. As pointed out by Ward and Kelly (2009), this confusion was generated by the interaction between the legal and biological disciplines in the interpretation of the Act's NS. They argue that the Act is an economic regulatory statute designed to promote the U.S. fishing industry at its most optimal level, as it is also evident from the mission statements from NMFS, DOC and NFMP. The Act is a "conservation" statute in that the conservation promotes the long-term health of the U.S. fishing industry. National Standard 1 (NS1) states that "*conservation and management measures shall prevent overfishing while achieving, on a continuing basis, the optimum yield from the United States fishing industry*" MSA 301(1). After the enactment of the SFA in 1996, the emphasis on the long-term health of the fishing industry has been overlooked and parties have referred to the "conservation" purposes of the Act without reference to the reasons for that conservation. Thus, the argument has arisen that NS1 should require NMFS to conserve fish stocks without regard to the health of the fishing industry (Ward and Kelly, 2009). This occurred because the U.S. Department of Justice (DOJ) conceded this point in oral arguments in the summer flounder case in 2000 (National Resources Defense Council vs Daley, 209F.3d747, 2000). However, the DOJ failed to recognize that the conservation goals of the Act are co-dependent with the long-term economic health of the fishing industry and the long-term health of the biological stock, not necessarily exclusively dependent on the latter (Ward and Kelly, 2009).

The main purpose of the Act was to exclude foreign fishing fleets within the U.S. EEZ, and it is widely recognized that the Act has accomplished this goal. The foreign catch in the EEZ for 1991 was insignificant and, in 1992, there were no foreign operations in the EEZ (Cloutier, 1996).

One issue is how to explain the short-term success (Finch, 1985) in biological terms, while the more questionable success on the long-term (NMFS, 1999; 2001). There is no doubt that the Act opened a new era of federal fisheries management in the U.S., but it also provided the incentive for overcapitalization. The new law transformed the U.S. fishing industry so rapidly that its conservation objective has not kept pace with the dramatic growth in capital investments. Overcapitalization led to increased competition among American fishers, who simply substituted foreign fishers harvesting the finite stock, with the consequence that the line between resource allocation and conservation was no longer easily drawn. However, this possible limitation for the effectiveness of the Act was identified since the beginning, as Congress recognized that once the U.S. had jurisdiction over the newly extended EEZ, it was going to have a conservation problem and was going to have to set some standards so American fishers did not overfish (Cloutier, 1996).

This concern is reflected in the requirements of the Act's 10 National Standards (Table 4. 1), with which each FMP has to be consistent. Clearly, many of these standards provide directives that are consistent with broad conservation goals, sensible ecosystem management, and economic efficiency. National Standards were intended to: manage stocks preventing overfishing while achieving the optimum yield for each fishery and avoiding bycatch (NS3, NS1 and NS9); use conservation and management measures based on sound provided scientific information (NS2); allow for equitability and fairness in the resource allocation process (NS4); provide for efficiency and minimization of costs and avoiding of unnecessary duplication (NS5 and NS7); consider variations in fishery resources and catches (NS6); and provide for the safety of human life, and also minimize adverse economic impact for local fishing communities (NS8 and NS10).

Some fisheries management experts claimed that since its first enactment, the Act lacked a clear definition for Optimum Yield (OY), which is the amount of fish that is prescribed as such on the basis of Maximum Sustainable Yield (MSY). "*We have as yet to come up with a complete and overriding definition of what "optimum yield" is. What we have preferred to do is let this concept develop over time through an accumulation of various decisions, while trying to maintain an overall consistency, and at the same time, trying to define better the various elements of OY*" (FCMAO, 1978). Also, it was noted how even other NSs were vaguely worded, contained either contingencies or escape clauses, or were not particularly operational in the first place (Fleming et al., 2003). For instance, NS1 was characterized by a vague description of "overfishing", without providing operational guidance (Fleming et al., 2003). To answer these criticisms, further amendments of the Act provided more precise articulations for these terms, particularly for the definition of the terms "overfishing" and "overfished" within NS1 guidelines (see Figure 1 in Methot et al., 2013). The overfishing issue is now a particular matter of concern, and became a major priority in the management agenda, as demonstrated by the goal to stop overfishing by 2011 under the Act's reauthorization in 2007.

One of the major problems related to the definition of overfishing is that it is based on biological parameters represented by MSY, instead of the more fishery stock conservative and industry oriented Maximum Economic Yield (MEY) (Ward and Kelly, 2009). This issue is amplified by the fact that all major management strategies have been based on biological definitions exclusively, such as the precautionary principle, ecosystems management, and the "ecosystem based management" (EBM) approach. However, solutions for improving fisheries management that are based solely on biological aspects can be ineffective, as a complete understanding of the problem cannot be exempted from a harmonic analysis of the complex interrelationship between fishing activities, socio-economic factors, and the marine ecosystem.

OY is defined as the yield that provides "the greatest overall benefit to the Nation". It is based on MSY as "reduced by any relevant economic, social, or ecological factor" (Ward and Kelly, 2009). The problem exists in that, at MEY, benefits net of cost are maximized, while only benefits are maximized at MSY without regards to their costs. Assuming that Congress knew what it was doing when it defined optimum to reflect "overall benefit", then their objective was to establish MSY as the implicit management target within the list of ten standards to be achieved (Ward and Kelly, 2009).

Criticisms of the Act

Considering the policy goals in U.S. fisheries management, in accordance with NS objectives, some of the most critical consequences of the Act were the increased overcapitalization, as already mentioned above, and the total absence in providing a fair and equitable allocation of the fishery resources to avoid increased individual or corporate power.

The overcapitalization issue has been a matter of concern since the Act became law in 1976, and it is mainly a direct consequence of the "free market" strategy of the U.S. economy. For instance, in the early 1980s, the North Pacific Fishery Management Council proposed a limited entry plan to prevent fleet overexpansion, which might further endanger the ability of managers to control harvests. The Secretary of Commerce, under the Reagan Administration, disapproved the plan because it ran against free market principles, and because it was contrary with basic economic liberties (Hsu and Wilen, 1997). However, the main issue of such a policy is that it creates overcapitalization. The original Act avoided addressing the inevitability of overcapitalization, leaving the responsibility to the Regional Councils, where political pressure, and sometimes an overtly evident presence of conflict of interests, results in fisheries with open access.

This brings us to the second issue, which is the lack of effective equitable sharing of decision-making power and diverse representation among the voting members in the Regional Councils, which is a primary criticism of fishery management under the Act. This disproportionality between users and nonusers among the voting membership on the Regional Councils was evidenced for the first time by Pontecorvo in 1977 (Pontecorvo, 1977), one year after the Act was enacted. He reported wide discrepancies in the level of representation within several states among the Councils. The greatest representation imbalance was found in the North Pacific Regional Council (Alaska, Oregon, and Washington), where Alaska had 71% of the appointed members, which basically allowed the state to be in control of the Council. He also illustrated the Regional Councils’ membership in terms of three categories: industry (further categorized into commercial and recreational interests), general (including academics, scientists, environmentalists, state legislators, etc.), and consumer. The data from Pontecorvo indicated that industry dominated the Regional Councils with 79% of the total (57% for commercial interests and 22% for recreational interests, respectively), with just nine individuals out of 68 total members (13%) who may be classified as either scientists, academics, or both. Also, only two of these nine were social scientists. Most interesting was the conclusion that there was not any consumer representation on the Regional Councils. This membership imbalance led Pontecorvo's conclusion that local producers were, in practice, authorized to effectively manage national important resources in a way that enhanced local interests, thereby affecting the quality of the fish over time and leading in some cases to overexploitation of local resources. The hazard of the actual Regional Councils structure is that local communities, although clearly having the right to make decisions regarding the amount of local services and how they should be managed at regional level, affect the national economy, as they are managing products important for international trade. Pontecorvo concluded that the Act did not favor the general welfare because producers dominated the Regional Councils, consumers were not represented at all, and there did not appear to be sufficient scientific expertise in either the natural or social sciences to permit the Regional Councils to accomplish the multiple complex management tasks that confronted them.

Another consequence of this unbalanced apportionment is the general lack of trust by the public in the decision-making process of some Regional Councils. For instance, in November 1991, the American Factory Trawlers Association (AFTA) approached the DOJ and the DOC to have conflict-of-interest charges investigated on three North Pacific Regional Council members (Cloutier, 1996). Council members are prohibited from participating in: 1) "*particular matters primarily of individual concern in which they have a financial interest*"; and 2) "*matters of general public concern that are likely to have a direct and predictable effect on their financial interests, unless that interest is in harvesting, processing, or marketing activities and has been disclosed*." (Cloutier, 1996). The Inspector General's General Counsel noted that although abuses were uncovered, investigations did not substantiate any violations of criminal laws because the members in question disclosed their interests (Cloutier, 1996). The General Counsel for the DOC noted that its report "*exposes some fundamental problems with the operations of the*

Fishery Management Councils", and that, in spite of finding that no legal violation had occurred, "*clearly there was a perception that certain members were controlling Council actions to maximize their personal financial interests*" (U.S. Congress, 1994).

The problem illustrated by Pontecorvo was not an unrecognized one, but failed to be adequately addressed. Almost three decades ago, the Director of the Office of Fisheries Management of the NMFS conceded that U.S. fisheries are managed through industry lobbying, but he made it seem as if this is a normal functional aspect of fisheries management (Finch, 1985). After several years of regional fisheries management under the Councils, things did not change that much, leading to a continuous failure in accomplishing the NS4 requirements. In an analysis of appointed Council voting member representation between 1990 and 2001, Okey (2003) found that commercial fishing interests made up 49% of the total members, recreational fishing interests made up 33%, and all "other" interests combined made up 17%. The "other", according to NMFS categories for appointing voting members of the eight Regional Councils, included experts in "biological, economic, or social sciences; environmental or ecological matters; consumer affairs; and associated field" (NMFS, 2002). The result of this general "commercial interests" dominance was that the interests within this category were skewed towards larger corporate interests supporting larger-sized vessel, while the small-scale vessels fleets and many other sectors of fishing-dependent communities were poorly represented (Hanna et al., 2000). It is clear that the present imbalance in representation within all Regional Councils is a consequence of the historical drivers that led to the creation of the Act, and its possible weaknesses. As noted by Okey (2003), examining goals, objectives, and missions of the NMFS, the DOC, and the MSFCMA reveals fundamental conflicts of interests, particularly between the NMFS and the DOC. The U.S. Congress effectively gives priority to DOC goals by using weak language in the direction of apportionment of representative interests on the Councils, thus effectively weakening the stated goals of the NMFS. Therefore, the existing legal structure of the Act was an attempt to optimize economic competitiveness of the U.S., by creating an implicit dominance of direct users groups within the Council voting member apportionment. In fact, a formula for assessing representation of whole Regional Councils is not explicitly provided in the legislation, and representation is basically the result of political and economic powers. The most explicit mandate of the U.S. Secretary of Commerce regarding representation of interests on Councils is that apportionment among the extractive user groups be fair and balanced, while representation of all other non-extractive interests is discussed as optional and is not explicitly mandated.

Theoretical and practical solutions

Overcapitalization

There are no exclusive solutions to problems surrounding common resource management and fishing effort regulations. Fishers have always found ways to by-pass controls to reduce fishing effort. For example, reductions in season lengths have encouraged them to build bigger, faster vessels with more short-term harvesting capacity. Restrictions on gear types or capacity have encouraged substitution of other inputs that partially thwart the regulations original purpose (Hsu and Wilen, 1997). These measures fail because they try to solve overcapitalization focusing on the symptom of the problem and not the cause, which is the “open access” nature of the resource. To prevent the open access of the fishery, leading to overcapitalization, a viable solution was the introduction of individual transferable quotas (ITQs), which the MSFCMA defines as permits to harvest specific quantities of fish of a particular species. Fisheries scientists, based on the best scientific information available (NS2), decide the annual TAC harvestable in a certain fishery (Chu, 2008), effectively limiting the number of participants in a fishery. The ITQ system allows fishers to make rationale economic choices about where and when to fish, effectively reducing the race to overcapitalization (Beddington et al., 2007). The ITQ system is still a recent strategy, but offers many other benefits. The quality of the product improves, because fish may be available fresh throughout the year. Fishers start acting as stakeholders of the resource, perceiving how more detrimental actions can impact their revenues. More fishers are inclined to support ITQ as they effectively provide valuable fisher property rights on future potential harvests that can be sold by those choosing to sell out ("transferability") (Hsu and Wilen, 1997; Beedington et al., 2007). Economic analyses show that ITQs are an improvement over so-called "input controls" (regulating fleet capacity, days at sea, etc.), which deliberately cause economic inefficiency (Branch, 2009).

Environmental groups are divided over the efficacy of ITQ programs, and the advocacy group Greenpeace led a campaign against ITQ arguing that this system concentrates power in the hands of fewer people (Greer, 1995). However, the Act specifically prohibits excessive shares that can control the market in an ITQ system. Another concern raised over ITQ is "high-grading". High-grading refers to the possibility that fishers will discard small or otherwise less valuable species, as they will be more encouraged to fill their quota with only the highest-valued fish. This problem can be successfully countered by the use of required observers by the management system. Observers in ITQ fisheries are used extensively in the U.S. Pacific, Australia, and New Zealand (Jentoft, 1989). In New Zealand fisheries, a combination of high-profile enforcement, increased penalties, and industry-led protocols reduced high-grading (Annala, 1996). As a result, the number of survey respondents concerned about high-grading in

New Zealand declined from 40% in the first year of ITQs to 21% eight years later (Dewees, 1999).

Another concern related to ITQs is the so-called “fishing for history” (Copes and Charles, 2004). The initial allocation each fisher receives through an ITQ program depends upon past participation (Hsu and Wilen, 1997). In the pre-ITQ adoption period, fishers are given a window of couple of years within which to accumulate catch records to position themselves favorably with regard to other fishers (Hsu and Wilen, 1997). This can lead to a far more dramatic incidence of overcapitalization, encouraging entry of new vessels to fisheries, while deterring old ones from exiting until ITQs have been introduced (Branch, 2009). In the Icelandic herring fishery, where allocation of rights was based on participation in the first year of ITQs, the fleet increased from 65 vessels in 1975 to over 200 in 1980, the first year of ITQs, before dwindling rapidly to 30 in 1993 (Arnason, 1996).

Another critique to ITQs is the fishing for non-quota species (the “spillover effect”), where fishers shift their efforts toward other species not under the ITQ system, and the needed increase of enforcement in order to hinder illegal fishing and quota busting (Asche et al., 2007; Branch, 2009). It is clear that program design plays a major role in determining whether the ITQ system is beneficial for the overall conservation status of fish stocks. First of all, it is important to point out that ITQs are a mechanism for dividing up the TAC, not for deciding on its value. ITQs cannot prevent fisheries collapse if the TAC is set too high (Sinclair et al., 1999), or if there is insufficient enforcement to prevent massive overharvest of the TAC (Chavez et al., 2008). However, when ITQs are enforced properly, catches are generally slightly below the TAC, and overcapitalization is largely eliminated (Branch, 2009). Important prerequisites for the success of ITQs are a stable political system, reliable scientific advice to ensure that TACs are sustainable

(Walters and Pearse, 1996), and a fishery that can be easily monitored (Branch, 2009). The important questions now are: who should be in charge for enforcement, and is TAC-setting really based on the most sound and unbiased scientific information? No doubt the central government (for the U.S. case) should be in charge of enforcement, as the fishing industry is a paramount national economic driver, but enforcement should be paid for by the fishing industry, as they are the first beneficiaries for the commercial trade of fishing resources. Also, to protect the value of their quota, fishers might be more willing to report violators to enforcement officials.

With increased industry involvement in science, one concern is that industry-derived science may be biased compared to government research. To solve the problem, science should be decoupled as much as possible from the fishing industry. This requires that fisheries scientists, social scientists, and conservationists should have a form of power comparable with that of users in the fishery management decision-making process. This is something actually lacking in the way most Regional Council voting memberships are apportioned. To solve this problem, the actual co-management system working under the Act framework should be reshaped, in order to allow nonusers (including consumer representatives) to have more decisional power. By definition, fisheries co-management means that government agencies and fishers, through their cooperative organizations, are sharing responsibility for management functions (Bailey, 1984). The actual co-management system working in the U.S. is in reality a form of “consultative” arrangements. Such arrangements usually involve an advisory board, in which representatives of the fishing industry are consulted by the government before regulations are introduced. In contrast, co-management means that fisher organizations have both a say in the decision-making process and also the authority to make and implement regulatory decision on their own (Fricke, 1985). The Regional Councils include, in addition to fisheries representatives, public officials, processors, recreationalists, and environmentalists. The Councils also arrange public hearings to ensure participation from the public, but their responsibilities are restricted to making recommendations to the government concerning fisheries management (Jentoft, 1989).

A crucial aspect for co-management, for promoting fishery sustainability at its most optimal level and for improving its economic efficiency, pertains to the social dynamics of the participatory process. Democratic organizations are often victims of oligarchic tendencies, group rivalry, and elite expropriation. Consequently, instead of advancing participant democracy, delegating responsibility can be a contribution to the consolidation of rigid, inequitable power structures (Bailey, 1988). Voting membership apportionment among Regional Councils is still not completely equitable. The most viable solution would be to mandate a real fair and equitable membership apportionment, allowing "others" categories to have a voting power in the management decision, which should be equal to that of fishing industry members. Giving fishing industry members too much voting power within Councils has led to not always achieving fishery sustainability.

Lack of equal representativeness among regional councils

It is recognized that too much influence by fishing industry in policy and management decisions can lead to unsustainable fishing, degraded marine ecosystems, and impoverished fishing communities, because a management system so structured tends inevitably to be influenced by those interests (McGoodwin, 1990; Cochrane, 2000). However, fishing industries have a collective interest in sustaining fisheries, and they sometimes support conservative and responsible fishing strategies (Smith et al., 1999). A natural tendency of capital-minded fisheries sectors is to maximize short-term profit at the expense of sustainability, and this has been identified as the fundamental cause of overexploitation in fisheries (Cochrane, 2000; Okey, 2003). This tendency is also favored by the fact that public agencies depend on the support of legislators who, in turn, depend on the support of constituents, who are often mainly represented by industry lobbyists and their own interests (Ludwig et al., 2001). To solve this problem, NS4 was designed to provide for fair and equitable allocation of fishery resources privileges, but it is questionable whether it has delivered on its promises. Also, one of the mandates of the MSFCMA for apportioning interests on Regional Councils is that the Secretary of the DOC shall, to the extent practicable, ensure a “fair and balanced apportionment” of the active participants in the commercial and recreational fisheries under the jurisdiction of the Council (MSFCMA Section 302(b)(2)(B)). Thus, it is not therein discussed a comparable supplemental fair and balanced apportionment for nonusers members, such as conservationists, social scientists, or consumers. The Secretary of the DOC selects appointed voting members from a list of names provided by each State’s Governor. If the list includes only commercial or recreational fishing interests, the Secretary must choose Council members from that list of names.

The most practicable and desirable solution would be to explicitly mandate a mechanism for ensuring a balanced apportionment among all interests involved, comprising those classified as “other” (e.g., scientific experts, general public, and conservation groups), which have usually had a simple role of advisors but no voting power among the Regional Councils. A more balanced representation of interests on the Councils will be beneficial both for the sustainability of the fishery and for the perceived trust held by consumers and general public toward Regional Council membership integrity. To restore public faith in the Councils, the most valid and effective strategy will be the restructuring of effective fishing management power under the framework of “co-management” between users and nonusers, with a mandatory equal apportionment decided by the Secretary of the DOC. The simplest solution would be to develop an explicit formula that could be inserted into fisheries management legislation requirements, perhaps clearly inserted in NS4 requirements and also in the MSA Section 302(b)(2)(B), in order to ensure a broader and more balanced representation of interests with the objectives of preventing fishing industry interests to prevail, while still encouraging participatory co-management. However, to my knowledge, such restructuring has not been tested, but has been discussed several times during previous Act reauthorization processes. For example, the Conservation Law Foundation noted that the New England Fishery Management Council was not representative of the full range of public interests associated with fisheries conservation and management (Shelley et al., 1996). These concerns were incorporated into a version of the MSFCMA reauthorization legislation entitled the "Fishery Conservation and Management Amendments Act of 1995", which attempted to modify Sec. 302(b)(2)(B) for providing more apportionment representation. However, this initial attempt received little support from the Congress or environmental lobbyists, who were more interested in solving other management issues such as overfishing, essential fish habitat, and bycatch. The SFA of 1996 that reauthorized the MSFCMA did not include a provision to broaden representation on the Regional Councils. The 2004 final report of the U.S. Commission on Ocean Policy (USCOP) (USCOP, 2004) noted that the highly homogeneous membership of the Regional Councils had led to failure in bringing diverse viewpoints in the Council decision-making process; an increased interest on the problem was generated. Also, the USCOP recommended that Congress should give the Administrator of NOAA responsibility for appointing Regional Council members, with the goal of creating Councils that are knowledgeable, fair, and reflect a broad range of interests (USCOP, 2004). The USCOP's recommendations were incorporated into a proposed bill entitled "Fisheries Management Reform Act of 2004", which again was intended to make purported changes in Sec.

302(b)(2) of the Act. However, the bill was not passed into law. Several further attempts failed to receive sufficient supports, such as the “Fisheries Science and Management Enhancement Act of 2005”, and the “American Fisheries Management and Marine Life Enhancement Act” in 2006, which both tended to provide for different forms of increased balanced representativeness of the various groups. Finally, the Bush Administration prepared its reauthorization proposal, which was signed into law in 2007. The enacted legislation contained no provision for broadening Regional Council membership.

Discussion

Since its first enactment, the Act’s effectiveness in achieving fishery sustainability has often been criticized. The general “environmental awakening” that partly promoted further amendments to, and reauthorizations of , the Act created the belief that the best management of living marine resources should be based mainly on biological stock conservation criteria. Conservation organizations claim that the Act failed in providing for the conservation of important fishery stocks based on the fact that under the FMP system, some fish stocks were not rebuilt. The Act has been implemented several times to address these conservation concerns, in such a way that fisheries managers have now stopped the overfishing on almost all species managed, and some stocks have rebuilt to levels that have not been observed since before the Act was originally enacted.

From a conservationist perspective, one recognized success is the North Atlantic spiny dogfish stock, which the NMFS declared overfished in 1998 as a consequence of an intense direct fishery. After 12 years of FMP management, the stock was considered rebuilt by the NMFS in 2010, which allowed both TACs to increase and the U.S. Atlantic spiny dogfish fishery to be MSC-certified for sustainability. However, concern still remains for the applicability of

NS2 to set the quotas after the stock was declared rebuilt, and the Councils recommended that NMFS should set these annual quotas in such a way that would allow for more stability in future landings to avoid possible reoccurrence of overfishing (Waters, 2010).

With regard to the applicability of NS2, it should be pointed out that the term “best scientific information available” will always be prone to different interpretations, depending on whether the emphasis is on the quality (best) or timeliness (available) of the scientific information used to develop a specific FMP (NRC, 2004). In the case of the FMP for the U.S. Atlantic spiny dogfish stock, it seems that both the quality and timeliness of scientific information were sound, and helped in restoring the stock. However, this does not mean that updated information in the future will not be used to foster the conservation status of the stock and the fishery sustainability.

The success or failure of the Act should be measured by using the original objectives of the National Standards as the only meaningful metric, which often have been considered in a misleading framework (Ward and Kelly, 2009). In light of these objectives, the Act was successful in achieving its initial goals to exclude foreign fleets fishing effort close to or within national waters, to build a domestic fishery, and to promote an optimal full potential of national fishery resources. Based on these goals, the Act is both an economic and conservation statute. However, confusion has occurred over interpretation of this “conservation” purpose, which through time has been shifting more and more toward its biological meaning. The Act must give priorities to conservation measures, but within the perspective of economic efficiency and the promotion of the long-term health of the fishing communities. Solutions that rely exclusively on biological considerations, with no regard for their economic and social consequences, can easily induce deleterious management crises, as they simplistically restrict managers to ignore the full picture of scientific understanding of human fishing activities and their interactions with natural marine resources. In that regard, the Act has been a valid instrument both for the economic and biological sustainability of the fishery, and FMPs are a significant contributor to this success. However, as with all management tools dealing with dynamic natural environments, this instrument is not perfect and could be improved. The failure to successfully rebuild some fishery stocks under a FMP management regime was mostly due to erroneously try solving the symptom of the problem instead of the cause: overcapitalization of the fishery. The result was to put too much emphasis in exclusive biological concerns when setting agenda priorities in the further Act reauthorizations, instead of providing more balanced alternative solutions to reshape management structure and program design. When attempting to conserve fish stocks for the good of the nation, fisheries managers have to find an effective strategy to contrast the natural propensity of fishers to deplete the resource. The incentive to exploit leads to overcapitalization of the fishery, as recognized by most economists and biologists (Pinkerton, 1989). This occurred after the enactment of the Act in 1976, when competition among U.S. fishers simply replaced foreign fishing. Then, fishers, forced to compete against each other for the same fish, inevitably overinvested in competitive gear, thereby dissipating all potential profits (Pinkerton, 1989). The SFA of 1996 failed to recognize the chronic overcapitalization of fishing industries, while it concentrated on addressing more biologically related issues. The SFA, just as the original Act, is clearly the product of political tradeoffs and compromises among different groups involved. Stamps of conservation groups are imprinted upon most of the provisions of the SFA (Hsu and Wilen, 1997).

The introduction of ITQ provisions in the reauthorization of the Act in 1996 would have served better for increasing the call for attention toward more conservation aspects of the fishery management under the Act regulations, especially with respect to NSs and the FMPs implementation. This would have resulted in more attention being paid to overcapitalization, in spite of more biologically-centered issues, and in the recognition of the lack of welfare among all parties involved with the fishery resources utilization. ITQs are still a recent introduction in the U.S. fisheries management, but hold promise of success. The main difficulties with ITQ fisheries have been in the realm of enforcement, also in recognition of the fact that fishery stocks have to be managed on two levels, commercial and biological. The result is a complex fishery framework from design to implementation. To achieve success, ITQ planning must include expert unbiased information on stocks status and an effective and cost-efficient plan for regulatory enforcement. Effective planning measures must include industry support for the proposed ITQ program. A high degree of this support is likely to increase the level of voluntary compliance, potentially reducing overall enforcement costs. A valuable enforcement program has been provided (McKinney, 1994), named as "four-tier" strategy, consisting of four stages designed to overlap one another: patrolling; monitoring; auditing; and investigation (McKinney, 1994). The patrolling phase features random offshore boarding as a mean of patrolling effort, which will allow greater flexibility to enforcement and uncertainty useful to discourage potential violators. The monitoring (off-loading observers, fish-hold checks, proper catch accounting checks, dock side activity observers), will support the patrolling phase, maintaining a high visibility profile of enforcement authorities. The auditing function refers to the review of participating fish dealer records and audits at random, providing the first opportunity to encounter possible violators within the fish-buying industry sector. The investigation phase requires a complex investigative unit aimed at identifying illegal activity in commercial sectors that operate worldwide, most frequently, on a "cash" basis. The "four-tier" enforcement system, although appearing conventional in its structure, departs from usual “omnipresence” deterrence enforcement approaches, in that it concentrates on “processes” of the commercial fishing industry instead of structures, making this strategy more fluid and more cost effective (McKinney, 1994).

Considering NS objectives, a likely failure should be recognized in relation to NS4, in terms of providing a fair and equitable apportionment for fishing privileges. This also brought more power to the hands of Regional Councils and to the fishing industry with regard to voting membership apportionment, in actual fact excluding nonuser groups from the management decision-making process. A more effective involvement of these groups will promote both the welfare of the fishery community and the realization of a successful balanced apportionment for the economic and biological conservation goals for which the Act was designed. Subsequent authorizations of the Act led to the fact that decisions of the Regional Councils have been increasingly involved in economic allocation. The original Congressional delegation of authority to manage fisheries, once carefully balanced between the Secretary of Commerce and the Regional Councils, became heavily concentrated in the Councils. The Regional Councils are still perceived by many as a group of individuals making economic decisions based on their personal interests and benefits, with few checks on their conflict of interests and a membership apportionment process, under the final decision power of the Secretary of Commerce, which favors disproportionality.

The “economical conservation” aspect of the original Act, reflected in NS objectives, should be fairly counterbalanced by the mere “biological conservation” objective, in such a way that each of these can enhance the other in the process of conserving important national fishery stocks. To do that, Regional Council membership allocation should be reshaped to guarantee the actual co-management structure to be more balanced among all parties involved in the fishery management. This co-management restructuring should be done with regard to the economic stability of local fishing communities and national fishing industry as main national priorities, for which conservationists and nonuser groups priorities must also be effectively considered for attaining successful management.

LITERATURE CITED

Annala, J.H. 1996. New Zealand's ITQ system: have the first eight years been a success or a failure? *Reviews in Fish Biology and Fisheries* 6: 43-62.

Arnason, R. 1996. On the ITQ fisheries management system in Iceland. *Reviews in Fish Biology and Fisheries* 6: 63-90.

Asche, F., Gordon, D.V., and Jensen, C.L. 2007. Individual vessel quotas and increased fishing pressure on unregulated species. *Land Economics* 83: 41-49.

ASMFC. 2002. Atlantic States Marine Fisheries Commission. Interstate Fishery Management Plan for Spiny Dogfish. Fishery Management Report #40, Atlantic States Marine Fisheries Commission, Washington, D.C. Available at www.asmfc.org (May 2013).

ASMFC. 2005. Atlantic States Marine Fisheries Commission. Addendum I to the Interstate Fishery Management Plan for Spiny Dogfish. Washington, D.C. Available at www.asmfc.org (May 2013).

ASMFC. 2008. Atlantic States Marine Fisheries Commission. Addendum II to the Interstate Fishery Management Plan for Spiny Dogfish. Washington, D.C. Available at www.asmfc.org (May 2013).

ASMFC. 2011. Atlantic States Marine Fisheries Commission. Addendum III to the Interstate Fishery Management Plan for Spiny Dogfish. Washington, D.C. Available at www.asmfc/org (May 2013).

Bailey, C. 1984. Managing an open access resource: the case of coastal fisheries. In Corten, D.C. and Klauss, R. (Eds.), People-centered developments, contributions toward theory and planning framework. Kumarian Press, West Hartford, CT.

Bailey, C. 1988. Optimal development of third world fisheries. In Morris, M. (ed), North-South perspectives in marine policy, pp 105-128. Westview Press, Boulder, Colorado.

Beddington, J.R., Agnew, D.J., and Clark, C.W. 2007. Current problems in the management of marine fisheries. *Science* 316: 1713-1716.

Branch, T.A. 2009. How do individual transferable quotas affect marine ecosystems? *Fish and Fisheries* 10: 39-57.

Chavez, C., Gonzalez, N., and Salgado, H. 2008. ITQs under illegal fishing: an application to the red shrimp fishery in Chile. *Marine Policy* 32: 570-579.

Chu, C. 2008. Thirty years later: the global growth of ITQs and their influence on stock status in marine fisheries. *Fish and Fisheries* 10: 217-230.

Cloutier, T.M. 1996. Conflicts of interest on regional fishery management councils: corruption or cooperative management? *Ocean & Coastal Law Journal* 2: 101-152.

Cochrane, K. 2000. Reconciling sustainability, economic efficiency and equity in fisheries: the one that got away? *Fish and Fisheries* 1: 3-21.

Committee on Commerce. 1976. Committee on Commerce, 94th Cong., 2d Sess., A legislative history of the fishery conservation and management act of 1976 263 (Comm. Print 1976) (Statement of Sen. Ernest F. Hollings, S.C.).

Copes, P., and Charles, A. 2004. Socioeconomics of individual transferable quotas and community-based fishery management. *Agricultural and Resource Economics Review* 33: 171-181.

Dewees, C.M. 1998. Effects of individual quota systems on New Zealand and British Columbia fisheries. *Ecological Applications* 8: S133-S138.

FCMAO. 1978. Fishery Conservation and Management Act Oversight. Hearings on oversight of the FCMA and S.3050 before the Senate Comm. On Commerce, Science, and Transp., 95th Cong. 15-16 (1978) (statement of James P. Walsh, Deputy Administrator, NOAA).

Finch, R. 1985. Fishery management under the Magnuson Act. *Marine Policy* 9: 170-179.

Fleming, R., Shelley, P., and Brooks, P.M. 2003. Twenty-eight years and counting: can the Magnuson-Stevens Act deliver on its conservation promise? *Vermont Law Review* 28: 579-622.

Fordham, S., and Dolan, C. 2004. A case study in international shark conservation: the Convention on International Trade in Endangered Species and the spiny dogfish. *Golden Gate University Law Review* 34: 531-572.

Francis, R.I.C.C., and Shotton, R. 1997. “Risk” in fisheries management: a review. *Canadian Journal of Fisheries and Aquatic Sciences* 54: 1699-1715.

Fricke, P. 1985. Use of sociological data in the allocation of common property resources: a comparison of practices. *Marine Policy* 9: 39-52.

Greer, J. 1995. The big business takeover of US fisheries: privatizing the oceans through Individual Transferable Quotas. Washington. Greenpeace, 21 pp.

Hanna, S., Blough, H., Allen, R., Iudicello, S., Matlock, G., and McCay, B. 2000. Fishing grounds: defining a new era for American fisheries management. Island Press, Washington, D.C.

Hardin, G. 1968. The tragedy of the commons. *Science* 162: 1243-1248.

Hoss, D.E., Bath, G.E., Cross, F.A., and Merriner, J.V. 1999. US Atlantic coastal fisheries-how effective have management plans been in maintaining "sustainable fisheries"? *Limnologica* 29: 227-232.

Hsu, S.L., and Wilen, J.E. 1997. Ecosystem management and the 1996 Sustainable Fisheries Act. *Ecology Law Quarterly* 24: 799-811.

Jentoft, S. 1989. Fisheries co-management, delegating government responsibility to fishermen's organizations. *Marine Policy* 13: 137-154.

Ludwig, D., Mangel, M., and Haddad, B. 2001. Ecology, conservation, and public policy. *Annual Review of Ecology and Systematics* 32: 481-517.

MAFMC. 1999. Mid-Atlantic Fishery Management Council. Spiny Dogfish Fishery Management Plan. MAFMC, Dover, Delaware.

McGoodwin, J.R. 1990. Crisis in the world's fisheries: people, problems, and policies. Stanford University Press, Stanford.

McKinney, D. 1994. Enforcement methodology of federal individual quota fisheries. In *Fisheries enforcement issues*: Papers presented at the OECD Committee for Fisheries' Workshop on Enforcement, held 21–22 September 1993, pp. 35–43. OECD Publications Service, Paris, France.

Methot, R.D., Tromble, G.R., Lambert, D.M., and Greene, K.E. 2013. Implementing a science-based system for preventing overfishing and guiding sustainable fisheries in the United States. *ICES Journal of Marine Science*; doi:10.1093/icesjms/fst119.

NMFS. 1996. National Marine Fisheries Service. Magnuson-Stevens Fishery Conservation, Management Act. US Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service, NOAA Technical Memorandum NMFS-F/SPO 23.

NMFS. 1999. National Marine Fisheries Service. Our living oceans: report on the status of US living marine resources. US Department of Commerce, NOAA Technical Memorandum NMFS-F/SPO-41, Silver Spring, Maryland.

NMFS. 2001. National Marine Fisheries Service. Report to Congress: status of the fisheries of the United States. National Marine Fisheries Service, Silver Spring, Maryland.

NMFS. 2002. National Marine Fisheries Service. 2001 Report on apportionment of membership on the Regional Fishery Management Council (RFMCs). National Marine Fishery Service, Silver Spring, Maryland.

NMFS. 2013. Status of stocks 2012. Annual report to Congress on the status of U.S. fisheries. National Marine Fisheries Service, Silver Spring, Maryland.

NOAA-NMFS. 2004. National Oceanic and Atmospheric Administration – National Marine Fisheries Service. 2003 Report to Congress on apportionment of membership on the Regional Fisheries Management Councils. National Oceanic and Atmospheric Administration, National Marine Fisheries Service.

NOAA-NMFS. 2007. National Oceanic and Atmospheric Administration – National Marine Fisheries Service. Magnuson-Stevens Fishery Conservation and Management Act Reauthorized. Available at http://www.nmfs.noaa.gov/msa2007 (May 2013).

NOAA. 2013. National Oceanic and Atmospheric Administration. Northeast Region Bulletin. Spiny dogfish fishery, small entity compliance guide. Final 2013-2015 fishery specifications. Available at http://www.nero.noaa.gov/mediacenter/2013/04/dogfish2013_2015_specs_phl.pdf (May 2013).

NRC. 2004. National Research Council. Improving the use of the "best scientific information available" standard in fisheries management. Committe on Defining Best Scientific Information Available for Fisheries Management, Ocean Studies Board, National Research Council of the National Academies. The National Academies Press, Washington, D.C.

Okey, T.A. 2003. Membership of the eight Regional Fishery Management Councils in the United States: are special interests over-represented? *Marine Policy* 27: 193-206.

O'Neill, J. 1997. Value pluralism, incommensurability and institutions. In Foster, J. (ed), Valuing nature: economics, ethics and the environment. Routledge, London.

Ostrom, E. 1990. Governing the Commons: the evolution of institutions for collective action. Cambridge University Press, New York.

Pinkerton, E. 1989. Co-operative management of local fisheries. University of British Columbia, Vancouver, Canada.

Pontecorvo, G. 1977. Fishery management and the general welfare: implications of the new structure. *Washington Law Review* 52: 641-656.

Rago, P. and Sosebee, K. 2013. Update on the status of spiny dogfish in 2013 and projected harvests at the Fmsy proxy and Pstar of 40%. Northeast Fisheries Science Center - National Marine Fisheries Service, Mid-Atlantic Fishery Management Council Science and Statistical Committee, September 12, 2013.

Rice, J.C., and Richards, L.J. 1996. A framework for reducing implementation uncertainty in fisheries management. *North American Journal of Fisheries Management* 16: 488-494.

SAW. 2006. Stock Assessment Workshop. 43rd Northeast Regional Stock Assessment Workshop (43rd SAW), Northeast Fisheries Science Center Reference Document 06-25; 400 p.

Shark Advocates International. 2012. Statement of concern. Re: Marine Stewardship Council (MSC) certification of Northeast U.S. fisheries for spiny dogfish (*Squalus acanthias*). Available at http://www.oceanfdn.org/userfiles/news/docs/MSC-dogfish-certification-statement.pdf (May 2013).

Shelley, P., Atkinson, J., Dorsey, E., and Brooks, P. 1996. The New England fisheries crisis: what have we learned? *Tulane Environmental Law Journal* 9: 221-244.

Schug, D.M. 2008. The institutional implications of environmental ethics for fishery management in the US exclusive economic zone. *Marine Policy* 32: 514-521.

Sinclair, M., O'Boyle, R.N., Burke, D.L., and Peacock, F.G. 1999. Groundfish management in transition within the Scotia-Fundy area of Canada. *ICES Journal of Marine Science* 56: 1014-1023.

Smith, A.D.M., Sainsbury, K.J., and Stevens, R.A. 1999. Implementing effective fisheries-management systems: management strategies evaluation and the Australian partnership approach. *ICES Journal of Marine Science* 56: 967-979.

U.S. Congress. 1994. Conflicts of interests within the Regional Fisheries Management Councils: hearing before the subcommittee on Fisheries Management of the House of Commerce on Merchant Marine and Fisheries, 103d Congress, First Session, Vol. 2.

USCOP. 2004. US Commission of Ocean Policy. An ocean blueprint for the 21st century. Final report, Washington, DC.

Walters, C., and Pearse, P.H. 1996. Stock information requirements for quota management systems in commercial fisheries. *Reviews in Fish Biology and Fisheries* 6: 21-42.

Ward, J.M., and Kelly, M. 2009. Measuring management success: experience with United States fisheries. *Marine Policy* 33: 164-171.

Waters J.D. 2010. The biology and socio-political culture of the spiny dogfish fishery in North Carolina. M.Sc. thesis Duke University, NC, 137 pp.

Table 4.1: National Standards (NS) for fishery conservation and management (Magnuson-Stevens Act, sec. 301).

Any Fishery Management Plan prepared, and any regulation promulgated to implement any such plan, pursuant to this title shall be consistent with the following national standards for fishery conservation and management:

1: Conservation and management measures shall prevent overfishing while achieving, on a continuing basis, the optimum yield from each fishery for the United States fishing industry.

2: Conservation and management measures shall be based on the best scientific information available.

3: To the extent practicable, an individual stock shall be managed as a unit through its range, and interrelated stocks shall be managed as a unit or in close coordination.

4: Conservation and management measures shall not discriminate between residents of different states. If it becomes necessary to allocate or assign fishing privileges among various US fishers, such allocation shall be fair and equitable to all, reasonably calculated to promote conservation and carried out in such a manner that no particular individual, corporation, or other entity acquires an excessive share of the privileges.

5: Conservation and management measures shall, where practicable, consider efficiency in the utilization of fishery resources; except that no such measure shall have economic allocation as its sole purpose.

6: Conservation and management measures shall take into account and allow for variances in fisheries, fishery resources, and catches.

7: Conservation and management measures shall, where practicable, minimize costs and avoid unnecessary duplication.

8: Conservation and management measures shall, consistent with the conservation requirements of this Act (including the prevention of overfishing and rebuilding of overfished stocks), take into account the importance of fishery resources to fishing communities by utilizing economic and social data that meet the requirements of paragraph (2), in order to provide for the sustained participation of such communities, and to the extent practicable, minimize adverse economic impacts on such communities.

9: Conservation and management measures shall, to the extent practicable, (A) minimize bycatch and (B) to the extent bycatch cannot be avoided, minimize the mortality of such bycatch.

10: Conservation and management measures shall, to the extent practicable, promote the safety of human life at sea.

Table 4.2: Spiny dogfish quota allocation's system within the ASMFC-FMP and further Addendums.

	Year	Reason for change	Allocation
ASMFC-FMP	2002	-	57.9% to Perriod I and 42.1% to Period II
Addendum I	2005	To set specified TAQs	Same, but TAQs were specified for up to five years
Addendum II	2008	Quota allocation inequitable at regional scale. Introduction of quota by region	58% to Northern region (Maine, New Hampshire, Massachusetts, Rhode Island, and Connecticut)
			26% to Southern region (New York, New Jersey, Delaware, Maryland, and Virginia)
			16% to North Carolina
Addendum III	2011	Perceived limited flexibility for state to modify possession limit	58% to Northen region
			North Carolina included in the Southern region: New York 2.707%, New Jersey 7.644%, Delaware 0.896%, Maryland 5.920%, Virginia 10.795%, and North Carolina 14.036%

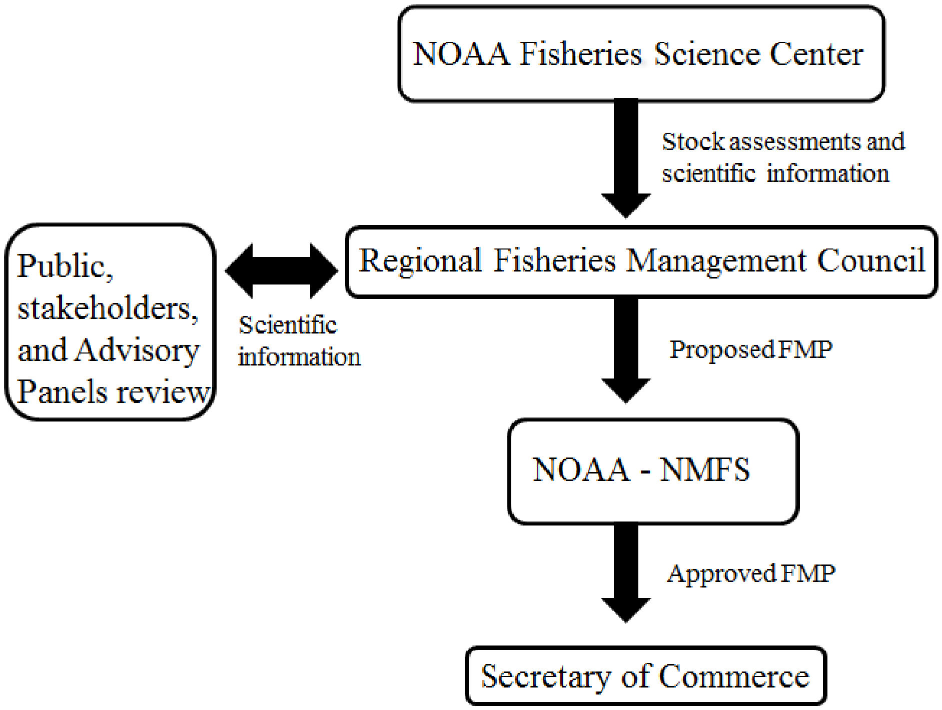

Figure 4.1: Development process of a Fishery Management Plan (FMP) under the MSFCMA provisions (NOAA – NMFS = National Oceanic and Atmospheric Administration – National Marine Fisheries Service).

Chapter 5

THE INTERNATIONAL TRADE AND FISHERY MANAGEMENT OF SPINY DOGFISH: A SOCIAL NETWORK APPROACH

Originally published as: "Dell'Apa, A., Johnson, J.C., Kimmel, D.G., and Rulifson, R.A. (2013). The international trade and fishery management of spiny dogfish: a social network approach. *Ocean & Coastal Management* 80: 65-72".

Abstract

The management of the spiny dogfish (*Squalus acanthias*) is a matter of international concern, as this species was a candidate for inclusion in lists for trade regulation. The major demand for its meat is from the European Union (EU) market, with the U.S. and Canada as its two major contributors. The U.S. has yet to support a spiny dogfish listing, although the U.S. Atlantic stock is under a fishery management plan (FMP) that proved to be successful in providing a certified sustainable fishery. I employed a cumulative sum technique to compare trade data for frozen spiny dogfish export from U.S. and Canada to the EU in relation to the FMP adoption. I also constructed a social network to visualize changes in the European trade scenario for spiny dogfish after adoption of the FMP and to predict future trade flow potentially affecting the conservation status of regional dogfish stocks in relation to recent management measures introduced in Europe. The social network analysis revealed that the exclusion of spiny dogfish from trade regulation lists eventually will affect the conservation status of dogfish stocks in Africa, Asia, South America, and the Mediterranean and Black Seas. My results suggest that the species listing would provide an economic benefit for the U.S. Northwest Atlantic fishery, and will eventually foster the conservation status of other regional stocks worldwide, as well as the search for a more sustainable global exploitation of spiny dogfish.

Introduction

The spiny dogfish (*Squalus acanthias*) is a small demersal shark with a circumboreal distribution. It schools by size and sex between the coastline and the continental shelf (Compagno, 1984), which facilitates exploitation by fisheries operating inside the Exclusive Economic Zones (EEZ) of coastal nations. The principal populations are in the east and west North Atlantic (including the Mediterranean and Black Seas), east and west North Pacific (including the Sea of Japan), the eastern South Pacific, the Atlantic coast of South America, the Cape coast of South Africa, and the southern coasts of Australia and New Zealand (Fowler et al., 2004; IUCN, 2006).

Despite its wide distribution, the spiny dogfish is highly vulnerable to fisheries overexploitation due to its life-history characteristics (slow growth rate, late maturity, low fecundity, and long gestation period). In the *red list of threatened species* of the International Union for Conservation of Nature and Natural Resources (IUCN), spiny dogfish is classified as *Vulnerable* (VU) globally and *Endangered* (EN) in the Mediterranean (IUCN, 2006; Cavanagh and Gibson, 2007). An increased international concern for its conservation status over the last decade led to several attempts to list the species in Appendix II of the Convention of International Trade in Endangered Species of Wild Fauna and Flora (CITES). The species was proposed for discussion in 2006 (CoP14 Prop.16, 2007) and 2009 (CoP15 Prop.18, 2010), but both proposals did not reach the two-third vote majority necessary for adoption (see chapter 2). The aim of CITES is to prevent threats to species caused by international commercial demand, while ensuring their sustainable exploitation, through the inclusion in specific lists (Appendix I, II and III) for trade regulation (CITES, 1973). A species qualifies for listing in Appendix II if the regulation of trade is necessary to avoid the species becoming eligible for inclusion in Appendix

I (species threatened with extinction), or if it is required to ensure that the harvest is not reducing the wild population to a level that might threaten its survival (CITES, 1973). An Appendix II listing does not restrict the species trade as long as the exporter country can certify that the export of the species will not be detrimental to its survival (Sky, 2010).

Most CITES members (Parties) agree that the spiny dogfish appears to meet the biological criteria for listing in Appendix II, but the proposal has yet to receive the required two-third vote majority necessary for listing (TRAFFIC, 2010). Some experts consider the lack of direct support from the U.S. government, despite its strong historical leadership in managing and conserving elasmobranchs and natural resources in general, as one of the main reasons for the failure in listing dogfish so far (Fordham and Dolan, 2004; Fordham, 2009).

The U.S. Atlantic spiny dogfish fishery has been successfully managed after the stock was declared overfished by the National Marine Fisheries Service (NMFS) in 1998 (see chapter 4). This assessment triggered the adoption of a federal (3-200 miles offshore) U.S. fishery management plan (U.S.-FMP, or FMP) for spiny dogfish (MAFMC, 1999), jointly developed by the Mid-Atlantic and New England Regional Fishery Management Councils (MAFMC-NEFMC) under the Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA) provisions. An interstate FMP was developed in 2002 (ASMFC, 2002) by the Atlantic States Marine Fisheries Commission (ASMFC) to manage dogfish in state waters (0-3 miles offshore). To my knowledge, the U.S.-FMP is the only fishery management regulation specifically employed for dogfish worldwide between 1990 and 2010. The Northwest Atlantic stock was declared rebuilt in 2010 by the NMFS, providing evidence of the effectiveness of the FMP adoption for the species (Dell’Apa et al., 2012a) (see chapter 4).

The international exploitation of spiny dogfish is mainly driven by the European Union (EU) demand for meat (Lack, 2006). In 2001, the U.S. exported 2,700 mt (92% of U.S. dogfish reported landings) and Canada exported 1,950 mt (23% of Canadian dogfish reported landings) to the EU (58% of EU spiny dogfish meat imports) (Fowler et al., 2004), which suggest that the North American spiny dogfish stocks are the primary source for the EU market. However, the Canadian Pacific spiny dogfish was recently classified as a different taxonomic species, the North Pacific spiny dogfish (*Squalus suckleyi*) (Ebert et al., 2010). In this regard, the Canadian catch in the northwest Atlantic has being historically marginal, comprising 5.4% of the total recorded landings in this coastal area over the last four decades (Wallace et al., 2009).

Despite its overriding role for the international dogfish exploitation, only recently has the EU adopted measures to protect the species, but only for the Northeast Atlantic stock (see chapter 3). The European Commission (EU Commission) enacted the first commercial quotas for this stock in 1998, although limits were based on historical landings rather than scientific evidence. In addition, the EU Commission, under the scientific advice of the International Council for the Exploration of the Sea (ICES), since 2006 repeatedly proposed a zero quota for total allowable catches (TAC) in the North Sea because the stock was considered depleted (ICES, 2006). Despite scientific advice, the Council of the European Community (EU Council) set higher quota limits (Ellis et al., 2009). As for most of the commercially important stocks the level of TACs set by the EU Council is determined mainly by political decisions, due to fisheries ministers worried about not losing national consensus because of quota reductions (Holden, 1994; Markus, 2009). The EU Council eventually followed the advice of the EU Commission ending fishing for dogfish in the Northeast Atlantic in 2011 (Council Regulation 57/11). This regulation was further amended in 2012 (Council Regulation 43/12).

With the recent closure of the spiny dogfish fishery in the Northeast Atlantic, future market demand for this area will have to be met primarily from imports (FAO, 2009). In turn, this demand is expected to modify the international trade scenario, potentially changing the magnitude of spiny dogfish landings in all major countries characterized by a direct fishery on the species. The majority of these countries lack a specific management strategy for spiny dogfish, which enhances the probability for certain local stocks to reach overexploited levels in the long-term.

Management of the spiny dogfish fishery at the local (Party) level should be tuned with regard to this international trade and its predicted changes, which are also dependent on a possible CITES Appendix II listing in the near future. Therefore, an in-depth analysis is needed to understand changes in the international trade in the EU in relation with important management regulations for the fishery: specifically the US-FMP, in consideration of the U.S. role as one of the major historical suppliers to the EU market demand. This type of analysis will help predict alternative scenarios for the international trade in case the spiny dogfish trade should be regulated, and will be useful in identifying countries most likely to increase fishing pressure to supply the EU market demand.

The primary goal of this chapter is to analyze the changes in U.S. and Canadian spiny dogfish exports to the EU in relation to the FMP adoption in 1999, in order to assess the consequence of this management regulation for the two major historical contributors to this market. The second goal is to provide a detailed understanding of the EU trade dynamic changes associated with the adoption of the US-FMP for dogfish through construction and analysis of a social network. This social network is used to identify the major historical exporters of spiny dogfish toward the EU, and to model scenario changes for this trade associated with a possible listing in Appendix II for the species.

Material and methods

I collected data on EU external trade from the available Eurostat database "EU27 Trade since 1988" (http://epp.eurostat.ec.europa.eu/newxtweb/), which provides annual data on external trade by all 27 countries partners of the EU (EU27). I selected the good under commodity code 03037520: Frozen dogfish of the species "Squalus acanthias", and I collected annual quantities (metric tons) of dogfish exported toward EU27 by all world countries reported between 1990 (no available data before this year) and 2010. The advantage of this database is that it provides quantities imported by each EU27 country from each exporting country. I excluded from the analysis all countries for which annual quantities of dogfish (imported and/or exported) were less than 1 mt over the study period, which led me to consider a total of 65 countries (25 EU27 and 40 non-EU27 countries).

Considering the global distribution range of spiny dogfish (IUCN, 2006), the selected countries are representative of the international exploitation of the species and of its international trade flow toward the EU in general. I assume that exports are a reliable proxy for exploitation, and that the market conforms to demand inelasticity over the study period (e.g., constant demand over time) for simplification. I also assume that, particularly for the most important exporting countries, the exported dogfish were caught in the same country or adjacent areas.

I analyzed temporal changes in frozen dogfish (Eurostat database) toward EU27 by U.S. and Canada by plotting a cumulative sum (CUSUM) chart of annual exports from these two countries between 1990 and 2010, in order to visualize clear change points in dogfish export over time. Temporal trends in the CUSUM chart were fitted over time by a LOESS curve with tension at 0.05 (Cleveland and Devlin, 1988). The CUSUM is a visual statistical procedure that allows the detection of temporal changes of a persistent process (Hurst, 1950; Woodward and Goldsmith, 1964; Montgomery, 1991). This technique was successfully applied for the analysis of temporal changes in elasmobranch landings in relation to changes in fishery regulations (Dell'Apa et al., 2012b). For a description of this technique and the methodology refer to Kimmel et al. (2012).

I built a social network of the trade data using UCINet 6.3 network analysis software (Borgatti et al., 2002) and the NetDraw network drawing software (Borgatti, 2002) to develop two one-mode networks: one before (Pre-FMP, 1990-1999) and one after (Post-FMP, 2000-2010) the introduction of the FMP. For each network, edges represent link-relationships (quantities of dogfish traded) between nodes (countries). The edge thicknesses were arbitrarily set to be proportional to trade quantities from exporting countries to importing countries, and they are directional (arrows pointing from the importer to the exporter country). The one-mode networks also provided a preliminary visualization of the major exporters toward EU27 and the major EU27 importers during the two periods considered for the analysis.

The one-mode network does not allow a clear identification of EU27 countries that have an important role as both importers and exporters toward other European countries, thus preventing the characterization of the specific role of each EU27 country within the trade network. To improve interpretation of results, I employed a non-metric multi-dimensional scaling (MDS) of the Regular Equivalence (RE) coefficients between countries following the method of Luczkovich et al. (2003).

MDS represents proximities (similarities or dissimilarities) among a given set of entities (countries in this case) in a two dimensional space, with entities closer to each other having more similar roles in the network. I employed the REGE algorithm in the UCINet to calculate RE coefficients among countries. The Regular Equivalence (RE), or Regular Coloration (White and Reitz, 1983), is an equivalence relation in which two nodes are considered equivalent if holding link relationships with corresponding type of nodes (but not necessarily the same one). Applied to this trade network, regularly equivalent countries import spiny dogfish from equivalent countries (but not necessarily the same one) and export spiny dogfish to equivalent countries (but not necessarily the same one). The RE is a method to partition entities based on their similarities within the network, and thus it allowed me to identify each country's specific role and trade niches within the EU spiny dogfish trade. For a more detailed description of RE I refer to White and Reitz (1983) and Luczkovich et al. (2003). The REGE coefficient matrixes were used as coordinates to plot the MDS of the two networks (pre-FMP and post-FMP) employing the NetDraw, thus obtaining a visualization of country similarities based on the REGE coefficient. To make the network more congruous to the real-world trade based on the available data, a Johnson's hierarchical clustering of the REGE algorithm matrix was performed in the UCINet (Johnson, 1967). All partitions within the Johnson's clustering are equally valid, as they represent different levels of resolution rather than alternative theories (Borgatti et al., 1990). To further simplify network interpretation, a series of regressions were performed to measure cluster adequacy following the method by Luczkovich et al. (2003), in which an analysis of variance is performed with cases as pairs of nodes (countries), the REGE coefficient for each pair as the dependent variable, and the independent variable is a dummy variable coded 1 (pair are in the same cluster, more similar) and 0 (pair are in different clusters, less similar). For each network (pre-FMP and post-FMP) the number of partitions presenting the highest eta-square (highest variance explained) was chosen (Luczkovich et al., 2003), providing the most adequate representation of country similarities within the MDS-REGE coefficient network. For each MDS-REGE coefficient network, each node was visually represented by a different shape based on the geographical location and role in the trade of the corresponding country.

Results

The time-series CUSUM plot evidenced that, over the study period (1990-2010), the U.S. and Canadian trends in frozen spiny dogfish exported toward EU were almost perfectly inversely mirroring each other (Figure 5.1). The plot shows a clear change point for both countries in 1999, the time for the U.S.-FMP adoption. Before 1999, the trend of U.S. exports was steadily increasing, whereas the Canadian exports trend was concurrently decreasing. After the introduction of the FMP, the two trends abruptly reversed, with the Canadian exports trend constantly increasing and the U.S. export trend decreasing. This result conforms to a planned reduction in U.S.-TAC after the FMP adoption.

The one-mode network for the pre-FMP period (1990-1999) indicates that the U.S. was the major exporter to EU27 countries, with major flow trade toward France, United Kingdom, Ireland, Germany, Belgium, and the Netherlands (Figure 5.2a). Also, Italy was one of the major importers of frozen dogfish within the EU27, importing smaller quantities from different countries in North America (USA), Central America (Panama and Honduras), South America (Brazil, Argentina, and Uruguay), Africa (from Morocco to South Africa), and Asia (from Iran to South Korea). Other exporters to EU27 countries within this period, but with fewer quantities than U.S., were Canada, Argentina, and New Zealand.

The one-mode network for the post-FMP period (2000-2010) shows that, compared to the previous period, U.S. exports to the EU decreased while new countries increased their importance as exporters; particularly Canada, Argentina, and New Zealand. Also, amongst the

EU27 countries, Spain became a central importer and exporter to both other west European countries (e.g., Portugal, Italy, France, and Greece) and several east European countries (e.g., Czech Republic, Poland, Bulgaria, and Slovenia). In addition, new countries from the east of Europe entered the network, increasing the demand for dogfish, in particular: Poland, Czech Republic, Bulgaria, Romania, Slovakia, Russia, and all the Baltic countries from Lithuania to Estonia.

The MDS-REGE plot for the pre-FMP period (Figure 5.3a) resulted from a country-type partitioning of the network in 19 different clusters, explaining the highest variance among all the possible partitioning (eta-square = 0.802). This graph indicates that U.S. was the major exporter toward EU27 countries and that it was not similar (regularly equivalent) to any of the other countries. Canada represented its own cluster, as well as Argentina with Mauritania, and New Zealand with Turkey. Within the EU27 countries playing the role of importer-exporter, United Kingdom and France were regularly equivalent, along with Belgium and Germany, and Greece and Netherlands. Italy and Spain were partitioned into two different clusters.

The MDS-REGE plot of the post-FMP period (Figure 5.3b) resulted from a partitioning of the network into 12 different groups based on their RE coefficients (eta-square = 0.687). The plot indicates the presence of a major cluster of exporting countries that in the graph are colored in red. This cluster includes U.S., Canada, Argentina, Mauritania, and New Zealand as non-EU27 countries (squares), and Spain and Netherlands as EU27 countries (triangles). Among these countries, U.S. and Canada have similar thicknesses of their link-relationship with other countries. This plot also shows the presence of a second main cluster of regularly equivalent countries within the list of EU27 importer-exporter that in the graph are colored in blue. This cluster includes Belgium, Luxemburg, United Kingdom, France, Germany, Greece, and Italy.

The plot also revealed an increase of EU27 importers of frozen dogfish among east European countries (e.g., Bulgaria, Romania, Estonia, and Poland) compared to the pre-FMP period, with Czech Republic potentially playing the role of main importer and re-exporter toward some of those countries for future years (i.e., Slovakia).

Discussion

Before 1999, the U.S. was the major exporter of dogfish toward EU27 countries, particularly for those directly exploiting the Northeast Atlantic stock including the United Kingdom, Ireland, Belgium, Germany, Netherlands, and France (Figure 5.2a). After 1999, Canada increased export quantities toward these same countries (Figure 5.3b), eventually supplying their demand after the U.S. exports decreased because of planned reduction in total U.S. Atlantic dogfish quotas (Figure 5.1). As a result, Canada gained economic importance in this market compared to the U.S. over the last decade (Figure 5.1 and Figure 5.2b). Furthermore, the decrease in U.S. exports likely caused an increasing global exploitation of dogfish in order to supply the EU market demand, particularly in Canada, Argentina, and New Zealand (Figure 5.2b). Among these countries, Canada is the only one with a known sustainable spiny dogfish fishery that was certified as sustainable by the Marine Stewardship Council (MSC) in 2011: the British Columbia hook-and-line fishery in the Pacific (http://www.msc.org). This result would have represented an economic advantage for Canada in the trade of *S.acanthias*, if recent taxonomic distinctions between Canadian Pacific and Atlantic dogfish species had not emerged. The U.S. Atlantic spiny dogfish fishery was certified as sustainable by the MSC in 2012 (http://www.msc.org). In light of that, it is reasonable to assume that the U.S. could likely achieve a similar economic position as Canada, eventually matching or overtaking Canada's dogfish export toward the EU27's market. However, the U.S. government, so far, has given lukewarm support to the possible inclusion of spiny dogfish in CITES's Appendix II (see chapter 2). A reason for that may be that the U.S. fishing industry wants to avoid the adoption of stricter regulations in species trade because of associated concern over the viability of dogfish exploitation. This is supported by a historical opposition to list dogfish manifested by several U.S. fishery agencies since 2004, and by the fact that even prior to 2004 several conservation organizations calling for the U.S. to take the lead for a dogfish proposal saw their requests rejected (Fordham and Dolan, 2004; Fordham, 2009). On the other hand, considering the success of its national management regulation (U.S.-FMP) in providing sustainability for the Northwest Atlantic spiny dogfish stock, it may be that the U.S. believes that fisheries management, rather than a CITES's listing, can be more effective in achieving sustainability for this species.

Whatever the reason, in light of the recent MSC certification for the U.S. Northwest Atlantic spiny dogfish fishery, the taxonomic differences between North Atlantic and North Pacific dogfish from Canadian waters, and the fishery closure in the Northeast Atlantic, the listing of spiny dogfish in the Appendix II could culminate in an economic advantage for the United States. This is because EU restrictions on imports of spiny dogfish coming from non-certified, sustainable stocks will likely eliminate competition from other exporters.

An important finding is the significant importer-exporter role of Spain in EU after 1999 (Figure 5.3b), which suggests increased dogfish exploitation by Spain in the Atlantic and in the Mediterranean Sea over the last decade. The Mediterranean fishery currently lacks any form of management for spiny dogfish, due to the absence of a board charged with scientifically advising the EU Commission on the stock status, such as ICES for the Northeast Atlantic. The current scientific advice on Mediterranean fisheries is considered insufficient, with most of the demersal, small pelagic or highly migratory species being overexploited (FAO, 2005; Markus, 2009). The increasing exploitation of dogfish by Spain could potentially threaten the conservation status of the Mediterranean stock in the absence of a specific fishery management regulation for dogfish. Concerns exist due to reported relationship between fishing exploitation and the diminishing of Squalidae in the Mediterranean (Gristina et al., 2006; Dell'Apa et al., 2012b). In 2009, the Food and Agriculture Organization of the United Nation Expert Advisory Panel (FAO-EAP) declared that the Mediterranean population meets the extent of the decline criterion (FAO, 2009).

I also found increasing demand for spiny dogfish from several east European countries (Figure 5.2b and Figure 5.3b), which can represent a trade niche for the future. In 1999 (FMP adoption), these countries (i.e., Romania, Bulgaria, Czech Republic, Poland, Slovenia, Slovakia, Estonia, Lithuania, and Latvia) were not members of the EU. The recent inclusion of these countries, most of which were formerly part of the Soviet Union or under a more directed economic influence from Russia, has widened the international trade of spiny dogfish given its low price (EUR 10-15 kg^{-1}, *in* Fowler et al., 2004). Therefore, it is likely that the eastern European market demand can eventually fuel the exploitation of dogfish from other areas that could harm the conservation status of regional and local stocks in case of unmanaged fisheries. Romania and Bulgaria can also exploit the Black Sea spiny dogfish stock, which is not under a EU-TAC management regulation and is listed as *Vulnerable* (VU) in the *red list of threatened species* of the IUCN (Cavanagh and Gibson, 2007). This exploitation can potentially develop an appreciable trade toward other EU27 countries affecting the conservation status of this stock if this fishery was overexploited.

In case of the species insertion in Appendix II, dogfish caught in EU waters would likely be traded within the EU thus limiting the efficacy of trade regulation (for CITES the EU is considered as a single Party), as these trades will not be subjected to CITES trade limitations

(FAO, 2009). However, considering the fishing closure in the Northeast Atlantic, this concern may not hold true. In fact, under this restriction the major historical consumers of spiny dogfish in the EU (i.e., the Northeast Atlantic countries) will have to meet their demand exclusively from imports. In case of listing, the U.S. would have an advantage toward other non-EU 27 countries (except for Spain) in providing dogfish to the Northeast Atlantic area because of its MSC certification.

My network results suggest that several African and Asian countries could potentially intensify the species exploitation to supply the EU27 market demand in the future (Figure 5.2a), and some countries (e.g., Mauritania) have already been reporting such increase (Figure 5.2b and Figure 5.3b). In addition, several South American countries (e.g., Argentina, Brazil, Uruguay, and Chile) could potentially increase their exploitation if the European demand should increase (Figure 5.2b). The conservation status for dogfish stocks in the jurisdictions of these countries is unknown or data deficient, with a lack of specific stock biomass estimation that could be employed to develop appropriate management measures to promote local fishery sustainability. For example, the export from Argentina increased after the U.S.-FMP introduction (Figure 5.2b), but a detailed biomass estimation of the local dogfish stock has yet to be produced (M. Belleggia, pers. comm.).

In contrast, some preliminary information for Squalidae are available for the Southern coasts of Africa, where the shortnose spiny dogfish *Squalus megalops* and the shortspine spiny dogfish *Squalus mitsukurii* are found along the eastern Cape coast (Compagno et al., 1989; Smale et al., 1993), while *S. acanthias* occurs on the Cape west coast (Compagno, 1991).

Preliminary studies were conducted to investigate the *S.megalops* biology and reproduction (Watson and Smale, 1998), and to examine the species age and growth rate for assessing the potential for fishery exploitation (Watson and Smale, 1999). The authors concluded that, despite recorded high biomass for the species, this population necessitates cautious management approach should it become a target because of the species life-history characteristics (Watson and Smale, 1999). Although *S. acanthias* matures at a similar age to *S. megalops* (McFarlane and Beamish, 1987), it is reported to reach a greater maximum age of at least 70 years (Beamish and McFarlane, 1985), attains greater size and has litters of up to 32 young, although this number varies geographically (Hanchet, 1988). Overall, these biological characteristics can be promising for exploring a potential sustainable exploitation of *S. acanthias* in the western Cape area, and should prompt the need for a detailed population stock assessment from South Africa to Namibia. It was already suggested that the deteriorating status of stocks elsewhere and the introduction of catch limits in some fisheries, together with continued strong international demand, may drive development of such a fishery (Lack, 2006).

Conclusions

The adoption of the U.S.-FMP for the Northwest Atlantic spiny dogfish stock corresponds to significant changes in the species international trade. As a direct result, Canada increased its dogfish exports to the EU market appreciably, while U.S. exports declined because of planned management quota reductions. In light of the effectiveness of the U.S.-FMP in achieving sustainability for the Northwest Atlantic spiny dogfish stock, and given the current state of the international exploitation and trade, and global and local conservation status, the U.S. government would reap economic benefit from the species inclusion in CITES’s Appendix II.

The network analysis also indicates that new areas increased exploitation to supply the EU market demand as U.S. exports declined, potentially affecting the conservation status of regional and local spiny dogfish stocks in African, Asian, and South American coastal areas.

Although there is no directed fishery for spiny dogfish off South Africa, my results, and available information on the species biology and management regulations introduced in the Northeast Atlantic, suggest that the South African-Namibian coastal area may be a potential fishing ground for dogfish in the future. This fishery should be considered for the employment of a management strategy prior to exploitation to ensure the fishery is sustainable and will help prevent species overexploitation.

Considering both the reported and forecasted increased exploitation of spiny dogfish stocks in the Mediterranean and Black Seas (e.g., Spain, Romania, and Bulgaria), awareness of the conservation status of these spiny dogfish stocks is also needed in order to encourage the introduction of conservation measures in this area, which is under the authority of the EU fishery management but lagging behind in terms of spiny dogfish conservation measures.

Effective and successful management systems are based on finding the best trade-off among contrasting biological, socio-economic, and political objectives. The case for managing the international trade of spiny dogfish shows that a major goal for managers should be to integrate all these different aspects to effectively contribute to the analysis of risks related to global exploitation. This study indicated that the employment of new analytical techniques, such as social network analysis of available trade data, can be useful in the discussion of implementing the fishery management and international biodiversity protection.

LITERATURE CITED

ASMFC. 2002. Atlantic States Marine Fisheries Commission. Interstate Fishery Management Plan for Spiny Dogfish. Fishery Management Report #40, Atlantic States Marine Fisheries Commission, Washington, D.C.

Beamish, R.J., and McFarlane, G.A. 1985. Annulus development on the second dorsal spine of the spiny dogfish *(Squalus acanthias)* and its validity for age determination. *Canadian Journal of Fisheries and Aquatic Sciences* 42: 1799-1805.

Borgatti, S.P., Everett, M.G., and Shirey, P. 1990. LS sets, lambda sets, and other cohesive subsets. *Social Networks* 12: 337-357.

Borgatti, S.P. 2002. Netdraw Network Visualization. Analytic Technologies, Harvard, MA.

Borgatti, S.P., Everett, M.G., and Freeman, L.C. 2002. Ucinet for Windows: Software for Social Network Analysis. Analytic Technologies, Harvard, MA.

Cavanagh, R.D., and Gibson, C. 2007. Overview of the conservation status of cartilaginous fishes (Chondrichthyans) in the Mediterranean Sea. IUCN, Gland, Switzerland and Malaga, Spain. vi + 42 pp.

CITES. 1973. Convention on International Trade in Endangered Species of Wild Fauna and Flora. Text of the Convention, 27 U.N.T.S. 243. Available at http://www.cites.org/eng/disc/E-Text.pdf (February 2013).

Cleveland, W.S., and Devlin, S. 1988. Locally weighted regression: an approach to regression analysis by local fitting. *Journal of the American Statistical Association* 83: 596–610.

Compagno, L.J.V. 1984. FAO species catalogue. Sharks of the world. An annotated and illustrated catalogue of shark species known to date. Part 1 - Hexanchiformes to Lamniformes. FAO Fisheries Synopsis Vol. 4, Pt. 1., pp. 1-249. Food and Agriculture Organization of the United Nations, Rome. Food and Agriculture Program of the United Nations, Rome.

Compagno, L.J.V., Ebert, D.A., and Smale, M.J. 1989. Guide to the sharks and rays of Southern Africa. Struik, Cape Town.

Compagno, L.J.V., Ebert, D.A., and Cowley, P.D., 1991. Distribution of offshore demersal cartilaginous fish (Class Chondrichthyes) off the west coast of southern Africa, with notes on their systematics. *South African Journal of Marine Science* 11: 43-139.

CoP14 Prop. 16. 2007. Conference of the Parties to the Convention 2007: Proposal 16. Convention on International Trade in Endangered Species of Wild Fauna and Flora. Available at http://www.cites.org/eng/cop/14/prop/E14-P16.pdf (February 2013).

CoP15 Prop. 18. 2010. Conference of the Parties to the Convention 2010: Proposal 18. Convention on International Trade in Endangered Species of Wild Fauna and Flora. Available at http://www.cites.org/eng/cop/15/prop/E15-P18.pdf (February 2013).

Council Regulation (EC) N° 57/2011 of 18 January 2011 on fixing for 2011 the fishing opportunities for certain fish stocks and groups of fish stocks, applicable in EU waters and, for EU vessels, in certain non-EU waters. *Official Journal of the European Communities* L24/1.

Council Regulation (EC) N° 43/2012 of 17 January 2012 on fixing for 2012 the fishing opportunities available to EU vessels for certain fish stocks and groups of fish stocks which are not subject to international negotiations or agreements. *Official Journal of the European Communities* L25/1.

Dell'Apa, A., Schiavinato, L., and Rulifson, R.A. 2012a. The Magnuson-Stevens act (1976) and its reauthorizations: failure or success for the implementation of fishery sustainability and management in the US? *Marine Policy* 36: 673-680.

Dell'Apa, A., Kimmel, D.G., and Clò, S., 2012b. Trends of fish and elasmobranch landings in Italy: associated management implications. *ICES Journal of Marine Science* 69: 1045-1052.

Dell'Apa, A., J.C. Johnson, D.G. Kimmel, and R.A. Rulifson. 2013. The international trade and fishery management of spiny dogfish: a social network approach. *Ocean & Coastal Management* 80: 65-72.

Ebert, D.A., White, W.T., Goldman, K.J., Compagno, L.J.V., Daly-Engel, T.S. and Ward, R.D. 2010. Resurrection and redescription of *Squalus suckleyi* (Girad, 1854) from the North Pacific, with comments on the *Squalus acanthias* subgroup (Squaliformes: Squalidae). *Zootaxa* 2612: 22-40.

Ellis, J., Doran, S., Dunlin, G., Hetherington, S., Keable, J., and Skea, N. 2009. Fisheries Science Partnership: 2009 final report programme 9: spurdog in the Irish, Centre for Environment, Fisheries and Aquaculture Science. Available at http://www.cefas.co.uk/media/359108/spurdog%20fsp_final%20report_v2.pdf (May 2013).

FAO. 2005. Food and Agriculture Organization of the United Nations. Fisheries laws and regulations in the Mediterranean: a comparative study. General Fisheries Commission for the Mediterranean, Rome.

FAO. 2009. Food and Agriculture Organization of the United Nations. Report of the third FAO ad hoc Expert Advisory Panel for the assessment of proposals to amend Appendices I and II of CITES concerning commercially-exploited aquatic species. *FAO Fisheries Report* N° 925, FIMF/R925, Rome.

Fordham, S., and Dolan, C. 2004. A case study in international shark conservation: the Convention on International Trade in Endangered Species and the spiny dogfish. *Golden Gate University Law Review* 34: 531-572.

Fordham, S. 2009. Conservation of Atlantic spiny dogfish under U.S. Law and CITES. In Gallucci, V.F., McFarlane, G.A., and Bargmann, G.G. (Eds.), Biology and management of dogfish sharks, 411-423. American Fisheries Society, Bethesda, Maryland.

Fowler, S., Raymakers, C., and Grimm, U. 2004. Trade in and conservation of two shark species, porbeagle (*Lamna nasus*) and spiny dogfish (*Squalus acanthias*). CoP13 Inf.16. BFN Skripten 118, Bonn; 58 p.

Gristina, M., Bahri, T., Fiorentino, F., and Garofalo, G. 2006. Comparison of demersal fish assemblages in three areas of the Strait of Sicily under different trawling pressure. *Fisheries Research* 81: 60–71.

Hanchet, S. 1998. Reproductive biology of *Squalus acanthias* from the East Coast, South Island, New Zealand. *New Zealand Journal of Marine and Freshwater Research* 22: 537-549.

Holden, M. 1994. The Common Fisheries Policy, Oxford, 274 p.

Hurst, H.E. 1950. Long-term storage capacity of reservoirs. *Proceedings of the American Society of Civil Engineers* 76: 1-30.

ICES. 2006. International Council for the Exploration of the Sea. Spurdog in the Northeast Atlantic, in Report of the Working Group on Elasmobranch Fishes (WGEF), ICES Advisory Committee on Fisheries Management, ICES CM 2006/ACFM31: 19-76.

IUCN. 2006. The International Union for Conservation of Nature. *Squalus acanthias*. The IUCN Red List of Threatened Species. Available at http://www.iucnredlist.org/apps/redlist/details/39326/0 (February 2013).

Johnson, S.C. 1967. Hierarchical clustering schemes. *Psychometrika* 32: 241-253.

Kimmel, D.G., Boynton, W.R., and Roman, M.R. 2012. Long-term decline in the calanoid copepod *Acartia tonsa* in central Chesapeake Bay, USA: an indirect effect of eutrophication? *Estuarine, Coastal and Shelf Science* 101: 76-85.

Lack, M. 2006. Conservation of spiny dogfish *Squalus acanthias*: A role for CITES? TRAFFIC International. Available at http://www.traffic.org/species-reports/traffic_species_fish5.pdf (July 2013).

Luczkovich, J.J., Borgatti, S.P., Johnson, J.C., and Everett, M.G., 2003. Defining and measuring trophic role similarity in food webs using regular equivalence. *Journal of Theoretical Biology* 220: 303-321.

MAFMC. 1999. Mid-Atlantic Fishery Management Council. Spiny Dogfish Fishery Management Plan. MAFMC, Dover, Delaware.

Markus, T. 2009. European fisheries law: from promotion to management, Europa Law Publishing, 390 p.

McFarlane, G.A., and Beamish, R.J. 1987. Validation of the dorsal spine method of age determination for spiny dogfish. In Summerfelt, R.C., and Hall, G.E. (Eds.), Age and Growth of Fish, pp. 287-300. State University Press, Ames, Iowa.

Montgomery, D.C. 1991. Introduction to statistical quality control, second ed. John Wiley and Sons, New York.

Sky, B.M. 2010. Getting on the list: politics and procedural maneuvering in CITES Appendix I and II decisions for commercially exploited marine and timber species. *Sustainable Development Law and Policies* 10: 35-40.

Smale, M.J., Roel, B.A., Badenhorst, A., and Field, J.G. 1993. Analysis of the demersal community of fish and cephalopods on the Agulhas Bank, South Africa. *Journal of Fish Biology* 43: 169-191.

TRAFFIC. 2010. CITES CoP15 Prop 18 Analysis. Inclusion of spiny dogfish *Squalus acanthias* in Appendix II. Proponent: Sweden, on behalf of the European Community's Member States acting in the interest of the European Community. Available at http://www.traffic.org/cites-cop-papers (April 2013).

Wallace, S.S., McFarlane, G.A., Campana, S.E., and King, J.R. 2009. Status of spiny dogfish in Atlantic and Pacific Canada. In Gallucci, V.F., McFarlane, G.A., and Bargmann, G.G. (Eds.), Biology and management of dogfish sharks, 313-334. American Fisheries Society, Bethesda, Maryland.

Watson, G., and Smale, M.J. 1998. Reproductive biology of shortnose spiny dogfish, *Squalus megalops,* from the Agulhas Bank, South Africa. *Marine and Freshwater Research* 49: 695-703.

Watson, G., and Smale, M.J. 1999. Age and growth of the shortnose spiny dogfish (*Squalus megalops)* from the Agulhas Bank, South Africa. *South African Journal of Marine Science* 21: 9-18.

White, H.C., and Reitz, K.P. 1983. Graph and semigroup homomorphisms on networks of relations. *Social Networks* 5: 193-235.

Woodward, R.H., and Goldsmith, P.L. 1964. Cumulative sum techniques. ICI Monograph, 3. Oliver and Boyd, Edinburgh.

Table 5.1: List of all countries included in the analysis with relative country abbreviation based on the “ISO 3166-1” 3-letter code of the International Organizations for Standardization (ISO) used by the United Nations (UN) (http://www.iso.org/iso/country_codes.htm). Germany (DEU) and West Germany (DDR) were two different countries before the unification of West and East Germany in 1990. In Eurostat database, Belgium (BEL) appears as a distinctive country for the period 1990-1998. Starting in 1999, Belgium and Luxemburg (BEL/LUX) data started to be pooled together up to 2010. Reprinted from Dell’Apa et al. (2013) with permission.

Nation	Abbreviation	Nation	Abbreviation
Angola	AGO	Malta	MLT
Argentina	ARG	Mauritania	MRT
Belgium/Luxemburg	BEL/LUX	Morocco	MAR
Belgium	BEL	Namibia	NAM
Brazil	BRA	Netherlands	NLD
Bulgaria	BGR	New Zealand	NZL
Canada	CAN	Norway	NOR
Canary Islands	CAI	Oman	OMN
Chile	CHL	Panama	PAN
China	CHN	Poland	POL
Cyprus	CYP	Portugal	PRT
Czech Republic	CZE	Romania	ROU
Cote D'Ivorie	CIV	Russia	RUS
Denmark	DNK	Senegal	SEN
Estonia	EST	Singapore	SGP
Faroe Islands	FRO	Sierra Leone	SLE
Finland	FIN	Slovakia	SVK
France	FRA	Slovenia	SVN
Germany	DEU	Somalia	SOM
Ghana	GHA	South Africa	ZAF
Greece	GRC	South Korea	COR
Guinea	GIN	Soviet Union	USSR
Guinea-Bissau	GNB	Spain	ESP
Honduras	HND	Sweden	SWE
Iceland	ISL	Taiwan	TWN
India	IND	Thailand	THA
Indonesia	IDN	Turkey	TUR
Iran	IRN	United Kingdom	UK
Ireland	IRL	United Stated	USA
Italy	ITA	Uruguay	URY
Latvia	LVA	West Germany	DDR
Lithuania	LTU	Yemen	YEM
Kenya	KEN		

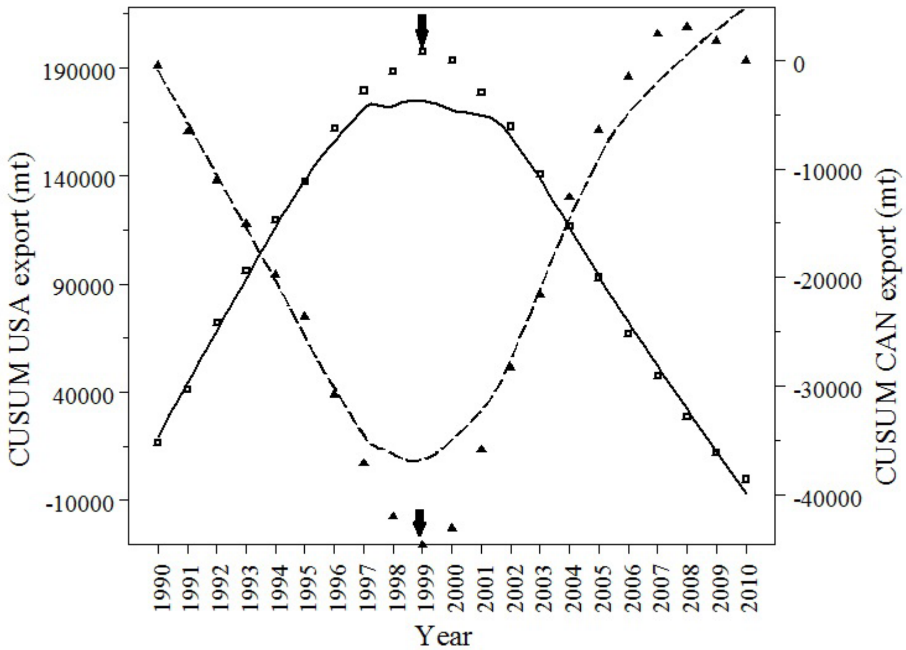

Figure 5.1: CUSUM of annual export (mt) of frozen spiny dogfish toward the EU by USA (open squares) and Canada (solid triangles) with relative trend expressed as LOESS (solid line for U.S. and dashed line for Canada) at tension of 0.05. Black arrows indicate the introduction of the federal US-FMP. Reprinted from Dell'Apa et al. (2013) with permission.

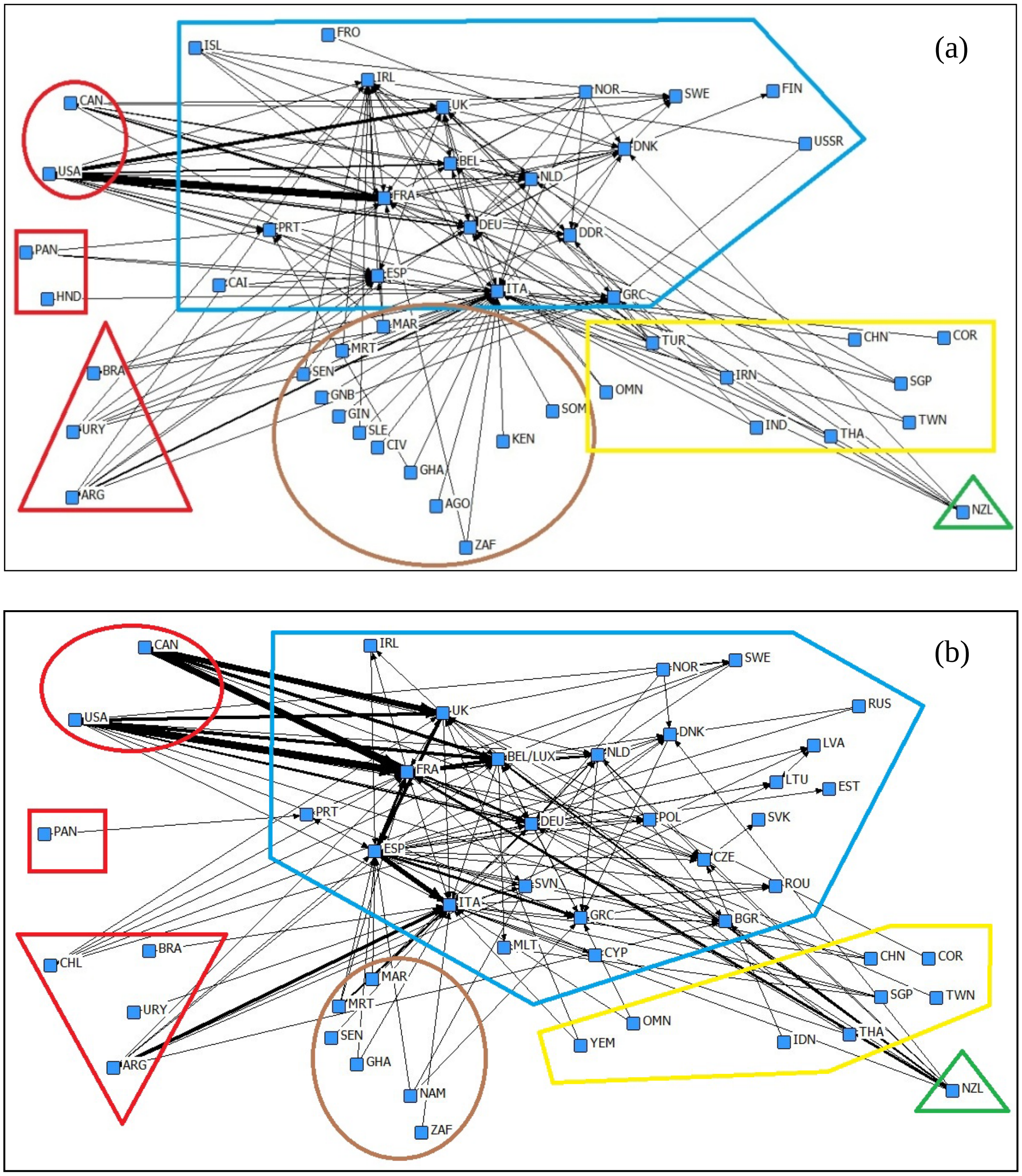

Figure 5.2: One-mode network for the pre-FMP period (1990-1999) (a), and for the post-FMP period (2000-2010) (b). Nodes represent countries and edges represent link-relationships between countries based on quantities of dogfish exported, with arrows pointing from the exporter to the importer country. Countries are displayed based on their geographical location: North America (red ellipse), Central America (red rectangle), South America (red triangle), Africa (brown ellipse), Asia (yellow rectangle in a and yellow polygon in b), Europe (blue polygon), and Oceania (green triangle). For a list of country abbreviation see Table 1. Reprinted from Dell’Apa et al. (2013) with permission.

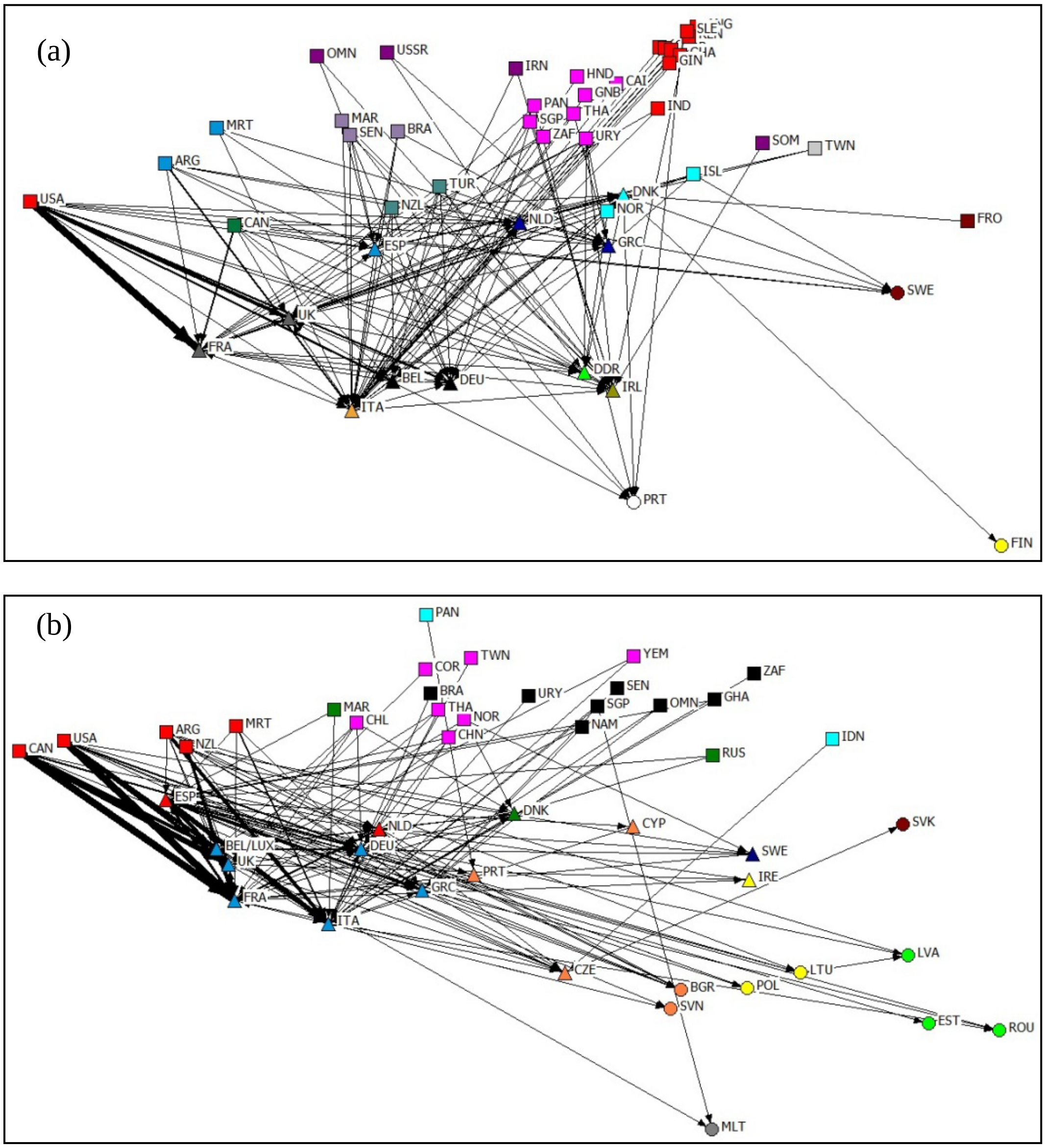

Figure 5.3: non-metric MDS of the REGE coefficient for the pre-FMP period (1990-1999) (a), and for the post-FMP period (2000-2010) (b). Nodes represent countries and edges represent link-relationships between countries based on quantities of dogfish exported, with arrows pointing from the exporter to the importer country. Countries are partitioned (same color) based on the highest eta-square obtained from regression analysis (see text in Material and methods), with 19 partitioning for the pre-FMP period (eta-square = 0.802) and 12 partitioning for the post-FMP period (eta-square = 0.687). In figure 3a, USA happens to have the same color (red) of countries located in the higher-right corner due to the shortage of colors available. Therefore, the two clusters are not regularly equivalent. Square nodes indicate non-EU27 exporters; triangle nodes indicate EU27 countries that are both importers and exporters within the EU27 dogfish trade network; circle nodes indicate EU27 countries that are only importers of dogfish. For a list of country abbreviation see Table 1. Reprinted from Dell'Apa et al. (2013) with permission.

Chapter 6

SEXUAL SEGREGATION OF SPINY DOGFISH (*SQUALUS ACANTHIAS*) IN CAPE COD, MASSACHUSETTS: POTENTIAL FOR A MALE-ONLY DIRECTED FISHERY

Abstract

Commercial gillnet and longline surveys were conducted in the Cape Cod, Massachusetts, area to assess if the percentage of male spiny dogfish (*Squalus acanthias*) in the catch changes throughout a normal fishing day, an event frequently observed by local commercial longliners, and to determine the associated potential benefits for the fishery management in the study area. Sex ratio changes were examined with respect to location (North and South of the 42° N latitude), environment (depth, surface and bottom temperature and salinity) and fishing (type of gear and time of activity). Dogfish showed differences in sex ratios that were related to location and fishing, as well as to depth and time. Higher numbers of dogfish were caught with longline and significantly higher numbers of males were caught in the southern area in inshore shallower waters at dawn and early in the day. The sex distribution found within sets conducted in the North was more consistent with previous research on species distribution, with a higher presence of females and a lower presence of males in shallower inshore waters. Changes in environmental parameters (depth and bottom temperature) were correlated to dogfish sex ratios only in the South. A consistent seasonal (summer and early fall) diurnal shift in the sex ratio was found within 10 miles off the east coast of the Cape Cod peninsula. This shift suggests that the potential for a seasonal male-only directed longline fishery might be investigated for this location. Such a fishery would enhance the sustainability of the U.S. Atlantic spiny dogfish stock by reducing fishing pressure on the adult female component. The sex ratios observed suggest that

sexual segregation in *S. acanthias* in the Cape Cod area corresponds to female avoidance of males coupled with specific mating and/or feeding behavior by males.

Introduction

The spiny dogfish (*Squalus acanthias*) is an important commercial shark species that schools by sex and size (Compagno et al., 2005). Adult females are most commonly reported in inshore shallower waters and reach a greater average size than males, while adult males are most commonly found in deeper waters farther offshore and are smaller at age (Shepherd et al., 2002; Compagno et al., 2005). These differences in habitat use by sex are due to the presence of sexual segregation, which can be spatial (each sex uses a different distinct area) or temporal (each sex uses the same area but at different times) (Conradt, 2005).

Sexual segregation is fairly common in sharks (Springer, 1967), for which a variety of explanations have being proposed. According to the social avoidance hypothesis (Sims, 2005), sexual segregation may be the result of females trying to avoid energy demanding copulation. Mating behavior is aggressive in sharks (Tricas and Le Feuvre, 1985), with males biting females during courtship and copulation, leaving clearly visible wounds on their pectoral fins and body (Tricas and Le Feuvre, 1985; Pratt and Carrier, 2001). As a male avoidance strategy, females seek refuge in shallower waters where males are usually less abundant, as was suggested for the lesser spotted dogfish (*Scyliorhinus canicula*) by Sims et al. (2001) and for the nurse shark (*Ginglymostoma cirratum*) by Pratt and Carrier (2001).

Sexual segregation in sharks has also been explained by a thermal condition hypothesis (Sims, 2005), for which adult, usually pregnant, females may prefer to inhabit warmer waters to increase their growth rate and fecundity compared to males, as was suggested for the grey reef shark (*Carcharhinus amblyrhynchos*) by Economakis and Lobel (1998).

There is a general lack of comparable research on spiny dogfish specifically addressing the presence of sexual segregation in the species and its causes, although it was the first shark species for which sexual segregation was reported (Ford, 1921). Perhaps, the best study providing valuable information on this subject was the one conducted by Shepherd et al. (2002), examining the associations between dogfish and environmental water parameters in the Bay of Fundy and Scotian Shelf. Sheperd et al. (2002) found that temperature preferences were not significantly different between sexes. In the same study, it was found that males were more abundant in deeper and more saline waters, while females dominated in shallower less saline waters. These results suggest the occurrence of sex-specific and length-specific environmental ranges in spiny dogfish.

These studies provide evidence that habitat for sharks may be selected differentially by the sexes for multiple reasons, suggesting that sexual segregation could be favorably explored for the purpose of commercial exploitation. The possibility for differential exploitation of sharks by sex has not been studied in detail (Mucientes et al., 2009), but could be an important mechanism for enhancing the fishery management and sustainability of important stocks such as the Northwest Atlantic stock of spiny dogfish. By targeting adult males, the fishing pressure on the adult female component could be reduced, potentially increasing the fishery sustainability.

Historically, the Northwest Atlantic dogfish stock has been commercially exploited to satisfy the European (EU) market, which demands larger individuals (Lack, 2006). As a result, between 1989 and 2000, females constituted 92 % of the U.S. spiny dogfish landings (Rago and Sosebee, 2010; NEFSC, 2003). Given the species biology (~ 2 years gestation period, late age at maturity, and slow growth rate), this strategy impacts the stock status. Recent assessments indicate a three-fold increase in the male:female ratio of dogfish catches from 1993-2006, and a substantial reduction in mean total length (TL) of reproductive females, resulting in the production of fewer and smaller offspring that could affect future recruitment (NMFS, 2006). In light of this reported concern for large adult females, a male-only directed fishery is a potential management option to preserve female stocks.

Regardless of its causes, sexual segregation in spiny dogfish has been recently observed by commercial longliners in the Cape Cod Bay, Massachusetts, who claimed the occurrence of male:female ratio changes in their inshore catches throughout a normal fishing day. Higher numbers of males are often caught in early morning, and greater numbers of females are caught as the day progresses. This anecdotal information has a twofold importance: it identifies a potential study area to investigate the causes of sexual segregation in spiny dogfish, and it may provide evidence for a differential exploitation of local dogfish populations based on differences in habitat use by sex and local commercial fishery characteristics.

The goal of this chapter is to present results of fishery-dependent surveys conducted in the Cape Cod area to determine if differences in the percentage of males caught varied by geographic location, type of gear, environmental conditions, and time of the day. I hypothesized that there will be difference in the percentage of males based on the aforementioned factors. Specifically, based on anecdotal information from commercial longliners, I predicted that the region north of Cape Cod will have a higher percentage of males compared to the south, and that more males will be caught with longline compared to gillnet. I also predicted that warmer and less saline inshore waters will have a lower percentage of males, as has been reported for female dogfish (Sheperd et al., 2002) and other shark species (Economakis and Lobel, 1998; Pratt and Carrier, 2001; Sims et al., 2001). Finally, I predicted that a higher percentage of males will be caught earlier in the day compared to later in the day, based on reports from commercial longliners in the region.

Material and methods

Opportunistic fishery-dependent surveys to tag and release spiny dogfish were conducted with commercial gillnet (10 panels of 6.5 cm stretch mesh size x 91.4 m = 914.4 m line) and commercial longline (4 bundles x 457.2 m = 1828.8 m line; 300 hooks per bundle = 1,200 hooks; Squid – *Loligo* spp. used as bait) vessels in the fall of 2010 (October), and in the spring (May and June) and summer (August) of 2011. Sets were conducted in the Cape Cod Bay, in Rhode Island, and in an area approximately 10 miles northeast off the coast of Chatham, Massachusetts along the eastern portion of the Cape Cod Peninsula. This sampling effort was part of a multi-tagging project designed to tag and release spiny dogfish with external tags and internal acoustic tags in the New England area, with the primary objective of testing the hypothesis that the Cape Cod area is the natural intermixing ground between the U.S. and the Canadian spiny dogfish stocks (results not shown here).

The secondary objective of this project was to test for significant changes in the percentage of males within the catch (PM), calculated as PM = male catches/(male catches + female catches), throughout a normal fishing day. The study area was divided into two sampling regions: North and South. The 42° N Latitude line from the outer edge of the Cape Cod peninsula was considered as the boundary between these two fishing regions, in accordance with the conventionally reported area of activity of local fishers in the North (M. Pratt and T. Bell, pers. comm.). For each set the latitude and longitude were recorded and mapped using ArcGIS 9.3.1.

Surface water temperature (°C) and salinity (YSI model 85), and sea bottom depth (m) from the vessel were collected at the beginning of each sampling. For surveys conducted in the spring and summer, fishing gears were equipped with a mini data logger (STAR-ODDI DST Centi-TD) to collect data on average gear depth (m) and average temperature (°C) at gear depth.

Data loggers were set to record environmental parameters at seven minute intervals. The resulting depth and temperature recorded during each set were averaged. For each set all sharks were sexed and measured for total length (TL in mm).

For each area (North and South), changes in PM within sets were correlated to environmental data. All statistical analyses used an $\alpha = 0.05$ level of significance. The presence of sexual segregation in the species affects the possibility for PM to show a normal distribution, with a consequential higher chance of recording either value of PM > 0.5 (higher abundance of males) or value of PM < 0.5 (higher abundance of females) within each set. Due to the absence of linearity, Spearman's correlation coefficients (ρ) were used to investigate the relationship between each of the independent variables (gear depth, temperature at gear depth, surface water temperature and salinity) with the dependent variable PM for each area. Differences in the total numbers of males and females caught in each set by gear in each area were tested with a Wilcoxon non-parametric test.

For each area, Kruskal-Wallis single factor ANOVA and Wilcoxon non-parametric test with Bonferroni correction were used to test for differences in PM and differences in the total number of males and females caught within sets and across average gear depth and time of deployment. For this analysis, the average gear depth was divided in three strata (stratum 0 = 0-29.9 m; stratum 1 = 30-44.9 m; stratum 2 = >45 m), and time was divided in three strata (stratum 0 or morning = 600 hours – 1259 hours; stratum 1 or afternoon = 1300 hours – 1859 hours; stratum 2 or night = 1900 hours – 559 hours). In case of overlap between two time strata, the corresponding set was assigned to the strata that included more than half of the deployment time duration. For comparison between two strata, a Wilcoxon non-parametric test was used. I considered the average sea bottom depth as the value recorded from the fishing vessel for sets that lacked data logger recordings, assuming that both gillnet and longline were operating at the sea bottom. Sets with gillnets conducted in the South in October 2010 were excluded from the analysis as these sets were conducted in a different area by a different fishing vessel with a different setting, potentially biasing comparisons with sets conducted in the North during the same period. The longline and gillnet surveys included in this analysis were conducted by the same vessels (one for longline and one for gillnet, respectively), using the same fishing crew and fishing gear setting for both the North and South study areas, providing a more reliable comparison of results.

Three surveys conducted in the South showed marked changes in the male:female ratio (R), calculated as the total number of males divided by the total number of females in the set, throughout the fishing day. Therefore, these three surveys were used for testing differences in R and in male and female numbers throughout the fishing day with a chi-square test, or alternative G-test in case chi-square assumptions were not met. To test temporal changes in male and female average size across consecutive sets a Kruskal-Wallis single factor ANOVA was used.

Results

A total of 89 sets (71 by gillnet and 18 by longline) were conducted in the study area among 13 days between October 2010 and August 2011, with 54 sets in the North and 35 in the South. The disparity in the number of sets by fishing gear is due to the fact that for each sampling season a discrete number of dogfish was targeted for tag and release. Longline had a greater catch efficiency compared to gillnet, thus requiring less sets to reach the targeted number of dogfish. Using sexual maturity criteria reported by Nammack et al. (1985) for the Northwest Atlantic spiny dogfish stock (> 60 cm for males and > 80 cm for females), 99.9 % of males and 91.2 % of females were considered adult (Figure 6.1).

Among these sets, 59 sets conducted at different seasons and with both gears (42 by gillnet and 17 by longline) were used for the analysis of PM changes in the North and South areas (Table 6.1 and Figure 6.1). Males were caught in 62.7 % (n = 37) of sets, represented by a mean number per set of 32.7 (SD 85.1; range 0-479). Females were caught in all sets, with a mean number per set of 79.2 (SD 116.1; range 1-589). Sets characterized by the highest numbers of males caught had a correspondingly low number of females caught, and *vice-versa* (Table 6.1).

A total of 39 sets were conducted in the North (Table 6.1), with 25.6 % (n = 10) of sets conducted with longline and 74.4 % (n = 29) with gillnet. Males were caught in 53.8 % (n = 21) of sets with a mean number per set of 4.7 (SD 5.4; range 0-128). Females were caught in all sets with a mean number per set of 81.1 (SD 112.3; range 1-589).

A total of 20 sets were conducted in the South (Table 6.1), with 35 % (n = 7) of sets conducted with longline and 65 % (n = 13) with gillnet. Males were caught in 80 % (n = 16) of sets with both gear, while females were caught in all sets. The mean number of males caught per set was 87.1 (SD 130.1; range 0-479), while the mean number of females per set was 75.6 (SD 126.2; range 3-584).

Over the study period, the North and South areas did not differ in bottom and surface temperature, sea surface salinity, or water depth (Table 6.2). However, the South area is characterized by the presence of a steep decline in sea bottom depth within approximately 10 miles from shore, which is not a characteristic of the North area (Figure 6.2 and Table 6.2).

All sets with PM > 0.5 (13.6 %, n = 8), indicating higher presence of males, were recorded in the South at different seasons (summer and fall) and with different gears (Figure 6.2

and Table 6.1). All sets conducted in the North were characterized by PM < 0.5, due to a higher presence of schools of females caught within sets (Figure 6.2 and Table 6.1).

Results from Spearman's rank correlation (Table 6.3) show that, for sets conducted in the North, PM was not significantly correlated with any of the environmental parameters considered. Sea surface salinity is the only parameter that was close to significance ($\rho = 0.42$, $P = 0.076$, $n = 19$).

In the South (Table 6.3), a significant negative correlation was found between PM and average gear depth ($\rho = -0.823$, $P < 0.001$, $n = 20$) and a significant positive correlation was found between PM and average temperature at gear depth ($\rho = 0.786$, $P < 0.001$, $n = 16$). These two variables are reciprocally negatively correlated ($\rho = -0.887$, $P < 0.001$, $n = 16$) as a natural consequence of a decrease in temperature as the depth increases. These results combined indicate that, for the South, changes in PM were most likely associated with sea bottom depth, as also suggested by the deeper depths present in this area compared to the North area (Figure 6.2).

In the North, significantly higher numbers of males (Wilcoxon test, $W = 84.5$; $P = 0.04$) and females (Wilcoxon test, $W = 68$; $P = 0.014$) were caught with longline than gillnet; and a higher median PM value was recorded in longline sets, although it was not significant (Wilcoxon test, $W = 101.5$; $P = 0.14$) (Figures 6.3a, 6.3b, 6.3c). In the South, significant difference in the median number of males caught across gear was found (Wilcoxon test, $W = 14$; $P = 0.01$), with more males caught with longline (Figure 6.4a). The median number of females caught was higher in gillnets, although difference by gear was not significant (Wilcoxon test, $W = 66$; $P = 0.1$) (Figure 6.4b). The median PM values across gear were significantly higher in longline compared to gillnet (Wilcoxon test, $W = 16.5$; $P = 0.02$) (Figure 6.4c).

In the North, Kruskal-Wallis test indicated no significant difference in median number of males caught across depth strata ($F_{0.05(2)} = 3.1$; $P = 0.2$) (Figure 6.3d). The median number of females caught was higher at depth strata 0 and 1 (Figure 6.3e), but differences across depth strata were not significant (Kruskal-Wallis test, $F_{0.05(2)} = 2.3$; $P = 0.3$). Differences for median values of PM were not significant (Kruskal-Wallis test, $F_{0.05(2)} = 3.2$; $P = 0.2$) (Figure 6.3f). In the South, the median number of males caught was significantly different across depth strata ($F_{0.05(2)} = 14.5$; $P < 0.001$), and Bonferroni-corrected pairwise Wilcoxon test detected a significant difference between depth stratum, with higher median number of males caught at the shallower stratum (Figure 6.4d). Significant difference was found for the median number of females caught across depth strata (Kruskall-Wallis test, $F_{0.05(2)} = 10.7$; $P = 0.0048$), with higher median numbers found at the deepest stratum compared to the shallowest (Bonferroni-corrected pairwise Wilcoxon test, $P < 0.05$) (Figure 6.4e). The median PM value across depth strata was significantly different (Kruskall-Wallis test, $F_{0.05(2)} = 14.4$; $P < 0.001$), with higher median values at stratum 0 compared to stratum 2 (Bonferroni-corrected pairwise Wilcoxon test, $P < 0.05$) (Figure 6.4f).

In the North, differences across time strata (no sets for stratum 2) in median number of sharks caught were not significant for both males (Wilcoxon test, $W = 185.5$; $P = 0.17$) and females (Wilcoxon test, $W = 162$; $P = 0.59$) (Figures 6.3g and 6.3h). No significant difference was found in the median PM values across time strata (Wilcoxon test, $W = 191.5$; $P = 0.1$) (Figure 6.3i). In the South, significant difference in the median number of males caught across time strata was found ($F_{0.05(2)} = 9.8$; $P = 0.007$), with significantly lower median numbers at time stratum 1 (afternoon) compared to time strata 0 (morning) and 2 (night) (Bonferroni-corrected pairwise Wilcoxon test, $P < 0.05$) (Figure 6.4g). The median number of females caught was not significantly different across time strata (Kruskal-Wallis test, $F_{0.05(2)} = 4.1$; $P = 0.1$), although more females were caught at night and in the afternoon (Figure 6.4h). Significant difference in median PM values across time strata was found (Kruskal-Wallis test, $F_{0.05(2)} = 8.6$; $P = 0.01$), with higher values during the morning (stratum 0) compared to other strata (Bonferroni-corrected pairwise Wilcoxon test, $P < 0.05$) (Figure 6.4i).

Two longline surveys (sets 57 to 59 on 11 October 2010 with average soaking time of 12.3 minutes, and sets 40 to 42 on 14 August 2011 with average soaking time of 14.3 minutes) and one gillnet survey (sets 43 to 46 on 17 August 2011 with average soaking time of 331 minutes) conducted in the South showed significant differences in the R values recorded within consecutive sets conducted in the same area ($G = 19.1$; $P < 0.001$ for 11 October 2010; $\chi^2 = 20.3$; $P < 0.001$ for 14 August 2011; $G = 87$; $P < 0.001$ for 17 August 2011), with higher values recorded early in the morning and lower values recorded at night and in late morning (Figures 6.5). All three surveys were conducted in inshore shallower waters, between 20.7 and 37.8 m depth (Table 6.1).

For sets conducted with longline (Figures 6.6a and 6.6b), significantly higher numbers of males were caught early in the day ($\chi^2 = 149.6$; $P < 0.001$ for 11 October 2010, and $\chi^2 = 485.6$; $P < 0.001$ for 14 August 2011, respectively). Higher numbers of females were caught in longline sets conducted later in the morning on 11 October 2010 ($\chi^2 = 50.7$; $P < 0.001$), while more females were caught in earlier longline sets on 14 August 2011 ($G = 6.5$; $P = 0.038$). For the gillnet survey (Figure 6.6c) differences in abundance across sets were significant for both sexes, with a higher number of females within sets conducted at night ($G = 197$; $P < 0.001$) and a clear shift toward higher numbers of males for sets conducted in the morning ($\chi^2 = 277$; $P < 0.001$).

Considering the average size of sharks caught by sex across sets, significantly larger females were caught in longline sets later in the morning on October 11 (Kruskal-Wallis test, $F_{0.05(2)} = 10.5$; $P = 0.005$), concurrent with the decrease in male abundance within the same sets (Figure 6.7a). The average size of females caught was also higher for longline sets conducted later in the morning on 14 August 2011 (Figure 6.7b), although differences were not significant (Kruskal-Wallis test, $F_{0.05(2)} = 1.72$; $P = 0.4$). For the gillnet survey on 17 August 2011 significantly differences for the average size of females caught through time were recorded (Kruskal-Wallis test, $F_{0.05(2)} = 16.5$; $P < 0.001$). Smaller females were caught later in the day, concurrently with a decrease in female numbers and increase in male numbers within the same gillnet sets (Figure 6.7c). The average size of males across sets for all three surveys did not change significantly (Figure 6.7).

Discussion

Occurrence of sexual segregation in Cape Cod

I found significant differences in the percentage of males within catches between the North and South study areas, suggesting that the species sex ratio differs by location in the Cape Cod area. Contrary to my original hypothesis and local fishermen information, I found higher PM values in the South and lower PM values in the North (Figures 6.2 and Table 6.1). Overall, significant higher numbers of dogfish were caught with longline in both areas (Figures 6.3a, 6.3b, and 6.4a), but more females (close to significance) were caught with gillnet in the South (Figure 6.4b). In addition, a higher male presence in the South seems to occur early in the day in inshore shallower waters between spring and early autumn (Figures 6.4d, 6.4g and Table 6.1). Concurrently, at the same sampling locations and time in the South, more females were caught in deeper waters (Figure 6.4e) at night and in the afternoon (close to significance, Figure 6.4h and

Table 6.1). In the North, female abundance did not significantly differ across depth and time strata (Figures 6.3e and 6.3h). Finally, I found no relationship between PM within catches and environmental conditions in the North, while a significant positive correlation was found between PM and average gear depth in the South (Table 6.3).

Overall, my results for the North study area are in agreement with other studies reporting that females inhabit shallower inshore areas, while males inhabit deeper offshore habitats (Shepherd et al., 2002; Methratta and Link, 2007). In addition, results for the North area are in agreement with available information on the reproductive cycle of spiny dogfish. Females are reported to undergo mating and fertilization right after parturition (Hanchet, 1988). Pups are reported to born in the fall or early winter, between November to January in the Northwest Atlantic (Nammack et al., 1985). Accordingly, a higher abundance of pregnant or adult females in inshore waters would be predicted in the study area between spring and fall. This female distribution is shown in the North (Figure 6.3e), but it is not clearly noticeable in the South (Figure 6.4e), where results are also not in agreement with aforementioned studies on spiny dogfish habitat preferences by sex (Shepherd et al., 2002; Methratta and Link, 2007). In addition, results from the South show the occurrence of changes in the male:female ratio R values throughout a fishing day (Figure 6.5), a scenario that, although commonly observed by local longliners in the North area (M. Pratt, pers. Comm.), is not supported by my results.

The lack of correlation between PM and environmental variables in the North suggests alternative causes, mainly behavior, for the occurrence of sexual segregation in the species in this area. In turn, this result seems not to support the thermal condition hypothesis, for which larger females tend to inhabit warmer waters in order to increase their growth rates and fecundity (Bass et al., 1973; Klimley, 1987; Sims, 2005). However, more data are needed from both areas to further support this hypothesis.

In the South, the higher percentage of males, and the concurrent lower percentage of females, in inshore waters early in the day is consistent with the social avoidance hypothesis (Sims, 2005) to explain the presence of sexual segregation in the species: as males move toward inshore waters, females move to offshore deeper waters to avoid males and mating behavior. During the spring and summer surveys in the South, the vast majority of males caught had reddened clasper tips, indicating the occurrence of a recent mating behavior (Dell'Apa, personal obs.). Also, within those sets the majority of females caught were in an advanced state of pregnancy (clearly identifiable bulge of the abdominal region), likely making them less vulnerable to male courtship (Dell'Apa, personal obs.). Sims et al. (2001) reported similar results for the lesser spotted dogfish, for which sexual segregation was hypothesized to be the result of females hiding from males in shallower water as a strategy to reduce energetically demanding mating activity. Therefore, shallow waters (North area) can function as a refuge for females to avoid males and energy demanding mating behavior, resulting in spatial segregation. In contrast, temporal segregation may occur in deeper areas that cannot provide female refuge to males (South area), where females likely synchronize their habitat choice to opposite that of males so to decrease the chance of encountering males that can be intent in mating and/or feeding behavior (Figures 6.6 and 6.7).

The differences in catches by gear in the South, with more males caught with longline and more females caught with gillnet, suggest that sexual segregation in this area may be associated with forage, as longline catch are the result of a feeding behavior that does not necessarily apply to gillnet catch. The sexual dimorphism characteristic of the species

(Compagno et al., 2005) may result in divergent feeding habits, as larger females likely have higher energy requirements than smaller males (Schmidt-Nielsen, 1972; Gillooly et al., 2001; Ruckstuhl and Clutton-Brock, 2005). The spiny dogfish is an opportunistic feeder, and the diet of the Northwest Atlantic population is based primarily on pelagic organisms such as fishes, ctenophores, squid, and secondarily on crustaceans, bivalves, and other invertebrates (Bowman et al., 2000; Link et al., 2002). Since I did not collect stomach contents, I could not test for differences in prey species composition by sex.

In a study investigating the environmental differences in the diet of spiny dogfish off the coast of North Carolina, a preliminary distinction between sexes was made, although the sample size of males was small (n = 16) (Bangley, 2011). These results are also in accordance with other studies reporting that males inhabit deeper habitats while large females inhabit shallow, inshore areas (Shepherd et al., 2002; Methratta and Link, 2007). Bangley (2011) reported a dietary divergence between the sexes. Females were primarily piscivorous (81.01% Index of Relative Importance - IRI), with crustaceans, molluscs, and other invertebrates as alternative important prey. In contrast, the diet of males was composed primarily of euphausiid shrimps (66.56% IRI) and secondarily by fish and ctenophores. Interestingly, squid was not found in male stomachs, and Bangley (2011) suggested that the importance of euphasiids and ctenophores in previous studies may have been underestimated due to the rapid digestion of these small, soft-bodied prey. These results, although reported from a different area, offer insight into my observed sexual segregation off the South of Cape Cod. Male diurnal vertical movements to inshore shallower waters may be the result of males following their prey, mostly euphausiids. Many species of euphausiids are known to perform diurnal vertical migrations, rising toward the surface at night and descending to deeper waters during the day (Mauchline, 1980). The bathymetry of the area

South of Cape Cod (Table 6.2 and Figure 6.3) could facilitate the local population of euphausiids performing diurnal vertical migrations in water within 5-10 miles from shore. In turn, schools of male dogfish likely take advantage of this euphausiids movement toward inshore shallower waters at dawn to feed, as suggested by the higher numbers of males caught with longline (Figures 5d and 5g).

Squid was used as bait during this study. Northern shortfin squid (*Illex illecebrosus*) and longfin inshore squid (*Loligo pealeii*) are commonly reported in the diet of spiny dogfish on the Northwest U.S. continental shelf, but with a higher occurrence in waters between the Scotian Shelf and the Southern New England (range between 17.2 and 26.3% of stomach content by weight) compared to the Middle Atlantic (5%) and the inshore regions of Cape Hatteras, NC (range between 3.4 and 9.1%) (Bowman et al., 2000; Link et al., 2002). Off Massachusetts, the longfin inshore squid overwinters in offshore warmer waters for then migrating inshore in April-May, while smaller individuals move inshore in the summer (Lange, 1982; MAFMC, 1998). Longfin inshore squid are known to perform diurnal vertical migrations up into the water column at night then moving to deeper waters during the day (MAFMC, 1998; Jacobson, 2005). This squid behavior may also explain the seasonal distribution (June and October) of male dogfish in inshore coastal waters early in the day in the South area. The bathymetry of the South area (Table 6.2 and Figure 6.2) could facilitate diurnal vertical migrations of the local population of squids in inshore waters, and, in turn, schools of male dogfish can take advantage of this behavior to feed in these water at dawn, as suggested by the higher numbers of males caught with longline compared to gillnet (Figures 6.4a, 6.4d and 6.4g).

Concurrently, females did not show significant differences in catches by gear in the South area, although higher numbers were caught with gillnet (Figure 6.4b). However, they were significantly more abundant in deeper waters (Figure 6.4e), a behavior that is not commonly reported in female dogfish (Sheperd et al., 2002) and that may further support the social avoidance hypothesis.

My results indicate that the sexual segregation in spiny dogfish in the Cape Cod area occurs both spatially (sexes use different areas) and temporally (sexes use the same area but at different time), which is the consequence of differential behavioral choices by each sex that affect their preferential distribution. In turn, a combination of factors is likely responsible for explaining the occurrence of sexual segregation in the species, and my results suggest testing of additional hypotheses. Males might move in inshore shallower waters for feeding behavior and/or for mating behavior, and if the latter occurs then the females might move away in offshore deeper waters as a male avoidance strategy to avoid energy demanding mating. If, instead, the former hypothesis holds true, this sex-based behavior, coupled with bathymetric features of the area, may be explored to support the development of a male-only spiny dogfish directed fishery during inshore seasonal migrations of squid or euphausiids in areas characterized by steep decline of the bottom closer to shore.

Caveats and implications

The restrictive geographic, habitat, seasonal, and diel scales of the sampling for this study may not be representative of the entire Northwest Atlantic spiny dogfish stock. The use of a model (e.g., logistic regression) to evaluate simultaneously the effects of area, habitat, and environmental conditions on the sex ratios in the catches would be more informative, and would likely provide a better interpretation of patterns. However, the use of modeling which such short data samples is not very useful.

In addition, care should be taken when drawing conclusions about changes in sex ratio across sets based on limited sampling. Although this is the case for some of my results, I am confident that they may still be indicative of behavioral patterns explaining the causes of sexual segregation in the species, as discussed above. Despite these inherent limitations, my results may encourage other researchers to apply such modeling to test hypothesis to explain the causes of sexual segregation in spiny dogfish by using other fishery-independent or fishery-dependent data. However, I encourage the use of the latter because they would be the most representative of the actual fishery exploitation characteristics.

Finally, specific studies on the differences in the feeding habits of spiny dogfish by sex are needed to support the conclusion that male presence at dawn in shallower waters from spring to early autumn in the South may be due to feeding on diurnal vertically migrating squid and/or euphausiids. As an alternative, this can be addressed by studies testing for differences in the male:female ratios of spiny dogfish caught by different gear (longline vs. gillnet) deployed at the same time and location.

From a management perspective, my results suggest the potential presence of consistent schools of males dogfish in an inshore area along the eastern board of the Cape Cod peninsula between spring and early autumn, as a consequence of temporal sexual segregation in the species. This time period corresponds to the fishing season for dogfish in the New England area, which usually covers the Period I (May 1st to October 31st) of the federal and state quota allocation for spiny dogfish (see chapter 4). Consequently, my results point at a potential pilot study testing the viability of a male-only directed longline fishery in the South area, where more males can potentially be caught during the regular spiny dogfish fishing season, eventually reducing fishing pressure on adult females. However, the effect of a male-only directed fishery should be considered cautiously, as selective harvesting can have negative impacts on species fitness and reproductive success (Sato, 2012). In regard to that, there is actually no specific knowledge on the “ideal” sex ratio for the Northwest Atlantic spiny dogfish stock, which further complicates the possibility to adjust fishery regulations as an answer to the potential benefits of a male-only directed fishery.

The potential role of sexual segregation in the management of shark fisheries has rarely been acknowledged. In a study analyzing the commercial longline catch composition of shortfin mako shark (*Isurus oxyrinchus*) in the South Pacific Ocean (Mucientes et al., 2009) males were found to be more abundant in catches conducted in western waters, whereas adult females where more abundant in eastern water catches. The authors hypothesized that a short seasonal longline fishery in the west may yield to higher catch rates of males and lower catches of females.

The presence of sexual segregation for important commercial species should be seriously considered in order to improve fishery management, as species life-history and biological complexity, coupled with region-specific fishing activities, can excessively concentrate fishing effort on one sex or in important key areas for the species (feeding or mating grounds, nursery areas). This strategy has recently lead to declines of the adult females component of the U.S. North Atlantic spiny dogfish stock, favoring an unsustainable fishery.

My findings also suggest the need for wide-scale studies on the composition of spiny dogfish commercial landings with regard to sex, size, and sex-related diet differences; with detailed spatial reference and local bathymetry and environmental characteristics. These studies will provide in-deep information on the spiny dogfish behavior and movement patterns at a fine-scale that can be integrated into the management of this fishery.

LITERATURE CITED

Bangley, C.W. 2011. Food and feeding habits of spiny dogfish *Squalus acanthias* overwintering off the coast of North Carolina and the effects on the marine community. M.Sc. thesis, East Carolina University, Greenville, North Carolina.

Bass, A.J., D'Aubrey, J., and Kistnasamy, N. 1973. Sharks of the east coast of southern Africa. I. The genus *Carcharhinus* (Carcharhinidae). Investigation Report of the Oceanographic Research Institute 33: 1-168.

Bowman, R.E., Stillwell, C.E., Micheals, W.L., and Grosslein, M.D. 2000. Food of Atlantic fishes and two common species of squid. NOAA Technical Memorandum NMFS-NE-155. NOAA, Woods Hole, Massachusetts.

Compagno, L., Dando, M., and Fowler, S. 2005. Sharks of the World. Princeton University Press, Princeton, New Jersey.

Conradt, L. 2005. Definitions, hypotheses, models and measures in the study of animal segregation. In: Ruckstuhl, K.E., and Neuhaus, P. (Eds.), Sexual segregation in vertebrates: ecology of the two sexes, pp. 11-32. Cambridge University Press, Cambridge, UK.

Economakis, A.E., and Lobel, P.S., 1998. Aggregation behavior of the grey reef shark, *Carcharhinus amblyrhynchos*, at Johnston Atoll, Central Pacific Ocean. *Environmental Biology of Fishes* 51: 129-139.

Ford, D. 1921. A contribution to our knowledge of the life-histories of the dogfishes landed at Plymouth. *Journal of the Marine Biological Association of the United Kingdom* 12: 468-505.

Fordham, S., and Dolan, C. 2004. A case study in International Shark Conservation: the Convention on International Trade in Endangered Species and the Spiny Dogfish. *Golden Gate University Law Review* 34: 531-572.

Gillooly, J.F., Brown, J.H., West, G.B., Savage, V.M., and Charnov, E.L. 2001. Effects of size and temperature on metabolic rate. *Science* 293: 2248-2251.

Hanchet, S. 1988. Reproductive biology of *Squalus acanthias* from the east coast, South Island, New Zealand. *New Zealand Journal of Marine and Freshwater Research* 22: 537-549.

Jacobson, L.D. 2005. Longfin inshore squid, *Loligo pealeii*, life history and habitat characteristics. NOAA Technical Memorandum NMFS-NE-193, NOAA, Woods Hole, Massachusetts.

Klimley, P. 1987. The determinants of sexual segregation in the scalloped hammerhead shark, Sphyrna lewini. *Environmental Biology of Fishes* 18: 27-40.

Lack, M. 2006. Conservation of spiny dogfish *Squalus acanthias*: A role for CITES? TRAFFIC International. Available at http://www.traffic.org/species-reports/traffic_species_fish5.pdf (July 2013).

Lange, A.M.T. 1982. Long-finned squid, *Loligo pealei*. In: Grosslein, M.D., and Azarovitz, T.R. (Eds.), Fish distribution, pp. 133-135. MESA New York Bight Atlas Monograph 15. Albany, New York.

Link, J.S., Garrison, L.P., and Almeida, F.P. 2002. Ecological interactions between elasmobranchs and groundfish species on the Northeastern US continental shelf. I. Evaluating predation. *North American Journal of Fisheries Management* 22: 550-562.

Mauchline, J. 1980. The biology of mysids and euphausids. In: Blaxter, J.H.S, Russel, F.S., and Yonge, C.M. (Eds.), Advances in Marine Biology. Part 1. The Biology of Mysids, Vol. 18: 1-369. Academic Press, London.

MAFMC. 1998. Mid-Atlantic Fishery Management Council, Amendment #8 to the Fishery Management Plan for Atlantic mackerel, squid, and butterfish. Mid-Atlantic Fishery Management Council, Dover, Delaware.

Methratta, E.T., and Link, J.S. 2007. Ontogenetic variation in habitat association for four groundfish species in the Gulf of Maine – Georges Bank region. *Marine Ecology Progress Series* 338: 169-181.

Mucientes, G.R., Queiroz, L., Sousa, L.L., Tarroso, P., and Sims, D.W. 2009. Sexual segregation of pelagic sharks and the potential threat from fisheries. *Biology Letters* 5: 156-159.

Nammack, M.F., Musick, J.A., and Colvocoresses, J.A. 1985. Life history of spiny dogfish off the Northeastern United States. *Transactions of the American Fisheries Society* 114: 367-376.

NEFSC. 2003. Northeast Fisheries Science Center, 37th Northeast Regional Stock Assessment Workshop (37th SAW): Spiny dogfish advisory report. US Department of Commerce, National Oceanic and Atmospheric Administration, Northeast Fisheries Science Center, Reference Document 03-17, Woods Hole, Massachusetts.

NMFS. 2006. National Marine Fisheries Service, Report to Congress: status of the fisheries of the United States. National Marine Fisheries Service, Silver Spring, Maryland.

Pratt, H.L., and Carrier, J.C. 2001. A review of elasmobranch reproductive behavior with a case study on the nurse shark, *Ginglymostoma cirratum. Environmental Biology of Fishes* 60: 157-188.

Rago, P.J., and Sosebee, K.A. 2010. Biological reference points for Spiny Dogfish. Northeast Fisheries Science Center, Reference Document 10-06; 52 p.

Ruckstuhl, K.E., and Clutton-Brock, T.H. 2005. Sexual segregation and the ecology of the two sexes. In: Ruckstuhl, K.E., and Neuhaus, P. (Eds.), Sexual segregation in vertebrates: ecology of the two sexes, pp. 3-10. Cambridge University Press, Cambridge, UK.

Sato, T. 2012. Impacts of large male-selective harvesting on reproduction: illustration with large decapods crustacean resources. *Aqua-BioScience Monographs* 5: 67-102.

Schmidt-Nielsen, K.1972. Locomotion: energy cost of swimming, flying, and running. *Science* 177: 222-228.

Shepherd, T., Page, F., and MacDonald, B. 2002. Length and sex-specific associations between spiny dogfish (*Squalus acanthias*) and hydrographic variables in the Bay of Fundy and Scotian shelf. *Fisheries Oceanography* 11: 78-89.

Sims, D.W., Nash, J.P., and Morritt, D. 2001. Movements and activity of male and female dogfish in a tidal sea lough: alternative behavioural strategies and apparent sexual segregation. *Marine Biology* 139: 1165-1175.

Sims, D.W. 2005. Differences in habitat selection and reproductive strategies of male and female sharks. In: Ruckstuhl, K.E., and Neuhaus, P. (Eds), Sexual segregation in vertebrates: ecology of the two sexes, pp. 127-147. Cambridge University Press, Cambridge, UK.

Springer, S. 1967. Social organization of shark populations. In: Gilbert, P.W., Mathewson, R.F., and Rall, D.P. (Eds.), Sharks, Skates and Rays, pp. 149-174. Johns Hopkins University Press, Baltimore, Maryland.

Tricas, T.C., and Le Feuvre, E.M., 1985. Mating in the reef white-tip shark *Triaenodon obesus. Marine Biology* 84: 233-237.

Table 6.1: Sets information: set ID number, date, season, gear, area (N = North, and S = South), deployment time (Settime), retrieval time (Pulltime), average gear depth (m), average temperature (°C) at gear depth, percentage of males in the set (PM), total number of males in the set (Males No), total number of females in the set (Females No), males average TL (mm) in the set, and females average TL (mm) in the set (NA = data not available).

Set No	Date	Season	Gear	Area	Settime	Pulltime	Gear Depth (m)	Gear T (°C)	PM	Males No	Females No	Males average TL (mm)	Females average TL (mm)
1	9 August 2011	Summer	Longline	N	650	704	23.2	9.1	0.27	128	346	768.98	848.74
2	9 August 2011	Summer	Longline	N	1122	1140	17.5	10.3	0.07	15	205	768.93	853.64
3	23 June 2011	Spring	Gillnet	N	650	720	38.9	6.8	0	0	137	NA	887.57
4	23 June 2011	Spring	Gillnet	N	1019	1043	32.9	6.6	0	0	168	NA	878.61
5	23 June 2011	Spring	Gillnet	N	1151	1209	34.4	6.5	0	0	61	NA	887.4
6	23 June 2011	Spring	Gillnet	N	1307	1320	39.8	6.7	0	0	21	NA	891.19
7	23 June 2011	Spring	Gillnet	N	1414	1434	40.7	6.5	0	0	7	NA	888
8	13 May 2011	Spring	Longline	N	1155	1230	28.5	9.1	0.003	2	589	776.5	839.66
9	14 May 2011	Spring	Longline	N	1156	1354	38.4	6.4	0.2	2	8	756	807.5
10	17 May 2011	Spring	Gillnet	N	745	829	39.4	5.3	0	0	3	NA	909
11	17 May 2011	Spring	Gillnet	N	802	910	51.8	4.7	0	0	3	NA	881
12	17 May 2011	Spring	Gillnet	N	1054	1124	50.4	5.7	0	0	21	NA	855.76
13	17 May 2011	Spring	Gillnet	N	1108	1204	46.7	5.6	0	0	28	NA	851.5
14	17 May 2011	Spring	Gillnet	N	1437	1542	26.7	9.3	0	0	15	NA	888.2
15	8 October 2010	Fall	Gillnet	N	705	740	20.1	NA	0	0	1	NA	853
16	8 October 2010	Fall	Gillnet	N	710	855	20.1	NA	0	0	4	NA	864
17	8 October 2010	Fall	Gillnet	N	935	1000	29.3	NA	0.1	1	9	748	906.78
18	8 October 2010	Fall	Gillnet	N	950	1100	31.1	NA	0.1	5	45	779.8	888.44
19	8 October 2010	Fall	Gillnet	N	1010	1117	30.2	NA	0	0	10	NA	899.3
20	8 October 2010	Fall	Gillnet	N	1104	1140	34.7	NA	0.08	2	23	855	872.7
21	8 October 2010	Fall	Gillnet	N	1128	1210	40.2	NA	0.2	2	8	754.5	884.75
22	8 October 2010	Fall	Gillnet	N	1206	1308	40.2	NA	0.043	5	111	756.2	881.97
23	8 October 2010	Fall	Gillnet	N	1238	1405	29.3	NA	0.03	5	163	774	888.31
24	8 October 2010	Fall	Gillnet	N	1441	1540	38.4	NA	0.047	4	81	775	882.93
25	9 October 2010	Fall	Gillnet	N	710	824	34.3	NA	0	0	24	NA	885.08
26	9 October 2010	Fall	Gillnet	N	717	852	37.4	NA	0.056	3	51	774	900.76
27	9 October 2010	Fall	Gillnet	N	839	1033	37.4	NA	0.038	3	77	817.33	896.19
28	9 October 2010	Fall	Gillnet	N	1052	1130	35.6	NA	0.042	1	23	825	862.35
29	7 October 2010	Fall	Longline	N	804	858	37.4	NA	0.006	1	163	752	852.2
30	7 October 2010	Fall	Longline	N	903	954	38.9	NA	0.004	1	265	778	844.1
31	7 October 2010	Fall	Longline	N	1000	1230	38.9	NA	0.009	1	107	813	853.1
32	7 October 2010	Fall	Longline	N	1235	1250	43.5	NA	0.019	1	53	770	859
33	7 October 2010	Fall	Longline	N	1255	1325	43.5	NA	0.019	1	53	790	850.7
34	7 October 2010	Fall	Longline	N	1330	1340	43.5	NA	0	0	14	NA	860.7
35	10 August 2011	Summer	Gillnet	N	1133	1205	17.1	9.9	0.013	1	78	758	857.65
36	10 August 2011	Summer	Gillnet	N	1146	1220	15.9	10.1	0.017	1	59	730	872.31
37	10 August 2011	Summer	Gillnet	N	1247	1400	12.7	10.8	0	0	51	NA	863.8
38	10 August 2011	Summer	Gillnet	N	1349	1510	18.6	9.9	0	0	43	NA	870.77
39	10 August 2011	Summer	Gillnet	N	1405	1602	10.1	10.9	0	0	36	NA	873.78
40	14 August 2011	Summer	Longline	S	744	800	25.4	9.9	0.976	479	12	756.29	774.5
41	14 August 2011	Summer	Longline	S	1032	1049	28.9	8.4	0.914	117	11	761.21	804
42	14 August 2011	Summer	Longline	S	1134	1144	24.7	9.1	0.947	54	3	765.06	844.67
43	17 August 2011	Summer	Gillnet	S	256	746	27.9	9.6	0.297	19	45	770.21	880.84
44	17 August 2011	Summer	Gillnet	S	234	915	37.8	8.5	0.236	47	152	764.64	871.5
45	17 August 2011	Summer	Gillnet	S	1131	1319	25.3	NA	0.976	164	4	768.44	791.25
46	17 August 2011	Summer	Gillnet	S	857	1145	28.3	10.5	0.847	244	44	772.47	878.25
47	24 June 2011	Spring	Longline	S	1026	1043	33.2	6.6	0.014	8	584	738.38	858.18
48	27 June 2011	Spring	Gillnet	S	1507	1542	71.8	5.9	0	0	48	NA	871.96
49	27 June 2011	Spring	Gillnet	S	1522	1645	67.9	5.9	0	0	110	NA	869.45
50	27 June 2011	Spring	Gillnet	S	1632	NA	77.7	5.8	0	0	88	NA	873.5
51	27 June 2011	Spring	Gillnet	S	1751	1910	72	5.9	0.025	2	77	783	876.47
52	27 June 2011	Spring	Gillnet	S	1900	2022	69.6	6.2	0.033	1	29	746	861.41
53	28 June 2011	Spring	Gillnet	S	2005	510	66	6	0.254	16	47	779	871.11
54	28 June 2011	Spring	Gillnet	S	2120	623	63.3	6.1	0.214	9	33	761	868.44
55	28 June 2011	Spring	Gillnet	S	735	806	73.8	6.1	0	0	24	NA	872.21
56	28 June 2011	Spring	Gillnet	S	747	900	75.2	5.9	0.078	9	106	781.89	862.47
57	11 October 2010	Fall	Longline	S	811	825	20.7	NA	0.956	194	9	751.3	739.6
58	11 October 2010	Fall	Longline	S	940	952	20.7	NA	0.830	309	63	754.9	830.4
59	11 October 2010	Fall	Longline	S	1155	1206	20.7	NA	0.761	70	22	755.8	821.7

Table 6.2: Range and mean (with ± standard deviation) of bottom temperature (°C), surface temperature (°C), water depth (m), and surface salinity for the North and South.

Environmental parameter	North	South
Bottom temperature (°C)	4.7-10.9; 7.9 ± 2.1	5.8-10.5; 7.3 ± 1.7
Surface temperature (°C)	8.9-19.2; 14.4 ± 3.5	14.5-19.6; 17.4 ± 1.5
Water depth (m)	10.1-51.8; 33 ± 10.4	20.7-77.7; 46.5 ± 23
Surface salinity	29.4-31.4; 30.3 ± 0.7	29.3-30.8; 30.3 ± 0.4

Table 6.3: Spearman's correlation (ρ) coefficients between percentage of males (PM) and average gear depth (m), average temperature (°C) at gear depth, surface water temperature (°C) and salinity for each sets conducted in the North area, and in the South area. Marked values are significant at 0.05 level.

PM	Gear Depth (m)	Gear T (°C)	Surface T (°C)	Surface Salinity
North	-0.02	0.26	0.10	0.42
South	-0.823*	0.786*	-0.188	0.388

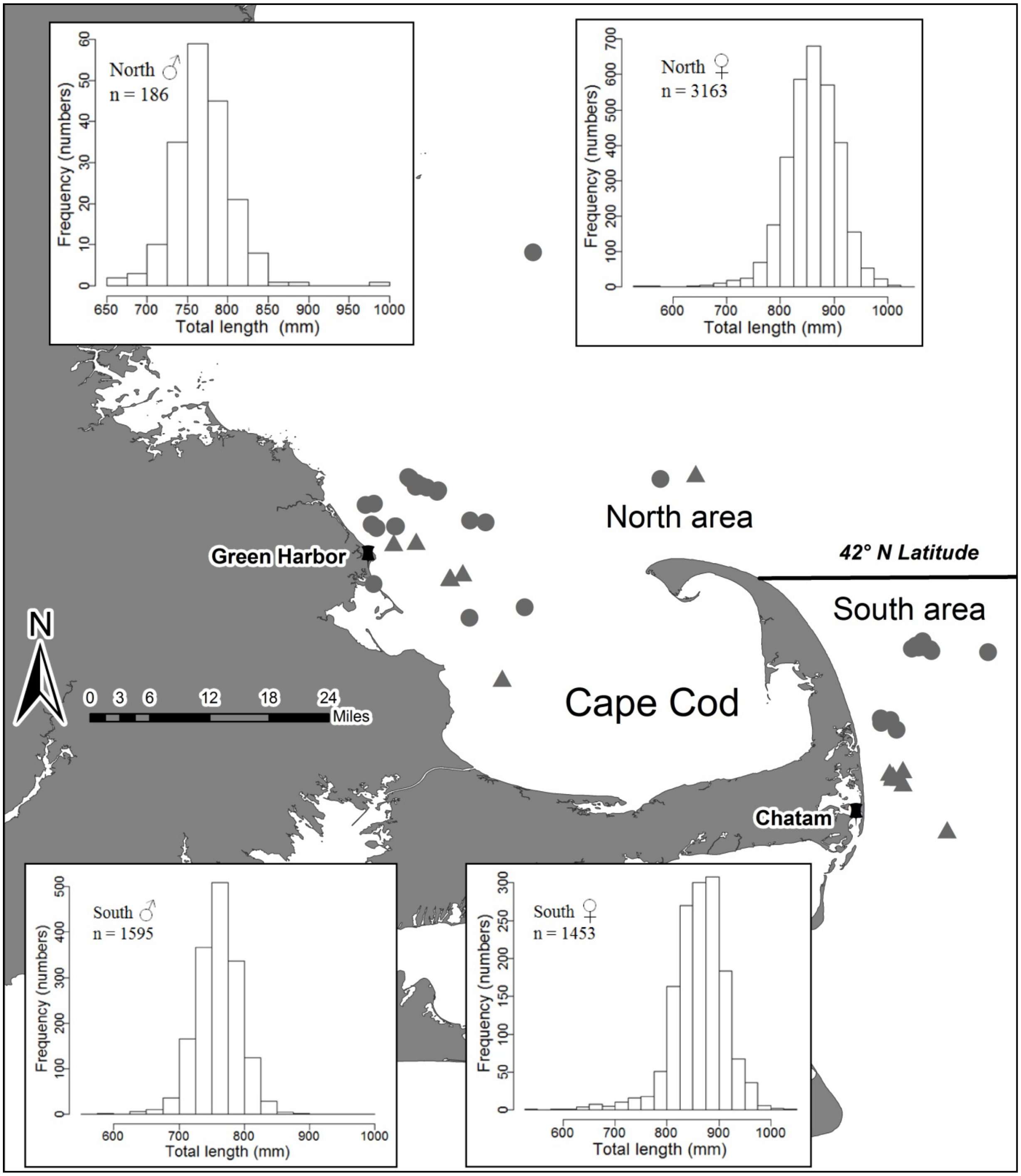

Figure 6.1: Map of the North and the South study area with locations (circles for gillnet and triangles for longline) of all sets (n = 59) and associated length composition (total length in mm) by sex conducted between October 2010 and August 2011 included in the analysis. Black solid horizontal line indicating the 42° N Latitude separating the North and the South study area.

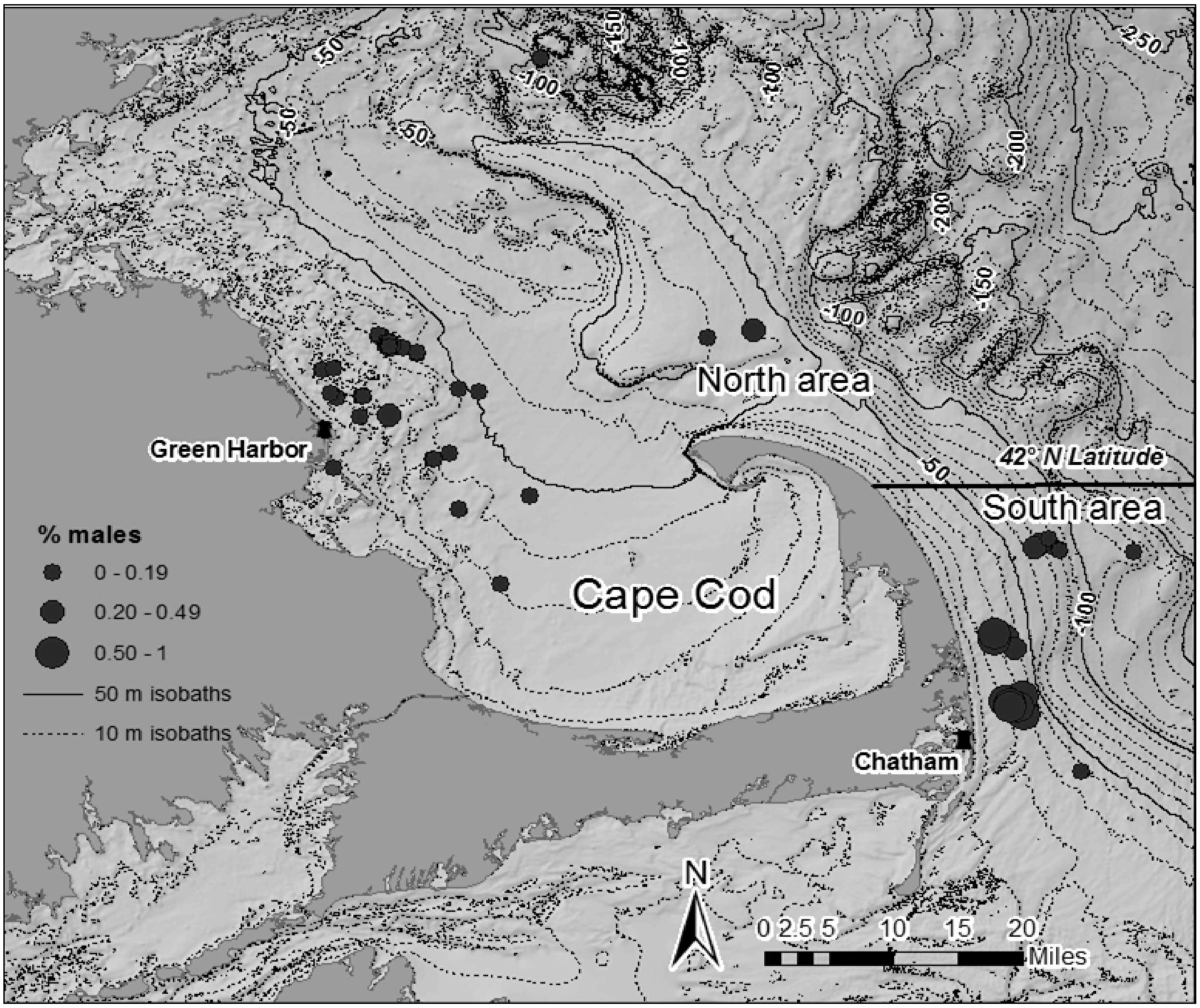

Figure 6.2: Percentage of males recorded for each set conducted in the North and in the South (dots), with 10 m isobaths (dashed lines) and 50 m isobaths (solid line). Black horizontal solid line indicating the 42° N Latitude separating the North and the South study area. Source for bathymetry: NOAA Geophysical Data Center (NGDC).

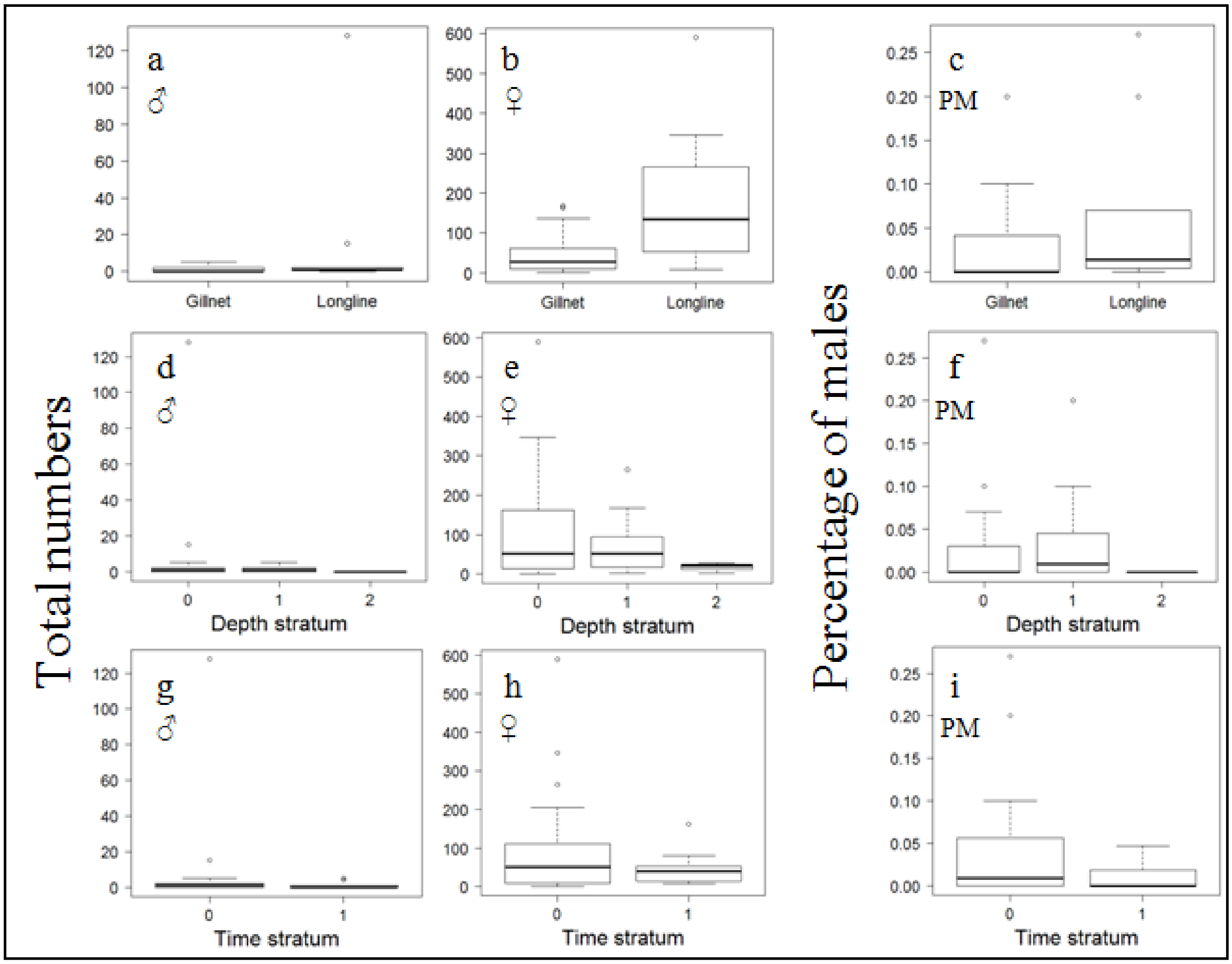

Figure 6.3: Box (percentiles) and whisker (non-outlier range; outliers denoted by open circles) plots of males (a), females (b), and percentage of males (c) caught across gear; plots of males (d), females (e), and percentage of males (f) caught across depth strata (stratum 0 = 0-29.9 m; stratum 1 = 30-44.9 m; stratum 2 = >45 m); plots of males (g), females (h), and percentage of males (i) caught across time strata stratum (0 = 600 hours – 1259 hours; stratum 1= 1300 hours – 1859 hours) in the North area.

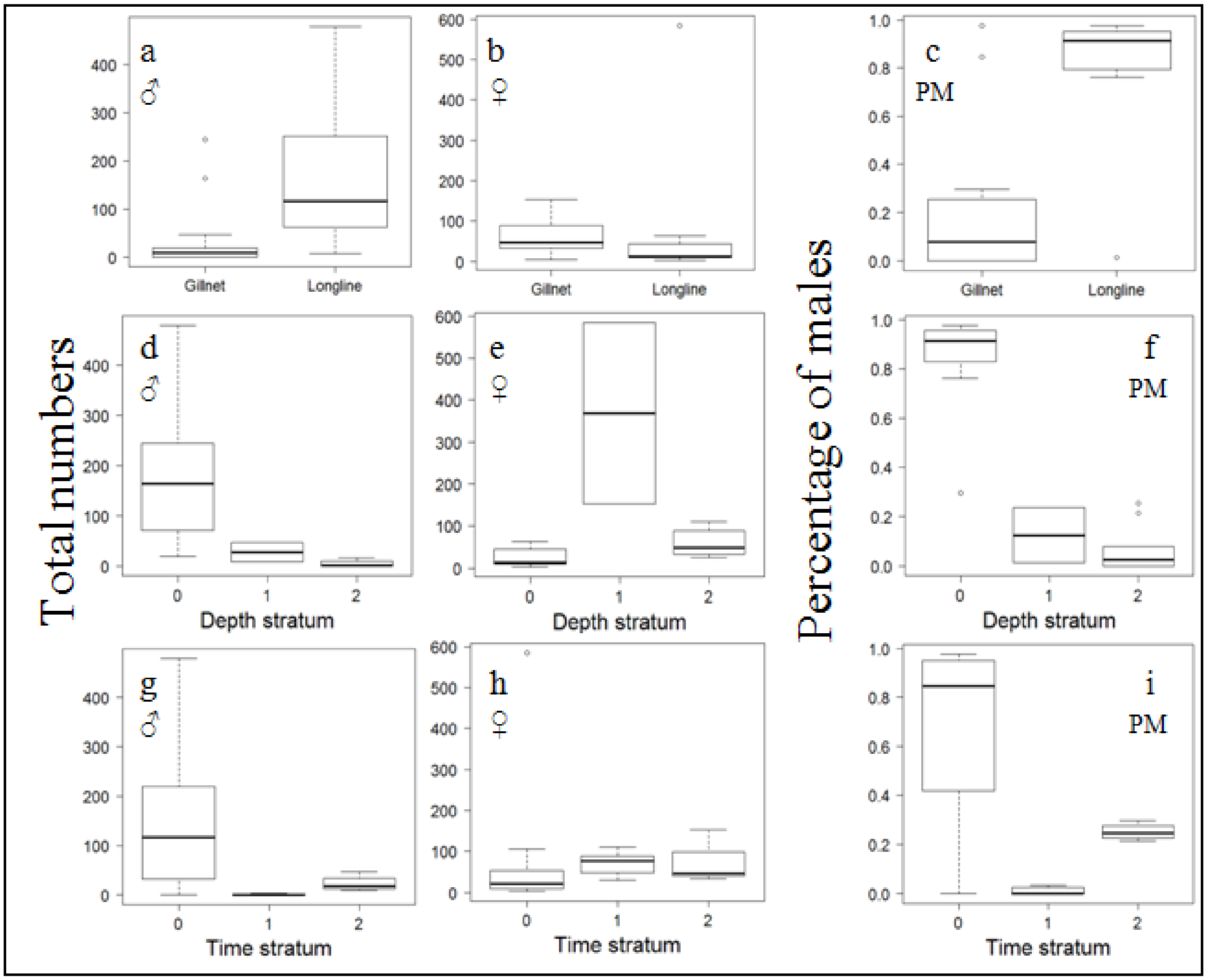

Figure 6.4: Box (percentiles) and whisker (non-outlier range; outliers denoted by open circles) plots of males (a), females (b), and percentage of males (c) caught across gear; plots of males (d), females (e), and percentage of males (f) caught across depth strata (stratum 0 = 0-29.9 m; stratum 1 = 30-44.9 m; stratum 2 = >45 m); plots of males (g), females (h), and percentage of males (i) caught across time strata stratum (0 = 600 hours – 1259 hours; stratum 1= 1300 – 1859 hours; stratum 2= 1900 hours – 559 hours) in the South area.

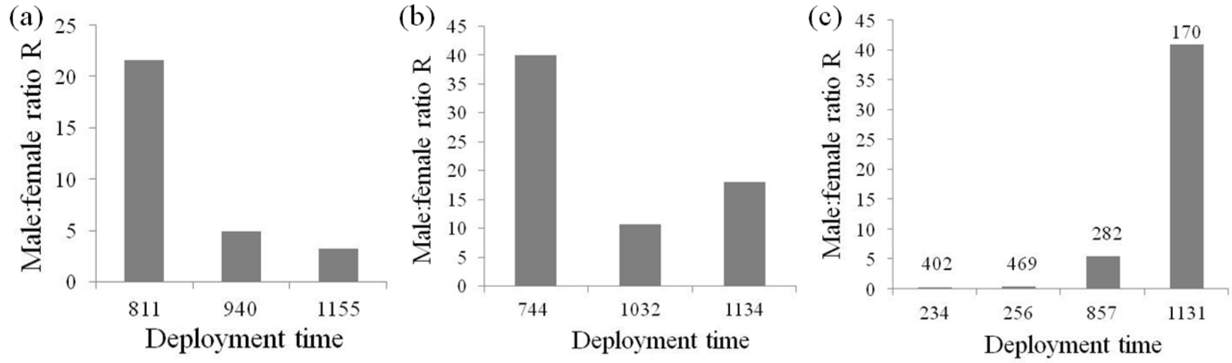

Figure 6.5: Male:female ratio (R) recorded in consecutive sets conducted in the South on 11 October 2010 with longline (a), on 14 August 2011 with longline (b), and on 17 August 2011 with gillnet, with numbers indicating total soaking time for each set (c).

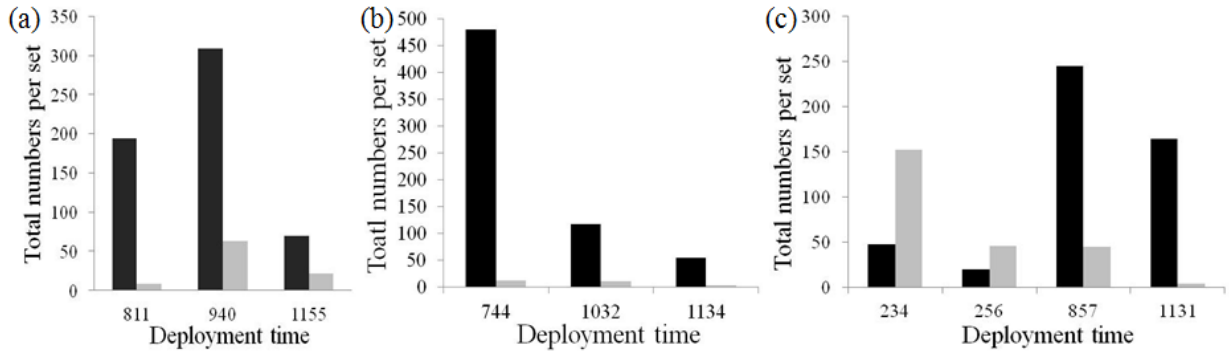

Figure 6.6: Total numbers of males (black bars) and females (grey bars) caught in consecutive sets conducted in the South on 11 October 2010 with longline (a), on 14 August 2011 with longline (b), and on 17 August 2011 with gillnet (c).

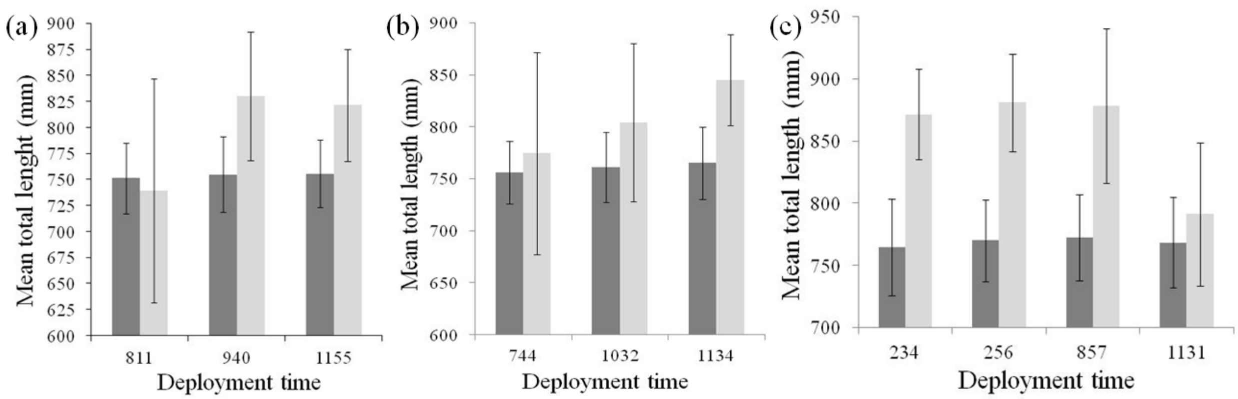

Figure 6.7: Average male (darker bars) and female (lighter bars) total length (mm, ± SD) for consecutive sets conducted in the South on 11 October 2010 with longline (a), on 14 August 2011 with longline (b), and on 17 August 2011 with gillnet (c).

Chapter 7

CONCLUSIONS AND MANAGEMENT IMPLICATIONS

Effectiveness of the U.S. and EU fishery governance

Nature and extent of the fishery management issues

The global status of fishery resources is alarming. According to capture statistics collected by the Food and Agriculture Organization of the United Nations (FAO), 29.9% of global fish stocks are considered overexploited, and thus in need of urgent management measures to rebuild the stocks (FAO, 2012). In addition, the majority of the top ten commercial species are considered fully exploited (FAO, 2012).

These results indicate a deteriorating condition for the world's fisheries, with negative consequences for the ecological status of fish resources and their environments. In turn, this condition reduces fish production and trade, which impact local coastal communities, their economies, and their associated social components (FAO, 2012). Overall, this points at a general failure of different fishery management systems to deliver on sustainable exploitation, and to provide for the well-being of fishing industries and coastal communities on a global scale.

Despite this common scenario of worldwide failure, the U.S. fishery management system, under the governance of the Magnuson-Stevens Fishery Conservation and Management Act (the MSFCMA or the Act), appears to be a better management tool in achieving its goals in regards to sustainability compared to the European Union (EU), whose fishery governance is under the Common Fisheries Policy (CFP).

In 1998, the National Marine Fisheries Service (NMFS) reported that for the 300 species for which there was an estimate of status, 90 (30%) were considered as "overfished", 10 (3%)

were "approaching overfished condition", and 200 (67%) were "not overfished" (NMFS, 1998). This exploitation scenario sensibly improved for the U.S. stocks, as in 2010 the NMFS declared that of the 253 stocks or stock complexes for which an overfishing determination could be made, 213 (84%) were not subject to overfishing and 40 (16%) were subject to overfishing (NMFS, 2010). Of the 207 stocks or stock complexes for which an overfished determination could be made, 159 (77%) were not overfished and 48 (23%) were overfished (NMFS, 2010).

Similarly, fishery statistics reported for 1990 by the European Commission (EU Commission) for the waters of the EU showed that 44 (57%) out of 77 fish stocks were heavily exploited, and 5 (6%) were being depleted (OECD, 1997). Two decades later the situation worsened, as exemplified by fishery statistics reported in 2009, which stated that 88% of the European stocks were overfished and profit margins of the fishing industry were continuously declining (EC, 2009).

The U.S. fishery governance has proved to be more successful than its EU counterpart: *i*) to provide sustainable fisheries; *ii*) to foster fish species conservation; and *iii*) to maintain more healthy profits and benefits for the fishing industry. These three objectives comply in full with the FAO's definition of sustainable development (FAO, 1989), and with the provisions of the three principles of sustainability included in the FAO Code of Conduct for Responsible Fisheries: *i)* to conserve (and sustain) the resource in its environment; *ii)* to satisfy the socio-economic needs of human beings; and *iii)* to guide the management toward the required changes in institutions and technology (FAO, 1995; Garcia, 2000).

Success in fisheries management should be reached by attaining the best trade-offs among four major objectives: biological, economic, social, and political (Mardle et al., 2002; Hilborn, 2007). These objectives are naturally conflicting and, therefore, hardly optimised at the same time (Pope, 1997). For example, biological objectives in fisheries management are usually achieved in the long-term, while socio-economic and political objectives are commonly considered in the short-term (Lane, 1989). By and large, the main goal of a successful fishery management system is to assure the viable exploitation of fishery resources in the long-term, in such a way that fishery efficiency should not be simplistically reduced to profit maximization, but regarded as net benefits maximization by minimizing economic and political conflicts and providing social sustainability through the attainment of fairness among user groups (Mardle et al., 2002).

The reason for the Act in being more "sustainable" than the CFP is due to several factors. First, the U.S. fishery governance has provided a higher harmonization among the four objectives of fishery management compared to the EU fishery governance. Second, the Act is characterized by clear objectives and priorities, which are embedded in the 10 National Standards (NSs), while the CFP is framed within broad objectives lacking clear prioritization (Österblom et al., 2011). The lack of clear objectives is fueled by the adoption of the principle of relative stability when allocating national quotas for specific fish stocks, which alters the equilibrium among the four objectives favouring the attainment of short-term economic and political objectives by each EU's member state at the stake of the long-term biological and social objectives of the EU Community as a whole. Third, contrary to the EU, the decision-making process in the U.S. fishery management system is strongly linked to scientific advice, which provides more transparency and higher legitimacy of quota adoptions among stakeholders (Österblom et al., 2011). Fourth, and more importantly, the U.S. fishery management system, although still considered "top-down" as much as the EU system, is structured on a regional base, thanks to the establishment of Regional Fisheries Management Councils (RFMCs) that provide for more effective stakeholder consultation in the decision-making process leading to the development of Fishery Management Plans (FMPs). These regional FMPs put a strong emphasis on ecological sustainability of fish stocks specific to each region by taking into account social and economic aspects, through the adoption of a "consultative" co-management of different stakeholders, as well as uncertainty in stock assessment, by using the best scientific information available (Österblom et al., 2011). In summary, the combination of these four points allows for more sustainability and economic efficiency of the U.S. fishery than the EU fishery in the long-term.

Management implications

In light of the limitations and deficiencies described in this study (Chapter 3), the CFP has failed to deliver a harmonic integration of the biological, economic, social, and political objectives of fisheries management. This failure is mainly attributable to the realm of political decisions (the principle of relative stability), further supported by a strong "top-down" decision-making process that weakens the power of the European Commission (EU Commission) and scientific advice, such as stock assessment information provided by the International Council for the Exploration of the Sea (ICES), while holding the decisional power in the hands of state members through the European Council of Ministers (EU Council).

In the most recent discussion to reform the CFP, emphasis has being placed on the introduction of a system of individual transferable quotas (ITQs) in order to foster sustainability and to eliminate fishery overcapacity (EC, 2011). Overcapacity can be considered as the most negative aspect of fishery management systems and, although at different levels of magnitude, it affects almost every national fishery worldwide, including the United States. However, overcapacity has being exacerbated the most in the EU because of the excessive use of economic subsidies for the fishing sector, which were more limited in the U.S. The adoption of rights-based approaches to fisheries management, such as ITQs, is seen as the most promising solution to solve the open access nature of fishery resources, which if unresolved leads to overcapitalization (Van Hoof, 2013).

The effectiveness of ITQs strongly depends on the local political and institutional setting (Van Hoof, 2013). The recent adoption of ITQs in the U.S. has likely more chance of success because its fishery governance is framed within a co-management design within which the incorporation of scientific advice is a key component of the decision-making process. By contrast, the proposed adoption of ITQs in the EU has more of a chance for failure, due to the lack of effective co-management across the different levels of the management pyramid, and the frequent misguided use of scientific advice. This is exemplified by the prolonged discrepancy between total allowable catches (TACs) proposed by the ICES/EU Commission and the final quotas approved by the EU Council. In this regard, ITQs cannot prevent overfishing if the TACs are set at an unsustainable level in the first place (Sinclair et al., 1999), which has been commonly the case for the most important commercial fish stocks in the EU.

With regard to regionalizing the CFP, a first attempt was taken with the policy reform of 2002, when five Regional Advisory Councils (RACs) were created to pave the way for enhancing stakeholder participation and knowledge integration in the development and implementation of fishery management policies. The number of RACs has increased to seven, with the most recent one established for the Mediterranean Sea in 2008. The goal of the RACs is to provide advice to the EU Commission in regard to fisheries management of specific regional sea areas and fish stocks, and to increase involvement of different stakeholders in the management process (Long, 2010). In order to fulfill their role, the RACs have a broad constituency, with representatives of the fishing industry, environmental organizations, consumers, aquaculture producers, and recreational anglers. Nevertheless, the effective contribution of the RACs to the CFP decision-making process so far has been minimal because, in essence, they are consultative bodies with little impact on policy development (Gray and Hatchard, 2003; Long, 2010). Therefore, in order to contribute effectively to the CFP's objectives to provide sustainable and efficient fisheries, the RACs should have a tangible decisional part in the "top-down" fishery governance of the EU, holding a role similar to the RFMCs established in the U.S. system (Long, 2010; Linke et al., 2011). The main problem, however, is that the EU is a community of different independent national state members, while the U.S. is a federal union of states with a central government recognized as the main authority for matters of national policies and governance. Therefore, it is reasonable to conclude that such a development of the EU fishery governance cannot be foreseen in the short-term, for which the reallocation of decisional power between the EU Commission and the EU Council, shifting the bar more toward the former, also represents the primary need for change and implementation of the CFP.

Although the RFMCs constitute an important advantage of the Act compared to the CFP in favouring more sustainable exploitation, they still suffer from providing a fair and equitable apportionment for fishing privileges, which is a requirement of National Standard 4. The quest for an equal representativeness within RFMCs should be a major priority for the next Act's reauthorization. In turn, this will enhance rebalancing fishery management objectives so to foster sustainability, profitability, and efficiency of fishery resources exploitation in the United States.

Implications for the management of spiny dogfish fisheries and species conservation

The international management

The international exploitation of spiny dogfish is driven by the EU market demand for dogfish meat, for which the Northwest Atlantic stock has being a primary market source over the last decade. In addition, the European countries demanding spiny dogfish the most, such as Germany, France, the United Kingdom, and Belgium, now have to cope with the inability to land their dogfish populations because of the fishery closure in the Northeast Atlantic intended to rebuild the overfished stock. Consequently, these countries will have to rely on imports for future years, which illustrates an important facet of fishery management of highly globalized commercial trades of natural resources. The conservation of species with a large international trade cannot rely merely on the adoption of national management regulations. Sustainability in the exploitation of natural resources has to be attained by considering all the drivers of commercial exploitation, which, as the spiny dogfish case illustrates, are frequently outside the frame of national management objectives. To foster successful fishery management the interplay between exploitation and the specific traits of the international trade driving such exploitation should not be overlooked.

The adoption of the U.S.-FMP for the North Atlantic spiny dogfish stock, which was a management measure necessary to fulfill the requirements of the Act with regard to the fishery sustainability in the U.S., had profound changes in the EU imports of spiny dogfish. This resulted in the development of new spiny dogfish fisheries in several countries that likely have not been managing stock exploitation as sustainably as the U.S., which potentially affected the conservation status of several regional spiny dogfish stocks. In regard to that, the history of spiny dogfish exploitation between the U.S. and the EU clearly shows how the U.S. government misguidedly failed to recognize that the lack of effectiveness of the EU in managing its fishery resources could have represented, and most likely can still represent, an important benefit.

Specifically, the U.S. government overlooked the strategic importance of a possible listing of spiny dogfish in Appendix II of the Convention of International Trade in Endangered Species of Wild Fauna and Flora (CITES), resulting in other countries, mainly Canada, gaining the benefit by increasing their exports of spiny dogfish to the EU to supply to the planned quota reduction from the U.S. resulting from the adoption of the U.S.-FMP in 1999. In turn, this scenario produced important socio-economic consequences and shortcomings within the fishery management of the U.S. North Atlantic spiny dogfish stock that should be seriously considered in the discussion for sustainable exploitation and associated fishery management of this stock. In regard to that, it is important to recognize that a listing in Appendix II of CITES, contrary to Appendix I, is a regulatory measure to conserve the wild population and not to preserve it. Therefore, as long as the fishery at hand is certified for sustainability, as the U.S. North Atlantic spiny dogfish fishery actually does, the trade can continue as long as there is market demand for the product. This also suggests the need for more in-depth analyses of the international trade of spiny dogfish from a social, economic, and political objective that should be integrated into the biological objective and conservation aspects of fishery management for spiny dogfish.

Results from my study are useful to predict the possible changes in the international exploitation and trade of spiny dogfish in case of listing of the species in Appendix II of CITES. In addition, my results can help in the preliminary monitoring of the changes to the foreign export markets of spiny dogfish regarding the U.S. stock and the expansion of existing markets, which was indicated recently as a priority to enhance the sustainability of the U.S. spiny dogfish commercial fishery (ASMFC, 2013).

In case of listing, the scenario delineated in my study indicates that, globally, the U.S. North Atlantic fishery and the Canadian North Pacific hook-and-line fishery would be the only two fisheries certified for sustainability. This situation will put the U.S and Canada in a position of exclusive importance for the EU's spiny dogfish market compared to other countries that have emerged recently in this specific market. In addition, the recent identification of the North Pacific spiny dogfish as a different species suggests that the U.S. North Atlantic spiny dogfish fishery is, in essence, the only current fishery certified for sustainability for the species *Squalus acanthias*.

However, it is worth mentioning that the Appendix II listing process also considers "look-alike" species that resemble listed species. Therefore, it is reasonable to conjecture that a listing of *S. acanthias* could end up in listing also *Squalus suckleyi* in case the respective trade products should be hard to distinguish by custom enforcement authorities.

In case the species should continue to not be listed in Appendix II, the scenario delineated by my social network analysis suggests a potential increased exploitation of spiny dogfish stocks in several coastal areas, including Africa, South America, and Asia, where knowledge of the species conservation status, ecological importance of the species within the local ecosystem, and local fishery management regulations for the species are lagging behind compared to the U.S. and the majority of the EU states. In this scenario of scientific uncertainty, the sustainable global exploitation of spiny dogfish could be jeopardized because of the likely maintenance of the *status-quo* of such exploitation, coupled with the prospective of new European market demand for spiny dogfish meat products, such as east European countries, and the increased contribution of other European countries allowed to exploit spiny dogfish stocks outside of the Northeast Atlantic, such as Spain in the Mediterranean Sea. In this regard, the U.S. government, which is advantaged by having produced and maintained good scientific knowledge on its Atlantic spiny dogfish stock, may consider the possibility of expanding its commercial trade of spiny dogfish products to the east European countries' market, which appears to be a potential trade niche for the future.

In light of these results, it appears advisable to increase the number of detailed scientific stock assessments, as wells as studies on the biology, life histories, feeding habits, reproductive behavior, and migratory behavior of spiny dogfish populations in several countries, which would also honor their agreement in adopting the voluntary FAO Code of Conduct for Responsible Fisheries. Accordingly, a recent evaluation for the 53 countries landing 96% of the global marine catch indicates a widespread and alarming poor compliance to this Code (Pitcher et al., 2009). Not so surprisingly, the majority of EU countries had some of the poorest compliance, which the authors suggest was the result of the deficiencies and dysfunctionalities of the CFP (Pitcher et al., 2009). Interestingly, this study reported higher scores of compliance from developing countries than developed countries, and, even more promising for the spiny dogfish fishery, Namibia and South Africa ranked sixth and seventh, respectively, in terms of their compliance scores, with similar scores to the U.S. and Canada (Pitcher et al., 2009). This result is encouraging and suggests the intent of these two African nations to develop and implement sustainable fishery management. Therefore, there is a need for a detailed stock assessment of and biological and ecological information on the Namibian/South African spiny dogfish stock to foster the potential for a sustainable fishery in this coastal area. In addition, spiny dogfish stock assessments are needed for local populations in Argentina and New Zealand, where scientific knowledge of the species conservation status is incomplete. For instance, a reliable stock assessment for spiny dogfish in Argentina is still not available and local authorities reported serious constraints in assessing the status of the species due to the high levels of bycatch discard affecting species quantification (Fischer et al., 2012). However, spiny dogfish abundance on the northern Argentinean Continental Shelf declined by 50% between 1995 and 2005 (Massa et al., 2007). Furthermore, the first stock assessment for the species in New Zealand, conducted in 2008, was not able to produce a detailed estimate of total stock biomass (CITES, 2010).

The management of the U.S. North Atlantic stock

In light of my study results, it can be argued that, for the U.S. North Atlantic spiny dogfish stock, what can be considered a management success for the biological objective it proves to be a mismanagement for the economic, social and political objectives. In turn, this shortcoming may have also contributed to undermine the conservation status of other regional and sub-regional spiny dogfish stocks worldwide. It is unquestionable that the main goal of the U.S.-FMP for spiny dogfish, the rebuilding of the U.S. North Atlantic stock, was achieved. Consequently, this shows the merits of the Act for fostering sustainable exploitation of the U.S. fishery resources. Nevertheless, several additional actions related to management of the U.S. North Atlantic spiny dogfish stock can be implemented that would enhance sustainable exploitation and fishery efficiency.

As already discussed, the U.S.-FMP for the Northwest Atlantic spiny dogfish stock, in accordance to the requirements of National Standard 2, is based on the best scientific information available. Within the provisions of the FMP, the quota allocation among the U.S. Atlantic states takes into account the seasonal migration of the stock and the stock biomass estimates resulting from fishery-independent stock assessments conducted annually by the Northeast Fisheries Science Center (NEFSC). However, there exists concern by fishermen in southern regions, supported by recent studies (Rulifson and Moore, 2009), that the annual trawl survey conducted by NEFSC is underestimating the range of the U.S. North Atlantic stock because samplings is not conducted south of Cape Hatteras, North Carolina, where local fishermen commonly report aggregations of spiny dogfish in winter months. In addition, the NEFSC bottom trawl survey may not adequately sample spiny dogfish inhabiting the inshore waters along the U.S. Atlantic coast, as the species can be found throughout the water column (Sulikowski et al., 2010) and because these surveys do not sample in shallower inshore waters and around ship-wrecks, where dogfish typically congregate (Register, 2007). Finally, there is still no undisputable knowledge of the "ideal" sex ratio for the species that can foster sustainable exploitation of the stock, and the sex ratio estimated by NEFSC surveys is based on surveys conducted only in the spring, between March and April, with no information for seasonal changes in the sex ratio. Therefore, the methodology and effectiveness of the NEFSC's trawl surveys has recently been questioned (Campana et al., 2008; Rulifson and Moore, 2009). These results indicate that, although the management of the spiny dogfish fishery in the U.S. North Atlantic has led to rebuild the overfished stock, the scientific information employed to manage the fishery still has a certain degree of incompleteness or inappropriateness for which more scientific studies are needed. This observation is further supported by the recent list of priorities for achieving effective management of the U.S. North Atlantic spiny dogfish stock reported by the Atlantic State Marine Fisheries Commission (ASMFC), which calls for an investigation of the distribution of spiny dogfish beyond the depth range sampled by NEFSC trawl surveys, as well as the stock's structure, migration, and mixing rate characteristics (ASMFC, 2013). In this regard, it is worth noting that a clear distinction should be made for the sex ratio between landings and catch. In fact, females still represent the major component (92%) of landings in the U.S. Atlantic, although the true sex ratio in the catch is largely unknown because of bycatch (Rago and Sosebee, 2012).

After the stock was considered rebuilt in 2010, total allowable catches (TACs) were increased in order to intensify the species exploitation and commercialization. However, my results suggest that this quota increase was disjointed from the logic of economic demand of the European market, which has concurrently expanded to other countries to supply to the decrease in U.S. spiny dogfish exports. This misalignment between national and international management objectives can have dramatic consequences for the efficiency of spiny dogfish exploitation in the U.S. North Atlantic coast. In fact, despite increases in the annual TAC, the limited number of operating processors capable of handling spiny dogfish (currently there are only two, one in Massachusetts and one in New Hampshire) represents a severe constraint to the economy of this fishery in the U.S. (Batsavage, 2013). This is the result of planned quota reduction of the FMP since 1999, coupled with the specific characteristics of the processing and export of dogfish meat.

The meat of spiny dogfish has to be processed within approximately 48 hour to maintain the good quality of the product to be commercialized. The need for short-time transport and processing, coupled with the generally low prices for spiny dogfish, require fishermen to land relatively high quantities of dogfish to make a profit (Waters, 2010). Therefore, within the last twenty years, many processors along the U.S. Atlantic coast (mainly in North Carolina and Virginia) have gone out of business or were forced to discontinue processing of dogfish (Waters, 2010). Nevertheless, the importance of spiny dogfish exploitation for southern coastal communities is still of great relevance, mainly for North Carolina fishermen during winter, when other valuable commercial species are not available (Hickman et al., 2000; Rulifson et al., 2002).

In addition, the management of the U.S. North Atlantic spiny dogfish stock, which has been marked by the integration of detailed, timely, and reliable scientific information on the biology, life history, and migratory behavior of the species, has produced a tremendous increase in annual TAC for the stock since 2010, and a recent 1,000-lb increase in maximum possession limit per vessel trip (from 3,000 to 4,000 lb). Although these management measures are scientifically justified, it is questionable whether are actually effective enough to foster sustainability of the fishery. In fact, the presence of sexual segregation in the species, with larger adult females inhabiting inshore shallower waters and smaller males most commonly inhabiting offshore deeper waters, has contributed to the differential exploitation of the stock, coupled with the EU market demanding for larger specimens (i.e. adult females). Consequently, the stock has being experiencing a recent increase in the male:female sex ratio in the catch and a decrease in the average size of spawning females, which may have deleterious consequences for the conservation status of the stock and the sustainability of the fishery (Rago and Sosebee, 2012).

The most rationale solution would be to increase the fishing effort on males, while reducing the fishing pressure on the adult female component of the stock. However, some relevant considerations should be contemplated before doing so. We need to determine at first the “ideal” sex ratio in the species to provide sustainable exploitation, which is actually unknown. However, we do know that males mature earlier than females in the Northwest Atlantic (Nammack et al., 1985; Campana et al., 2007), and that this stock is characterized by the presence of multiple paternity (30% in Lage et al., 2008; 17% in Verissimo et al., 2011). These characteristics suggest that higher exploitation of males could enhance sustainable exploitation for the stock, but more studies on the true sex ratio in the catch are needed to provide more firm conclusions. In order to develop a viable male-only directed commercial fishery, coastal areas characterized by a consistent and predictable presence of schools of male spiny dogfish along the U.S. North Atlantic coast have to be identified. Although national management authorities (i.e., NOAA-NMFS) are open to the idea of a male-only directed fishery, this possibility may still be hampered by the requirements of the EU market for larger individuals, which are mainly adult females. Therefore, unless the European market becomes more open to the processing of smaller individuals, such a development of the U.S. North Atlantic spiny dogfish stock fishery could not be achieved (Waters, 2010). Moreover, in case of such an implementation for this fishery, the ecological consequences for the increased exploitation of adult males need to be determined. These consequences may be further amplified by the recent increase in maximum possession limit per vessel trip. In fact, due to the presence of sexual dimorphism in the species, it is likely that more serious consequences for the conservation status of the stock will result when the landing of 4,000 lb of male spiny dogfish compared to the previous management regulation of 3,000 lb quotas without sex differentiation is allowed.

The management of the New England/Cape Cod population

Results from my study suggest a potential for a male-only directed fishery in an area about 10 miles northeast off the Cape Cod, Massachusetts peninsula, or at least the opportunity to explore the viability for this scenario. Moreover, the development of this fishery should be based on season (between summer and early fall) and time of the day (more schools of males are predicted to inhabit this inshore coastal area early in the day). Interestingly, this time-restricted male-directed fishery could occur concurrently with the regular fishing season for spiny dogfish in the New England area, which may increase fishing efficiency. In regard to this potential fishery development, my results suggest that the employment of longlines would be more sustainable than gillnets, as the deployment time is normally considerably shorter for longlines, and because catching schools of males will automatically reduce the chances of catching schools of females, as the sexes do not normally overlap, both spatially and temporally, due to the presence of sexual segregation. Moreover, it is worth noting that results from my study originated from a collaborative research project between scientists and commercial fishermen, using their ecological knowledge of the local spiny dogfish population. This further supports the higher potential for success of the U.S. fishery governance compared to the EU counterpart. Specifically, this shows the benefit of the U.S. adopting a fishery management strategy that recognizes the importance of the use of collaborative research projects that contribute to expand knowledge on species biology and behavior, as well as characteristics of the fishery (Österblom et al., 2011).

Perhaps development of an area-based amendment to the spiny dogfish FMP specific to the New England/Cape Cod area should be considered, but careful attention should be devoted to limit the number of females landed, the ecological consequences for the species and the environment for an enhanced exploitation of males, and the current limits in annual quotas and vessel trips.

In regards to the distribution of schools of males, my results suggest a possible link between their feeding habits and their temporal presence in inshore deeper coastal habitats off the Cape Cod area at the eastern edge of the Georges Bank region. Although these results are based on limited sampling, I believe they are indicative of behavioral patterns of male spiny dogfish in the Cape Cod area, and are most likely also representative of the entire New England/Georges Bank coastal area. This area is characterized by the presence of an important commercial fishing industry that contributes significantly to the economy of local coastal communities and the whole United States. Ecosystem considerations in this area have increased over the last decades in order to improve the management of the most valuable fisheries, particularly for gadids species, such as Atlantic cod (*Gadus morhua*), haddock (*Melanogrammus aeglefinus*) and pollock (*Pollachius virens*).

There exists a general perception by local commercial fishermen that spiny dogfish, due to their “voracious” nature, have a negative impact on the rebuilding of these groundfish stocks, (Link et al., 2011). However, recent studies do not support this notion of spiny dogfish in the U.S. Northeast continental shelf feeding on groundfish species, as they are reported to largely feed upon small pelagic fish (mainly Atlantic herrings - *Clupea harengus* and Atlantic mackerel - *Scomber scombrus*), squid (northern shortfin squid – *Illex illecebrosus* and longfin inshore squid – *Loligo pealeii*), and ctenophores (Link et al. 2002; Link and Ford, 2006). In addition, some studies point at the influence of climatic change as a key environmental factor limiting the success of cod recruitment in the New England/Georges Bank area (Brodziak and O’Brien, 2005; Groger and Fogarty, 2013).

In brief, intense fishing pressure on gadids during the 1970s brought to a notable change in the Georges Bank fish community, with a decrease in groundfish species and a parallel increase in elasmobranchs, mainly spiny dogfish and skates (Boreman et al., 1997; Fogarty and Murawski, 1998; Link and Garrison, 2002). Concurrently, the fish community of the Northern Mid-Atlantic Bight, which extends from New Jersey up to the southern edge of the Georges Bank region, appears to have extended its range distribution northward because of consistent periods of water warming since the 1960s, which further limited the recruitment of groundfish in the New England/Georges Bank area (Gabriel, 1992; Brodziak and O’Brien, 2005; Groger and Fogarty, 2013). Therefore, the decrease in the abundance of the groundfish species complex has likely led to the increase in spiny dogfish biomass, due to reduced competition for resources, lack of a market for dogfish in North America, higher bycatch discard survivorship of dogfish, and hydrographic changes on the Northwest Atlantic that brought warmer waters in this coastal area (Gabriel, 1992; Hall, 1999; Link and Garrison, 2002). These results are consistent with the observations of the Georges Bank region having shifted from a primarily demersal to a more pelagic ecosystem as a consequence of intense fishing pressure (Fogarty and Murawski, 1998; Garrison and Link, 2000) and local water warming (Gabriel, 1992; Sullivan et al. 2001).

Interestingly, some authors hypothesized that the severe depletion of groundfish as a consequence of heavy fishing between 1970s and 1980s in the Northwest Atlantic may have also contributed to the increase in landings of cephalopods (mainly squids) in the same period, although warmer water masses were indicated as the most probable key environmental factor for this increase (Caddy and Rodhouse, 1998). Consequently, an increased abundance of pelagic species, such as ctenophores, have been reported in the stomach content of spiny dogfish off the U.S. Northeast continental shelf, and particularly in the Georges Bank region, in recent decades (Link and Ford, 2006). However, a study on temporal changes in the diet of the Georges Bank's fish community reported that dogfish larger than 80 cm, which should be mainly adult females (Nammack et al., 1985), were primarily piscivores between 1977 and 1998, while smaller individuals, including adult males, consumed a smaller proportion of fish despite higher abundances of these medium-size dogfish compared to larger individuals, mainly during 1988-1993 (Link and Garrison, 2002).

Results from these studies suggest that the feeding habits of spiny dogfish, which is recognized as the dominant piscivore in the New England/Georges Bank ecosystem, has likely shifted toward more pelagic species, including squid and ctenophores. Although the species is considered an opportunistic feeder, it is likely that adult females have maintained their primarily piscivorous diet, while smaller adult males has being specializing in consuming smaller pelagic prey, such as squids and ctenophores, due to their increased abundance in the Georges Bank region. However, these conclusions are conjectural and need more detailed studies on the temporal changes in the diet composition of spiny dogfish by sex. Several studies have reported on the food habit of spiny dogfish in this area, but, to my knowledge, none of these studies has investigated the differences by sex, limiting the analysis on the differences by length classes at best (Overholtz et al., 2000; Link and Garrison, 2002; Link et al., 2002).

Following this line of research, preliminary results from stomach content analysis of spiny dogfish off the Argentinean shelf indicate that, similar to Georges Bank, significant changes have occurred in the diet of this stock over the last 30 years, with an increased frequency of occurrence of the Argentine shortfin squid (*Illex argentinus*) and ctenophores (*Pleurobranchia pileus*) due to a decrease in Argentine hake (*Merluccius hubbsi*) as a consequence of overfishing (Koen-Alonso et al., 2002; Belleggia et al., 2012). These results indicate a clear decrease in the trophic level of spiny dogfish off the Argentinean coast, which the authors reported as evidence of major changes in the structure of this ecosystem (Belleggia et al., 2012), similar to what has being reported for the U.S. Northwest Atlantic (Link and Ford, 2006). In turn, these changes have contributed to the increase in cephalopod abundances (Caddy and Rodhouse, 1998), which have increased in frequency in the diet of local populations of spiny dogfish. In regard to that, it is hypothesized that the Southwest Atlantic is a region with a natural high dominance of cephalophods, due to a lower ecological diversity of the local fish assemblage that allowed cephalophods to fill a niche normally occupied by other finfish species (Caddy and Rodhouse, 1998).

Results by Belleggia et al. (2012) indicate that consumption of all prey categories was independent of spiny dogfish total length, but that sex of dogfish was an important explanatory variable in their model, although for fish and jellyfish but not for *I. argentinus*. Furthermore, the consumption of *I. argentinus* was higher in the warmer season (Belleggia et al., 2012).

In light of these results, although drawn from a different area with a lower ecological diversity, the Georges Bank region seems to be the appropriate area to investigate the importance of sex in the consumption of squid and ctenophores by spiny dogfish, particularly in the warmer season when higher abundances of these species should be reported in New England compared to the Middle Atlantic and North Carolina (Bowman et al., 2000; Link et al., 2002). Results from these studies will likely enhance the ecosystem management of the fishery in this area, as the normal spiny dogfish fishery in New England occurs between spring and early fall. Ecosystem-based management of the spiny dogfish population in the New England/Georges Bank area should also take into account the influence of sexual segregation in the species, a behavioral characteristic of spiny dogfish that it is not present in the majority of the other commercially valuable finfish species in the area. Although there is a plethora of studies analyzing the trophic dynamics and food habit of this species in the U.S. Northwest Atlantic, a detailed analysis of the specific differences by sex has not yet been produced. Such an analysis will likely expand the knowledge of spiny dogfish impacts on the trophic dynamics of this ecosystem, and also contribute to enhancing fisheries management in this coastal region.

LITERATURE CITED

ASMFC. 2013. Atlantic States Marine Fisheries Commission. Research priorities and recommendations to support interjurisdictional fisheries management. Special Report #89. ASMFC, Arlington, VA.

Batsavage, C. 2013. North Carolina Marine Fisheries Commission Meeting. Director's Report, Dogfish season update, and dogfish and the European Union. 27 February – 1 March, 2013, Pine Knoll Shores, North Carolina.

Belleggia, M., Figueroa, D.E., Sánchez, F., and Bremec, C. 2012. Long-term changes in the spiny dogfish (*Squalus acanthias*) trophic role in the southwestern Atlantic. *Hydrobiologia* 684: 57-67.

Boreman, J., Nakashima, B.S., Wilson, J.A., and Kendall, R.L. 1997. Northwest Atlantic groundfish, perspective on a fishery collapse. American Fisheries Society, Bethesda, MD.

Bowman, R.E., Stillwell, C.E., Micheals, W.L., and Grosslein, M.D. 2000. Food of Atlantic fishes and two common species of squid. NOAA Technical Memorandum NMFS-NE-155. NOAA, Woods Hole, Massachusetts.

Brodziak, J., and O'Brien, L. 2005. Do environmental factors affect recruits per spawner anomalies of New England groundfish? *ICES Journal of Marine Science* 62: 1394-1407.

Caddy, J.F., and Rodhouse, P.G. 1998. Cephalophods and groundfish landings: evidence for ecological change in global fisheries? *Reviews in Fish Biology and Fisheries* 8: 431-444.

Campana, S.E., Gibson, J.F., Marks, L., Joyce, W., Rulifson, R., and Dadswell, M. 2007. Stock structure, life history, fishery and abundance indices for spiny dogfish (Squalus acanthias) in Atlantic Canada. Canadian Science Advisory Secretariat, Research Document 2007–2089.

Campana, S.E., Gibbson, A.J.F., Marks, L., Joyce, W., Rulifson, R.A., and Dadswell, M.J. 2008. Stock structure, life history, fishery and abundance indices for spiny dogfish (*Squalus acanthias*) in Atlantic Canada. Fisheries and Oceans Canada, Science 2008 Research Document 2007/89. Ottawa, Canada.

CITES. 2010. Convention on International Trade in Endangered Species of Wild Fauna and Flora. Consideration of proposals for amendment of Appendices I and II. 15th Meeting of the Conference of the Parties, 13-25 March, Doha, Qatar, CoP15 Prop.18.

EC. 2009. European Commission. Green Paper: Reform of the Common Fisheries Policy, COM 2009, 163 final, Brussels.

EC. 2011. European Commission. Proposal for a regulation of the European Parliament and the Council on the Common Fisheries Policy.

FAO. 1989. Food and Agriculture Organization of the United Nations. Sustainable development and natural resources management. FAO Conference Twenty-fifth Session, Rome 11–30 November 1989. C89/2-Supp. 2, Rome.

FAO. 1995. Food and Agriculture Organization of the United Nations. Code of Conduct for Responsible Fisheries, Rome.

FAO. 2012. Food and Agriculture Organization of the United Nations. The state of world fisheries and aquaculture 2012. Rome.

Fogarty, M.J., and Murawski, S.A. 1998. Large-scale disturbance and the structure of marine system: fishery impacts on Georges Bank. *Ecological Applications* 8: 6-22.

Gabriel, W.L. 1992. Persistence of demersal fish assemblages between Cape Hatteras and Nova Scotia, Northwest Atlantic. *Journal of the Northwest Atlantic Fisheries Science* 14: 29-46.

Garcia, S.M. 2000. The FAO definition of sustainable development and the Code of Conduct for Responsible Fisheries: an analysis of the related principles, criteria and indicators. *Marine and Freshwater Research* 51: 535-541.

Garrison, L.P., and Link, J.S. 2000. Fishing effects on spatial distribution and trophic guild structure of the fish community in the Georges Bank region. ICES Journal of Marine Science 57: 723-730.

Gray, T., and Hatchard, J. 2003. The 2002 reform of the Common Fisheries Policy's system of governance – rhetoric or reality? *Marine Policy* 27: 545-554.

Groger, J.P., and Fogarty, M.J. 2013. Broad-scale climate influences on cod (*Gadus morhua*) recruitment on Georges Bank. *ICES Journal of Marine Science* doi:10.1093/icesjms/fsq196

Hall, S.J. 1999. Demersal fish populations: three case studies. In, the effects of fishing on marine ecosystems and communities, 146-176, Blackwell Science, Oxford, UK.

Hickman, C., Moore, T.M., and Rulifson, R.A. 2000. Biological information of the Northern District spiny dogfish fishery needed for the fishery management plan. North Carolina Sea Grant, Fisheries Resource Grant Program, Project No 98FEG-29. Raleigh, North Carolina.

Hilborn, R. 2007. Defining success in fisheries and conflicts in objectives. *Marine Policy* 31: 153-158.

Koen-Alonso, M., Crespo, E.A., García, N.A., Pedraza, S.N., Mariotti, P.A., and Mora, N.J. 2002. Fishery and onthogenetic driven changes in the diet of the spiny dogfish, *Squalus acanthias*, in Patagonian waters, Argentina. *Environmental Biology of Fishes* 63: 193-202.

Lage, C.R., Petersen, C.W., Forest, D., Barnes, D., Kornfield, I., and Wray, C. 2008. Evidence of multiple paternity in spiny dogfish (Squalus acanthias) broods based on microsatellite analysis. *Journal of Fish Biology* 73: 2068-2074.

Lane, D.E. 1989. Operational research and fisheries management. *European Journal of Operational Research* 42: 229-242.

Link, J.S., and Garrison, L.P. 2002. Changes in piscivory associated with fishing induced changes to the finfish community on Georges Bank. *Fisheries Research* 55: 71-86.

Link, J.S., Garrison, L.P., and Almeida, F.P. 2002. Ecological interactions between elasmobranchs and groundfish species on the Northeastern U.S. Continental Shelf. I. Evaluating predation. *North American Journal of Fisheries Management* 22: 550-562.

Link, J.S., and Ford, M.D. 2006. Widespread and persistent increase of ctenophore in the continental shelf ecosystem off NE USA. *Marine Ecology Progress Series* 320: 153-159.

Link, J.S., Bundy, A., Overholtz, W.J., Shackell, N., Manderson, J., Duplisea, D., Hare, J., Koen-Alonso, M., and Friedland, K.D. 2011. Ecosystem-based fisheries management in the Northwest Atlantic. *Fish and Fisheries* 12: 152-170.

Linke, S., Dreyer, M., and Sellke, P. 2011. The Regional Advisory Councils: what is their potential to incorporate stakeholder knowledge into fisheries governance? *Ambio* 40: 133-143.

Long, R. 2010. The role of Regional Advisory Councils in the European Common Fisheries Policy: legal constraints and future options. *The International Journal of Marine and Coastal Law* 25: 289/346.

Mardle, S., Pascoe, S., Boncoeur, J., Le Gallic, B., Garcia-Hoyo, J.J., Herrero, N., et al. 2002. Objectives of fisheries management: case studies from the UK, France, Spain and Denmark. *Marine Policy* 26: 415-428.

Massa, A., Mari, N., Giussi, A., and Hozbor, N.B. 2007. Indices de abundancia de *Squalus acanthias* en la Plataforma Continental Argentina. INIDEP Technical Report 6: 1-17.

Nammack, M.F., Musick, J.A., and Colvocoresses, J.A. 1985. Life history of spiny dogfish off the Northeastern United States. *Transactions of the American Fisheries Society* 114: 367-376.

NMFS. 1998. National Marine Fisheries Service. Report to Congress: Status of Fisheries of the United States, Silver Spring, Maryland. Available at http://www.nmfs.noaa.gov/sfa/statusoffisheries/Archives/StatusofFisheriesReportCongress1998.pdf (June 2013).

NMFS. 2010. National Marine Fisheries Services. Report to Congress: the status of US fisheries, Silver Spring, Maryland. Available at http://www.nmfs.noaa.gov/sfa/statusoffisheries/2010/2010_Report_to_Congress.pdf (June 2013).

OECD. 1997. Organisation for Economic Co-operation and Development. Towards Sustainable Fisheries: Country Reports. OECD/GD(97), 119, Paris, France.

Österblom, H., Sissenwine, M., Symes, D., Kadin, M., Daw, T., and Folke, C. 2011. Incentives, social-ecological feedbacks and European fisheries. *Marine Policy* 35: 568-574.

Overholtz, W.J., Link, J.S., and Suslowicz, L.E. 2000. Consumption of important pelagic fish and squid by predatory fish in the northeastern USA shelf ecosystem with some fishery comparisons. *ICES Journal of Marine Science* 57: 1147-1159.

Pitcher, T., Kalikoski, D., Pramod, G., and Short, K. 2009. Not honouring the code. *Nature* 475: 658-659.

Pope, J.G. 1997. Integrating and presenting scientific fisheries management advice for complex fisheries subject to multiple objectives. In Montero, C.C. (Ed), Multiple objectives and fisheries management: strategies for the future, Vilamoura International Meeting on Fisheries, Portugal, 3-4 November.

Rago, P., and Sosebee, K. 2012. Update on the status of spiny dogfish in 2012 and initial evaluation of harvest at the Fmsy proxy. Mid-Atlantic Fishery Management Council Science and Statistical Committee, September 19.

Register, K.E. 2007. Population estimation and female reproductive state of spiny dogfish (*Squalus acanthias*) overwintering in North Carolina coastal waters. M.Sc. Thesis, Department of Biology, East Carolina University, Greenville, North Carolina.

Rulifson, R.A., Moore, T.M., and Hickman, C.S. 2002. Biological characterization of the North Carolina spiny dogfish (*Squalus acanthias*) fishery. North Carolina Sea Grant, Fisheries Resource Grant Program, Project No. 97FEG-28. Raleigh, North Carolina.

Rulifson, R.A., and Moore, T.M. 2009. Population estimates of spiny dogfish aggregations south of Cape Hatteras, North Carolina, using an area density method. In Gallucci V.F., McFarlane, G.A., and Bargmann, G.G. (Eds.), Biology and management of dogfish sharks, 133-138. American Fisheries Society, Bethesda, Maryland.

Sinclair, M., O’Boyle, R.N., Burke, D.L., and Peacock, F.G. 1999. Groundfish management in transition within the Scotia-Fundy area of Canada. *ICES Journal of Marine Science* 56: 1014-1023.

Sulikowski, J.A., Galuardi, B., Bubley, W., Furey, N.B., Driggers III, W.B., Ingram Jr., G.W., and Tsang, P.C.W. 2010. Use of satellite tags to reveal the movements of spiny dogfish *Squalus acanthias* in the western North Atlantic Ocean. *Marine Ecology Progress Series* 418: 249-254.

Sullivan, B.K., Van Keuren, D., and Clancy, M. 2001. Timing and size of blooms of the ctenophore *Mnemiopsis leidyi* in relation to temperature in Narragansett Bay, RI. *Hydrobiologia* 451: 113-120.

Van Hoof, L. 2013. Design or pragmatic evolution: applying ITQs in EU fisheries management. *ICES Journal of Marine Science* 70: 462-470.

Verissimo, A., Grubbs, D., McDowell, J., Musick, J., and Portnoy, D. 2011. Frequency of multiple paternity in the spiny dogfish Squalus acanthias in the Western North Atlantic. *Journal of Heredity* 102: 88-93.

Waters, J.D. 2010. The biology and socio-political culture of the spiny dogfish fishery in North Carolina. M.Sc. thesis Duke University, NC, 137 pp.

East Carolina University.

Animal Care and Use Commitee
212 Ed Warren Life Sciences Building
East Carolina University
Greenville, NC 27834

252-744-2436 office
252-744-2355 fax

August 17, 2010

Roger Rulifson, Ph.D.
Department of ICSP/Biology
Flanagan 385
East Carolina University

Dear Dr. Rulifson:

Your Animal Use Protocol entitled, "Is Cape Cod a Natural Delineation for Migratory Patterns in U.S. and Canadian Spiny Dogfish Stocks?," (AUP #D249) was reviewed by this institution's Animal Care and Use Committee on 8/17/10. The following action was taken by the Committee:

"Approved as submitted"

A copy is enclosed for your laboratory files. Please be reminded that all animal procedures must be conducted as described in the approved Animal Use Protocol. Modifications of these procedures cannot be performed without prior approval of the ACUC. The Animal Welfare Act and Public Health Service Guidelines require the ACUC to suspend activities not in accordance with approved procedures and report such activities to the responsible University Official (Vice Chancellor for Health Sciences or Vice Chancellor for Academic Affairs) and appropriate federal Agencies.

Sincerely yours,

Robert G. Carroll, Ph.D.

Robert G. Carroll, Ph.D.
Chairman, Animal Care and Use Committee

RGC/jd

enclosure

Appendix A

East Carolina University
Animal Use Protocol (AUP) Form
Latest Revision, July, 2010

Project Title: Is Cape Cod a Natural Delineation for Migratory Patterns in U.S. and Canadian Spiny Dogfish Stocks?

1. Personnel

1.1. Principal investigator and email: Roger A. Rulifson, rulifsonr@ecu.edu

1.2. Department, office phone: ICSP / Biology, Flanagan 385, Office 252.328.9400

1.3. Emergency numbers:

	Principal Investigator	Other (Co-I, technician, student)
Name:	Roger A. Rulifson	Andrea Dell'Apa
Cell:	252.916.1599	Lab 252.328.9407
Pager:		Jennifer L. Cudney
Home:	252.355.7632	252.626.1375

FOR IACUC USE ONLY

AUP #
New/renewal:
Date received:
Full Review and date: Designated Reviewer and date:
Approval date:
Study type:
Pain/Distress category:
Surgery: Survival: Multiple:
Prolonged restraint:
Food/fluid restriction:
Hazard approval/dates: Rad: IBC: EH&S:
OHP enrollment/mandatory animal training completed :
Amendments approved:

1.4. Co-Investigators if any:

N/A

1.5. List all personnel (PI, Co-I, technicians, students) that will be performing procedures on live animals and describe their qualifications and experience with these specific procedures. If people are to be trained, indicate by whom:

Name	Required ECU Training	Other Relevant Animal Experience/ Training
PI: Roger Rulifson	online training (2008, 2010)	Senior Scientist – Institute for Coastal and Marine Resources Professor – Department of Biology Director – Field Station for Coastal Studies at Mattamuskeet
Others:		
Andrea Dell'Apa	online training (2010) *Animal Handling Class (2010) *Surgery class (2010) ** will be completed upon arrival in the U.S.*	Ph.d student in the Coastal Resources Management Ph.d Program. Six years of fisheries and marine field experience, including 2 months as a field technician conducting acoustic telemetry tracking studies on Great White sharks off the coast of South Africa and 1 month of volunteer experience with the ECU spiny dogfish program (Sea Grant Fund #08-FEG-11). M.Sc. Marine Biology and Oceanography – Università Politecnica delle Marche (Ancona-Italy)
Jennifer Cudney	online training (2008, 2010) Animal Handling Class (2008) Surgery class (2008) Surgery refresher (2009)	Ph.d student in the Coastal Resources Management Ph.D program. Eight years of fisheries field experience, including 1 year as a research technician on a acoustic telemetry project (observed and assisted with acoustic transmitter surgeries, learned aseptic field surgery techniques) and 2 years of acoustic telemetry research on the spiny dogfish shark (Sea Grant Fund #08-FEG-11) M.Sc Biology – East Carolina University B.S. Biology – Ohio Northern University

2. Regulatory Compliance

2.1 Non-Technical Summary

Using language a non-scientist would understand, please provide a 6 to 8 sentence summary explaining the overall study objectives and benefits of proposed research or teaching activity, and a brief overview of all procedures involving live animals (more detailed procedures are requested later in the AUP). Do **not** cut and paste the grant abstract.

The management of spiny dogfish sharks is highly controversial, and based on the assumption of a single-unit stock from North Carolina to Maine. We argue that there could be two stocks of dogfish (one group migrates north and south along the mid-Atlantic coast while the other follows a gyre-like migration pattern in the Gulf of Maine), and that Cape Cod may be a natural delineation point between the two. The proposed research would compliment other tag studies completed at the periphery of the range (North Carolina and Canada) and either support or negate this hypothesis. 8,000 sharks will be externally tagged with a single barb dart "Floy tag" lodged into the dorsal musculature just below the dorsal fin. 120 sharks will be surgically implanted with acoustic transmitters to identify movement patterns of individual sharks using procedures developed for a previous acoustic telemetry study (Sea Grant Fund #08-FEG-11). Male and female sharks collected from two types of fishing gear (gillnet and longline) will be tagged over three seasons (Fall 2010, Spring 2011, and Summer 2011; 667 externally tagged and 40 surgically implanted per season) in coastal waters north and south of Cape Cod.

2.2. Duplication

Does this study duplicate existing research? Yes ☐ No ☒
If yes, why is it necessary? (note: teaching by definition is duplicative)

2.3 Alternatives to the Use of Live Animals

Are there less invasive procedures, other species, isolated organ preparation, cell or tissue culture, or computer simulation that can be used in place of the live vertebrate species proposed here? Yes ☐ No ☒
If yes, please explain why you cannot use these alternatives.

This research is based on the study of the migration and localized movement patterns of live sharks, therefore it is necessary to surgically implant tags and externally tag live sharks. The mixed research design, which incorporates less invasive (Floy tags) and more invasive (acoustic transmitters) methods, allows us to gain population level and individual level knowledge of movement and behavior without having to conduct the more intensive methods on a larger group of animals. Floy tags, which are slender spaghetti tags that are injected into the dorsal musculature, are less prone to entanglement than button tags. Artificial entanglement would bias research results, and would not allow the inclusion of this dataset into a 13-year mark recapture program that uses identical tags for comparison and analysis of long-term trends.

2.4 Literature Search to ensure that there are no alternatives to all potentially painful and/or distressful procedures

List the following information for each search (please do not submit search results but retain them for your records):

Date Search was performed: 7/27/2010-7/28/2010
Database searched: Aquatic Sciences and Fisheries Abstracts, Biological Abstracts, Google Scholar, American Fisheries Society online journal access
Period of years covered in the search: 1990 - 2010
Keywords used and strategy: spiny dogfish migration, spiny dogfish movement, shark behavior, shark behavior methods, fish behavior, fish behavior methods, shark transmitter surgeries, acoustic telemetry, acoustic telemetry surgeries, fish acoustic telemetry surgeries, spiny dogfish gillnet mortality, spiny dogfish longline mortality, spiny dogfish trawl mortality, spiny dogfish capture methods
Other sources consulted: Workshop held at ECU in summer 2007 with spiny dogfish and acoustic telemetry experts to discuss methodologies for a previous project that used these methods, "Sexual Segregation in Vertebrates", notes from a Fish Health symposium that a colleague attended at CMAST, NCSU, Morehead City from 10/8/08 to 10/10/08, Commercial Fisheries news, Amazon.com (to identify new books recently released on the subject), used ILL to request a book on the subject. Commercial Fisheries News (trade magazine, covered new research on spiny dogfish in a special focus issue), attended a symposium on surgical methods for acoustic telemetry at the 2009 American Fisheries Society meeting.

Surgical procedures are identical to those developed for Sea Grant Fund #08-FEG-11, a project conducted by the Rulifson lab during 2009-2010. Protocols for this grant are based on accepted protocols for Sea Grant Fund #08-FEG-11, and were developed by the same individual (J. Cudney). This project had 100% short term (12-24 hours) survival, and over half of the sharks were redetected on acoustic receivers up to 1.5 years after surgical procedures were completed in coastal North Carolina waters. Many of these detections occurred on receivers in coastal waters of Delaware, New York, Cape Cod, and North Carolina (1 year after surgery). This suggests that surgically implanted sharks are capable of normal migratory behaviors. There is no published literature that specifies surgical procedures for implanting tags into spiny dogfish, so initial methodologies were adapted from other species of sharks and fish. Alternatives to implanting acoustic transmitters (external tag attachment and gastric implantation) have a number of problems that render them unsuitable for a long term study; tag size, fouling of tags, drag effects, entanglement, fishery bias, and tag shedding.

Individual spiny dogfish are known to make wildly different movements (Commercial Fisheries News, May 2008 and September 2008). These sharks school by sex and relative maturity. We will surgically implant 40 sharks per season, using representatives from each type of school. We will use collection and surgical techniques that minimize stress because we need healthy individuals for the research project. This includes the use of short gillnet and longline soak times, careful disentanglement and hook removal, and the involvement of multiple persons in the surgery (to assist the surgeon with maintaining a sterile environment). Tonic immobility is an accepted method by itself to sedate sharks that are immediately returned to a food fishery (spiny dogfish populations are subjected to harvest throughout the year).

This type of research cannot be completed with non-animal models.

2.5 Hazardous agents

2.5a. Protocol related hazards

Please indicate if any of the following are used in animals and the status of review/approval by the referenced committees:

HAZARDS	Oversight committee	Status (Approved, Pending, Submitted)/Date	AUP Appendix 1 Completed?
Radioisotopes	Radiation		
Ionizing radiation	Radiation		
Infectious agents (bacteria, viruses, rickettsia, prions)	IBC		
Toxins of biological origins (venoms, plant toxins, etc.)	IBC		
Transgenic, Knock In, Knock Out Animals---breeding, cross breeding or any use of live animals or tissues	IBC		
Human tissues, cells, body fluids, cell lines	IBC		
Viral/ Plasmid Vectors/ Recombinant DNA or recombinant techniques	IBC		
Oncogenic/toxic/mutagenic chemical agents	EH&S		
Nanoparticles	EH&S		

Cell lines injected or implanted in animals (MAP test)	DCM		
Other agents			

2.5b. Incidental hazards

Will personnel be exposed to any incidental zoonotic diseases or hazards during the study (field studies, primate work, etc)? If so, please identify each and explain steps taken to mitigate risk:

Dr Rulifson and Jennifer have each had extensive boat safety and hazards training. Dr Rulifson co-taught a class on boating safety in conjunction with the NC Coast Guard Auxiliary for several years (which Jennifer has taken). Jennifer has had CPR / First Aid training and renewals since 2005. Dr Rulifson, Jennifer and Andrea are familiar with the hazards posed by wintertime field work on a boat, and have several years experience working in less than ideal conditions. Suitable personal equipment (life jackets, rain gear, float coats, insulated work boots, mustang survival suits) is available as necessary for protection against winter maritime hazards. The potential to encounter hazardous marine flora and fauna is mitigated through protective equipment (foul weather gear including rubber bib overalls and gloves); Dr Rulifson, Jennifer, and Andrea are trained in identifying hazardous marine flora and fauna. Spiny dogfish sharks do have venomous spines, but proper handling minimizes contact (and gloves are always worn to protect the skin). In addition, dogfish will be subjected to tonic immobility, which significantly reduces the panic response. Exposure to viral, bacterial or parasitic disease from contact with the sharks will be minimized through the use of protective gloves and by washing hands after contact.

<u>3. Animals and Housing</u>

3.1. Species and strains: *Squalus acanthias*

3.2. Weight, sex and/or age: Mature females (> 80 cm), immature females (<80 cm), mature males (>60 cm)

Total number of animals in treatment and control groups	Additional animals (Breeders, substitute animals)	Total number of animals used for this project
8,000 external tagging 120 internal tagging Total: 8,120 subjects	640 (gear mortality) 10 (surgical mortality) Total: 650 contingency	8,640 130 **Total: 8,770**

3.3. Justify the species and number (use statistical justification when applicable) of animals requested:

This species is the target species of interest, and cannot be replaced by another species. We anticipate externally tagging 8,000 fish over one year. Encounter rates for mark-recapture analysis are 1.1% for North Carolina sharks, but slightly higher for Canadian fisheries (1-4%). Since we anticipate dispersal of sharks to both regions we needed to tag enough sharks to provide a high enough return rate to predict movements (n = 80 to 340).

The total acoustic tag redetection rate for spiny dogfish released in North Carolina was 52% between 2009 and 2010. Most redetections were from North Carolina and Delaware Bay, and at present only 3 sharks tagged in North Carolina were detected in New England. Therefore, it is possible that sharks tagged in Cape Cod may behave differently than sharks tagged in North Carolina. Most literature for this type of research on sharks reports results for a small number of individuals (4 to 20) over the entire duration of the study. Since we expect sharks to disperse north and south of Cape Hatteras (without being sure how many would go either way), we opted to increase the number of sharks being tagged from our first study. Experts (NOAA-NMFS, DFO Canada) consulted for this project and previous research recommend deploying the maximum number of tags that the budget will allow for this type of research.

3.4. Justify the number and use of any additional animals needed for this study (i.e. breeder animals, inappropriate genotype/phenotype, extra animals due to problems that may arise, etc.):

Additional animals will only be used if a shark fails to recover from surgery within a half hour. Short-term (24-hr) mortality of gillnet-caught sharks was found to be 17% (Rulifson 2007). Mortality of longline caught fish ranges up to 22% (Tallak et al. 2007). These studies did not evaluate immediate mortality of sharks over variable time sets, and we anticipate deploying the gear for no more than 10 minutes (gillnets) to a half hour (longline) to minimize mortality. A ratio comparison (e.g., 17% in 24 hrs vs. x% in 1 hour) suggests an immediate 7% and 9% mortality for gillnets and longline, respectively. This equates to an allowance of up to 640 sharks over the course of the year's sampling efforts.

3.5. Will the phenotype of mutant, transgenic or knockout animals predispose them to any health behavioral, or physical abnormalities?

Yes ☐ No ☒ (if yes, describe)

3.6. Are there any unusual husbandry and environmental conditions required? Yes ☐ No ☒ If yes, then describe conditions and justify the exceptions to standard housing (temperature, light cycles, sterile cages, special feed, feed on cage floor, prolonged weaning times, wire-bottom cages, no enrichment, social isolation, etc.):

3.7. If wild animals will be captured or used, provide permissions (collection permit # or other required information):

Letter of authorization request sent to Ryan Silva (ryan.silva@noaa.gov) on 7/27/10 by R.A. Rulifson; NOAA's full support on the project is expected because this is a NOAA grant. Lab activities conducted in N.C. are supported under NC DMF permit # 706671 ("Scientific or educational collection permit"), which is renewed annually by the Department of Biology at ECU.

3.8. List all laboratories or locations outside the animal facility where animals will be used. Note that animals may not stay in areas outside the animal facilities for more than 12 hours without prior IACUC approval. For field studies, list location of work/study site.

Animals will be retained aboard commercial fishing vessels based out of Green Harbor and Scituate, Massachusetts, and Little Compton, Rhode Island, for approximately ½ hour in holding tanks. The study will be conducted north and south of Cape Cod, Massachusetts. Animals will be collected in shallow coastal environments (<150 ft) to minimize barotrauma, and returned within the same capture region. Surgical animals will be observed for 10 minutes to ½ hour after surgery until sustained normal swimming activity is noted for 5 or more minutes.

4. Animal Procedures

4.1. Will procedures other than euthanasia and tissue collection be performed? Yes ☒ No ☐
If animals will be used exclusively for tissue collection following euthanasia (answer "no" above), then skip to Question 5 (Euthanasia).

4.2. Outline the Experimental Design including all treatment and control groups and the number of animals in each. If this is a breeding protocol, please describe the breeding strategy (pairs, trios, etc.) and method and

age of genotyping (if applicable). Tables or flow charts are particularly useful to communicate your design.

Two separate design strategies were developed for external and internal tagging procedures. Please refer to Table 1 and Figure 1 for the external mark-recapture tagging program and the acoustic tagging program designs, respectively.

External tagging (Table 1): Approximately 667 sharks will be collected using each type of gear within each season of interest for a total of 8,000 sharks.

Internal tagging (Figure 1): We will surgically implant 120 sharks with acoustic tags over the duration of the study.

Table 1. Study design indicating the number of tagged spiny dogfish to be released north of Cape Cod, and south of Cape Cod, in 2011 using two capture gear.

Gear	North			South			Total
type	Spring	Summer	Fall	Spring	Summer	Fall	By gear
Longline	667	667	666	667	667	666	4,000
Gillnet	667	667	666	667	667	666	4,000

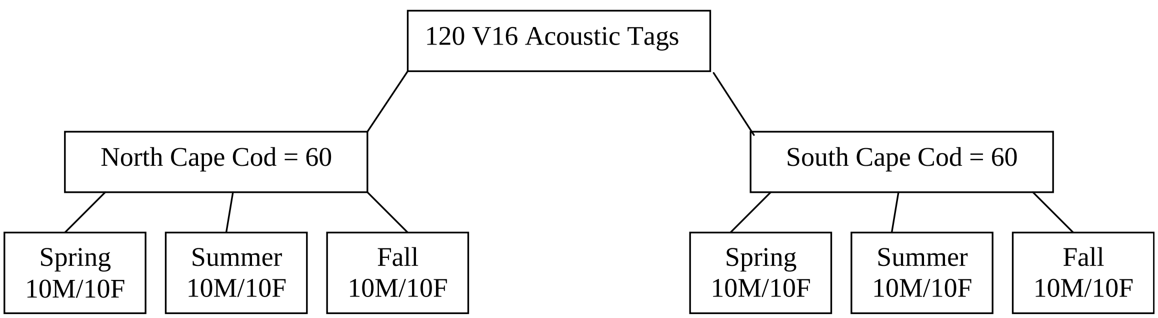

Figure 1. Proposed acoustic tag deployment scheme off the coast of Massachusetts.

In sections 4.3-4.19 below, please respond to all items relating to your proposed animal procedures. If a section does not apply to your experimental plans, please leave it blank.

Note: Procedures covered by DCM and IACUC guidelines and policies are indicated by asterisk (*). Please refer to these and justify any departures.

4.3. <u>Anesthesia/Analgesia/Tranquilization/Pain/Distress Management (for procedures other than surgery)</u>

Adequate records describing anesthetic monitoring and recovery must be maintained for all species.

If anesthesia/analgesia must be withheld for scientific reasons, please provide compelling scientific justification as to why this is necessary.

Describe the pre-procedural preparation of the animals:

1a. Food restricted for ______ hours

1b. Food restriction is not recommended for rodents and rabbits and must be justified:

2a. Water restricted for ______ hours

2b. Water restriction is not recommended in any species for routine pre-op prep and must be justified:

	Agent	Concentration	Dose (mg/kg)	Volume	Route	Frequency	Duration
Pre-emptive analgesic							
Pre-anesthetic							
Anesthetic							
Analgesic Post procedure							
Other							

a. Reason for administering agent(s):

b. For which procedure(s):

c. Method of monitoring anesthetic depth:

d. Methods of physiologic support during anesthesia and recovery:

e. Duration of recovery:

f. Frequency of recovery monitoring:

g. Specifically what will be monitored?

h. When will animals be returned to their home environment?

i. Describe any behavioral or husbandry manipulations that will be used to alleviate pain, distress, and/or discomfort:

4.4 Use of Paralytics

Will paralyzing drugs be used?

For what purpose:

Please provide scientific justification for paralytic use:

Paralytic drug:

Dose:

Method of ensuring appropriate analgesia during paralysis:

4.5. Blood or Body Fluid Withdrawal/Tissue Collection/Injections/Tail Snip*/Gavage

Please fill out appropriate sections of the chart below:

	Location on animal	Needle/ catheter/ gavage tube size	Route of administration	Biopsy size	Volume collected	Compound and volume administered (include concentration and/or dose)	Frequency of procedure
Body Fluid Withdrawal			N/A	N/A		N/A	
Tissue Collection		N/A	N/A		N/A	N/A	
Injection/Infusion				N/A	N/A		

Tail snip*		N/A	N/A		N/A	N/A	
Gavage				N/A	N/A		
Other							

<u>4.6. Prolonged restraint with mechanical devices</u>

*Restraint in this context means **beyond routine care and use procedures** for rodent and rabbit restrainers, and large animal stocks. Prolonged restraint also includes **any** use of slings, tethers, metabolic crates, inhalation chambers, primate chairs and radiation exposure restraint devices.*

a. For what procedure(s):

b. Restraint device(s):

c. Duration of restraint:

d. Frequency of observations during restraint/person responsible

e. Frequency and total number of restraints:

f. Conditioning procedures:

g. Steps to assure comfort and well-being:

h. Describe potential adverse effects of procedures and provide humane endpoints (criteria for either humanely euthanizing or otherwise removing from study):

4.7 Tumor* and Disease Models/Toxicity Testing

a. Describe methodology:

b. Expected model and/or clinical/pathological manifestations:

c. Signs of pain/discomfort:

d. Frequency of observations:

e. Describe potential adverse effects of procedures and provide humane endpoints (criteria for either humanely euthanizing or otherwise removing from study):

4.8 Treadmills/Swimming/Forced Exercise

a. Describe aversive stimulus (if used):

b. Conditioning:

c. Safeguards to protect animal:

d. Duration:

e. Frequency:

f. Total number of sessions:

g. Describe potential adverse effects of procedures and provide humane endpoints (criteria for either humanely euthanizing or otherwise removing from study):

4.9 Projects Involving Food and Water Deprivation or Dietary Manipulation
(Routine pre-surgical fasting not relevant for this section)

a. Food Restriction
   i. Amount restricted and rationale:

   ii. Duration (hours for short term/weeks or months for long term):

   iii. Frequency of observation/parameters documented (weight, etc):

iv. Describe potential adverse effects of procedures and provide humane endpoints (criteria for either humanely euthanizing or otherwise removing from study):

b. Fluid Restriction

i. Amount restricted and rationale:

ii. Duration (hours for short term/weeks or months for long term):

iii. Frequency of observation/parameters documented:

iv. Describe potential adverse effects of procedures and provide humane endpoints (criteria for either humanely euthanizing or otherwise removing from study):

c. Dietary Manipulations

i. Compound supplemented/deleted and amount:

ii. Duration (hours for short term/weeks or months for long term):

iii. Frequency of observation/parameters documented:

iv. Describe potential adverse effects of procedures and provide humane endpoints (criteria for either humanely euthanizing or otherwise removing from study):

4.10 Endoscopy/Fluroscopy/X-Ray/Ultrasound/MRI/CT/PET/Other Imaging

a. Describe animal methodology:

b. Duration of procedure:

c. Frequency of observations during procedure:

d. Frequency/total number of procedures:

e. Method of transport to/from procedure area:

e. Please provide or attach appropriate permissions/procedures for animal use on human equipment:

4.11 Polyclonal Antibody Production*

a. Antigen/adjuvant used:

b. Needle size:

c. Route of injection:

d. Site of injection:

e. Volume of injection:

f. Total number of injection sites:

g. Frequency and total number of boosts:

h. What will be done to minimize pain/distress:

i. Describe potential adverse effects of procedures and provide humane endpoints (criteria for either humanely euthanizing or otherwise removing from study):

4.12 Monoclonal Antibody Production

a. Describe methodology:

b. Is pristane used: [ ] Yes [ ] No

- Volume of pristane:

c. Will ascites be generated: [ ] Yes [ ] No

d. Criteria/signs that will dictate ascites harvest:

e. Size of needle for taps:

f. Total number of taps:

g. How will animals be monitored/cared for following taps:

h. What will be done to minimize pain/distress:

j. Describe potential adverse effects of procedures and provide humane endpoints (criteria for either humanely euthanizing or otherwise removing from study):

4.13 Temperature/Light/Environmental Manipulations

a. Describe manipulation(s):

b. Duration:

c. Intensity:

d. Frequency:

e. Frequency of observations/parameters documented:

f. Describe potential adverse effects of procedures and provide humane endpoints (criteria for either humanely euthanizing or otherwise removing from study):

4.14 Behavioral Studies

a. Describe methodology/test(s) used:

b. If aversive stimulus used, frequency, intensity and duration:

c. Frequency of tests:

d. Length of time in test apparatus/test situation:

e. Frequency of observation/monitoring during test:

f. Describe potential adverse effects of procedures and provide humane endpoints (criteria for either humanely euthanizing or otherwise removing from study):

4.15 Capture with Mechanical Devices/Traps/Nets

a. Description of capture device/method:

External tagging (Table 1): Bundles of longline hooks and gillnets will be deployed in a manner consistent with a “normal” commercial fishing day. Dogfish will be collected in shallow water (preferentially < 50 ft, but up to 150 ft deep), close to the shoreline, to minimize barotrauma.

Gillnet specifications may vary slightly by boat, but will consist of 50 yards of 6 ½ -inch stretch mesh and 50 yards of 7-inch stretch mesh. Gillnets will be deployed for a period of ten minutes to minimize stress and trauma on captured sharks.

The first set will be just after dawn, and we will continue with sets throughout the day until reaching the target of 667 fish.

Longline gear consists of 300 hooks bundled together that will also be deployed just after dawn with a goal of five sets per trip. A preliminary tag study was conducted in October 2009 to determine tag recovery rates and the number of tags that could be deployed in a 12-hour work day off a longline vessel (n ≈ 900, 5 longline deployments, 6:00am to 6:00pm). Retrieval will commence after a soak time of ½ hour. Sharks with shallow hook wounds will be preferentially used in the tagging program. Animals with extremely deep hooking wounds will be anesthetized and euthanized.

Internal tagging (Figure 1): Sharks collected for internal implantation of acoustic transmitters will be collected using the gillnet methodologies described above.

b. Maximum time animal will be in capture device:

10 minutes – 1 hour in gillnet and longline gear, depending on gear saturation.

c. Frequency of checking capture device:

Longline gear will be retrieved after ½ hour. Gillnets will be retrieved after 10 minutes.

d. Methods to ensure well-being of animals in capture device:

Short soak times, gentle removal from gear (commercial fishermen will be instructed to not rip sharks out of or off gear). Also, retrievals will be slow because we will be processing animals straight from the net, which will allow acclimation to depth.

e. Methods to avoid non-target species capture:

Short soak times and immediate removal from gear if a non-target animal is captured. Also, fishermen will use local ecological knowledge (info from other fishermen, radar signatures, other knowledge) to identify locations with a high probability of capturing lots of dogfish. Finally, we will test each location prior to deployment by angling to determine dogfish presence.

f. Method of transport to laboratory/field station/processing site and duration of transport:

Sharks will be tagged and released at the same location. Sharks will be placed in holding tanks with circulating sea water onboard the vessels to minimize stress.

g. Methods to ensure animal well-being during transport:

Sharks will be held in circulating sea water tanks to ensure well being. During surgery, sharks will have seawater flushed over the gills.

h. Expected mortality rates:

We do not expect any short-term mortality of sharks given short soak time, gentle handling, and rapid return to the ocean.

i. Describe potential adverse effects of procedures and provide humane endpoints (criteria for either humanely euthanizing or otherwise removing from study):

Surgically implanted animals that do not display normal swimming activity after ½ hour will be anesthetized, euthanized, and held on ice until they may be properly disposed (either brought back to ECU or taken to a local lab with appropriate biohazard disposal facilities). Sharks will be anesthetized with 100 mg/L MS-222 and then euthanized by severing the spinal cord.

4.16
Manipulation of Wild-Caught Animals in the Field or Laboratory

a. Parameters to be measured/collected:

All animals captured in the gear will be measured, sexed, and observed for general condition, previous tagging efforts, and extreme short-term mortality.

Animals selected to receive external tags will be measured, sexed, tagged with an external tag (tag reward, tag number recorded), and released immediately.

Animals selected for acoustic transmitter implantation will be anesthetized using tonic immobility, measured, sexed, subjected to surgical procedures, and observed for 10 minutes.

b. Approximate time required for data collection per animal:

It takes approximately 2 minutes to obtain total length and sex of the animal. External tagging takes 2 minutes. Surgeries take approximately 5-15 minutes.

c. Method of restraint for data collection:

The animal will be held rightside-up as it is measured and sexed, and tagged with an external Floy Tag. Typically sharks are restrained with one hand just behind the head and the other holding the caudal peduncle.

A surgical table with foam padding will be used to cushion the sharks and minimize patient movement (or movements induced by the pitch and roll of the ship). An assistant will help the surgeon to hold the upsidown animal in place.

d. Methods to ensure animal well-being during processing:

Sharks will be kept in live well tanks until processing and have water flushed over the gills during surgery.

e. Disposition of animals post-processing:

Sharks will be allowed to recover in live well tanks and gently returned to the water.

f. Describe potential adverse effects of procedures and provide humane endpoints (criteria for either humanely euthanizing or otherwise removing from study):

If the animal does not recover from surgery within a half hour (upright movement and swimming on own), it will be euthanized by anesthetizing with MS-222 and severing the spinal cord.

4.17 Wildlife Telemetry/Other Marking Methods

a. Describe methodology (including description of device):

Most of the sharks will be externally tagged with a “Floy Tag”, a thin, spaghetti-type tag that has a steel core and a barb on one end designed to catch within the muscle tissue of the shark. The tag is inserted into the musculature using a canula, which is essentially a sharpened, large gauge needle into which the tag is placed. This type of procedure is very, very common in the fisheries literature. After being pushed into the muscle tissue, the canula is gently slid out, the barb on the tag lodges into the muscle, and the tag is left behind. Sharks with external tags will be released and allowed to resume normal behavior. Data will be collected after these animals have been recaptured by a commercial fisherman. Parameters of interest include the location of capture, size and sex of the animal, date and time of capture, sea conditions, and gear specifications.

Sharks that are surgically implanted with tags will be returned to the water after a successful recovery period and will resume normal movement behaviors. External anthropogenic influences on movement are minimal, permitting natural behavior of study subjects to commence. Compatible receivers will be deployed by research partners off the U.S. east coast, and we will receive acoustic detection data from these individuals as sharks swim within range of the gear. We will also deploy a set of receivers in North Carolina to listen for sharks tagged in this study and from the previous research program.

b. Will telemetry device /tags/etc be removed? If so, describe:

Tags will not be removed unless the animal does not survive surgery. If this is the case, the tag will be reinitialized, sterilized, and used in another surgery.

c. Describe potential adverse effects of procedures and provide humane endpoints (criteria for either humanely euthanizing or otherwise removing from study):

We are actively advertising this study via a website, updates in trade magazines, and by contacting agencies and departments that may encounter our tagged sharks. Sharks are easily identifiable as a study animal due to the bright tag by the dorsal fin, and the surgical scars on the abdomen. We expect both recreational and commercial fishermen to encounter our animals. We ask that sharks bearing our tags be treated humanely and returned to the water to allow the study to continue if captured by recreational fishermen; because removal of the tag would stress the animal if it were to be returned, we ask folks to write down the tag number of the animal. Sharks that are being captured for the commercial fishery will be retained for profit if the animal is of an appropriate size; therefore we ask commercial fishermen to cut the tag off the animal prior to field processing or wait until after the animal is dead to remove tags.

4.18 Other Animal Manipulations

a. Describe methodology:

b. Describe methods to ensure animal comfort and well-being:

c. Describe potential adverse effects of procedures and provide humane endpoints (criteria for either humanely euthanizing or otherwise removing from study):

4.19 Surgical Procedures

All survival surgical procedures must be done aseptically, regardless of species or location of surgery. Adequate records describing surgical procedures, anesthetic monitoring and postoperative care must be maintained for all species.

A. Location of Surgery (Room #):

Onboard commercial fishing vessels owned

B. Type of Surgery:

[ ] Nonsurvival surgery (animals euthanized without regaining consciousness)
[x] Major survival surgery (major surgery penetrates and exposes a body cavity or produces substantial impairment of physical or physiologic function)
[ ] Minor survival surgery

[ ] Multiple survival surgery*
If yes, provide scientific justification for multiple survival surgical procedures:

C. Describe the pre-op preparation of the animals:

1a. Food restricted for [ ] hours

1b. Food restriction is not recommended for rodents and rabbits and must be justified:

2a. Water restricted for [ ] hours

2b. Water restriction is not recommended in any species for routine pre-op prep and must be justified:

D. Minimal sterile techniques will include (check all that apply):
Please refer to DCM Guidelines for Aseptic Surgery for specific information on what is required for each species and type of surgery (survival vs. non-survival).

[x] Sterile instruments

- How will instruments be sterilized:

Instruments will be autoclaved by surgery staff and stored in sterile packaging.

- If serial surgeries are done, how will instruments be sterilized between surgeries:

Instruments will be placed in Nolvasan disinfectant, a sterile wash, and then placed in a glass bead sterilizer. We will have five surgical "packs", each with an appropriate set of surgical instruments that will be sterilized between each surgery. One surgical assistant will be responsible for continuously sterilizing instruments via cold sterilization while the other provides assistance directly to the surgeon. Each surgical pack will be used 2 times a day (x 4 days) for a total of 8 times per trip.

[x] Sterile gloves
[ ] Cap and mask
[ ] Sterile gown
[ ] Sanitized operating area
[ ] Clipping or plucking of hair or feathers
[x] Skin preparation with a sterilant such as betadine
[x] Practices to maintain sterility of instruments during surgery
[ ] Non-survival (clean gloves, clean instruments, etc.)

E. Describe all surgical procedures:

1. Skin incision size and site on the animal:

Incision will be approximately 2-3 cm long, and be located on the abdomen 2/3 of the way between the pectoral and pelvic fin. The incision will be made on the midline of the shark where the muscle layers are thinnest.

2. Describe surgery in detail (include size of implant if applicable):

The sharks will be placed into live well tanks that will have fresh seawater pumped in. Surgeries will commence after tonic immobility is reached (the shark has stopped reacting to stimuli and shows minimal outward signs of stress). Sharks will be placed onto foam padding on the surgery table. Sea water will be washed over the gills to ensure continued anesthesia. The incision site will be swabbed with a QTip soaked in Nolvasan disinfectant. A lidocaine block will be injected into the upper dermal layers of skin around the incision site. A small incision will be made in the abdomen at roughly 2/3 of the distance between the pectoral fins and the cloaca, on the midline of the shark. A sterilized (ethelyne oxide gas) transmitter will be inserted into the abdomen and gently pushed anterior to the incision. The incision will be closed using either a simple continuous or simple interrupted surgical suture pattern (Carlisle 2006; Harms 2005; Mulcahy 2003). The shark will be placed into a recovery tank (live well with circulating sea water) and observed for up to ½ hour prior to release.

3. Method of wound closure:

a. Number of layers

1

b. Type of wound closure and suture pattern:

Simple continuous or simple interrupted suture pattern

c. Suture type/size / wound clips/tissue glue:

3-0 absorbable monofilament suture

d. Plan for removal of skin sutures/wound clips/etc:

We will not remove the sutures, as the sharks will likely not be recaptured after surgery.

F. Anesthetic Protocol:

If anesthesia/analgesia must be withheld for scientific reasons, please provide compelling scientific justification as to why this is necessary.

MS222 provides some residual analgesia, and lidocaine provides longer residual analgesia. Butorphanol has not been demonstrated to be effective in sharks, and may impair the animals' ability to avoid predation. The sharks will not be held for three weeks (the recommended withholding period for MS-222 drugged foodfish).

	Agent	Concentration	Dose (mg/kg)	Volume	Route	Frequency	Duration
Pre-emptive analgesic							
Pre-anesthetic							
Anesthetic	lidocaine	2% lidocaine			Injection; line block	Once	2-4 hrs
Analgesic Post Op							
Other							

1. Criteria to monitor anesthetic depth, including paralyzing drugs:

Sharks will be gently held upsidown on a surgical table (with fresh circulating seawater flushed over the gills). Surgery will not commence until after the shark ceases to move.

2. Methods of physiologic support during anesthesia and immediate post-op period:

Flushing of fresh seawater across gills, tonic immersion, recovery in fresh seawater.

3. Duration of recovery from anesthesia (immediate post-op period):

10 - 30 min

4. Frequency/parameters monitored during immediate post-op period:

We will ensure that gill activity continues throughout surgery.

5. Describe any behavioral or husbandry manipulations that will be used to alleviate pain, distress, and/or discomfort during the immediate post-op period:

After observed swimming normally in recovery tanks for a period of 10 minutes or longer.

6. List criteria used to determine when animals are adequately recovered and when the animals can be returned to their home environment:

Animals will be returned to their home environment as soon as possible. If held, they will be in tanks that have solid opaque walls to avoid stress.

G. Recovery from Surgical Manipulations (after animal regains consciousness and is returned to its home environment)

1. What parameters will be monitored:

Transmitter pings (impulses)

2. How frequently will animals be monitored:

Sharks will be checked for proper transmitter functioning while in the recovery tank. We have moored receivers that will seasonally track the sharks while in NC waters. Other moored receivers are located along the coast and will also track the sharks as they migrate between New England and North Carolina.

3. How long post-operatively will animals be monitored:

Up to 3 years

H. Surgical Manipulations affecting animals

1. Describe any signs of pain/ discomfort/ functional deficits resulting from the surgical procedure:

Thrashing during surgery

2. What will be done to manage any signs of pain or discomfort/ (include pharmacologic and non-pharmacologic interventions):

Operations will cease until movement ceases (with the wound held shut by the surgeon), the animal will be gently braced, and additional water will be flushed over the gills.

3. Describe potential adverse effects of procedures and provide humane endpoints (criteria for either humanely euthanizing or otherwise removing from study):

Buoyancy/orientation issues may occur because the open air surgery allows air into the body cavity. Therefore, sharks will be allowed a half hour recovery time with assisted swimming (gently grasping the caudal peduncle and moving the animal back and forth in the water) as necessary. If the animal dies or shows an inability to recover from surgery within a half hour, it will be humanely euthanized.

5. Euthanasia

**Please refer to the 2007 AVMA Guidelines on Euthanasia and DCM Guidelines to determine appropriate euthanasia methods.*

5.1 Euthanasia Procedure. If a physical method is used, the animal should be first sedated/anesthetized with CO_2 or other anesthetic agent. If prior sedation is not possible, a **scientific justification** must be provided. All investigators, even those doing survival or field studies, must complete this section in case euthanasia is required for humane reasons.

Sharks will be dosed with MS-222 (100mg/L) and then the spinal cord will be severed.

5.2. Method of ensuring death (can be a physical method, such as pneumothorax or decapitation for small species and assessment method such as auscultation for large animals):

Freezer flowing euthanasia will be used as a means to confirm death.

5.3. For field studies, describe disposition of carcass following euthanasia (If carcass will be kept for genetic/morphological/phylogenetic analysis, please include preservation, transportation, and storage technique):

Carcasses will be returned to the university or an appropriate lab facility for

examination, dissection, and disposal. They will be transported on ice in coolers until reaching a facility that is capable of disposing the remains. Carcasses will be placed in red biohazard bags and frozen until pick-up. Contents of biohazard bags are incinerated.

I acknowledge that humane care and use of animals in research, teaching and testing is of paramount importance, and agree to conduct animal studies with professionalism, using ethical principles of sound animal stewardship. I further acknowledge that I will perform only those procedures that are described in this AUP and that my use of animals must conform to the standards described in the Animal Welfare Act, the Public Health Service Policy, The Guide For the Care and Use of Laboratory Animals, the Association for the Assessment and Accreditation of Laboratory Animal Care, and East Carolina University.

Please submit the completed animal use protocol form via e-mail attachment to iacuc@ecu.edu. You must also carbon copy your Department Chair.

PI Signature: ______________________________ Date:____________

Veterinarian:______________________________ Date:____________

IACUC Chair: ______________________________Date:_____________

*updates sent by email from Andrea Dell'Apa (dellapaa10@students.ecu.edu) or Jennifer Cudney (cudneyj01@students.ecu.edu) constitute approval of the protocol by Roger A. Rulifson.

Appendix B: Summary set and environmental water information for spiny dogfish caught and released, from October 7, 2010, to August 17, 2011, off Massachusetts and Rhode Island: date (month/day/year), gear (LN = longline, GN = gillnet), gear depth (Gear Dp, m), water temperature at gear depth (Gear T, °C), deployment time (Time set), retrieval time (Time pulled), latitude, longitude, bottom depth (Dp, m), surface water temperature (SST, °C), surface water salinity (SSS), external tag ID number (Tag #), shark total length (TL, mm), and sex (M = male, F = female). (NA = data not available).

Date	Gear	Gear Dp (m)	Gear T (°C)	Time set	Time pulled	Latitude	Longitude	Dp (m)	SST (°C)	SSS	Tag #	TL (mm)	Sex
10/7/10	LN	NA	NA	804	858	4203.304	7031.873	37.4	NA	NA	40001	813	F
10/7/10	LN	NA	NA	804	858	4203.304	7031.873	37.4	NA	NA	40002	790	F
10/7/10	LN	NA	NA	804	858	4203.304	7031.873	37.4	NA	NA	40003	863	F
10/7/10	LN	NA	NA	804	858	4203.304	7031.873	37.4	NA	NA	40004	853	F
10/7/10	LN	NA	NA	804	858	4203.304	7031.873	37.4	NA	NA	40005	845	F
10/7/10	LN	NA	NA	804	858	4203.304	7031.873	37.4	NA	NA	40006	896	F
10/7/10	LN	NA	NA	804	858	4203.304	7031.873	37.4	NA	NA	40007	825	F
10/7/10	LN	NA	NA	804	858	4203.304	7031.873	37.4	NA	NA	40008	865	F
10/7/10	LN	NA	NA	804	858	4203.304	7031.873	37.4	NA	NA	40009	690	F
10/7/10	LN	NA	NA	804	858	4203.304	7031.873	37.4	NA	NA	40010	855	F
10/7/10	LN	NA	NA	804	858	4203.304	7031.873	37.4	NA	NA	47201	828	F
10/7/10	LN	NA	NA	804	858	4203.304	7031.873	37.4	NA	NA	40011	878	F
10/7/10	LN	NA	NA	804	858	4203.304	7031.873	37.4	NA	NA	40012	935	F
10/7/10	LN	NA	NA	804	858	4203.304	7031.873	37.4	NA	NA	40013	870	F
10/7/10	LN	NA	NA	804	858	4203.304	7031.873	37.4	NA	NA	40014	860	F
10/7/10	LN	NA	NA	804	858	4203.304	7031.873	37.4	NA	NA	40015	855	F
10/7/10	LN	NA	NA	804	858	4203.304	7031.873	37.4	NA	NA	40016	895	F
10/7/10	LN	NA	NA	804	858	4203.304	7031.873	37.4	NA	NA	40017	882	F
10/7/10	LN	NA	NA	804	858	4203.304	7031.873	37.4	NA	NA	40018	880	F
10/7/10	LN	NA	NA	804	858	4203.304	7031.873	37.4	NA	NA	40019	831	F
10/7/10	LN	NA	NA	804	858	4203.304	7031.873	37.4	NA	NA	40020	866	F
10/7/10	LN	NA	NA	804	858	4203.304	7031.873	37.4	NA	NA	47202	911	F
10/7/10	LN	NA	NA	804	858	4203.304	7031.873	37.4	NA	NA	40021	881	F
10/7/10	LN	NA	NA	804	858	4203.304	7031.873	37.4	NA	NA	40022	805	F
10/7/10	LN	NA	NA	804	858	4203.304	7031.873	37.4	NA	NA	40023	792	F
10/7/10	LN	NA	NA	804	858	4203.304	7031.873	37.4	NA	NA	40024	870	F
10/7/10	LN	NA	NA	804	858	4203.304	7031.873	37.4	NA	NA	40025	861	F
10/7/10	LN	NA	NA	804	858	4203.304	7031.873	37.4	NA	NA	40026	861	F
10/7/10	LN	NA	NA	804	858	4203.304	7031.873	37.4	NA	NA	40027	909	F
10/7/10	LN	NA	NA	804	858	4203.304	7031.873	37.4	NA	NA	40028	878	F
10/7/10	LN	NA	NA	804	858	4203.304	7031.873	37.4	NA	NA	40029	771	F
10/7/10	LN	NA	NA	804	858	4203.304	7031.873	37.4	NA	NA	40030	849	F
10/7/10	LN	NA	NA	804	858	4203.304	7031.873	37.4	NA	NA	47203	888	F
10/7/10	LN	NA	NA	804	858	4203.304	7031.873	37.4	NA	NA	40031	790	F

Appendix B (continued)

Date	Gear	Gear Dp (m)	Gear T (°C)	Time set	Time pulled	Latitude	Longitude	Dp (m)	SST (°C)	SSS	Tag #	TL (mm)	Sex
10/7/10	LN	NA	NA	804	858	4203.304	7031.873	37.4	NA	NA	40032	860	F
10/7/10	LN	NA	NA	804	858	4203.304	7031.873	37.4	NA	NA	40033	869	F
10/7/10	LN	NA	NA	804	858	4203.304	7031.873	37.4	NA	NA	40034	920	F
10/7/10	LN	NA	NA	804	858	4203.304	7031.873	37.4	NA	NA	40035	781	F
10/7/10	LN	NA	NA	804	858	4203.304	7031.873	37.4	NA	NA	40036	845	F
10/7/10	LN	NA	NA	804	858	4203.304	7031.873	37.4	NA	NA	40037	879	F
10/7/10	LN	NA	NA	804	858	4203.304	7031.873	37.4	NA	NA	40038	844	F
10/7/10	LN	NA	NA	804	858	4203.304	7031.873	37.4	NA	NA	40039	803	F
10/7/10	LN	NA	NA	804	858	4203.304	7031.873	37.4	NA	NA	40040	878	F
10/7/10	LN	NA	NA	804	858	4203.304	7031.873	37.4	NA	NA	47204	873	F
10/7/10	LN	NA	NA	804	858	4203.304	7031.873	37.4	NA	NA	40041	800	F
10/7/10	LN	NA	NA	804	858	4203.304	7031.873	37.4	NA	NA	40042	858	F
10/7/10	LN	NA	NA	804	858	4203.304	7031.873	37.4	NA	NA	40043	805	F
10/7/10	LN	NA	NA	804	858	4203.304	7031.873	37.4	NA	NA	40044	849	F
10/7/10	LN	NA	NA	804	858	4203.304	7031.873	37.4	NA	NA	40045	864	F
10/7/10	LN	NA	NA	804	858	4203.304	7031.873	37.4	NA	NA	40046	831	F
10/7/10	LN	NA	NA	804	858	4203.304	7031.873	37.4	NA	NA	40047	905	F
10/7/10	LN	NA	NA	804	858	4203.304	7031.873	37.4	NA	NA	40048	796	F
10/7/10	LN	NA	NA	804	858	4203.304	7031.873	37.4	NA	NA	40049	880	F
10/7/10	LN	NA	NA	804	858	4203.304	7031.873	37.4	NA	NA	40050	849	F
10/7/10	LN	NA	NA	804	858	4203.304	7031.873	37.4	NA	NA	47205	901	F
10/7/10	LN	NA	NA	804	858	4203.304	7031.873	37.4	NA	NA	40051	890	F
10/7/10	LN	NA	NA	804	858	4203.304	7031.873	37.4	NA	NA	40052	843	F
10/7/10	LN	NA	NA	804	858	4203.304	7031.873	37.4	NA	NA	40053	844	F
10/7/10	LN	NA	NA	804	858	4203.304	7031.873	37.4	NA	NA	40054	860	F
10/7/10	LN	NA	NA	804	858	4203.304	7031.873	37.4	NA	NA	40055	842	F
10/7/10	LN	NA	NA	804	858	4203.304	7031.873	37.4	NA	NA	40056	913	F
10/7/10	LN	NA	NA	804	858	4203.304	7031.873	37.4	NA	NA	40057	869	F
10/7/10	LN	NA	NA	804	858	4203.304	7031.873	37.4	NA	NA	40058	831	F
10/7/10	LN	NA	NA	804	858	4203.304	7031.873	37.4	NA	NA	40059	886	F
10/7/10	LN	NA	NA	804	858	4203.304	7031.873	37.4	NA	NA	40060	809	F
10/7/10	LN	NA	NA	804	858	4203.304	7031.873	37.4	NA	NA	47206	838	F
10/7/10	LN	NA	NA	804	858	4203.304	7031.873	37.4	NA	NA	40061	846	F
10/7/10	LN	NA	NA	804	858	4203.304	7031.873	37.4	NA	NA	40062	831	F
10/7/10	LN	NA	NA	804	858	4203.304	7031.873	37.4	NA	NA	40063	851	F
10/7/10	LN	NA	NA	804	858	4203.304	7031.873	37.4	NA	NA	40064	752	F
10/7/10	LN	NA	NA	804	858	4203.304	7031.873	37.4	NA	NA	40065	883	F
10/7/10	LN	NA	NA	804	858	4203.304	7031.873	37.4	NA	NA	40066	880	F
10/7/10	LN	NA	NA	804	858	4203.304	7031.873	37.4	NA	NA	40067	871	F
10/7/10	LN	NA	NA	804	858	4203.304	7031.873	37.4	NA	NA	40068	708	F
10/7/10	LN	NA	NA	804	858	4203.304	7031.873	37.4	NA	NA	40069	805	F

Appendix B (continued)

Date	Gear	Gear Dp (m)	Gear T (°C)	Time set	Time pulled	Latitude	Longitude	Dp (m)	SST (°C)	SSS	Tag #	TL (mm)	Sex
10/7/10	LN	NA	NA	804	858	4203.304	7031.873	37.4	NA	NA	40070	822	F
10/7/10	LN	NA	NA	804	858	4203.304	7031.873	37.4	NA	NA	47207	900	F
10/7/10	LN	NA	NA	804	858	4203.304	7031.873	37.4	NA	NA	40073	852	F
10/7/10	LN	NA	NA	804	858	4203.304	7031.873	37.4	NA	NA	40072	846	F
10/7/10	LN	NA	NA	804	858	4203.304	7031.873	37.4	NA	NA	40071	713	F
10/7/10	LN	NA	NA	804	858	4203.304	7031.873	37.4	NA	NA	40074	918	F
10/7/10	LN	NA	NA	804	858	4203.304	7031.873	37.4	NA	NA	40075	843	F
10/7/10	LN	NA	NA	804	858	4203.304	7031.873	37.4	NA	NA	40076	822	F
10/7/10	LN	NA	NA	804	858	4203.304	7031.873	37.4	NA	NA	40077	840	F
10/7/10	LN	NA	NA	804	858	4203.304	7031.873	37.4	NA	NA	40078	898	F
10/7/10	LN	NA	NA	804	858	4203.304	7031.873	37.4	NA	NA	40079	831	F
10/7/10	LN	NA	NA	804	858	4203.304	7031.873	37.4	NA	NA	40080	929	F
10/7/10	LN	NA	NA	804	858	4203.304	7031.873	37.4	NA	NA	47208	791	F
10/7/10	LN	NA	NA	804	858	4203.304	7031.873	37.4	NA	NA	40081	908	F
10/7/10	LN	NA	NA	804	858	4203.304	7031.873	37.4	NA	NA	40082	802	F
10/7/10	LN	NA	NA	804	858	4203.304	7031.873	37.4	NA	NA	40083	864	F
10/7/10	LN	NA	NA	804	858	4203.304	7031.873	37.4	NA	NA	40084	838	F
10/7/10	LN	NA	NA	804	858	4203.304	7031.873	37.4	NA	NA	40085	836	F
10/7/10	LN	NA	NA	804	858	4203.304	7031.873	37.4	NA	NA	40086	854	F
10/7/10	LN	NA	NA	804	858	4203.304	7031.873	37.4	NA	NA	40087	885	F
10/7/10	LN	NA	NA	804	858	4203.304	7031.873	37.4	NA	NA	40088	856	F
10/7/10	LN	NA	NA	804	858	4203.304	7031.873	37.4	NA	NA	40089	851	F
10/7/10	LN	NA	NA	804	858	4203.304	7031.873	37.4	NA	NA	40090	915	F
10/7/10	LN	NA	NA	804	858	4203.304	7031.873	37.4	NA	NA	47209	840	F
10/7/10	LN	NA	NA	804	858	4203.304	7031.873	37.4	NA	NA	40091	789	F
10/7/10	LN	NA	NA	804	858	4203.304	7031.873	37.4	NA	NA	40092	909	F
10/7/10	LN	NA	NA	804	858	4203.304	7031.873	37.4	NA	NA	40093	893	F
10/7/10	LN	NA	NA	804	858	4203.304	7031.873	37.4	NA	NA	40094	816	F
10/7/10	LN	NA	NA	804	858	4203.304	7031.873	37.4	NA	NA	40095	860	F
10/7/10	LN	NA	NA	804	858	4203.304	7031.873	37.4	NA	NA	40096	817	F
10/7/10	LN	NA	NA	804	858	4203.304	7031.873	37.4	NA	NA	40097	855	F
10/7/10	LN	NA	NA	804	858	4203.304	7031.873	37.4	NA	NA	40098	878	F
10/7/10	LN	NA	NA	804	858	4203.304	7031.873	37.4	NA	NA	40099	902	F
10/7/10	LN	NA	NA	804	858	4203.304	7031.873	37.4	NA	NA	40100	861	F
10/7/10	LN	NA	NA	804	858	4203.304	7031.873	37.4	NA	NA	47210	830	F
10/7/10	LN	NA	NA	804	858	4203.304	7031.873	37.4	NA	NA	40101	860	F
10/7/10	LN	NA	NA	804	858	4203.304	7031.873	37.4	NA	NA	40102	913	F
10/7/10	LN	NA	NA	804	858	4203.304	7031.873	37.4	NA	NA	40103	855	F
10/7/10	LN	NA	NA	804	858	4203.304	7031.873	37.4	NA	NA	40104	896	F
10/7/10	LN	NA	NA	804	858	4203.304	7031.873	37.4	NA	NA	40105	814	F
10/7/10	LN	NA	NA	804	858	4203.304	7031.873	37.4	NA	NA	40106	832	F

Appendix B (continued)

Date	Gear	Gear Dp (m)	Gear T (°C)	Time set	Time pulled	Latitude	Longitude	Dp (m)	SST (°C)	SSS	Tag #	TL (mm)	Sex
10/7/10	LN	NA	NA	804	858	4203.304	7031.873	37.4	NA	NA	40107	859	F
10/7/10	LN	NA	NA	804	858	4203.304	7031.873	37.4	NA	NA	40108	851	F
10/7/10	LN	NA	NA	804	858	4203.304	7031.873	37.4	NA	NA	40109	810	F
10/7/10	LN	NA	NA	804	858	4203.304	7031.873	37.4	NA	NA	40110	870	F
10/7/10	LN	NA	NA	804	858	4203.304	7031.873	37.4	NA	NA	47211	890	F
10/7/10	LN	NA	NA	804	858	4203.304	7031.873	37.4	NA	NA	40111	915	F
10/7/10	LN	NA	NA	804	858	4203.304	7031.873	37.4	NA	NA	40112	893	F
10/7/10	LN	NA	NA	804	858	4203.304	7031.873	37.4	NA	NA	40113	861	F
10/7/10	LN	NA	NA	804	858	4203.304	7031.873	37.4	NA	NA	40114	861	F
10/7/10	LN	NA	NA	804	858	4203.304	7031.873	37.4	NA	NA	40115	810	F
10/7/10	LN	NA	NA	804	858	4203.304	7031.873	37.4	NA	NA	40116	883	F
10/7/10	LN	NA	NA	804	858	4203.304	7031.873	37.4	NA	NA	40117	883	F
10/7/10	LN	NA	NA	804	858	4203.304	7031.873	37.4	NA	NA	40118	814	F
10/7/10	LN	NA	NA	804	858	4203.304	7031.873	37.4	NA	NA	40071	798	F
10/7/10	LN	NA	NA	804	858	4203.304	7031.873	37.4	NA	NA	40119	830	F
10/7/10	LN	NA	NA	804	858	4203.304	7031.873	37.4	NA	NA	40120	822	F
10/7/10	LN	NA	NA	804	858	4203.304	7031.873	37.4	NA	NA	47212	830	F
10/7/10	LN	NA	NA	804	858	4203.304	7031.873	37.4	NA	NA	40121	837	F
10/7/10	LN	NA	NA	804	858	4203.304	7031.873	37.4	NA	NA	40122	847	F
10/7/10	LN	NA	NA	804	858	4203.304	7031.873	37.4	NA	NA	40123	909	F
10/7/10	LN	NA	NA	804	858	4203.304	7031.873	37.4	NA	NA	40124	954	F
10/7/10	LN	NA	NA	804	858	4203.304	7031.873	37.4	NA	NA	40125	860	F
10/7/10	LN	NA	NA	804	858	4203.304	7031.873	37.4	NA	NA	40126	857	F
10/7/10	LN	NA	NA	804	858	4203.304	7031.873	37.4	NA	NA	40127	799	F
10/7/10	LN	NA	NA	804	858	4203.304	7031.873	37.4	NA	NA	40128	835	F
10/7/10	LN	NA	NA	804	858	4203.304	7031.873	37.4	NA	NA	40129	869	F
10/7/10	LN	NA	NA	804	858	4203.304	7031.873	37.4	NA	NA	40130	879	F
10/7/10	LN	NA	NA	804	858	4203.304	7031.873	37.4	NA	NA	47213	880	F
10/7/10	LN	NA	NA	804	858	4203.304	7031.873	37.4	NA	NA	40131	835	F
10/7/10	LN	NA	NA	804	858	4203.304	7031.873	37.4	NA	NA	40132	863	F
10/7/10	LN	NA	NA	804	858	4203.304	7031.873	37.4	NA	NA	40133	839	F
10/7/10	LN	NA	NA	804	858	4203.304	7031.873	37.4	NA	NA	40134	815	F
10/7/10	LN	NA	NA	804	858	4203.304	7031.873	37.4	NA	NA	40135	752	M
10/7/10	LN	NA	NA	804	858	4203.304	7031.873	37.4	NA	NA	40136	850	F
10/7/10	LN	NA	NA	804	858	4203.304	7031.873	37.4	NA	NA	40137	842	F
10/7/10	LN	NA	NA	804	858	4203.304	7031.873	37.4	NA	NA	40138	915	F
10/7/10	LN	NA	NA	804	858	4203.304	7031.873	37.4	NA	NA	40139	903	F
10/7/10	LN	NA	NA	804	858	4203.304	7031.873	37.4	NA	NA	40140	875	F
10/7/10	LN	NA	NA	804	858	4203.304	7031.873	37.4	NA	NA	47214	810	F
10/7/10	LN	NA	NA	804	858	4203.304	7031.873	37.4	NA	NA	40141	915	F
10/7/10	LN	NA	NA	804	858	4203.304	7031.873	37.4	NA	NA	40142	870	F

Appendix B (continued)

Date	Gear	Gear Dp (m)	Gear T (°C)	Time set	Time pulled	Latitude	Longitude	Dp (m)	SST (°C)	SSS	Tag #	TL (mm)	Sex
10/7/10	LN	NA	NA	804	858	4203.304	7031.873	37.4	NA	NA	40143	901	F
10/7/10	LN	NA	NA	804	858	4203.304	7031.873	37.4	NA	NA	40144	817	F
10/7/10	LN	NA	NA	804	858	4203.304	7031.873	37.4	NA	NA	40145	776	F
10/7/10	LN	NA	NA	804	858	4203.304	7031.873	37.4	NA	NA	40146	831	F
10/7/10	LN	NA	NA	804	858	4203.304	7031.873	37.4	NA	NA	40147	806	F
10/7/10	LN	NA	NA	804	858	4203.304	7031.873	37.4	NA	NA	40148	840	F
10/7/10	LN	NA	NA	804	858	4203.304	7031.873	37.4	NA	NA	40149	887	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40150	879	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	47215	793	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40151	852	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40152	793	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40153	858	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40154	855	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40155	860	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40156	804	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40157	883	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40158	894	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40159	859	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40160	853	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	47216	885	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40161	879	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40162	800	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40163	890	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40164	881	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40165	825	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40166	979	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40167	834	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40168	813	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40169	769	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40170	837	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	47217	827	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40171	830	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40172	826	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40173	753	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40174	890	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40175	763	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40176	914	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40177	830	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40178	880	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40179	825	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40180	858	F

Appendix B (continued)

Date	Gear	Gear Dp (m)	Gear T (°C)	Time set	Time pulled	Latitude	Longitude	Dp (m)	SST (°C)	SSS	Tag #	TL (mm)	Sex
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	47218	819	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40181	805	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40182	810	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40183	776	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40184	836	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40185	799	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40186	873	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40187	801	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40188	840	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40189	771	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40190	905	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	47219	850	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40191	849	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40192	892	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40193	885	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40194	821	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40195	815	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40196	878	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40197	815	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40198	872	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40199	907	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40200	834	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	47220	920	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40201	830	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40202	860	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40203	821	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40204	919	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40205	708	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40206	849	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40207	790	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40208	825	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40209	831	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40210	840	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	47221	840	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40211	832	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40212	867	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40213	870	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40214	901	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40215	938	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40216	868	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40217	830	F

Appendix B (continued)

Date	Gear	Gear Dp (m)	Gear T (°C)	Time set	Time pulled	Latitude	Longitude	Dp (m)	SST (°C)	SSS	Tag #	TL (mm)	Sex
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40218	840	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40219	751	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40220	914	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	48222	889	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40221	840	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40222	850	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40223	841	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40224	862	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40225	860	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40226	855	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40227	858	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40228	839	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40229	860	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40230	830	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	47223	833	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40231	929	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40232	840	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40233	888	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40234	845	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40235	875	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40236	825	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40237	845	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40238	820	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40239	869	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40240	814	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	47224	795	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40241	834	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40242	782	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40243	911	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40244	766	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40245	800	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40246	901	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40247	932	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40248	910	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40249	849	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40250	831	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	47225	860	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40251	872	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40252	705	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40253	840	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40254	783	F

Appendix B (continued)

Date	Gear	Gear Dp (m)	Gear T (°C)	Time set	Time pulled	Latitude	Longitude	Dp (m)	SST (°C)	SSS	Tag #	TL (mm)	Sex
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40255	880	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40256	801	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40258	890	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40257	805	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40259	815	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40260	809	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	47226	865	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40261	825	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40262	871	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40263	792	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40264	854	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40265	853	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40266	803	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40267	778	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40268	845	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40269	829	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40270	772	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	47227	842	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40271	830	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40272	966	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40273	780	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40274	861	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40275	895	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40276	793	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40277	820	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40278	882	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40279	884	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40280	870	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	47228	826	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40282	809	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40281	840	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40283	800	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40284	782	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40285	910	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40286	916	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40287	872	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40288	815	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40289	871	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40290	804	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	47229	808	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40291	829	F

Appendix B (continued)

Date	Gear	Gear Dp (m)	Gear T (°C)	Time set	Time pulled	Latitude	Longitude	Dp (m)	SST (°C)	SSS	Tag #	TL (mm)	Sex
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40292	860	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40293	794	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40294	902	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40295	880	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40296	832	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40297	870	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40298	785	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40299	815	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40300	899	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	47230	755	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40301	565	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40302	880	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40303	948	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40304	915	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40305	858	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40306	890	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40307	875	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40308	891	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40309	844	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40310	778	M
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	47231	848	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40311	809	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40312	785	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40313	880	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40314	870	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40315	864	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40316	836	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40317	844	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40318	773	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40319	870	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40320	866	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	47232	830	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40321	845	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40322	876	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40323	795	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40324	860	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40325	775	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40326	832	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40327	884	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40328	820	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40329	886	F

Appendix B (continued)

Date	Gear	Gear Dp (m)	Gear T (°C)	Time set	Time pulled	Latitude	Longitude	Dp (m)	SST (°C)	SSS	Tag #	TL (mm)	Sex
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	47233	886	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40330	794	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40331	911	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40332	895	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40333	857	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40334	819	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40335	735	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40336	804	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40337	885	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40338	861	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40339	860	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40340	900	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	47234	920	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40341	905	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40342	858	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40343	903	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40344	874	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40345	857	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40346	865	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40347	952	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40348	805	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40349	893	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40350	850	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	47235	893	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40351	870	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40352	754	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40353	816	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40354	922	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40355	756	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40356	901	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40357	784	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40358	543	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40359	919	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40360	882	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	47236	824	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40361	840	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40362	860	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40363	808	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40364	869	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40365	950	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40366	902	F

Appendix B (continued)

Date	Gear	Gear Dp (m)	Gear T (°C)	Time set	Time pulled	Latitude	Longitude	Dp (m)	SST (°C)	SSS	Tag #	TL (mm)	Sex
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40367	808	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40368	828	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40369	722	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40370	785	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	47237	895	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40371	802	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40372	856	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40373	794	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40374	812	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40375	845	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40376	840	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40377	857	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40378	861	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40379	869	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40380	860	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	47238	854	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40382	825	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40381	805	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40383	837	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40384	842	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40385	803	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40386	862	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40387	895	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40388	882	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40389	824	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	40390	870	F
10/7/10	LN	NA	NA	903	954	4203.270	7031.807	38.9	NA	NA	47239	867	F
10/7/10	LN	NA	NA	1000	1230	4203.270	7031.807	38.9	NA	NA	40391	890	F
10/7/10	LN	NA	NA	1000	1230	4203.270	7031.807	38.9	NA	NA	40392	860	F
10/7/10	LN	NA	NA	1000	1230	4203.270	7031.807	38.9	NA	NA	40393	895	F
10/7/10	LN	NA	NA	1000	1230	4203.270	7031.807	38.9	NA	NA	40394	828	F
10/7/10	LN	NA	NA	1000	1230	4203.270	7031.807	38.9	NA	NA	40395	902	F
10/7/10	LN	NA	NA	1000	1230	4203.270	7031.807	38.9	NA	NA	40396	809	F
10/7/10	LN	NA	NA	1000	1230	4203.270	7031.807	38.9	NA	NA	40397	831	F
10/7/10	LN	NA	NA	1000	1230	4203.270	7031.807	38.9	NA	NA	40398	859	F
10/7/10	LN	NA	NA	1000	1230	4203.270	7031.807	38.9	NA	NA	40399	882	F
10/7/10	LN	NA	NA	1000	1230	4203.270	7031.807	38.9	NA	NA	40400	830	F
10/7/10	LN	NA	NA	1000	1230	4203.270	7031.807	38.9	NA	NA	47240	891	F
10/7/10	LN	NA	NA	1000	1230	4203.270	7031.807	38.9	NA	NA	40401	830	F
10/7/10	LN	NA	NA	1000	1230	4203.270	7031.807	38.9	NA	NA	40402	881	F
10/7/10	LN	NA	NA	1000	1230	4203.270	7031.807	38.9	NA	NA	40403	801	F

Appendix B (continued)

Date	Gear	Gear Dp (m)	Gear T (°C)	Time set	Time pulled	Latitude	Longitude	Dp (m)	SST (°C)	SSS	Tag #	TL (mm)	Sex
10/7/10	LN	NA	NA	1000	1230	4203.270	7031.807	38.9	NA	NA	40404	870	F
10/7/10	LN	NA	NA	1000	1230	4203.270	7031.807	38.9	NA	NA	40405	847	F
10/7/10	LN	NA	NA	1000	1230	4203.270	7031.807	38.9	NA	NA	40406	847	F
10/7/10	LN	NA	NA	1000	1230	4203.270	7031.807	38.9	NA	NA	40407	800	F
10/7/10	LN	NA	NA	1000	1230	4203.270	7031.807	38.9	NA	NA	40408	804	F
10/7/10	LN	NA	NA	1000	1230	4203.270	7031.807	38.9	NA	NA	40409	990	F
10/7/10	LN	NA	NA	1000	1230	4203.270	7031.807	38.9	NA	NA	40410	874	F
10/7/10	LN	NA	NA	1000	1230	4203.270	7031.807	38.9	NA	NA	47241	846	F
10/7/10	LN	NA	NA	1000	1230	4203.270	7031.807	38.9	NA	NA	40411	837	F
10/7/10	LN	NA	NA	1000	1230	4203.270	7031.807	38.9	NA	NA	40412	895	F
10/7/10	LN	NA	NA	1000	1230	4203.270	7031.807	38.9	NA	NA	40413	893	F
10/7/10	LN	NA	NA	1000	1230	4203.270	7031.807	38.9	NA	NA	40414	856	F
10/7/10	LN	NA	NA	1000	1230	4203.270	7031.807	38.9	NA	NA	40415	820	F
10/7/10	LN	NA	NA	1000	1230	4203.270	7031.807	38.9	NA	NA	40416	805	F
10/7/10	LN	NA	NA	1000	1230	4203.270	7031.807	38.9	NA	NA	40417	813	F
10/7/10	LN	NA	NA	1000	1230	4203.270	7031.807	38.9	NA	NA	40418	857	F
10/7/10	LN	NA	NA	1000	1230	4203.270	7031.807	38.9	NA	NA	40419	811	F
10/7/10	LN	NA	NA	1000	1230	4203.270	7031.807	38.9	NA	NA	40420	849	F
10/7/10	LN	NA	NA	1000	1230	4203.270	7031.807	38.9	NA	NA	47242	812	F
10/7/10	LN	NA	NA	1000	1230	4203.270	7031.807	38.9	NA	NA	40421	829	F
10/7/10	LN	NA	NA	1000	1230	4203.270	7031.807	38.9	NA	NA	40422	827	F
10/7/10	LN	NA	NA	1000	1230	4203.270	7031.807	38.9	NA	NA	40423	892	F
10/7/10	LN	NA	NA	1000	1230	4203.270	7031.807	38.9	NA	NA	40424	870	F
10/7/10	LN	NA	NA	1000	1230	4203.270	7031.807	38.9	NA	NA	40425	884	F
10/7/10	LN	NA	NA	1000	1230	4203.270	7031.807	38.9	NA	NA	40426	863	F
10/7/10	LN	NA	NA	1000	1230	4203.270	7031.807	38.9	NA	NA	40427	889	F
10/7/10	LN	NA	NA	1000	1230	4203.270	7031.807	38.9	NA	NA	40428	829	F
10/7/10	LN	NA	NA	1000	1230	4203.270	7031.807	38.9	NA	NA	40429	834	F
10/7/10	LN	NA	NA	1000	1230	4203.270	7031.807	38.9	NA	NA	40430	860	F
10/7/10	LN	NA	NA	1000	1230	4203.270	7031.807	38.9	NA	NA	47243	886	F
10/7/10	LN	NA	NA	1000	1230	4203.270	7031.807	38.9	NA	NA	40431	780	F
10/7/10	LN	NA	NA	1000	1230	4203.270	7031.807	38.9	NA	NA	40432	860	F
10/7/10	LN	NA	NA	1000	1230	4203.270	7031.807	38.9	NA	NA	40433	765	F
10/7/10	LN	NA	NA	1000	1230	4203.270	7031.807	38.9	NA	NA	40434	818	F
10/7/10	LN	NA	NA	1000	1230	4203.270	7031.807	38.9	NA	NA	40435	846	F
10/7/10	LN	NA	NA	1000	1230	4203.270	7031.807	38.9	NA	NA	40436	990	F
10/7/10	LN	NA	NA	1000	1230	4203.270	7031.807	38.9	NA	NA	40437	886	F
10/7/10	LN	NA	NA	1000	1230	4203.270	7031.807	38.9	NA	NA	40438	892	F
10/7/10	LN	NA	NA	1000	1230	4203.270	7031.807	38.9	NA	NA	40439	895	F
10/7/10	LN	NA	NA	1000	1230	4203.270	7031.807	38.9	NA	NA	40440	886	F
10/7/10	LN	NA	NA	1000	1230	4203.270	7031.807	38.9	NA	NA	47244	890	F

Appendix B (continued)

Date	Gear	Gear Dp (m)	Gear T (°C)	Time set	Time pulled	Latitude	Longitude	Dp (m)	SST (°C)	SSS	Tag #	TL (mm)	Sex
10/7/10	LN	NA	NA	1000	1230	4203.270	7031.807	38.9	NA	NA	40441	861	F
10/7/10	LN	NA	NA	1000	1230	4203.270	7031.807	38.9	NA	NA	40442	848	F
10/7/10	LN	NA	NA	1000	1230	4203.270	7031.807	38.9	NA	NA	40443	819	F
10/7/10	LN	NA	NA	1000	1230	4203.270	7031.807	38.9	NA	NA	40444	815	F
10/7/10	LN	NA	NA	1000	1230	4203.270	7031.807	38.9	NA	NA	40445	824	F
10/7/10	LN	NA	NA	1000	1230	4203.270	7031.807	38.9	NA	NA	40446	900	F
10/7/10	LN	NA	NA	1000	1230	4203.270	7031.807	38.9	NA	NA	40447	835	F
10/7/10	LN	NA	NA	1000	1230	4203.270	7031.807	38.9	NA	NA	40448	835	F
10/7/10	LN	NA	NA	1000	1230	4203.270	7031.807	38.9	NA	NA	40449	841	F
10/7/10	LN	NA	NA	1000	1230	4203.270	7031.807	38.9	NA	NA	40450	895	F
10/7/10	LN	NA	NA	1000	1230	4203.270	7031.807	38.9	NA	NA	47245	871	F
10/7/10	LN	NA	NA	1000	1230	4203.270	7031.807	38.9	NA	NA	40451	867	F
10/7/10	LN	NA	NA	1000	1230	4203.270	7031.807	38.9	NA	NA	40452	892	F
10/7/10	LN	NA	NA	1000	1230	4203.270	7031.807	38.9	NA	NA	40453	885	F
10/7/10	LN	NA	NA	1000	1230	4203.270	7031.807	38.9	NA	NA	40454	895	F
10/7/10	LN	NA	NA	1000	1230	4203.270	7031.807	38.9	NA	NA	40455	860	F
10/7/10	LN	NA	NA	1000	1230	4203.270	7031.807	38.9	NA	NA	40456	867	F
10/7/10	LN	NA	NA	1000	1230	4203.270	7031.807	38.9	NA	NA	40457	880	F
10/7/10	LN	NA	NA	1000	1230	4203.270	7031.807	38.9	NA	NA	40458	839	F
10/7/10	LN	NA	NA	1000	1230	4203.270	7031.807	38.9	NA	NA	40459	894	F
10/7/10	LN	NA	NA	1000	1230	4203.270	7031.807	38.9	NA	NA	40460	862	F
10/7/10	LN	NA	NA	1000	1230	4203.270	7031.807	38.9	NA	NA	47246	789	F
10/7/10	LN	NA	NA	1000	1230	4203.270	7031.807	38.9	NA	NA	40461	903	F
10/7/10	LN	NA	NA	1000	1230	4203.270	7031.807	38.9	NA	NA	40462	725	F
10/7/10	LN	NA	NA	1000	1230	4203.270	7031.807	38.9	NA	NA	40463	822	F
10/7/10	LN	NA	NA	1000	1230	4203.270	7031.807	38.9	NA	NA	40464	869	F
10/7/10	LN	NA	NA	1000	1230	4203.270	7031.807	38.9	NA	NA	40465	871	F
10/7/10	LN	NA	NA	1000	1230	4203.270	7031.807	38.9	NA	NA	40466	819	F
10/7/10	LN	NA	NA	1000	1230	4203.270	7031.807	38.9	NA	NA	40467	811	F
10/7/10	LN	NA	NA	1000	1230	4203.270	7031.807	38.9	NA	NA	40468	850	F
10/7/10	LN	NA	NA	1000	1230	4203.270	7031.807	38.9	NA	NA	40469	880	F
10/7/10	LN	NA	NA	1000	1230	4203.270	7031.807	38.9	NA	NA	40470	861	F
10/7/10	LN	NA	NA	1000	1230	4203.270	7031.807	38.9	NA	NA	47247	849	F
10/7/10	LN	NA	NA	1000	1230	4203.270	7031.807	38.9	NA	NA	40471	816	F
10/7/10	LN	NA	NA	1000	1230	4203.270	7031.807	38.9	NA	NA	40472	855	F
10/7/10	LN	NA	NA	1000	1230	4203.270	7031.807	38.9	NA	NA	40473	849	F
10/7/10	LN	NA	NA	1000	1230	4203.270	7031.807	38.9	NA	NA	40474	890	F
10/7/10	LN	NA	NA	1000	1230	4203.270	7031.807	38.9	NA	NA	40475	830	F
10/7/10	LN	NA	NA	1000	1230	4203.270	7031.807	38.9	NA	NA	40476	813	M
10/7/10	LN	NA	NA	1000	1230	4203.270	7031.807	38.9	NA	NA	40477	880	F
10/7/10	LN	NA	NA	1000	1230	4203.270	7031.807	38.9	NA	NA	40478	804	F

Appendix B (continued)

Date	Gear	Gear Dp (m)	Gear T (°C)	Time set	Time pulled	Latitude	Longitude	Dp (m)	SST (°C)	SSS	Tag #	TL (mm)	Sex
10/7/10	LN	NA	NA	1000	1230	4203.270	7031.807	38.9	NA	NA	40479	850	F
10/7/10	LN	NA	NA	1000	1230	4203.270	7031.807	38.9	NA	NA	40480	891	F
10/7/10	LN	NA	NA	1000	1230	4203.270	7031.807	38.9	NA	NA	47248	870	F
10/7/10	LN	NA	NA	1000	1230	4203.270	7031.807	38.9	NA	NA	40481	835	F
10/7/10	LN	NA	NA	1000	1230	4203.270	7031.807	38.9	NA	NA	40482	800	F
10/7/10	LN	NA	NA	1000	1230	4203.270	7031.807	38.9	NA	NA	40483	874	F
10/7/10	LN	NA	NA	1000	1230	4203.270	7031.807	38.9	NA	NA	40484	820	F
10/7/10	LN	NA	NA	1000	1230	4203.270	7031.807	38.9	NA	NA	40485	863	F
10/7/10	LN	NA	NA	1000	1230	4203.270	7031.807	38.9	NA	NA	40486	830	F
10/7/10	LN	NA	NA	1000	1230	4203.270	7031.807	38.9	NA	NA	40487	850	F
10/7/10	LN	NA	NA	1000	1230	4203.270	7031.807	38.9	NA	NA	40488	808	F
10/7/10	LN	NA	NA	1000	1230	4203.270	7031.807	38.9	NA	NA	40489	850	F
10/7/10	LN	NA	NA	1235	1250	4203.676	7030.741	43.5	63.1	NA	40490	879	F
10/7/10	LN	NA	NA	1235	1250	4203.676	7030.741	43.5	63.1	NA	47249	910	F
10/7/10	LN	NA	NA	1235	1250	4203.676	7030.741	43.5	63.1	NA	40491	838	F
10/7/10	LN	NA	NA	1235	1250	4203.676	7030.741	43.5	63.1	NA	40492	955	F
10/7/10	LN	NA	NA	1235	1250	4203.676	7030.741	43.5	63.1	NA	40493	834	F
10/7/10	LN	NA	NA	1235	1250	4203.676	7030.741	43.5	63.1	NA	40494	855	F
10/7/10	LN	NA	NA	1235	1250	4203.676	7030.741	43.5	63.1	NA	40495	891	F
10/7/10	LN	NA	NA	1235	1250	4203.676	7030.741	43.5	63.1	NA	40496	851	F
10/7/10	LN	NA	NA	1235	1250	4203.676	7030.741	43.5	63.1	NA	40497	893	F
10/7/10	LN	NA	NA	1235	1250	4203.676	7030.741	43.5	63.1	NA	40498	810	F
10/7/10	LN	NA	NA	1235	1250	4203.676	7030.741	43.5	63.1	NA	40499	827	F
10/7/10	LN	NA	NA	1235	1250	4203.676	7030.741	43.5	63.1	NA	40500	820	F
10/7/10	LN	NA	NA	1235	1250	4203.676	7030.741	43.5	63.1	NA	47250	849	F
10/7/10	LN	NA	NA	1235	1250	4203.676	7030.741	43.5	63.1	NA	40502	890	F
10/7/10	LN	NA	NA	1235	1250	4203.676	7030.741	43.5	63.1	NA	40501	908	F
10/7/10	LN	NA	NA	1235	1250	4203.676	7030.741	43.5	63.1	NA	40503	774	F
10/7/10	LN	NA	NA	1235	1250	4203.676	7030.741	43.5	63.1	NA	40504	844	F
10/7/10	LN	NA	NA	1235	1250	4203.676	7030.741	43.5	63.1	NA	40505	842	F
10/7/10	LN	NA	NA	1235	1250	4203.676	7030.741	43.5	63.1	NA	40506	870	F
10/7/10	LN	NA	NA	1235	1250	4203.676	7030.741	43.5	63.1	NA	40507	968	F
10/7/10	LN	NA	NA	1235	1250	4203.676	7030.741	43.5	63.1	NA	40508	890	F
10/7/10	LN	NA	NA	1235	1250	4203.676	7030.741	43.5	63.1	NA	40509	851	F
10/7/10	LN	NA	NA	1235	1250	4203.676	7030.741	43.5	63.1	NA	40510	892	F
10/7/10	LN	NA	NA	1235	1250	4203.676	7030.741	43.5	63.1	NA	47251	855	F
10/7/10	LN	NA	NA	1235	1250	4203.676	7030.741	43.5	63.1	NA	40511	894	F
10/7/10	LN	NA	NA	1235	1250	4203.676	7030.741	43.5	63.1	NA	40512	762	F
10/7/10	LN	NA	NA	1235	1250	4203.676	7030.741	43.5	63.1	NA	40513	790	F
10/7/10	LN	NA	NA	1235	1250	4203.676	7030.741	43.5	63.1	NA	40514	857	F
10/7/10	LN	NA	NA	1235	1250	4203.676	7030.741	43.5	63.1	NA	40515	770	F

Appendix B (continued)

Date	Gear	Gear Dp (m)	Gear T (°C)	Time set	Time pulled	Latitude	Longitude	Dp (m)	SST (°C)	SSS	Tag #	TL (mm)	Sex
10/7/10	LN	NA	NA	1235	1250	4203.676	7030.741	43.5	63.1	NA	40516	879	F
10/7/10	LN	NA	NA	1235	1250	4203.676	7030.741	43.5	63.1	NA	40517	891	F
10/7/10	LN	NA	NA	1235	1250	4203.676	7030.741	43.5	63.1	NA	40518	770	M
10/7/10	LN	NA	NA	1235	1250	4203.676	7030.741	43.5	63.1	NA	40519	868	F
10/7/10	LN	NA	NA	1235	1250	4203.676	7030.741	43.5	63.1	NA	47252	836	F
10/7/10	LN	NA	NA	1235	1250	4203.676	7030.741	43.5	63.1	NA	40520	902	F
10/7/10	LN	NA	NA	1235	1250	4203.676	7030.741	43.5	63.1	NA	40521	840	F
10/7/10	LN	NA	NA	1235	1250	4203.676	7030.741	43.5	63.1	NA	40522	881	F
10/7/10	LN	NA	NA	1235	1250	4203.676	7030.741	43.5	63.1	NA	40523	865	F
10/7/10	LN	NA	NA	1235	1250	4203.676	7030.741	43.5	63.1	NA	40524	939	F
10/7/10	LN	NA	NA	1235	1250	4203.676	7030.741	43.5	63.1	NA	40525	850	F
10/7/10	LN	NA	NA	1235	1250	4203.676	7030.741	43.5	63.1	NA	40526	771	F
10/7/10	LN	NA	NA	1235	1250	4203.676	7030.741	43.5	63.1	NA	40527	856	F
10/7/10	LN	NA	NA	1235	1250	4203.676	7030.741	43.5	63.1	NA	40528	754	F
10/7/10	LN	NA	NA	1235	1250	4203.676	7030.741	43.5	63.1	NA	40529	819	F
10/7/10	LN	NA	NA	1235	1250	4203.676	7030.741	43.5	63.1	NA	40530	996	F
10/7/10	LN	NA	NA	1235	1250	4203.676	7030.741	43.5	63.1	NA	47253	893	F
10/7/10	LN	NA	NA	1235	1250	4203.676	7030.741	43.5	63.1	NA	40531	855	F
10/7/10	LN	NA	NA	1235	1250	4203.676	7030.741	43.5	63.1	NA	40532	818	F
10/7/10	LN	NA	NA	1235	1250	4203.676	7030.741	43.5	63.1	NA	40533	860	F
10/7/10	LN	NA	NA	1235	1250	4203.676	7030.741	43.5	63.1	NA	40534	863	F
10/7/10	LN	NA	NA	1235	1250	4203.676	7030.741	43.5	63.1	NA	40535	875	F
10/7/10	LN	NA	NA	1235	1250	4203.676	7030.741	43.5	63.1	NA	40536	885	F
10/7/10	LN	NA	NA	1235	1250	4203.676	7030.741	43.5	63.1	NA	40537	817	F
10/7/10	LN	NA	NA	1235	1250	4203.676	7030.741	43.5	63.1	NA	40538	845	F
10/7/10	LN	NA	NA	1255	1325	4203.676	7030.741	43.5	63.1	NA	40539	889	F
10/7/10	LN	NA	NA	1255	1325	4203.676	7030.741	43.5	63.1	NA	47254	858	F
10/7/10	LN	NA	NA	1255	1325	4203.676	7030.741	43.5	63.1	NA	40540	837	F
10/7/10	LN	NA	NA	1255	1325	4203.676	7030.741	43.5	63.1	NA	40541	858	F
10/7/10	LN	NA	NA	1255	1325	4203.676	7030.741	43.5	63.1	NA	40542	865	F
10/7/10	LN	NA	NA	1255	1325	4203.676	7030.741	43.5	63.1	NA	40543	838	F
10/7/10	LN	NA	NA	1255	1325	4203.676	7030.741	43.5	63.1	NA	40544	859	F
10/7/10	LN	NA	NA	1255	1325	4203.676	7030.741	43.5	63.1	NA	40545	840	F
10/7/10	LN	NA	NA	1255	1325	4203.676	7030.741	43.5	63.1	NA	40546	860	F
10/7/10	LN	NA	NA	1255	1325	4203.676	7030.741	43.5	63.1	NA	40547	841	F
10/7/10	LN	NA	NA	1255	1325	4203.676	7030.741	43.5	63.1	NA	40548	846	F
10/7/10	LN	NA	NA	1255	1325	4203.676	7030.741	43.5	63.1	NA	40549	830	F
10/7/10	LN	NA	NA	1255	1325	4203.676	7030.741	43.5	63.1	NA	40550	882	F
10/7/10	LN	NA	NA	1255	1325	4203.676	7030.741	43.5	63.1	NA	47255	880	F
10/7/10	LN	NA	NA	1255	1325	4203.676	7030.741	43.5	63.1	NA	40551	890	F
10/7/10	LN	NA	NA	1255	1325	4203.676	7030.741	43.5	63.1	NA	40552	859	F

Appendix B (continued)

Date	Gear	Gear Dp (m)	Gear T (°C)	Time set	Time pulled	Latitude	Longitude	Dp (m)	SST (°C)	SSS	Tag #	TL (mm)	Sex
10/7/10	LN	NA	NA	1255	1325	4203.676	7030.741	43.5	63.1	NA	40553	810	F
10/7/10	LN	NA	NA	1255	1325	4203.676	7030.741	43.5	63.1	NA	40554	845	F
10/7/10	LN	NA	NA	1255	1325	4203.676	7030.741	43.5	63.1	NA	40555	864	F
10/7/10	LN	NA	NA	1255	1325	4203.676	7030.741	43.5	63.1	NA	40556	860	F
10/7/10	LN	NA	NA	1255	1325	4203.676	7030.741	43.5	63.1	NA	40557	861	F
10/7/10	LN	NA	NA	1255	1325	4203.676	7030.741	43.5	63.1	NA	40558	845	F
10/7/10	LN	NA	NA	1255	1325	4203.676	7030.741	43.5	63.1	NA	40559	729	F
10/7/10	LN	NA	NA	1255	1325	4203.676	7030.741	43.5	63.1	NA	40560	860	F
10/7/10	LN	NA	NA	1255	1325	4203.676	7030.741	43.5	63.1	NA	47256	833	F
10/7/10	LN	NA	NA	1255	1325	4203.676	7030.741	43.5	63.1	NA	40561	820	F
10/7/10	LN	NA	NA	1255	1325	4203.676	7030.741	43.5	63.1	NA	40562	862	F
10/7/10	LN	NA	NA	1255	1325	4203.676	7030.741	43.5	63.1	NA	40563	854	F
10/7/10	LN	NA	NA	1255	1325	4203.676	7030.741	43.5	63.1	NA	40564	810	F
10/7/10	LN	NA	NA	1255	1325	4203.676	7030.741	43.5	63.1	NA	40565	818	F
10/7/10	LN	NA	NA	1255	1325	4203.676	7030.741	43.5	63.1	NA	40566	829	F
10/7/10	LN	NA	NA	1255	1325	4203.676	7030.741	43.5	63.1	NA	40567	934	F
10/7/10	LN	NA	NA	1255	1325	4203.676	7030.741	43.5	63.1	NA	40568	790	M
10/7/10	LN	NA	NA	1255	1325	4203.676	7030.741	43.5	63.1	NA	40569	844	F
10/7/10	LN	NA	NA	1255	1325	4203.676	7030.741	43.5	63.1	NA	40570	835	F
10/7/10	LN	NA	NA	1255	1325	4203.676	7030.741	43.5	63.1	NA	47257	892	F
10/7/10	LN	NA	NA	1255	1325	4203.676	7030.741	43.5	63.1	NA	40571	850	F
10/7/10	LN	NA	NA	1255	1325	4203.676	7030.741	43.5	63.1	NA	40572	810	F
10/7/10	LN	NA	NA	1255	1325	4203.676	7030.741	43.5	63.1	NA	40573	772	F
10/7/10	LN	NA	NA	1255	1325	4203.676	7030.741	43.5	63.1	NA	40574	910	F
10/7/10	LN	NA	NA	1255	1325	4203.676	7030.741	43.5	63.1	NA	40575	820	F
10/7/10	LN	NA	NA	1255	1325	4203.676	7030.741	43.5	63.1	NA	40576	870	F
10/7/10	LN	NA	NA	1255	1325	4203.676	7030.741	43.5	63.1	NA	40577	840	F
10/7/10	LN	NA	NA	1255	1325	4203.676	7030.741	43.5	63.1	NA	40578	904	F
10/7/10	LN	NA	NA	1255	1325	4203.676	7030.741	43.5	63.1	NA	40579	844	F
10/7/10	LN	NA	NA	1255	1325	4203.676	7030.741	43.5	63.1	NA	40580	908	F
10/7/10	LN	NA	NA	1255	1325	4203.676	7030.741	43.5	63.1	NA	47258	792	F
10/7/10	LN	NA	NA	1255	1325	4203.676	7030.741	43.5	63.1	NA	40581	830	F
10/7/10	LN	NA	NA	1255	1325	4203.676	7030.741	43.5	63.1	NA	40582	892	F
10/7/10	LN	NA	NA	1255	1325	4203.676	7030.741	43.5	63.1	NA	40583	890	F
10/7/10	LN	NA	NA	1255	1325	4203.676	7030.741	43.5	63.1	NA	40584	881	F
10/7/10	LN	NA	NA	1255	1325	4203.676	7030.741	43.5	63.1	NA	40585	827	F
10/7/10	LN	NA	NA	1255	1325	4203.676	7030.741	43.5	63.1	NA	40586	830	F
10/7/10	LN	NA	NA	1255	1325	4203.676	7030.741	43.5	63.1	NA	40587	878	F
10/7/10	LN	NA	NA	1330	1340	4203.676	7030.741	43.5	63.1	NA	40588	903	F
10/7/10	LN	NA	NA	1330	1340	4203.676	7030.741	43.5	63.1	NA	40589	875	F
10/7/10	LN	NA	NA	1330	1340	4203.676	7030.741	43.5	63.1	NA	40590	808	F

Appendix B (continued)

Date	Gear	Gear Dp (m)	Gear T (°C)	Time set	Time pulled	Latitude	Longitude	Dp (m)	SST (°C)	SSS	Tag #	TL (mm)	Sex
10/7/10	LN	NA	NA	1330	1340	4203.676	7030.741	43.5	63.1	NA	47259	894	F
10/7/10	LN	NA	NA	1330	1340	4203.676	7030.741	43.5	63.1	NA	40591	862	F
10/7/10	LN	NA	NA	1330	1340	4203.676	7030.741	43.5	63.1	NA	40592	870	F
10/7/10	LN	NA	NA	1330	1340	4203.676	7030.741	43.5	63.1	NA	40593	880	F
10/7/10	LN	NA	NA	1330	1340	4203.676	7030.741	43.5	63.1	NA	40594	830	F
10/7/10	LN	NA	NA	1330	1340	4203.676	7030.741	43.5	63.1	NA	40595	824	F
10/7/10	LN	NA	NA	1330	1340	4203.676	7030.741	43.5	63.1	NA	40596	815	F
10/7/10	LN	NA	NA	1330	1340	4203.676	7030.741	43.5	63.1	NA	40597	912	F
10/7/10	LN	NA	NA	1330	1340	4203.676	7030.741	43.5	63.1	NA	40598	922	F
10/7/10	LN	NA	NA	1330	1340	4203.676	7030.741	43.5	63.1	NA	40599	839	F
10/7/10	LN	NA	NA	1330	1340	4203.676	7030.741	43.5	63.1	NA	40600	816	F
10/8/10	LN	NA	NA	810	NA	4203.721	7031.329	NA	NA	NA	40601	825	F
10/8/10	LN	NA	NA	810	NA	4203.721	7031.329	NA	NA	NA	40602	774	F
10/8/10	LN	NA	NA	810	NA	4203.721	7031.329	NA	NA	NA	40603	780	F
10/8/10	LN	NA	NA	810	NA	4203.721	7031.329	NA	NA	NA	40604	854	F
10/8/10	LN	NA	NA	810	NA	4203.721	7031.329	NA	NA	NA	40605	799	F
10/8/10	GN	NA	NA	705	740	4209.61	7039.23	20.1	NA	NA	40606	853	F
10/8/10	GN	NA	NA	710	855	4209.718	7038.485	20.1	14.1	31.4	40607	841	F
10/8/10	GN	NA	NA	710	855	4209.718	7038.485	20.1	14.1	31.4	40608	921	F
10/8/10	GN	NA	NA	710	855	4209.718	7038.485	20.1	14.1	31.4	40609	874	F
10/8/10	GN	NA	NA	710	855	4209.718	7038.485	20.1	14.1	31.4	40610	820	F
10/8/10	GN	NA	NA	935	1000	4211.934	7035.336	29.3	14.8	31.4	47261	870	F
10/8/10	GN	NA	NA	935	1000	4211.934	7035.336	29.3	14.8	31.4	40611	930	F
10/8/10	GN	NA	NA	935	1000	4211.934	7035.336	29.3	14.8	31.4	40612	980	F
10/8/10	GN	NA	NA	935	1000	4211.934	7035.336	29.3	14.8	31.4	40613	859	F
10/8/10	GN	NA	NA	935	1000	4211.934	7035.336	29.3	14.8	31.4	40614	905	F
10/8/10	GN	NA	NA	935	1000	4211.934	7035.336	29.3	14.8	31.4	40615	748	M
10/8/10	GN	NA	NA	935	1000	4211.934	7035.336	29.3	14.8	31.4	40616	924	F
10/8/10	GN	NA	NA	935	1000	4211.934	7035.336	29.3	14.8	31.4	40617	906	F
10/8/10	GN	NA	NA	935	1000	4211.934	7035.336	29.3	14.8	31.4	40618	892	F
10/8/10	GN	NA	NA	935	1000	4211.934	7035.336	29.3	14.8	31.4	40619	895	F
10/8/10	GN	NA	NA	950	1100	4211.96	7035.37	31.1	14.8	31.4	40620	743	M
10/8/10	GN	NA	NA	950	1100	4211.96	7035.37	31.1	14.8	31.4	47262	932	F
10/8/10	GN	NA	NA	950	1100	4211.96	7035.37	31.1	14.8	31.4	40621	561	F
10/8/10	GN	NA	NA	950	1100	4211.96	7035.37	31.1	14.8	31.4	40622	925	F
10/8/10	GN	NA	NA	950	1100	4211.96	7035.37	31.1	14.8	31.4	40623	836	F
10/8/10	GN	NA	NA	950	1100	4211.96	7035.37	31.1	14.8	31.4	40624	970	F
10/8/10	GN	NA	NA	950	1100	4211.96	7035.37	31.1	14.8	31.4	40625	858	F
10/8/10	GN	NA	NA	950	1100	4211.96	7035.37	31.1	14.8	31.4	40626	826	F
10/8/10	GN	NA	NA	950	1100	4211.96	7035.37	31.1	14.8	31.4	40627	882	F
10/8/10	GN	NA	NA	950	1100	4211.96	7035.37	31.1	14.8	31.4	40628	890	F

Appendix B (continued)

Date	Gear	Gear Dp (m)	Gear T (°C)	Time set	Time pulled	Latitude	Longitude	Dp (m)	SST (°C)	SSS	Tag #	TL (mm)	Sex
10/8/10	GN	NA	NA	950	1100	4211.96	7035.37	31.1	14.8	31.4	40629	802	F
10/8/10	GN	NA	NA	950	1100	4211.96	7035.37	31.1	14.8	31.4	40630	896	F
10/8/10	GN	NA	NA	950	1100	4211.96	7035.37	31.1	14.8	31.4	47263	775	M
10/8/10	GN	NA	NA	950	1100	4211.96	7035.37	31.1	14.8	31.4	40631	754	M
10/8/10	GN	NA	NA	950	1100	4211.96	7035.37	31.1	14.8	31.4	40632	897	F
10/8/10	GN	NA	NA	950	1100	4211.96	7035.37	31.1	14.8	31.4	40633	875	F
10/8/10	GN	NA	NA	950	1100	4211.96	7035.37	31.1	14.8	31.4	40634	892	F
10/8/10	GN	NA	NA	950	1100	4211.96	7035.37	31.1	14.8	31.4	40635	917	F
10/8/10	GN	NA	NA	950	1100	4211.96	7035.37	31.1	14.8	31.4	40636	926	F
10/8/10	GN	NA	NA	950	1100	4211.96	7035.37	31.1	14.8	31.4	40637	878	F
10/8/10	GN	NA	NA	950	1100	4211.96	7035.37	31.1	14.8	31.4	40638	915	F
10/8/10	GN	NA	NA	950	1100	4211.96	7035.37	31.1	14.8	31.4	40639	826	M
10/8/10	GN	NA	NA	950	1100	4211.96	7035.37	31.1	14.8	31.4	40640	847	F
10/8/10	GN	NA	NA	950	1100	4211.96	7035.37	31.1	14.8	31.4	47264	867	F
10/8/10	GN	NA	NA	950	1100	4211.96	7035.37	31.1	14.8	31.4	40641	919	F
10/8/10	GN	NA	NA	950	1100	4211.96	7035.37	31.1	14.8	31.4	40642	940	F
10/8/10	GN	NA	NA	950	1100	4211.96	7035.37	31.1	14.8	31.4	40643	949	F
10/8/10	GN	NA	NA	950	1100	4211.96	7035.37	31.1	14.8	31.4	40644	861	F
10/8/10	GN	NA	NA	950	1100	4211.96	7035.37	31.1	14.8	31.4	40645	945	F
10/8/10	GN	NA	NA	950	1100	4211.96	7035.37	31.1	14.8	31.4	40646	844	F
10/8/10	GN	NA	NA	950	1100	4211.96	7035.37	31.1	14.8	31.4	40647	891	F
10/8/10	GN	NA	NA	950	1100	4211.96	7035.37	31.1	14.8	31.4	40648	850	F
10/8/10	GN	NA	NA	950	1100	4211.96	7035.37	31.1	14.8	31.4	40649	938	F
10/8/10	GN	NA	NA	950	1100	4211.96	7035.37	31.1	14.8	31.4	40650	992	F
10/8/10	GN	NA	NA	950	1100	4211.96	7035.37	31.1	14.8	31.4	47265	864	F
10/8/10	GN	NA	NA	950	1100	4211.96	7035.37	31.1	14.8	31.4	40651	957	F
10/8/10	GN	NA	NA	950	1100	4211.96	7035.37	31.1	14.8	31.4	40652	854	F
10/8/10	GN	NA	NA	950	1100	4211.96	7035.37	31.1	14.8	31.4	40653	877	F
10/8/10	GN	NA	NA	950	1100	4211.96	7035.37	31.1	14.8	31.4	40654	901	F
10/8/10	GN	NA	NA	950	1100	4211.96	7035.37	31.1	14.8	31.4	40655	939	F
10/8/10	GN	NA	NA	950	1100	4211.96	7035.37	31.1	14.8	31.4	40656	880	F
10/8/10	GN	NA	NA	950	1100	4211.96	7035.37	31.1	14.8	31.4	40657	923	F
10/8/10	GN	NA	NA	950	1100	4211.96	7035.37	31.1	14.8	31.4	40658	886	F
10/8/10	GN	NA	NA	950	1100	4211.96	7035.37	31.1	14.8	31.4	40659	842	F
10/8/10	GN	NA	NA	950	1100	4211.96	7035.37	31.1	14.8	31.4	40660	932	F
10/8/10	GN	NA	NA	950	1100	4211.96	7035.37	31.1	14.8	31.4	47266	900	F
10/8/10	GN	NA	NA	950	1100	4211.96	7035.37	31.1	14.8	31.4	40661	NA	F
10/8/10	GN	NA	NA	950	1100	4211.96	7035.37	31.1	14.8	31.4	40662	896	F
10/8/10	GN	NA	NA	950	1100	4211.96	7035.37	31.1	14.8	31.4	40663	873	F
10/8/10	GN	NA	NA	950	1100	4211.96	7035.37	31.1	14.8	31.4	40664	801	M
10/8/10	GN	NA	NA	950	1100	4211.96	7035.37	31.1	14.8	31.4	40665	935	F

Appendix B (continued)

Date	Gear	Gear Dp (m)	Gear T (°C)	Time set	Time pulled	Latitude	Longitude	Dp (m)	SST (°C)	SSS	Tag #	TL (mm)	Sex
10/8/10	GN	NA	NA	1010	1117	4212.05	7035.48	30.2	NA	NA	40666	869	F
10/8/10	GN	NA	NA	1010	1117	4212.05	7035.48	30.2	NA	NA	40667	945	F
10/8/10	GN	NA	NA	1010	1117	4212.05	7035.48	30.2	NA	NA	40668	860	F
10/8/10	GN	NA	NA	1010	1117	4212.05	7035.48	30.2	NA	NA	40669	940	F
10/8/10	GN	NA	NA	1010	1117	4212.05	7035.48	30.2	NA	NA	40670	909	F
10/8/10	GN	NA	NA	1010	1117	4212.05	7035.48	30.2	NA	NA	47267	877	F
10/8/10	GN	NA	NA	1010	1117	4212.05	7035.48	30.2	NA	NA	40671	886	F
10/8/10	GN	NA	NA	1010	1117	4212.05	7035.48	30.2	NA	NA	40672	902	F
10/8/10	GN	NA	NA	1010	1117	4212.05	7035.48	30.2	NA	NA	40673	970	F
10/8/10	GN	NA	NA	1104	1140	4211.89	7035.33	34.7	NA	NA	40674	863	F
10/8/10	GN	NA	NA	1104	1140	4211.89	7035.33	34.7	NA	NA	40675	847	F
10/8/10	GN	NA	NA	1104	1140	4211.89	7035.33	34.7	NA	NA	40676	890	F
10/8/10	GN	NA	NA	1104	1140	4211.89	7035.33	34.7	NA	NA	40677	876	F
10/8/10	GN	NA	NA	1104	1140	4211.89	7035.33	34.7	NA	NA	40678	859	F
10/8/10	GN	NA	NA	1104	1140	4211.89	7035.33	34.7	NA	NA	40679	885	F
10/8/10	GN	NA	NA	1104	1140	4211.89	7035.33	34.7	NA	NA	40680	833	M
10/8/10	GN	NA	NA	1104	1140	4211.89	7035.33	34.7	NA	NA	40681	877	M
10/8/10	GN	NA	NA	1104	1140	4211.89	7035.33	34.7	NA	NA	47268	839	F
10/8/10	GN	NA	NA	1104	1140	4211.89	7035.33	34.7	NA	NA	40682	847	F
10/8/10	GN	NA	NA	1104	1140	4211.89	7035.33	34.7	NA	NA	40683	868	F
10/8/10	GN	NA	NA	1104	1140	4211.89	7035.33	34.7	NA	NA	40684	840	F
10/8/10	GN	NA	NA	1104	1140	4211.89	7035.33	34.7	NA	NA	40685	880	F
10/8/10	GN	NA	NA	1104	1140	4211.89	7035.33	34.7	NA	NA	40686	940	F
10/8/10	GN	NA	NA	1104	1140	4211.89	7035.33	34.7	NA	NA	40687	903	F
10/8/10	GN	NA	NA	1104	1140	4211.89	7035.33	34.7	NA	NA	40688	822	F
10/8/10	GN	NA	NA	1104	1140	4211.89	7035.33	34.7	NA	NA	40689	864	F
10/8/10	GN	NA	NA	1104	1140	4211.89	7035.33	34.7	NA	NA	40690	881	F
10/8/10	GN	NA	NA	1104	1140	4211.89	7035.33	34.7	NA	NA	47269	855	F
10/8/10	GN	NA	NA	1104	1140	4211.89	7035.33	34.7	NA	NA	40691	885	F
10/8/10	GN	NA	NA	1104	1140	4211.89	7035.33	34.7	NA	NA	40692	919	F
10/8/10	GN	NA	NA	1104	1140	4211.89	7035.33	34.7	NA	NA	40693	876	F
10/8/10	GN	NA	NA	1104	1140	4211.89	7035.33	34.7	NA	NA	40694	918	F
10/8/10	GN	NA	NA	1104	1140	4211.89	7035.33	34.7	NA	NA	40695	807	F
10/8/10	GN	NA	NA	1104	1140	4211.89	7035.33	34.7	NA	NA	40696	908	F
10/8/10	GN	NA	NA	1128	1210	4211.7	7035.1	40.2	NA	NA	40697	761	M
10/8/10	GN	NA	NA	1128	1210	4211.7	7035.1	40.2	NA	NA	40698	851	F
10/8/10	GN	NA	NA	1128	1210	4211.7	7035.1	40.2	NA	NA	40699	932	F
10/8/10	GN	NA	NA	1128	1210	4211.7	7035.1	40.2	NA	NA	40700	929	F
10/8/10	GN	NA	NA	1128	1210	4211.7	7035.1	40.2	NA	NA	47270	852	F
10/8/10	GN	NA	NA	1128	1210	4211.7	7035.1	40.2	NA	NA	40701	872	F
10/8/10	GN	NA	NA	1128	1210	4211.7	7035.1	40.2	NA	NA	40702	748	M

Appendix B (continued)

Date	Gear	Gear Dp (m)	Gear T (°C)	Time set	Time pulled	Latitude	Longitude	Dp (m)	SST (°C)	SSS	Tag #	TL (mm)	Sex
10/8/10	GN	NA	NA	1128	1210	4211.7	7035.1	40.2	NA	NA	40703	856	F
10/8/10	GN	NA	NA	1128	1210	4211.7	7035.1	40.2	NA	NA	40704	881	F
10/8/10	GN	NA	NA	1128	1210	4211.7	7035.1	40.2	NA	NA	40705	905	F
10/8/10	GN	NA	NA	1206	1308	4211.31	7034.82	40.2	14.9	31.1	40706	844	F
10/8/10	GN	NA	NA	1206	1308	4211.31	7034.82	40.2	14.9	31.1	40707	805	F
10/8/10	GN	NA	NA	1206	1308	4211.31	7034.82	40.2	14.9	31.1	40708	862	F
10/8/10	GN	NA	NA	1206	1308	4211.31	7034.82	40.2	14.9	31.1	40709	870	F
10/8/10	GN	NA	NA	1206	1308	4211.31	7034.82	40.2	14.9	31.1	40710	755	M
10/8/10	GN	NA	NA	1206	1308	4211.31	7034.82	40.2	14.9	31.1	47271	928	F
10/8/10	GN	NA	NA	1206	1308	4211.31	7034.82	40.2	14.9	31.1	40711	898	F
10/8/10	GN	NA	NA	1206	1308	4211.31	7034.82	40.2	14.9	31.1	40712	850	F
10/8/10	GN	NA	NA	1206	1308	4211.31	7034.82	40.2	14.9	31.1	40713	903	F
10/8/10	GN	NA	NA	1206	1308	4211.31	7034.82	40.2	14.9	31.1	40714	870	F
10/8/10	GN	NA	NA	1206	1308	4211.31	7034.82	40.2	14.9	31.1	40715	890	F
10/8/10	GN	NA	NA	1206	1308	4211.31	7034.82	40.2	14.9	31.1	40716	798	F
10/8/10	GN	NA	NA	1206	1308	4211.31	7034.82	40.2	14.9	31.1	40717	850	F
10/8/10	GN	NA	NA	1206	1308	4211.31	7034.82	40.2	14.9	31.1	40718	920	F
10/8/10	GN	NA	NA	1206	1308	4211.31	7034.82	40.2	14.9	31.1	40719	940	F
10/8/10	GN	NA	NA	1206	1308	4211.31	7034.82	40.2	14.9	31.1	40720	903	F
10/8/10	GN	NA	NA	1206	1308	4211.31	7034.82	40.2	14.9	31.1	47272	900	F
10/8/10	GN	NA	NA	1206	1308	4211.31	7034.82	40.2	14.9	31.1	40721	853	F
10/8/10	GN	NA	NA	1206	1308	4211.31	7034.82	40.2	14.9	31.1	40722	872	F
10/8/10	GN	NA	NA	1206	1308	4211.31	7034.82	40.2	14.9	31.1	40723	875	F
10/8/10	GN	NA	NA	1206	1308	4211.31	7034.82	40.2	14.9	31.1	40724	864	F
10/8/10	GN	NA	NA	1206	1308	4211.31	7034.82	40.2	14.9	31.1	40725	890	F
10/8/10	GN	NA	NA	1206	1308	4211.31	7034.82	40.2	14.9	31.1	40726	877	F
10/8/10	GN	NA	NA	1206	1308	4211.31	7034.82	40.2	14.9	31.1	40727	855	F
10/8/10	GN	NA	NA	1206	1308	4211.31	7034.82	40.2	14.9	31.1	40728	857	F
10/8/10	GN	NA	NA	1206	1308	4211.31	7034.82	40.2	14.9	31.1	40729	893	F
10/8/10	GN	NA	NA	1206	1308	4211.31	7034.82	40.2	14.9	31.1	40730	890	F
10/8/10	GN	NA	NA	1206	1308	4211.31	7034.82	40.2	14.9	31.1	47273	914	F
10/8/10	GN	NA	NA	1206	1308	4211.31	7034.82	40.2	14.9	31.1	40731	780	M
10/8/10	GN	NA	NA	1206	1308	4211.31	7034.82	40.2	14.9	31.1	40732	840	F
10/8/10	GN	NA	NA	1206	1308	4211.31	7034.82	40.2	14.9	31.1	40733	890	F
10/8/10	GN	NA	NA	1206	1308	4211.31	7034.82	40.2	14.9	31.1	40734	858	F
10/8/10	GN	NA	NA	1206	1308	4211.31	7034.82	40.2	14.9	31.1	40735	899	F
10/8/10	GN	NA	NA	1206	1308	4211.31	7034.82	40.2	14.9	31.1	40736	869	F
10/8/10	GN	NA	NA	1206	1308	4211.31	7034.82	40.2	14.9	31.1	40737	905	F
10/8/10	GN	NA	NA	1206	1308	4211.31	7034.82	40.2	14.9	31.1	40738	906	F
10/8/10	GN	NA	NA	1206	1308	4211.31	7034.82	40.2	14.9	31.1	40739	848	F
10/8/10	GN	NA	NA	1206	1308	4211.31	7034.82	40.2	14.9	31.1	40740	930	F

Appendix B (continued)

Date	Gear	Gear Dp (m)	Gear T (°C)	Time set	Time pulled	Latitude	Longitude	Dp (m)	SST (°C)	SSS	Tag #	TL (mm)	Sex
10/8/10	GN	NA	NA	1206	1308	4211.31	7034.82	40.2	14.9	31.1	47274	876	F
10/8/10	GN	NA	NA	1206	1308	4211.31	7034.82	40.2	14.9	31.1	40741	854	F
10/8/10	GN	NA	NA	1206	1308	4211.31	7034.82	40.2	14.9	31.1	40742	923	F
10/8/10	GN	NA	NA	1206	1308	4211.31	7034.82	40.2	14.9	31.1	40743	912	F
10/8/10	GN	NA	NA	1206	1308	4211.31	7034.82	40.2	14.9	31.1	40744	870	F
10/8/10	GN	NA	NA	1206	1308	4211.31	7034.82	40.2	14.9	31.1	40745	907	F
10/8/10	GN	NA	NA	1206	1308	4211.31	7034.82	40.2	14.9	31.1	40746	893	F
10/8/10	GN	NA	NA	1206	1308	4211.31	7034.82	40.2	14.9	31.1	40747	803	F
10/8/10	GN	NA	NA	1206	1308	4211.31	7034.82	40.2	14.9	31.1	40748	870	F
10/8/10	GN	NA	NA	1206	1308	4211.31	7034.82	40.2	14.9	31.1	40749	878	F
10/8/10	GN	NA	NA	1206	1308	4211.31	7034.82	40.2	14.9	31.1	40750	925	F
10/8/10	GN	NA	NA	1206	1308	4211.31	7034.82	40.2	14.9	31.1	47275	978	F
10/8/10	GN	NA	NA	1206	1308	4211.31	7034.82	40.2	14.9	31.1	40751	869	F
10/8/10	GN	NA	NA	1206	1308	4211.31	7034.82	40.2	14.9	31.1	40752	921	F
10/8/10	GN	NA	NA	1206	1308	4211.31	7034.82	40.2	14.9	31.1	40753	856	F
10/8/10	GN	NA	NA	1206	1308	4211.31	7034.82	40.2	14.9	31.1	40754	930	F
10/8/10	GN	NA	NA	1206	1308	4211.31	7034.82	40.2	14.9	31.1	40755	906	F
10/8/10	GN	NA	NA	1206	1308	4211.31	7034.82	40.2	14.9	31.1	40756	879	F
10/8/10	GN	NA	NA	1206	1308	4211.31	7034.82	40.2	14.9	31.1	40757	890	F
10/8/10	GN	NA	NA	1206	1308	4211.31	7034.82	40.2	14.9	31.1	40758	906	F
10/8/10	GN	NA	NA	1206	1308	4211.31	7034.82	40.2	14.9	31.1	40759	898	F
10/8/10	GN	NA	NA	1206	1308	4211.31	7034.82	40.2	14.9	31.1	40760	814	F
10/8/10	GN	NA	NA	1206	1308	4211.31	7034.82	40.2	14.9	31.1	47276	861	F
10/8/10	GN	NA	NA	1206	1308	4211.31	7034.82	40.2	14.9	31.1	40761	894	F
10/8/10	GN	NA	NA	1206	1308	4211.31	7034.82	40.2	14.9	31.1	40762	750	M
10/8/10	GN	NA	NA	1206	1308	4211.31	7034.82	40.2	14.9	31.1	40763	821	F
10/8/10	GN	NA	NA	1206	1308	4211.31	7034.82	40.2	14.9	31.1	40764	922	F
10/8/10	GN	NA	NA	1206	1308	4211.31	7034.82	40.2	14.9	31.1	40765	875	F
10/8/10	GN	NA	NA	1206	1308	4211.31	7034.82	40.2	14.9	31.1	40766	848	F
10/8/10	GN	NA	NA	1206	1308	4211.31	7034.82	40.2	14.9	31.1	40767	914	F
10/8/10	GN	NA	NA	1206	1308	4211.31	7034.82	40.2	14.9	31.1	40768	890	F
10/8/10	GN	NA	NA	1206	1308	4211.31	7034.82	40.2	14.9	31.1	40769	920	F
10/8/10	GN	NA	NA	1206	1308	4211.31	7034.82	40.2	14.9	31.1	40770	964	F
10/8/10	GN	NA	NA	1206	1308	4211.31	7034.82	40.2	14.9	31.1	47277	913	F
10/8/10	GN	NA	NA	1206	1308	4211.31	7034.82	40.2	14.9	31.1	40771	873	F
10/8/10	GN	NA	NA	1206	1308	4211.31	7034.82	40.2	14.9	31.1	40772	801	F
10/8/10	GN	NA	NA	1206	1308	4211.31	7034.82	40.2	14.9	31.1	40773	900	F
10/8/10	GN	NA	NA	1206	1308	4211.31	7034.82	40.2	14.9	31.1	40774	920	F
10/8/10	GN	NA	NA	1206	1308	4211.31	7034.82	40.2	14.9	31.1	40775	910	F
10/8/10	GN	NA	NA	1206	1308	4211.31	7034.82	40.2	14.9	31.1	40776	906	F
10/8/10	GN	NA	NA	1206	1308	4211.31	7034.82	40.2	14.9	31.1	40777	868	F

Appendix B (continued)

Date	Gear	Gear Dp (m)	Gear T (°C)	Time set	Time pulled	Latitude	Longitude	Dp (m)	SST (°C)	SSS	Tag #	TL (mm)	Sex
10/8/10	GN	NA	NA	1206	1308	4211.31	7034.82	40.2	14.9	31.1	40778	850	F
10/8/10	GN	NA	NA	1206	1308	4211.31	7034.82	40.2	14.9	31.1	40779	794	F
10/8/10	GN	NA	NA	1206	1308	4211.31	7034.82	40.2	14.9	31.1	40780	811	F
10/8/10	GN	NA	NA	1206	1308	4211.31	7034.82	40.2	14.9	31.1	47278	915	F
10/8/10	GN	NA	NA	1206	1308	4211.31	7034.82	40.2	14.9	31.1	40781	892	F
10/8/10	GN	NA	NA	1206	1308	4211.31	7034.82	40.2	14.9	31.1	40782	NA	F
10/8/10	GN	NA	NA	1206	1308	4211.31	7034.82	40.2	14.9	31.1	40783	740	M
10/8/10	GN	NA	NA	1206	1308	4211.31	7034.82	40.2	14.9	31.1	40784	961	F
10/8/10	GN	NA	NA	1206	1308	4211.31	7034.82	40.2	14.9	31.1	40785	882	F
10/8/10	GN	NA	NA	1206	1308	4211.31	7034.82	40.2	14.9	31.1	40786	861	F
10/8/10	GN	NA	NA	1206	1308	4211.31	7034.82	40.2	14.9	31.1	40787	756	M
10/8/10	GN	NA	NA	1206	1308	4211.31	7034.82	40.2	14.9	31.1	40788	853	F
10/8/10	GN	NA	NA	1206	1308	4211.31	7034.82	40.2	14.9	31.1	40789	922	F
10/8/10	GN	NA	NA	1206	1308	4211.31	7034.82	40.2	14.9	31.1	40790	919	F
10/8/10	GN	NA	NA	1206	1308	4211.31	7034.82	40.2	14.9	31.1	47279	881	F
10/8/10	GN	NA	NA	1206	1308	4211.31	7034.82	40.2	14.9	31.1	40791	915	F
10/8/10	GN	NA	NA	1206	1308	4211.31	7034.82	40.2	14.9	31.1	40792	842	F
10/8/10	GN	NA	NA	1206	1308	4211.31	7034.82	40.2	14.9	31.1	40793	908	F
10/8/10	GN	NA	NA	1206	1308	4211.31	7034.82	40.2	14.9	31.1	40794	873	F
10/8/10	GN	NA	NA	1206	1308	4211.31	7034.82	40.2	14.9	31.1	40795	899	F
10/8/10	GN	NA	NA	1206	1308	4211.31	7034.82	40.2	14.9	31.1	40796	876	F
10/8/10	GN	NA	NA	1206	1308	4211.31	7034.82	40.2	14.9	31.1	40797	855	F
10/8/10	GN	NA	NA	1206	1308	4211.31	7034.82	40.2	14.9	31.1	40798	860	F
10/8/10	GN	NA	NA	1206	1308	4211.31	7034.82	40.2	14.9	31.1	40799	933	F
10/8/10	GN	NA	NA	1206	1308	4211.31	7034.82	40.2	14.9	31.1	40800	929	F
10/8/10	GN	NA	NA	1206	1308	4211.31	7034.82	40.2	14.9	31.1	47280	822	F
10/8/10	GN	NA	NA	1206	1308	4211.31	7034.82	40.2	14.9	31.1	40801	839	F
10/8/10	GN	NA	NA	1206	1308	4211.31	7034.82	40.2	14.9	31.1	40802	859	F
10/8/10	GN	NA	NA	1206	1308	4211.31	7034.82	40.2	14.9	31.1	40803	881	F
10/8/10	GN	NA	NA	1206	1308	4211.31	7034.82	40.2	14.9	31.1	40804	NA	F
10/8/10	GN	NA	NA	1206	1308	4211.31	7034.82	40.2	14.9	31.1	40805	777	F
10/8/10	GN	NA	NA	1206	1308	4211.31	7034.82	40.2	14.9	31.1	40806	949	F
10/8/10	GN	NA	NA	1206	1308	4211.31	7034.82	40.2	14.9	31.1	40807	842	F
10/8/10	GN	NA	NA	1206	1308	4211.31	7034.82	40.2	14.9	31.1	40808	889	F
10/8/10	GN	NA	NA	1206	1308	4211.31	7034.82	40.2	14.9	31.1	40809	970	F
10/8/10	GN	NA	NA	1206	1308	4211.31	7034.82	40.2	14.9	31.1	40810	830	F
10/8/10	GN	NA	NA	1206	1308	4211.31	7034.82	40.2	14.9	31.1	47281	872	F
10/8/10	GN	NA	NA	1238	1405	4212.05	7035.51	29.3	NA	NA	40811	861	F
10/8/10	GN	NA	NA	1238	1405	4212.05	7035.51	29.3	NA	NA	40812	886	F
10/8/10	GN	NA	NA	1238	1405	4212.05	7035.51	29.3	NA	NA	40813	850	F
10/8/10	GN	NA	NA	1238	1405	4212.05	7035.51	29.3	NA	NA	40814	873	F

Appendix B (continued)

Date	Gear	Gear Dp (m)	Gear T (°C)	Time set	Time pulled	Latitude	Longitude	Dp (m)	SST (°C)	SSS	Tag #	TL (mm)	Sex
10/8/10	GN	NA	NA	1238	1405	4212.05	7035.51	29.3	NA	NA	40815	966	F
10/8/10	GN	NA	NA	1238	1405	4212.05	7035.51	29.3	NA	NA	40816	882	F
10/8/10	GN	NA	NA	1238	1405	4212.05	7035.51	29.3	NA	NA	40817	829	F
10/8/10	GN	NA	NA	1238	1405	4212.05	7035.51	29.3	NA	NA	40818	778	F
10/8/10	GN	NA	NA	1238	1405	4212.05	7035.51	29.3	NA	NA	40819	934	F
10/8/10	GN	NA	NA	1238	1405	4212.05	7035.51	29.3	NA	NA	40820	900	F
10/8/10	GN	NA	NA	1238	1405	4212.05	7035.51	29.3	NA	NA	47282	911	F
10/8/10	GN	NA	NA	1238	1405	4212.05	7035.51	29.3	NA	NA	40821	862	F
10/8/10	GN	NA	NA	1238	1405	4212.05	7035.51	29.3	NA	NA	40822	890	F
10/8/10	GN	NA	NA	1238	1405	4212.05	7035.51	29.3	NA	NA	40823	903	F
10/8/10	GN	NA	NA	1238	1405	4212.05	7035.51	29.3	NA	NA	40824	879	F
10/8/10	GN	NA	NA	1238	1405	4212.05	7035.51	29.3	NA	NA	40825	875	F
10/8/10	GN	NA	NA	1238	1405	4212.05	7035.51	29.3	NA	NA	40826	815	F
10/8/10	GN	NA	NA	1238	1405	4212.05	7035.51	29.3	NA	NA	40827	932	F
10/8/10	GN	NA	NA	1238	1405	4212.05	7035.51	29.3	NA	NA	40828	921	F
10/8/10	GN	NA	NA	1238	1405	4212.05	7035.51	29.3	NA	NA	40829	874	F
10/8/10	GN	NA	NA	1238	1405	4212.05	7035.51	29.3	NA	NA	40830	893	F
10/8/10	GN	NA	NA	1238	1405	4212.05	7035.51	29.3	NA	NA	47283	918	F
10/8/10	GN	NA	NA	1238	1405	4212.05	7035.51	29.3	NA	NA	40831	909	F
10/8/10	GN	NA	NA	1238	1405	4212.05	7035.51	29.3	NA	NA	40832	885	F
10/8/10	GN	NA	NA	1238	1405	4212.05	7035.51	29.3	NA	NA	40833	876	F
10/8/10	GN	NA	NA	1238	1405	4212.05	7035.51	29.3	NA	NA	40834	862	F
10/8/10	GN	NA	NA	1238	1405	4212.05	7035.51	29.3	NA	NA	40835	905	F
10/8/10	GN	NA	NA	1238	1405	4212.05	7035.51	29.3	NA	NA	40836	906	F
10/8/10	GN	NA	NA	1238	1405	4212.05	7035.51	29.3	NA	NA	40837	912	F
10/8/10	GN	NA	NA	1238	1405	4212.05	7035.51	29.3	NA	NA	40838	881	F
10/8/10	GN	NA	NA	1238	1405	4212.05	7035.51	29.3	NA	NA	40839	920	F
10/8/10	GN	NA	NA	1238	1405	4212.05	7035.51	29.3	NA	NA	40840	875	F
10/8/10	GN	NA	NA	1238	1405	4212.05	7035.51	29.3	NA	NA	47284	900	F
10/8/10	GN	NA	NA	1238	1405	4212.05	7035.51	29.3	NA	NA	40841	831	F
10/8/10	GN	NA	NA	1238	1405	4212.05	7035.51	29.3	NA	NA	40842	962	F
10/8/10	GN	NA	NA	1238	1405	4212.05	7035.51	29.3	NA	NA	40843	886	F
10/8/10	GN	NA	NA	1238	1405	4212.05	7035.51	29.3	NA	NA	40844	869	F
10/8/10	GN	NA	NA	1238	1405	4212.05	7035.51	29.3	NA	NA	40845	910	F
10/8/10	GN	NA	NA	1238	1405	4212.05	7035.51	29.3	NA	NA	40846	718	M
10/8/10	GN	NA	NA	1238	1405	4212.05	7035.51	29.3	NA	NA	40847	859	F
10/8/10	GN	NA	NA	1238	1405	4212.05	7035.51	29.3	NA	NA	40848	921	F
10/8/10	GN	NA	NA	1238	1405	4212.05	7035.51	29.3	NA	NA	40849	910	F
10/8/10	GN	NA	NA	1238	1405	4212.05	7035.51	29.3	NA	NA	40850	904	F
10/8/10	GN	NA	NA	1238	1405	4212.05	7035.51	29.3	NA	NA	47285	831	F
10/8/10	GN	NA	NA	1238	1405	4212.05	7035.51	29.3	NA	NA	40851	820	F

Appendix B (continued)

Date	Gear	Gear Dp (m)	Gear T (°C)	Time set	Time pulled	Latitude	Longitude	Dp (m)	SST (°C)	SSS	Tag #	TL (mm)	Sex
10/8/10	GN	NA	NA	1238	1405	4212.05	7035.51	29.3	NA	NA	40852	870	F
10/8/10	GN	NA	NA	1238	1405	4212.05	7035.51	29.3	NA	NA	40853	892	F
10/8/10	GN	NA	NA	1238	1405	4212.05	7035.51	29.3	NA	NA	40854	870	F
10/8/10	GN	NA	NA	1238	1405	4212.05	7035.51	29.3	NA	NA	40855	849	F
10/8/10	GN	NA	NA	1238	1405	4212.05	7035.51	29.3	NA	NA	40856	910	F
10/8/10	GN	NA	NA	1238	1405	4212.05	7035.51	29.3	NA	NA	40857	931	F
10/8/10	GN	NA	NA	1238	1405	4212.05	7035.51	29.3	NA	NA	40858	885	F
10/8/10	GN	NA	NA	1238	1405	4212.05	7035.51	29.3	NA	NA	40859	853	F
10/8/10	GN	NA	NA	1238	1405	4212.05	7035.51	29.3	NA	NA	40860	869	F
10/8/10	GN	NA	NA	1238	1405	4212.05	7035.51	29.3	NA	NA	48286	944	F
10/8/10	GN	NA	NA	1238	1405	4212.05	7035.51	29.3	NA	NA	40861	829	F
10/8/10	GN	NA	NA	1238	1405	4212.05	7035.51	29.3	NA	NA	40862	941	F
10/8/10	GN	NA	NA	1238	1405	4212.05	7035.51	29.3	NA	NA	40863	895	F
10/8/10	GN	NA	NA	1238	1405	4212.05	7035.51	29.3	NA	NA	40864	911	F
10/8/10	GN	NA	NA	1238	1405	4212.05	7035.51	29.3	NA	NA	40865	913	F
10/8/10	GN	NA	NA	1238	1405	4212.05	7035.51	29.3	NA	NA	40866	849	F
10/8/10	GN	NA	NA	1238	1405	4212.05	7035.51	29.3	NA	NA	40867	790	M
10/8/10	GN	NA	NA	1238	1405	4212.05	7035.51	29.3	NA	NA	40868	880	F
10/8/10	GN	NA	NA	1238	1405	4212.05	7035.51	29.3	NA	NA	40869	950	F
10/8/10	GN	NA	NA	1238	1405	4212.05	7035.51	29.3	NA	NA	47287	896	F
10/8/10	GN	NA	NA	1238	1405	4212.05	7035.51	29.3	NA	NA	40870	940	F
10/8/10	GN	NA	NA	1238	1405	4212.05	7035.51	29.3	NA	NA	40871	1003	F
10/8/10	GN	NA	NA	1238	1405	4212.05	7035.51	29.3	NA	NA	40872	902	F
10/8/10	GN	NA	NA	1238	1405	4212.05	7035.51	29.3	NA	NA	40873	906	F
10/8/10	GN	NA	NA	1238	1405	4212.05	7035.51	29.3	NA	NA	40874	841	F
10/8/10	GN	NA	NA	1238	1405	4212.05	7035.51	29.3	NA	NA	40875	824	F
10/8/10	GN	NA	NA	1238	1405	4212.05	7035.51	29.3	NA	NA	40876	850	F
10/8/10	GN	NA	NA	1238	1405	4212.05	7035.51	29.3	NA	NA	40877	955	F
10/8/10	GN	NA	NA	1238	1405	4212.05	7035.51	29.3	NA	NA	40878	866	F
10/8/10	GN	NA	NA	1238	1405	4212.05	7035.51	29.3	NA	NA	40879	920	F
10/8/10	GN	NA	NA	1238	1405	4212.05	7035.51	29.3	NA	NA	40880	865	F
10/8/10	GN	NA	NA	1238	1405	4212.05	7035.51	29.3	NA	NA	47288	864	F
10/8/10	GN	NA	NA	1238	1405	4212.05	7035.51	29.3	NA	NA	40881	922	F
10/8/10	GN	NA	NA	1238	1405	4212.05	7035.51	29.3	NA	NA	40882	802	M
10/8/10	GN	NA	NA	1238	1405	4212.05	7035.51	29.3	NA	NA	40883	821	F
10/8/10	GN	NA	NA	1238	1405	4212.05	7035.51	29.3	NA	NA	40884	880	F
10/8/10	GN	NA	NA	1238	1405	4212.05	7035.51	29.3	NA	NA	40885	903	F
10/8/10	GN	NA	NA	1238	1405	4212.05	7035.51	29.3	NA	NA	40886	867	F
10/8/10	GN	NA	NA	1238	1405	4212.05	7035.51	29.3	NA	NA	40887	828	F
10/8/10	GN	NA	NA	1238	1405	4212.05	7035.51	29.3	NA	NA	40888	797	F
10/8/10	GN	NA	NA	1238	1405	4212.05	7035.51	29.3	NA	NA	40889	949	F

Appendix B (continued)

Date	Gear	Gear Dp (m)	Gear T (°C)	Time set	Time pulled	Latitude	Longitude	Dp (m)	SST (°C)	SSS	Tag #	TL (mm)	Sex
10/8/10	GN	NA	NA	1238	1405	4212.05	7035.51	29.3	NA	NA	40890	860	F
10/8/10	GN	NA	NA	1238	1405	4212.05	7035.51	29.3	NA	NA	47289	861	F
10/8/10	GN	NA	NA	1238	1405	4212.05	7035.51	29.3	NA	NA	40891	884	F
10/8/10	GN	NA	NA	1238	1405	4212.05	7035.51	29.3	NA	NA	40892	898	F
10/8/10	GN	NA	NA	1238	1405	4212.05	7035.51	29.3	NA	NA	40893	902	F
10/8/10	GN	NA	NA	1238	1405	4212.05	7035.51	29.3	NA	NA	40894	932	F
10/8/10	GN	NA	NA	1238	1405	4212.05	7035.51	29.3	NA	NA	40895	901	F
10/8/10	GN	NA	NA	1238	1405	4212.05	7035.51	29.3	NA	NA	40896	965	F
10/8/10	GN	NA	NA	1238	1405	4212.05	7035.51	29.3	NA	NA	40897	883	F
10/8/10	GN	NA	NA	1238	1405	4212.05	7035.51	29.3	NA	NA	40898	932	F
10/8/10	GN	NA	NA	1238	1405	4212.05	7035.51	29.3	NA	NA	40899	885	F
10/8/10	GN	NA	NA	1238	1405	4212.05	7035.51	29.3	NA	NA	40900	900	F
10/8/10	GN	NA	NA	1238	1405	4212.05	7035.51	29.3	NA	NA	47290	869	F
10/8/10	GN	NA	NA	1238	1405	4212.05	7035.51	29.3	NA	NA	40901	866	F
10/8/10	GN	NA	NA	1238	1405	4212.05	7035.51	29.3	NA	NA	40902	911	F
10/8/10	GN	NA	NA	1238	1405	4212.05	7035.51	29.3	NA	NA	40903	853	F
10/8/10	GN	NA	NA	1238	1405	4212.05	7035.51	29.3	NA	NA	40904	871	F
10/8/10	GN	NA	NA	1238	1405	4212.05	7035.51	29.3	NA	NA	40905	918	F
10/8/10	GN	NA	NA	1238	1405	4212.05	7035.51	29.3	NA	NA	40906	860	F
10/8/10	GN	NA	NA	1238	1405	4212.05	7035.51	29.3	NA	NA	40907	910	F
10/8/10	GN	NA	NA	1238	1405	4212.05	7035.51	29.3	NA	NA	40908	914	F
10/8/10	GN	NA	NA	1238	1405	4212.05	7035.51	29.3	NA	NA	40909	874	F
10/8/10	GN	NA	NA	1238	1405	4212.05	7035.51	29.3	NA	NA	40910	827	F
10/8/10	GN	NA	NA	1238	1405	4212.05	7035.51	29.3	NA	NA	47291	890	F
10/8/10	GN	NA	NA	1238	1405	4212.05	7035.51	29.3	NA	NA	40911	910	F
10/8/10	GN	NA	NA	1238	1405	4212.05	7035.51	29.3	NA	NA	40912	834	F
10/8/10	GN	NA	NA	1238	1405	4212.05	7035.51	29.3	NA	NA	40913	917	F
10/8/10	GN	NA	NA	1238	1405	4212.05	7035.51	29.3	NA	NA	40914	901	F
10/8/10	GN	NA	NA	1238	1405	4212.05	7035.51	29.3	NA	NA	40915	900	F
10/8/10	GN	NA	NA	1238	1405	4212.05	7035.51	29.3	NA	NA	40916	842	F
10/8/10	GN	NA	NA	1238	1405	4212.05	7035.51	29.3	NA	NA	40917	857	F
10/8/10	GN	NA	NA	1238	1405	4212.05	7035.51	29.3	NA	NA	40918	886	F
10/8/10	GN	NA	NA	1238	1405	4212.05	7035.51	29.3	NA	NA	40919	961	F
10/8/10	GN	NA	NA	1238	1405	4212.05	7035.51	29.3	NA	NA	40920	905	F
10/8/10	GN	NA	NA	1238	1405	4212.05	7035.51	29.3	NA	NA	47292	831	F
10/8/10	GN	NA	NA	1238	1405	4212.05	7035.51	29.3	NA	NA	40921	935	F
10/8/10	GN	NA	NA	1238	1405	4212.05	7035.51	29.3	NA	NA	40922	930	F
10/8/10	GN	NA	NA	1238	1405	4212.05	7035.51	29.3	NA	NA	40923	890	F
10/8/10	GN	NA	NA	1238	1405	4212.05	7035.51	29.3	NA	NA	40924	859	F
10/8/10	GN	NA	NA	1238	1405	4212.05	7035.51	29.3	NA	NA	40925	925	F
10/8/10	GN	NA	NA	1238	1405	4212.05	7035.51	29.3	NA	NA	40926	932	F

Appendix B (continued)

Date	Gear	Gear Dp (m)	Gear T (°C)	Time set	Time pulled	Latitude	Longitude	Dp (m)	SST (°C)	SSS	Tag #	TL (mm)	Sex
10/8/10	GN	NA	NA	1238	1405	4212.05	7035.51	29.3	NA	NA	40927	934	F
10/8/10	GN	NA	NA	1238	1405	4212.05	7035.51	29.3	NA	NA	40928	950	F
10/8/10	GN	NA	NA	1238	1405	4212.05	7035.51	29.3	NA	NA	40929	837	F
10/8/10	GN	NA	NA	1238	1405	4212.05	7035.51	29.3	NA	NA	40930	724	M
10/8/10	GN	NA	NA	1238	1405	4212.05	7035.51	29.3	NA	NA	47293	908	F
10/8/10	GN	NA	NA	1238	1405	4212.05	7035.51	29.3	NA	NA	40931	811	F
10/8/10	GN	NA	NA	1238	1405	4212.05	7035.51	29.3	NA	NA	40932	899	F
10/8/10	GN	NA	NA	1238	1405	4212.05	7035.51	29.3	NA	NA	40933	931	F
10/8/10	GN	NA	NA	1238	1405	4212.05	7035.51	29.3	NA	NA	40934	896	F
10/8/10	GN	NA	NA	1238	1405	4212.05	7035.51	29.3	NA	NA	40935	862	F
10/8/10	GN	NA	NA	1238	1405	4212.05	7035.51	29.3	NA	NA	40936	934	F
10/8/10	GN	NA	NA	1238	1405	4212.05	7035.51	29.3	NA	NA	40937	875	F
10/8/10	GN	NA	NA	1238	1405	4212.05	7035.51	29.3	NA	NA	40938	854	F
10/8/10	GN	NA	NA	1238	1405	4212.05	7035.51	29.3	NA	NA	40939	911	F
10/8/10	GN	NA	NA	1238	1405	4212.05	7035.51	29.3	NA	NA	40940	848	F
10/8/10	GN	NA	NA	1238	1405	4212.05	7035.51	29.3	NA	NA	47294	831	F
10/8/10	GN	NA	NA	1238	1405	4212.05	7035.51	29.3	NA	NA	40941	911	F
10/8/10	GN	NA	NA	1238	1405	4212.05	7035.51	29.3	NA	NA	40942	941	F
10/8/10	GN	NA	NA	1238	1405	4212.05	7035.51	29.3	NA	NA	40943	836	M
10/8/10	GN	NA	NA	1238	1405	4212.05	7035.51	29.3	NA	NA	40944	856	F
10/8/10	GN	NA	NA	1238	1405	4212.05	7035.51	29.3	NA	NA	40945	920	F
10/8/10	GN	NA	NA	1238	1405	4212.05	7035.51	29.3	NA	NA	40946	929	F
10/8/10	GN	NA	NA	1238	1405	4212.05	7035.51	29.3	NA	NA	40947	882	F
10/8/10	GN	NA	NA	1238	1405	4212.05	7035.51	29.3	NA	NA	40948	904	F
10/8/10	GN	NA	NA	1238	1405	4212.05	7035.51	29.3	NA	NA	40949	836	F
10/8/10	GN	NA	NA	1238	1405	4212.05	7035.51	29.3	NA	NA	40950	879	F
10/8/10	GN	NA	NA	1238	1405	4212.05	7035.51	29.3	NA	NA	47295	884	F
10/8/10	GN	NA	NA	1238	1405	4212.05	7035.51	29.3	NA	NA	40951	876	F
10/8/10	GN	NA	NA	1238	1405	4212.05	7035.51	29.3	NA	NA	40952	891	F
10/8/10	GN	NA	NA	1238	1405	4212.05	7035.51	29.3	NA	NA	40953	866	F
10/8/10	GN	NA	NA	1238	1405	4212.05	7035.51	29.3	NA	NA	40954	979	F
10/8/10	GN	NA	NA	1238	1405	4212.05	7035.51	29.3	NA	NA	40955	909	F
10/8/10	GN	NA	NA	1238	1405	4212.05	7035.51	29.3	NA	NA	40956	878	F
10/8/10	GN	NA	NA	1238	1405	4212.05	7035.51	29.3	NA	NA	40957	891	F
10/8/10	GN	NA	NA	1238	1405	4212.05	7035.51	29.3	NA	NA	40958	883	F
10/8/10	GN	NA	NA	1238	1405	4212.05	7035.51	29.3	NA	NA	40959	838	F
10/8/10	GN	NA	NA	1238	1405	4212.05	7035.51	29.3	NA	NA	40960	895	F
10/8/10	GN	NA	NA	1238	1405	4212.05	7035.51	29.3	NA	NA	47296	930	F
10/8/10	GN	NA	NA	1238	1405	4212.05	7035.51	29.3	NA	NA	40961	874	F
10/8/10	GN	NA	NA	1238	1405	4212.05	7035.51	29.3	NA	NA	40962	850	F
10/8/10	GN	NA	NA	1238	1405	4212.05	7035.51	29.3	NA	NA	40963	825	F

Appendix B (continued)

Date	Gear	Gear Dp (m)	Gear T (°C)	Time set	Time pulled	Latitude	Longitude	Dp (m)	SST (°C)	SSS	Tag #	TL (mm)	Sex
10/8/10	GN	NA	NA	1441	1540	4211.57	7034.96	38.4	NA	NA	40964	869	F
10/8/10	GN	NA	NA	1441	1540	4211.57	7034.96	38.4	NA	NA	40965	808	F
10/8/10	GN	NA	NA	1441	1540	4211.57	7034.96	38.4	NA	NA	40966	851	F
10/8/10	GN	NA	NA	1441	1540	4211.57	7034.96	38.4	NA	NA	40967	895	F
10/8/10	GN	NA	NA	1441	1540	4211.57	7034.96	38.4	NA	NA	40968	974	F
10/8/10	GN	NA	NA	1441	1540	4211.57	7034.96	38.4	NA	NA	40969	920	F
10/8/10	GN	NA	NA	1441	1540	4211.57	7034.96	38.4	NA	NA	40970	970	F
10/8/10	GN	NA	NA	1441	1540	4211.57	7034.96	38.4	NA	NA	47297	941	F
10/8/10	GN	NA	NA	1441	1540	4211.57	7034.96	38.4	NA	NA	40971	931	F
10/8/10	GN	NA	NA	1441	1540	4211.57	7034.96	38.4	NA	NA	40972	862	F
10/8/10	GN	NA	NA	1441	1540	4211.57	7034.96	38.4	NA	NA	40973	923	F
10/8/10	GN	NA	NA	1441	1540	4211.57	7034.96	38.4	NA	NA	40974	813	F
10/8/10	GN	NA	NA	1441	1540	4211.57	7034.96	38.4	NA	NA	40975	837	F
10/8/10	GN	NA	NA	1441	1540	4211.57	7034.96	38.4	NA	NA	40976	875	F
10/8/10	GN	NA	NA	1441	1540	4211.57	7034.96	38.4	NA	NA	40977	915	F
10/8/10	GN	NA	NA	1441	1540	4211.57	7034.96	38.4	NA	NA	40978	873	F
10/8/10	GN	NA	NA	1441	1540	4211.57	7034.96	38.4	NA	NA	40979	763	M
10/8/10	GN	NA	NA	1441	1540	4211.57	7034.96	38.4	NA	NA	47298	888	F
10/8/10	GN	NA	NA	1441	1540	4211.57	7034.96	38.4	NA	NA	40980	NA	F
10/8/10	GN	NA	NA	1441	1540	4211.57	7034.96	38.4	NA	NA	40981	926	F
10/8/10	GN	NA	NA	1441	1540	4211.57	7034.96	38.4	NA	NA	40982	873	F
10/8/10	GN	NA	NA	1441	1540	4211.57	7034.96	38.4	NA	NA	40983	868	F
10/8/10	GN	NA	NA	1441	1540	4211.57	7034.96	38.4	NA	NA	40984	932	F
10/8/10	GN	NA	NA	1441	1540	4211.57	7034.96	38.4	NA	NA	40985	858	F
10/8/10	GN	NA	NA	1441	1540	4211.57	7034.96	38.4	NA	NA	40986	870	F
10/8/10	GN	NA	NA	1441	1540	4211.57	7034.96	38.4	NA	NA	40987	882	F
10/8/10	GN	NA	NA	1441	1540	4211.57	7034.96	38.4	NA	NA	40988	776	M
10/8/10	GN	NA	NA	1441	1540	4211.57	7034.96	38.4	NA	NA	40989	881	F
10/8/10	GN	NA	NA	1441	1540	4211.57	7034.96	38.4	NA	NA	40990	859	F
10/8/10	GN	NA	NA	1441	1540	4211.57	7034.96	38.4	NA	NA	47299	868	F
10/8/10	GN	NA	NA	1441	1540	4211.57	7034.96	38.4	NA	NA	40991	931	F
10/8/10	GN	NA	NA	1441	1540	4211.57	7034.96	38.4	NA	NA	40992	921	F
10/8/10	GN	NA	NA	1441	1540	4211.57	7034.96	38.4	NA	NA	40993	867	F
10/8/10	GN	NA	NA	1441	1540	4211.57	7034.96	38.4	NA	NA	40994	880	F
10/8/10	GN	NA	NA	1441	1540	4211.57	7034.96	38.4	NA	NA	40995	911	F
10/8/10	GN	NA	NA	1441	1540	4211.57	7034.96	38.4	NA	NA	40996	871	F
10/8/10	GN	NA	NA	1441	1540	4211.57	7034.96	38.4	NA	NA	40997	840	F
10/8/10	GN	NA	NA	1441	1540	4211.57	7034.96	38.4	NA	NA	40998	864	F
10/8/10	GN	NA	NA	1441	1540	4211.57	7034.96	38.4	NA	NA	40999	910	F
10/8/10	GN	NA	NA	1441	1540	4211.57	7034.96	38.4	NA	NA	41000	825	F
10/8/10	GN	NA	NA	1441	1540	4211.57	7034.96	38.4	NA	NA	47300	856	F

Appendix B (continued)

Date	Gear	Gear Dp (m)	Gear T (°C)	Time set	Time pulled	Latitude	Longitude	Dp (m)	SST (°C)	SSS	Tag #	TL (mm)	Sex
10/8/10	GN	NA	NA	1441	1540	4211.57	7034.96	38.4	NA	NA	41001	894	F
10/8/10	GN	NA	NA	1441	1540	4211.57	7034.96	38.4	NA	NA	41002	869	F
10/8/10	GN	NA	NA	1441	1540	4211.57	7034.96	38.4	NA	NA	41003	853	F
10/8/10	GN	NA	NA	1441	1540	4211.57	7034.96	38.4	NA	NA	41004	894	F
10/8/10	GN	NA	NA	1441	1540	4211.57	7034.96	38.4	NA	NA	41005	890	F
10/8/10	GN	NA	NA	1441	1540	4211.57	7034.96	38.4	NA	NA	41006	865	F
10/8/10	GN	NA	NA	1441	1540	4211.57	7034.96	38.4	NA	NA	41007	838	F
10/8/10	GN	NA	NA	1441	1540	4211.57	7034.96	38.4	NA	NA	41008	840	F
10/8/10	GN	NA	NA	1441	1540	4211.57	7034.96	38.4	NA	NA	41009	895	F
10/8/10	GN	NA	NA	1441	1540	4211.57	7034.96	38.4	NA	NA	41010	922	F
10/8/10	GN	NA	NA	1441	1540	4211.57	7034.96	38.4	NA	NA	47301	853	F
10/8/10	GN	NA	NA	1441	1540	4211.57	7034.96	38.4	NA	NA	41011	951	F
10/8/10	GN	NA	NA	1441	1540	4211.57	7034.96	38.4	NA	NA	41012	843	F
10/8/10	GN	NA	NA	1441	1540	4211.57	7034.96	38.4	NA	NA	41013	921	F
10/8/10	GN	NA	NA	1441	1540	4211.57	7034.96	38.4	NA	NA	41014	887	F
10/8/10	GN	NA	NA	1441	1540	4211.57	7034.96	38.4	NA	NA	41015	764	M
10/8/10	GN	NA	NA	1441	1540	4211.57	7034.96	38.4	NA	NA	41016	834	F
10/8/10	GN	NA	NA	1441	1540	4211.57	7034.96	38.4	NA	NA	41017	834	F
10/8/10	GN	NA	NA	1441	1540	4211.57	7034.96	38.4	NA	NA	41018	797	M
10/8/10	GN	NA	NA	1441	1540	4211.57	7034.96	38.4	NA	NA	41019	932	F
10/8/10	GN	NA	NA	1441	1540	4211.57	7034.96	38.4	NA	NA	41020	814	F
10/8/10	GN	NA	NA	1441	1540	4211.57	7034.96	38.4	NA	NA	47302	865	F
10/8/10	GN	NA	NA	1441	1540	4211.57	7034.96	38.4	NA	NA	41021	864	F
10/8/10	GN	NA	NA	1441	1540	4211.57	7034.96	38.4	NA	NA	41022	901	F
10/8/10	GN	NA	NA	1441	1540	4211.57	7034.96	38.4	NA	NA	41023	859	F
10/8/10	GN	NA	NA	1441	1540	4211.57	7034.96	38.4	NA	NA	41024	834	F
10/8/10	GN	NA	NA	1441	1540	4211.57	7034.96	38.4	NA	NA	41025	927	F
10/8/10	GN	NA	NA	1441	1540	4211.57	7034.96	38.4	NA	NA	41026	825	F
10/8/10	GN	NA	NA	1441	1540	4211.57	7034.96	38.4	NA	NA	41027	997	F
10/8/10	GN	NA	NA	1441	1540	4211.57	7034.96	38.4	NA	NA	41028	889	F
10/8/10	GN	NA	NA	1441	1540	4211.57	7034.96	38.4	NA	NA	41029	962	F
10/8/10	GN	NA	NA	1441	1540	4211.57	7034.96	38.4	NA	NA	41030	856	F
10/8/10	GN	NA	NA	1441	1540	4211.57	7034.96	38.4	NA	NA	47303	898	F
10/8/10	GN	NA	NA	1441	1540	4211.57	7034.96	38.4	NA	NA	41031	915	F
10/8/10	GN	NA	NA	1441	1540	4211.57	7034.96	38.4	NA	NA	41032	876	F
10/8/10	GN	NA	NA	1441	1540	4211.57	7034.96	38.4	NA	NA	41033	903	F
10/8/10	GN	NA	NA	1441	1540	4211.57	7034.96	38.4	NA	NA	41034	883	F
10/8/10	GN	NA	NA	1441	1540	4211.57	7034.96	38.4	NA	NA	41035	884	F
10/8/10	GN	NA	NA	1441	1540	4211.57	7034.96	38.4	NA	NA	41036	799	F
10/8/10	GN	NA	NA	1441	1540	4211.57	7034.96	38.4	NA	NA	41037	820	F
10/8/10	GN	NA	NA	1441	1540	4211.57	7034.96	38.4	NA	NA	41038	882	F

Appendix B (continued)

Date	Gear	Gear Dp (m)	Gear T (°C)	Time set	Time pulled	Latitude	Longitude	Dp (m)	SST (°C)	SSS	Tag #	TL (mm)	Sex
10/8/10	GN	NA	NA	1441	1540	4211.57	7034.96	38.4	NA	NA	41039	921	F
10/8/10	GN	NA	NA	1441	1540	4211.57	7034.96	38.4	NA	NA	41040	851	F
10/8/10	GN	NA	NA	1441	1540	4211.57	7034.96	38.4	NA	NA	47304	956	F
10/9/10	GN	NA	NA	710	824	4211.5	7034.92	34.3	14.8	31.4	41041	866	F
10/9/10	GN	NA	NA	710	824	4211.5	7034.92	34.3	14.8	31.4	41042	830	F
10/9/10	GN	NA	NA	710	824	4211.5	7034.92	34.3	14.8	31.4	41043	850	F
10/9/10	GN	NA	NA	710	824	4211.5	7034.92	34.3	14.8	31.4	41044	864	F
10/9/10	GN	NA	NA	710	824	4211.5	7034.92	34.3	14.8	31.4	41045	864	F
10/9/10	GN	NA	NA	710	824	4211.5	7034.92	34.3	14.8	31.4	41046	917	F
10/9/10	GN	NA	NA	710	824	4211.5	7034.92	34.3	14.8	31.4	41047	848	F
10/9/10	GN	NA	NA	710	824	4211.5	7034.92	34.3	14.8	31.4	41048	893	F
10/9/10	GN	NA	NA	710	824	4211.5	7034.92	34.3	14.8	31.4	41049	911	F
10/9/10	GN	NA	NA	710	824	4211.5	7034.92	34.3	14.8	31.4	41050	861	F
10/9/10	GN	NA	NA	710	824	4211.5	7034.92	34.3	14.8	31.4	47305	885	F
10/9/10	GN	NA	NA	710	824	4211.5	7034.92	34.3	14.8	31.4	41051	900	F
10/9/10	GN	NA	NA	710	824	4211.5	7034.92	34.3	14.8	31.4	41052	880	F
10/9/10	GN	NA	NA	710	824	4211.5	7034.92	34.3	14.8	31.4	41053	861	F
10/9/10	GN	NA	NA	710	824	4211.5	7034.92	34.3	14.8	31.4	41054	935	F
10/9/10	GN	NA	NA	710	824	4211.5	7034.92	34.3	14.8	31.4	41055	905	F
10/9/10	GN	NA	NA	710	824	4211.5	7034.92	34.3	14.8	31.4	41056	922	F
10/9/10	GN	NA	NA	710	824	4211.5	7034.92	34.3	14.8	31.4	41057	880	F
10/9/10	GN	NA	NA	710	824	4211.5	7034.92	34.3	14.8	31.4	41058	908	F
10/9/10	GN	NA	NA	710	824	4211.5	7034.92	34.3	14.8	31.4	41059	872	F
10/9/10	GN	NA	NA	710	824	4211.5	7034.92	34.3	14.8	31.4	41060	925	F
10/9/10	GN	NA	NA	710	824	4211.5	7034.92	34.3	14.8	31.4	47306	890	F
10/9/10	GN	NA	NA	710	824	4211.5	7034.92	34.3	14.8	31.4	41601	885	F
10/9/10	GN	NA	NA	710	824	4211.5	7034.92	34.3	14.8	31.4	41602	890	F
10/9/10	GN	NA	NA	717	852	4211.52	7034.77	37.4	NA	NA	41063	956	F
10/9/10	GN	NA	NA	717	852	4211.52	7034.77	37.4	NA	NA	41064	893	F
10/9/10	GN	NA	NA	717	852	4211.52	7034.77	37.4	NA	NA	41065	1003	F
10/9/10	GN	NA	NA	717	852	4211.52	7034.77	37.4	NA	NA	41066	932	F
10/9/10	GN	NA	NA	717	852	4211.52	7034.77	37.4	NA	NA	41067	910	F
10/9/10	GN	NA	NA	717	852	4211.52	7034.77	37.4	NA	NA	41068	911	F
10/9/10	GN	NA	NA	717	852	4211.52	7034.77	37.4	NA	NA	41069	918	F
10/9/10	GN	NA	NA	717	852	4211.52	7034.77	37.4	NA	NA	41070	790	M
10/9/10	GN	NA	NA	717	852	4211.52	7034.77	37.4	NA	NA	47307	841	F
10/9/10	GN	NA	NA	717	852	4211.52	7034.77	37.4	NA	NA	41071	916	F
10/9/10	GN	NA	NA	717	852	4211.52	7034.77	37.4	NA	NA	41072	900	F
10/9/10	GN	NA	NA	717	852	4211.52	7034.77	37.4	NA	NA	41073	889	F
10/9/10	GN	NA	NA	717	852	4211.52	7034.77	37.4	NA	NA	41074	921	F
10/9/10	GN	NA	NA	717	852	4211.52	7034.77	37.4	NA	NA	41075	828	F

Appendix B (continued)

Date	Gear	Gear Dp (m)	Gear T (°C)	Time set	Time pulled	Latitude	Longitude	Dp (m)	SST (°C)	SSS	Tag #	TL (mm)	Sex
10/9/10	GN	NA	NA	717	852	4211.52	7034.77	37.4	NA	NA	41076	881	F
10/9/10	GN	NA	NA	717	852	4211.52	7034.77	37.4	NA	NA	41077	884	F
10/9/10	GN	NA	NA	717	852	4211.52	7034.77	37.4	NA	NA	41078	934	F
10/9/10	GN	NA	NA	717	852	4211.52	7034.77	37.4	NA	NA	41079	923	F
10/9/10	GN	NA	NA	717	852	4211.52	7034.77	37.4	NA	NA	41080	730	M
10/9/10	GN	NA	NA	717	852	4211.52	7034.77	37.4	NA	NA	47308	932	F
10/9/10	GN	NA	NA	717	852	4211.52	7034.77	37.4	NA	NA	41081	915	F
10/9/10	GN	NA	NA	717	852	4211.52	7034.77	37.4	NA	NA	41082	962	F
10/9/10	GN	NA	NA	717	852	4211.52	7034.77	37.4	NA	NA	41083	950	F
10/9/10	GN	NA	NA	717	852	4211.52	7034.77	37.4	NA	NA	41084	890	F
10/9/10	GN	NA	NA	717	852	4211.52	7034.77	37.4	NA	NA	41085	864	F
10/9/10	GN	NA	NA	717	852	4211.52	7034.77	37.4	NA	NA	41086	910	F
10/9/10	GN	NA	NA	717	852	4211.52	7034.77	37.4	NA	NA	41087	891	F
10/9/10	GN	NA	NA	717	852	4211.52	7034.77	37.4	NA	NA	41088	910	F
10/9/10	GN	NA	NA	717	852	4211.52	7034.77	37.4	NA	NA	41089	875	F
10/9/10	GN	NA	NA	717	852	4211.52	7034.77	37.4	NA	NA	41090	875	F
10/9/10	GN	NA	NA	717	852	4211.52	7034.77	37.4	NA	NA	47309	802	M
10/9/10	GN	NA	NA	717	852	4211.52	7034.77	37.4	NA	NA	41091	849	F
10/9/10	GN	NA	NA	717	852	4211.52	7034.77	37.4	NA	NA	41092	850	F
10/9/10	GN	NA	NA	717	852	4211.52	7034.77	37.4	NA	NA	41093	911	F
10/9/10	GN	NA	NA	717	852	4211.52	7034.77	37.4	NA	NA	41094	905	F
10/9/10	GN	NA	NA	717	852	4211.52	7034.77	37.4	NA	NA	41095	890	F
10/9/10	GN	NA	NA	717	852	4211.52	7034.77	37.4	NA	NA	41096	871	F
10/9/10	GN	NA	NA	717	852	4211.52	7034.77	37.4	NA	NA	41097	869	F
10/9/10	GN	NA	NA	717	852	4211.52	7034.77	37.4	NA	NA	41098	862	F
10/9/10	GN	NA	NA	717	852	4211.52	7034.77	37.4	NA	NA	41099	890	F
10/9/10	GN	NA	NA	717	852	4211.52	7034.77	37.4	NA	NA	41100	840	F
10/9/10	GN	NA	NA	717	852	4211.52	7034.77	37.4	NA	NA	47310	943	F
10/9/10	GN	NA	NA	717	852	4211.52	7034.77	37.4	NA	NA	41101	868	F
10/9/10	GN	NA	NA	717	852	4211.52	7034.77	37.4	NA	NA	41102	925	F
10/9/10	GN	NA	NA	717	852	4211.52	7034.77	37.4	NA	NA	41103	869	F
10/9/10	GN	NA	NA	717	852	4211.52	7034.77	37.4	NA	NA	41104	898	F
10/9/10	GN	NA	NA	717	852	4211.52	7034.77	37.4	NA	NA	41105	941	F
10/9/10	GN	NA	NA	717	852	4211.52	7034.77	37.4	NA	NA	41106	890	F
10/9/10	GN	NA	NA	717	852	4211.52	7034.77	37.4	NA	NA	41107	872	F
10/9/10	GN	NA	NA	717	852	4211.52	7034.77	37.4	NA	NA	41108	885	F
10/9/10	GN	NA	NA	717	852	4211.52	7034.77	37.4	NA	NA	41109	942	F
10/9/10	GN	NA	NA	717	852	4211.52	7034.77	37.4	NA	NA	41110	921	F
10/9/10	GN	NA	NA	717	852	4211.52	7034.77	37.4	NA	NA	47311	936	F
10/9/10	GN	NA	NA	717	852	4211.52	7034.77	37.4	NA	NA	41111	898	F
10/9/10	GN	NA	NA	826	950	4211.506	7034.825	NA	NA	NA	41112	911	F

Appendix B (continued)

Date	Gear	Gear Dp (m)	Gear T (°C)	Time set	Time pulled	Latitude	Longitude	Dp (m)	SST (°C)	SSS	Tag #	TL (mm)	Sex
10/9/10	GN	NA	NA	826	950	4211.506	7034.825	NA	NA	NA	41113	875	F
10/9/10	GN	NA	NA	826	950	4211.506	7034.825	NA	NA	NA	41114	872	F
10/9/10	GN	NA	NA	826	950	4211.506	7034.825	NA	NA	NA	41115	865	F
10/9/10	GN	NA	NA	826	950	4211.506	7034.825	NA	NA	NA	41116	910	F
10/9/10	GN	NA	NA	826	950	4211.506	7034.825	NA	NA	NA	41117	870	F
10/9/10	GN	NA	NA	826	950	4211.506	7034.825	NA	NA	NA	41118	867	F
10/9/10	GN	NA	NA	826	950	4211.506	7034.825	NA	NA	NA	41119	898	F
10/9/10	GN	NA	NA	826	950	4211.506	7034.825	NA	NA	NA	41120	915	F
10/9/10	GN	NA	NA	826	950	4211.506	7034.825	NA	NA	NA	47312	902	F
10/9/10	GN	NA	NA	826	950	4211.506	7034.825	NA	NA	NA	41121	900	F
10/9/10	GN	NA	NA	826	950	4211.506	7034.825	NA	NA	NA	41122	928	F
10/9/10	GN	NA	NA	826	950	4211.506	7034.825	NA	NA	NA	41123	865	F
10/9/10	GN	NA	NA	826	950	4211.506	7034.825	NA	NA	NA	41124	910	F
10/9/10	GN	NA	NA	826	950	4211.506	7034.825	NA	NA	NA	41125	889	F
10/9/10	GN	NA	NA	826	950	4211.506	7034.825	NA	NA	NA	41126	923	F
10/9/10	GN	NA	NA	826	950	4211.506	7034.825	NA	NA	NA	41127	888	F
10/9/10	GN	NA	NA	826	950	4211.506	7034.825	NA	NA	NA	41128	902	F
10/9/10	GN	NA	NA	826	950	4211.506	7034.825	NA	NA	NA	41129	955	F
10/9/10	GN	NA	NA	826	950	4211.506	7034.825	NA	NA	NA	41130	778	M
10/9/10	GN	NA	NA	826	950	4211.506	7034.825	NA	NA	NA	47313	888	F
10/9/10	GN	NA	NA	826	950	4211.506	7034.825	NA	NA	NA	41131	860	F
10/9/10	GN	NA	NA	826	950	4211.506	7034.825	NA	NA	NA	41132	869	F
10/9/10	GN	NA	NA	826	950	4211.506	7034.825	NA	NA	NA	41133	890	F
10/9/10	GN	NA	NA	826	950	4211.506	7034.825	NA	NA	NA	41134	880	F
10/9/10	GN	NA	NA	826	950	4211.506	7034.825	NA	NA	NA	41135	935	F
10/9/10	GN	NA	NA	826	950	4211.506	7034.825	NA	NA	NA	41136	910	F
10/9/10	GN	NA	NA	826	950	4211.506	7034.825	NA	NA	NA	41137	878	F
10/9/10	GN	NA	NA	826	950	4211.506	7034.825	NA	NA	NA	41138	912	F
10/9/10	GN	NA	NA	826	950	4211.506	7034.825	NA	NA	NA	41139	850	F
10/9/10	GN	NA	NA	826	950	4211.506	7034.825	NA	NA	NA	41140	951	F
10/9/10	GN	NA	NA	826	950	4211.506	7034.825	NA	NA	NA	47314	989	F
10/9/10	GN	NA	NA	826	950	4211.506	7034.825	NA	NA	NA	41141	901	F
10/9/10	GN	NA	NA	826	950	4211.506	7034.825	NA	NA	NA	41142	910	F
10/9/10	GN	NA	NA	826	950	4211.506	7034.825	NA	NA	NA	41143	856	F
10/9/10	GN	NA	NA	826	950	4211.506	7034.825	NA	NA	NA	41144	886	F
10/9/10	GN	NA	NA	826	950	4211.506	7034.825	NA	NA	NA	41145	907	F
10/9/10	GN	NA	NA	826	950	4211.506	7034.825	NA	NA	NA	41146	894	F
10/9/10	GN	NA	NA	826	950	4211.506	7034.825	NA	NA	NA	41147	889	F
10/9/10	GN	NA	NA	826	950	4211.506	7034.825	NA	NA	NA	41148	880	F
10/9/10	GN	NA	NA	826	950	4211.506	7034.825	NA	NA	NA	41149	861	F
10/9/10	GN	NA	NA	826	950	4211.506	7034.825	NA	NA	NA	41150	922	F

Appendix B (continued)

Date	Gear	Gear Dp (m)	Gear T (°C)	Time set	Time pulled	Latitude	Longitude	Dp (m)	SST (°C)	SSS	Tag #	TL (mm)	Sex
10/9/10	GN	NA	NA	826	950	4211.506	7034.825	NA	NA	NA	47315	913	F
10/9/10	GN	NA	NA	826	950	4211.506	7034.825	NA	NA	NA	41151	864	F
10/9/10	GN	NA	NA	826	950	4211.506	7034.825	NA	NA	NA	41152	750	M
10/9/10	GN	NA	NA	839	1033	4211.2	7034.85	37.4	NA	NA	41153	902	F
10/9/10	GN	NA	NA	839	1033	4211.2	7034.85	37.4	NA	NA	41154	885	F
10/9/10	GN	NA	NA	839	1033	4211.2	7034.85	37.4	NA	NA	41155	870	F
10/9/10	GN	NA	NA	839	1033	4211.2	7034.85	37.4	NA	NA	41156	912	F
10/9/10	GN	NA	NA	839	1033	4211.2	7034.85	37.4	NA	NA	41157	860	F
10/9/10	GN	NA	NA	839	1033	4211.2	7034.85	37.4	NA	NA	41158	943	F
10/9/10	GN	NA	NA	839	1033	4211.2	7034.85	37.4	NA	NA	41159	928	F
10/9/10	GN	NA	NA	839	1033	4211.2	7034.85	37.4	NA	NA	41160	893	F
10/9/10	GN	NA	NA	839	1033	4211.2	7034.85	37.4	NA	NA	47316	924	F
10/9/10	GN	NA	NA	839	1033	4211.2	7034.85	37.4	NA	NA	41161	906	F
10/9/10	GN	NA	NA	839	1033	4211.2	7034.85	37.4	NA	NA	41162	880	F
10/9/10	GN	NA	NA	839	1033	4211.2	7034.85	37.4	NA	NA	41163	938	F
10/9/10	GN	NA	NA	839	1033	4211.2	7034.85	37.4	NA	NA	41164	848	F
10/9/10	GN	NA	NA	839	1033	4211.2	7034.85	37.4	NA	NA	41165	918	F
10/9/10	GN	NA	NA	839	1033	4211.2	7034.85	37.4	NA	NA	41166	998	F
10/9/10	GN	NA	NA	839	1033	4211.2	7034.85	37.4	NA	NA	41167	890	F
10/9/10	GN	NA	NA	839	1033	4211.2	7034.85	37.4	NA	NA	41168	890	F
10/9/10	GN	NA	NA	839	1033	4211.2	7034.85	37.4	NA	NA	41169	938	F
10/9/10	GN	NA	NA	839	1033	4211.2	7034.85	37.4	NA	NA	41170	816	F
10/9/10	GN	NA	NA	839	1033	4211.2	7034.85	37.4	NA	NA	47317	848	F
10/9/10	GN	NA	NA	839	1033	4211.2	7034.85	37.4	NA	NA	41171	857	F
10/9/10	GN	NA	NA	839	1033	4211.2	7034.85	37.4	NA	NA	41172	830	F
10/9/10	GN	NA	NA	839	1033	4211.2	7034.85	37.4	NA	NA	41173	895	F
10/9/10	GN	NA	NA	839	1033	4211.2	7034.85	37.4	NA	NA	41174	899	F
10/9/10	GN	NA	NA	839	1033	4211.2	7034.85	37.4	NA	NA	41175	962	F
10/9/10	GN	NA	NA	839	1033	4211.2	7034.85	37.4	NA	NA	41176	884	F
10/9/10	GN	NA	NA	839	1033	4211.2	7034.85	37.4	NA	NA	41177	979	F
10/9/10	GN	NA	NA	839	1033	4211.2	7034.85	37.4	NA	NA	41178	905	F
10/9/10	GN	NA	NA	839	1033	4211.2	7034.85	37.4	NA	NA	41179	930	F
10/9/10	GN	NA	NA	839	1033	4211.2	7034.85	37.4	NA	NA	41180	904	F
10/9/10	GN	NA	NA	839	1033	4211.2	7034.85	37.4	NA	NA	47318	904	F
10/9/10	GN	NA	NA	839	1033	4211.2	7034.85	37.4	NA	NA	41181	943	F
10/9/10	GN	NA	NA	839	1033	4211.2	7034.85	37.4	NA	NA	41182	957	F
10/9/10	GN	NA	NA	839	1033	4211.2	7034.85	37.4	NA	NA	41183	898	F
10/9/10	GN	NA	NA	839	1033	4211.2	7034.85	37.4	NA	NA	41184	921	F
10/9/10	GN	NA	NA	839	1033	4211.2	7034.85	37.4	NA	NA	41185	870	F
10/9/10	GN	NA	NA	839	1100	4211.506	7034.825	36.5	NA	NA	41186	875	F
10/9/10	GN	NA	NA	839	1100	4211.506	7034.825	36.5	NA	NA	41187	893	F

Appendix B (continued)

Date	Gear	Gear Dp (m)	Gear T (°C)	Time set	Time pulled	Latitude	Longitude	Dp (m)	SST (°C)	SSS	Tag #	TL (mm)	Sex
10/9/10	GN	NA	NA	839	1100	4211.506	7034.825	36.5	NA	NA	41188	902	F
10/9/10	GN	NA	NA	839	1100	4211.506	7034.825	36.5	NA	NA	41189	810	F
10/9/10	GN	NA	NA	839	1100	4211.506	7034.825	36.5	NA	NA	41190	898	F
10/9/10	GN	NA	NA	839	1100	4211.506	7034.825	36.5	NA	NA	47319	882	F
10/9/10	GN	NA	NA	839	1100	4211.506	7034.825	36.5	NA	NA	41191	909	F
10/9/10	GN	NA	NA	839	1100	4211.506	7034.825	36.5	NA	NA	41192	891	F
10/9/10	GN	NA	NA	839	1100	4211.506	7034.825	36.5	NA	NA	41193	880	F
10/9/10	GN	NA	NA	839	1100	4211.506	7034.825	36.5	NA	NA	41194	888	F
10/9/10	GN	NA	NA	839	1100	4211.506	7034.825	36.5	NA	NA	41195	870	F
10/9/10	GN	NA	NA	839	1100	4211.506	7034.825	36.5	NA	NA	41196	944	F
10/9/10	GN	NA	NA	839	1100	4211.506	7034.825	36.5	NA	NA	41197	946	F
10/9/10	GN	NA	NA	839	1100	4211.506	7034.825	36.5	NA	NA	41198	891	F
10/9/10	GN	NA	NA	839	1100	4211.506	7034.825	36.5	NA	NA	41199	859	F
10/9/10	GN	NA	NA	839	1100	4211.506	7034.825	36.5	NA	NA	41200	888	F
10/9/10	GN	NA	NA	839	1100	4211.506	7034.825	36.5	NA	NA	47320	871	F
10/9/10	GN	NA	NA	839	1100	4211.506	7034.825	36.5	NA	NA	41201	850	F
10/9/10	GN	NA	NA	839	1100	4211.506	7034.825	36.5	NA	NA	41202	825	M
10/9/10	GN	NA	NA	839	1100	4211.506	7034.825	36.5	NA	NA	41203	912	F
10/9/10	GN	NA	NA	839	1100	4211.506	7034.825	36.5	NA	NA	41204	896	F
10/9/10	GN	NA	NA	839	1100	4211.506	7034.825	36.5	NA	NA	41205	820	F
10/9/10	GN	NA	NA	839	1100	4211.506	7034.825	36.5	NA	NA	41206	901	F
10/9/10	GN	NA	NA	839	1100	4211.506	7034.825	36.5	NA	NA	41207	891	F
10/9/10	GN	NA	NA	839	1100	4211.506	7034.825	36.5	NA	NA	41208	887	F
10/9/10	GN	NA	NA	839	1100	4211.506	7034.825	36.5	NA	NA	41209	824	F
10/9/10	GN	NA	NA	839	1100	4211.506	7034.825	36.5	NA	NA	41210	896	F
10/9/10	GN	NA	NA	839	1100	4211.506	7034.825	36.5	NA	NA	47321	966	F
10/9/10	GN	NA	NA	839	1100	4211.506	7034.825	36.5	NA	NA	41211	898	F
10/9/10	GN	NA	NA	839	1100	4211.506	7034.825	36.5	NA	NA	41212	802	M
10/9/10	GN	NA	NA	839	1100	4211.506	7034.825	36.5	NA	NA	41213	866	F
10/9/10	GN	NA	NA	839	1100	4211.506	7034.825	36.5	NA	NA	41214	872	F
10/9/10	GN	NA	NA	839	1100	4211.506	7034.825	36.5	NA	NA	41215	825	M
10/9/10	GN	NA	NA	839	1100	4211.506	7034.825	36.5	NA	NA	41216	930	F
10/9/10	GN	NA	NA	839	1100	4211.506	7034.825	36.5	NA	NA	41217	872	F
10/9/10	GN	NA	NA	839	1100	4211.506	7034.825	36.5	NA	NA	41218	931	F
10/9/10	GN	NA	NA	839	1100	4211.506	7034.825	36.5	NA	NA	41219	934	F
10/9/10	GN	NA	NA	839	1100	4211.506	7034.825	36.5	NA	NA	41220	868	F
10/9/10	GN	NA	NA	839	1100	4211.506	7034.825	36.5	NA	NA	47322	852	F
10/9/10	GN	NA	NA	839	1100	4211.506	7034.825	36.5	NA	NA	41221	854	F
10/9/10	GN	NA	NA	839	1100	4211.506	7034.825	36.5	NA	NA	41222	904	F
10/9/10	GN	NA	NA	839	1100	4211.506	7034.825	36.5	NA	NA	41223	854	F
10/9/10	GN	NA	NA	839	1100	4211.506	7034.825	36.5	NA	NA	41224	995	F

Appendix B (continued)

Date	Gear	Gear Dp (m)	Gear T (°C)	Time set	Time pulled	Latitude	Longitude	Dp (m)	SST (°C)	SSS	Tag #	TL (mm)	Sex
10/9/10	GN	NA	NA	839	1100	4211.506	7034.825	36.5	NA	NA	41225	912	F
10/9/10	GN	NA	NA	1052	1130	4211.27	7034.78	35.6	NA	NA	41226	875	F
10/9/10	GN	NA	NA	1052	1130	4211.27	7034.78	35.6	NA	NA	41227	934	F
10/9/10	GN	NA	NA	1052	1130	4211.27	7034.78	35.6	NA	NA	41228	779	F
10/9/10	GN	NA	NA	1052	1130	4211.27	7034.78	35.6	NA	NA	41229	818	F
10/9/10	GN	NA	NA	1052	1130	4211.27	7034.78	35.6	NA	NA	41230	824	F
10/9/10	GN	NA	NA	1052	1130	4211.27	7034.78	35.6	NA	NA	47323	825	M
10/9/10	GN	NA	NA	1052	1130	4211.27	7034.78	35.6	NA	NA	41231	870	F
10/9/10	GN	NA	NA	1052	1130	4211.27	7034.78	35.6	NA	NA	41232	874	F
10/9/10	GN	NA	NA	1052	1130	4211.27	7034.78	35.6	NA	NA	41233	880	F
10/9/10	GN	NA	NA	1052	1130	4211.27	7034.78	35.6	NA	NA	41234	851	F
10/9/10	GN	NA	NA	1052	1130	4211.27	7034.78	35.6	NA	NA	41235	865	F
10/9/10	GN	NA	NA	1052	1130	4211.27	7034.78	35.6	NA	NA	41236	865	F
10/9/10	GN	NA	NA	1052	1130	4211.27	7034.78	35.6	NA	NA	41237	899	F
10/9/10	GN	NA	NA	1052	1130	4211.27	7034.78	35.6	NA	NA	41238	891	F
10/9/10	GN	NA	NA	1052	1130	4211.27	7034.78	35.6	NA	NA	41239	915	F
10/9/10	GN	NA	NA	1052	1130	4211.27	7034.78	35.6	NA	NA	41240	810	F
10/9/10	GN	NA	NA	1052	1130	4211.27	7034.78	35.6	NA	NA	47324	961	F
10/9/10	GN	NA	NA	1052	1130	4211.27	7034.78	35.6	NA	NA	41241	874	F
10/9/10	GN	NA	NA	1052	1130	4211.27	7034.78	35.6	NA	NA	41242	833	F
10/9/10	GN	NA	NA	1052	1130	4211.27	7034.78	35.6	NA	NA	41243	875	F
10/9/10	GN	NA	NA	1052	1130	4211.27	7034.78	35.6	NA	NA	41244	870	F
10/9/10	GN	NA	NA	1052	1130	4211.27	7034.78	35.6	NA	NA	41245	802	F
10/9/10	GN	NA	NA	1052	1130	4211.27	7034.78	35.6	NA	NA	41246	845	F
10/9/10	GN	NA	NA	1052	1130	4211.27	7034.78	35.6	NA	NA	41247	824	F
10/9/10	GN	NA	NA	1128	1200	4211.59	7035.06	40.2	NA	NA	41248	950	F
10/9/10	GN	NA	NA	1128	1200	4211.59	7035.06	40.2	NA	NA	41249	858	F
10/9/10	GN	NA	NA	1128	1200	4211.59	7035.06	40.2	NA	NA	41250	911	F
10/9/10	GN	NA	NA	1128	1200	4211.59	7035.06	40.2	NA	NA	47325	860	F
10/9/10	GN	NA	NA	1128	1200	4211.59	7035.06	40.2	NA	NA	41251	998	F
10/11/10	LN	NA	NA	811	825	4146.245	6953.459	20.7	NA	NA	41252	769	M
10/11/10	LN	NA	NA	811	825	4146.245	6953.459	20.7	NA	NA	41253	685	M
10/11/10	LN	NA	NA	811	825	4146.245	6953.459	20.7	NA	NA	41254	739	M
10/11/10	LN	NA	NA	811	825	4146.245	6953.459	20.7	NA	NA	41255	789	M
10/11/10	LN	NA	NA	811	825	4146.245	6953.459	20.7	NA	NA	41256	754	M
10/11/10	LN	NA	NA	811	825	4146.245	6953.459	20.7	NA	NA	41257	757	M
10/11/10	LN	NA	NA	811	825	4146.245	6953.459	20.7	NA	NA	41258	763	M
10/11/10	LN	NA	NA	811	825	4146.245	6953.459	20.7	NA	NA	41259	697	M
10/11/10	LN	NA	NA	811	825	4146.245	6953.459	20.7	NA	NA	41260	720	M
10/11/10	LN	NA	NA	811	825	4146.245	6953.459	20.7	NA	NA	47326	796	M
10/11/10	LN	NA	NA	811	825	4146.245	6953.459	20.7	NA	NA	41261	761	M

Appendix B (continued)

Date	Gear	Gear Dp (m)	Gear T (°C)	Time set	Time pulled	Latitude	Longitude	Dp (m)	SST (°C)	SSS	Tag #	TL (mm)	Sex
10/11/10	LN	NA	NA	811	825	4146.245	6953.459	20.7	NA	NA	41262	721	M
10/11/10	LN	NA	NA	811	825	4146.245	6953.459	20.7	NA	NA	41263	825	M
10/11/10	LN	NA	NA	811	825	4146.245	6953.459	20.7	NA	NA	41264	719	M
10/11/10	LN	NA	NA	811	825	4146.245	6953.459	20.7	NA	NA	41265	832	F
10/11/10	LN	NA	NA	811	825	4146.245	6953.459	20.7	NA	NA	41266	721	M
10/11/10	LN	NA	NA	811	825	4146.245	6953.459	20.7	NA	NA	41267	782	M
10/11/10	LN	NA	NA	811	825	4146.245	6953.459	20.7	NA	NA	41268	754	M
10/11/10	LN	NA	NA	811	825	4146.245	6953.459	20.7	NA	NA	41269	775	M
10/11/10	LN	NA	NA	811	825	4146.245	6953.459	20.7	NA	NA	41270	768	M
10/11/10	LN	NA	NA	811	825	4146.245	6953.459	20.7	NA	NA	47327	754	M
10/11/10	LN	NA	NA	811	825	4146.245	6953.459	20.7	NA	NA	41271	599	M
10/11/10	LN	NA	NA	811	825	4146.245	6953.459	20.7	NA	NA	41272	713	M
10/11/10	LN	NA	NA	811	825	4146.245	6953.459	20.7	NA	NA	41273	720	M
10/11/10	LN	NA	NA	811	825	4146.245	6953.459	20.7	NA	NA	41274	750	M
10/11/10	LN	NA	NA	811	825	4146.245	6953.459	20.7	NA	NA	41275	712	M
10/11/10	LN	NA	NA	811	825	4146.245	6953.459	20.7	NA	NA	41276	679	M
10/11/10	LN	NA	NA	811	825	4146.245	6953.459	20.7	NA	NA	41277	709	M
10/11/10	LN	NA	NA	811	825	4146.245	6953.459	20.7	NA	NA	41278	721	M
10/11/10	LN	NA	NA	811	825	4146.245	6953.459	20.7	NA	NA	41279	776	M
10/11/10	LN	NA	NA	811	825	4146.245	6953.459	20.7	NA	NA	41280	792	M
10/11/10	LN	NA	NA	811	825	4146.245	6953.459	20.7	NA	NA	47328	781	M
10/11/10	LN	NA	NA	811	825	4146.245	6953.459	20.7	NA	NA	41281	760	M
10/11/10	LN	NA	NA	811	825	4146.245	6953.459	20.7	NA	NA	41282	761	M
10/11/10	LN	NA	NA	811	825	4146.245	6953.459	20.7	NA	NA	41283	719	M
10/11/10	LN	NA	NA	811	825	4146.245	6953.459	20.7	NA	NA	41284	774	M
10/11/10	LN	NA	NA	811	825	4146.245	6953.459	20.7	NA	NA	41285	773	M
10/11/10	LN	NA	NA	811	825	4146.245	6953.459	20.7	NA	NA	41286	680	M
10/11/10	LN	NA	NA	811	825	4146.245	6953.459	20.7	NA	NA	41287	701	M
10/11/10	LN	NA	NA	811	825	4146.245	6953.459	20.7	NA	NA	41288	765	M
10/11/10	LN	NA	NA	811	825	4146.245	6953.459	20.7	NA	NA	41289	738	M
10/11/10	LN	NA	NA	811	825	4146.245	6953.459	20.7	NA	NA	41290	750	M
10/11/10	LN	NA	NA	811	825	4146.245	6953.459	20.7	NA	NA	47329	740	M
10/11/10	LN	NA	NA	811	825	4146.245	6953.459	20.7	NA	NA	41291	628	M
10/11/10	LN	NA	NA	811	825	4146.245	6953.459	20.7	NA	NA	41292	777	M
10/11/10	LN	NA	NA	811	825	4146.245	6953.459	20.7	NA	NA	41293	768	M
10/11/10	LN	NA	NA	811	825	4146.245	6953.459	20.7	NA	NA	41294	720	M
10/11/10	LN	NA	NA	811	825	4146.245	6953.459	20.7	NA	NA	41295	747	M
10/11/10	LN	NA	NA	811	825	4146.245	6953.459	20.7	NA	NA	41296	830	M
10/11/10	LN	NA	NA	811	825	4146.245	6953.459	20.7	NA	NA	41297	744	M
10/11/10	LN	NA	NA	811	825	4146.245	6953.459	20.7	NA	NA	41298	785	M
10/11/10	LN	NA	NA	811	825	4146.245	6953.459	20.7	NA	NA	41299	778	M

Appendix B (continued)

Date	Gear	Gear Dp (m)	Gear T (°C)	Time set	Time pulled	Latitude	Longitude	Dp (m)	SST (°C)	SSS	Tag #	TL (mm)	Sex
10/11/10	LN	NA	NA	811	825	4146.245	6953.459	20.7	NA	NA	41300	705	M
10/11/10	LN	NA	NA	811	825	4146.245	6953.459	20.7	NA	NA	47330	738	M
10/11/10	LN	NA	NA	811	825	4146.245	6953.459	20.7	NA	NA	41301	745	M
10/11/10	LN	NA	NA	811	825	4146.245	6953.459	20.7	NA	NA	41302	602	F
10/11/10	LN	NA	NA	811	825	4146.245	6953.459	20.7	NA	NA	41303	702	M
10/11/10	LN	NA	NA	811	825	4146.245	6953.459	20.7	NA	NA	41304	741	M
10/11/10	LN	NA	NA	811	825	4146.245	6953.459	20.7	NA	NA	41305	765	M
10/11/10	LN	NA	NA	811	825	4146.245	6953.459	20.7	NA	NA	41306	645	M
10/11/10	LN	NA	NA	811	825	4146.245	6953.459	20.7	NA	NA	41307	815	M
10/11/10	LN	NA	NA	811	825	4146.245	6953.459	20.7	NA	NA	41308	799	M
10/11/10	LN	NA	NA	811	825	4146.245	6953.459	20.7	NA	NA	41309	755	M
10/11/10	LN	NA	NA	811	825	4146.245	6953.459	20.7	NA	NA	41310	749	M
10/11/10	LN	NA	NA	811	825	4146.245	6953.459	20.7	NA	NA	47331	771	M
10/11/10	LN	NA	NA	811	825	4146.245	6953.459	20.7	NA	NA	41311	696	M
10/11/10	LN	NA	NA	811	825	4146.245	6953.459	20.7	NA	NA	41312	769	M
10/11/10	LN	NA	NA	811	825	4146.245	6953.459	20.7	NA	NA	41313	721	M
10/11/10	LN	NA	NA	811	825	4146.245	6953.459	20.7	NA	NA	41314	675	F
10/11/10	LN	NA	NA	811	825	4146.245	6953.459	20.7	NA	NA	41315	714	M
10/11/10	LN	NA	NA	811	825	4146.245	6953.459	20.7	NA	NA	41316	755	M
10/11/10	LN	NA	NA	811	825	4146.245	6953.459	20.7	NA	NA	41317	721	M
10/11/10	LN	NA	NA	811	825	4146.245	6953.459	20.7	NA	NA	41318	795	M
10/11/10	LN	NA	NA	811	825	4146.245	6953.459	20.7	NA	NA	41319	755	M
10/11/10	LN	NA	NA	811	825	4146.245	6953.459	20.7	NA	NA	41320	790	M
10/11/10	LN	NA	NA	811	825	4146.245	6953.459	20.7	NA	NA	47332	746	M
10/11/10	LN	NA	NA	811	825	4146.245	6953.459	20.7	NA	NA	41321	735	M
10/11/10	LN	NA	NA	811	825	4146.245	6953.459	20.7	NA	NA	41322	754	M
10/11/10	LN	NA	NA	811	825	4146.245	6953.459	20.7	NA	NA	41323	698	M
10/11/10	LN	NA	NA	811	825	4146.245	6953.459	20.7	NA	NA	41324	744	M
10/11/10	LN	NA	NA	811	825	4146.245	6953.459	20.7	NA	NA	41325	771	M
10/11/10	LN	NA	NA	811	825	4146.245	6953.459	20.7	NA	NA	41326	785	M
10/11/10	LN	NA	NA	811	825	4146.245	6953.459	20.7	NA	NA	41327	760	F
10/11/10	LN	NA	NA	811	825	4146.245	6953.459	20.7	NA	NA	41328	710	M
10/11/10	LN	NA	NA	811	825	4146.245	6953.459	20.7	NA	NA	41329	742	M
10/11/10	LN	NA	NA	811	825	4146.245	6953.459	20.7	NA	NA	41330	702	M
10/11/10	LN	NA	NA	811	825	4146.245	6953.459	20.7	NA	NA	47333	769	M
10/11/10	LN	NA	NA	811	825	4146.245	6953.459	20.7	NA	NA	41331	775	M
10/11/10	LN	NA	NA	811	825	4146.245	6953.459	20.7	NA	NA	41332	720	M
10/11/10	LN	NA	NA	811	825	4146.245	6953.459	20.7	NA	NA	41333	775	M
10/11/10	LN	NA	NA	811	825	4146.245	6953.459	20.7	NA	NA	41334	820	M
10/11/10	LN	NA	NA	811	825	4146.245	6953.459	20.7	NA	NA	41335	790	M
10/11/10	LN	NA	NA	811	825	4146.245	6953.459	20.7	NA	NA	41336	775	M

Appendix B (continued)

Date	Gear	Gear Dp (m)	Gear T (°C)	Time set	Time pulled	Latitude	Longitude	Dp (m)	SST (°C)	SSS	Tag #	TL (mm)	Sex
10/11/10	LN	NA	NA	811	825	4146.245	6953.459	20.7	NA	NA	41337	748	M
10/11/10	LN	NA	NA	811	825	4146.245	6953.459	20.7	NA	NA	41338	635	M
10/11/10	LN	NA	NA	811	825	4146.245	6953.459	20.7	NA	NA	41339	745	M
10/11/10	LN	NA	NA	811	825	4146.245	6953.459	20.7	NA	NA	41340	771	M
10/11/10	LN	NA	NA	811	825	4146.245	6953.459	20.7	NA	NA	47334	777	M
10/11/10	LN	NA	NA	811	825	4146.245	6953.459	20.7	NA	NA	41341	716	M
10/11/10	LN	NA	NA	811	825	4146.245	6953.459	20.7	NA	NA	41342	798	M
10/11/10	LN	NA	NA	811	825	4146.245	6953.459	20.7	NA	NA	41343	710	M
10/11/10	LN	NA	NA	811	825	4146.245	6953.459	20.7	NA	NA	41344	730	M
10/11/10	LN	NA	NA	811	825	4146.245	6953.459	20.7	NA	NA	41345	740	M
10/11/10	LN	NA	NA	811	825	4146.245	6953.459	20.7	NA	NA	41346	754	M
10/11/10	LN	NA	NA	811	825	4146.245	6953.459	20.7	NA	NA	41347	806	M
10/11/10	LN	NA	NA	811	825	4146.245	6953.459	20.7	NA	NA	41348	705	M
10/11/10	LN	NA	NA	811	825	4146.245	6953.459	20.7	NA	NA	41349	748	M
10/11/10	LN	NA	NA	811	825	4146.245	6953.459	20.7	NA	NA	41350	745	M
10/11/10	LN	NA	NA	811	825	4146.245	6953.459	20.7	NA	NA	47335	774	M
10/11/10	LN	NA	NA	811	825	4146.245	6953.459	20.7	NA	NA	41351	780	M
10/11/10	LN	NA	NA	811	825	4146.245	6953.459	20.7	NA	NA	41352	772	M
10/11/10	LN	NA	NA	811	825	4146.245	6953.459	20.7	NA	NA	41353	750	M
10/11/10	LN	NA	NA	811	825	4146.245	6953.459	20.7	NA	NA	41354	739	M
10/11/10	LN	NA	NA	811	825	4146.245	6953.459	20.7	NA	NA	41355	751	M
10/11/10	LN	NA	NA	811	825	4146.245	6953.459	20.7	NA	NA	41356	758	M
10/11/10	LN	NA	NA	811	825	4146.245	6953.459	20.7	NA	NA	41357	778	M
10/11/10	LN	NA	NA	811	825	4146.245	6953.459	20.7	NA	NA	41358	692	M
10/11/10	LN	NA	NA	811	825	4146.245	6953.459	20.7	NA	NA	41359	762	M
10/11/10	LN	NA	NA	811	825	4146.245	6953.459	20.7	NA	NA	41360	746	M
10/11/10	LN	NA	NA	811	825	4146.245	6953.459	20.7	NA	NA	47336	709	M
10/11/10	LN	NA	NA	811	825	4146.245	6953.459	20.7	NA	NA	41361	756	M
10/11/10	LN	NA	NA	811	825	4146.245	6953.459	20.7	NA	NA	41362	780	M
10/11/10	LN	NA	NA	811	825	4146.245	6953.459	20.7	NA	NA	41363	780	M
10/11/10	LN	NA	NA	811	825	4146.245	6953.459	20.7	NA	NA	41364	756	M
10/11/10	LN	NA	NA	811	825	4146.245	6953.459	20.7	NA	NA	41365	780	M
10/11/10	LN	NA	NA	811	825	4146.245	6953.459	20.7	NA	NA	41366	760	M
10/11/10	LN	NA	NA	811	825	4146.245	6953.459	20.7	NA	NA	41367	766	M
10/11/10	LN	NA	NA	811	825	4146.245	6953.459	20.7	NA	NA	41368	790	M
10/11/10	LN	NA	NA	811	825	4146.245	6953.459	20.7	NA	NA	41369	785	M
10/11/10	LN	NA	NA	811	825	4146.245	6953.459	20.7	NA	NA	41370	755	M
10/11/10	LN	NA	NA	811	825	4146.245	6953.459	20.7	NA	NA	47337	745	M
10/11/10	LN	NA	NA	811	825	4146.245	6953.459	20.7	NA	NA	41371	805	M
10/11/10	LN	NA	NA	811	825	4146.245	6953.459	20.7	NA	NA	41372	659	F
10/11/10	LN	NA	NA	811	825	4146.245	6953.459	20.7	NA	NA	41373	758	M

Appendix B (continued)

Date	Gear	Gear Dp (m)	Gear T (°C)	Time set	Time pulled	Latitude	Longitude	Dp (m)	SST (°C)	SSS	Tag #	TL (mm)	Sex
10/11/10	LN	NA	NA	811	825	4146.245	6953.459	20.7	NA	NA	41374	773	M
10/11/10	LN	NA	NA	811	825	4146.245	6953.459	20.7	NA	NA	41375	744	M
10/11/10	LN	NA	NA	811	825	4146.245	6953.459	20.7	NA	NA	41376	771	M
10/11/10	LN	NA	NA	811	825	4146.245	6953.459	20.7	NA	NA	41377	743	M
10/11/10	LN	NA	NA	811	825	4146.245	6953.459	20.7	NA	NA	41378	758	M
10/11/10	LN	NA	NA	811	825	4146.245	6953.459	20.7	NA	NA	41379	794	M
10/11/10	LN	NA	NA	811	825	4146.245	6953.459	20.7	NA	NA	41380	710	M
10/11/10	LN	NA	NA	811	825	4146.245	6953.459	20.7	NA	NA	47338	750	M
10/11/10	LN	NA	NA	811	825	4146.245	6953.459	20.7	NA	NA	41381	758	M
10/11/10	LN	NA	NA	811	825	4146.245	6953.459	20.7	NA	NA	41382	746	M
10/11/10	LN	NA	NA	811	825	4146.245	6953.459	20.7	NA	NA	41383	796	M
10/11/10	LN	NA	NA	811	825	4146.245	6953.459	20.7	NA	NA	41384	811	M
10/11/10	LN	NA	NA	811	825	4146.245	6953.459	20.7	NA	NA	41385	691	M
10/11/10	LN	NA	NA	811	825	4146.245	6953.459	20.7	NA	NA	41386	756	M
10/11/10	LN	NA	NA	811	825	4146.245	6953.459	20.7	NA	NA	41387	720	M
10/11/10	LN	NA	NA	811	825	4146.245	6953.459	20.7	NA	NA	41388	735	M
10/11/10	LN	NA	NA	811	825	4146.245	6953.459	20.7	NA	NA	41389	754	M
10/11/10	LN	NA	NA	811	825	4146.245	6953.459	20.7	NA	NA	41390	715	M
10/11/10	LN	NA	NA	811	825	4146.245	6953.459	20.7	NA	NA	47339	776	M
10/11/10	LN	NA	NA	811	825	4146.245	6953.459	20.7	NA	NA	41391	660	F
10/11/10	LN	NA	NA	811	825	4146.245	6953.459	20.7	NA	NA	41392	781	M
10/11/10	LN	NA	NA	811	825	4146.245	6953.459	20.7	NA	NA	41393	771	M
10/11/10	LN	NA	NA	811	825	4146.245	6953.459	20.7	NA	NA	41394	785	M
10/11/10	LN	NA	NA	811	825	4146.245	6953.459	20.7	NA	NA	41395	763	M
10/11/10	LN	NA	NA	811	825	4146.245	6953.459	20.7	NA	NA	41396	752	M
10/11/10	LN	NA	NA	811	825	4146.245	6953.459	20.7	NA	NA	41397	760	M
10/11/10	LN	NA	NA	811	825	4146.245	6953.459	20.7	NA	NA	41398	790	M
10/11/10	LN	NA	NA	811	825	4146.245	6953.459	20.7	NA	NA	41399	726	M
10/11/10	LN	NA	NA	811	825	4146.245	6953.459	20.7	NA	NA	41400	774	M
10/11/10	LN	NA	NA	811	825	4146.245	6953.459	20.7	NA	NA	47340	741	M
10/11/10	LN	NA	NA	811	825	4146.245	6953.459	20.7	NA	NA	41401	741	M
10/11/10	LN	NA	NA	811	825	4146.245	6953.459	20.7	NA	NA	41402	802	F
10/11/10	LN	NA	NA	811	825	4146.245	6953.459	20.7	NA	NA	41403	761	M
10/11/10	LN	NA	NA	811	825	4146.245	6953.459	20.7	NA	NA	41404	757	M
10/11/10	LN	NA	NA	811	825	4146.245	6953.459	20.7	NA	NA	41405	741	M
10/11/10	LN	NA	NA	811	825	4146.245	6953.459	20.7	NA	NA	41406	750	M
10/11/10	LN	NA	NA	811	825	4146.245	6953.459	20.7	NA	NA	41407	801	M
10/11/10	LN	NA	NA	811	825	4146.245	6953.459	20.7	NA	NA	41408	766	M
10/11/10	LN	NA	NA	811	825	4146.245	6953.459	20.7	NA	NA	41409	761	M
10/11/10	LN	NA	NA	811	825	4146.245	6953.459	20.7	NA	NA	41410	748	M
10/11/10	LN	NA	NA	811	825	4146.245	6953.459	20.7	NA	NA	47341	807	M

Appendix B (continued)

Date	Gear	Gear Dp (m)	Gear T (°C)	Time set	Time pulled	Latitude	Longitude	Dp (m)	SST (°C)	SSS	Tag #	TL (mm)	Sex
10/11/10	LN	NA	NA	811	825	4146.245	6953.459	20.7	NA	NA	41411	767	M
10/11/10	LN	NA	NA	811	825	4146.245	6953.459	20.7	NA	NA	41412	770	M
10/11/10	LN	NA	NA	811	825	4146.245	6953.459	20.7	NA	NA	41413	787	M
10/11/10	LN	NA	NA	811	825	4146.245	6953.459	20.7	NA	NA	41414	769	M
10/11/10	LN	NA	NA	811	825	4146.245	6953.459	20.7	NA	NA	41415	748	M
10/11/10	LN	NA	NA	811	825	4146.245	6953.459	20.7	NA	NA	41416	704	M
10/11/10	LN	NA	NA	811	825	4146.245	6953.459	20.7	NA	NA	41417	756	M
10/11/10	LN	NA	NA	811	825	4146.245	6953.459	20.7	NA	NA	41418	751	M
10/11/10	LN	NA	NA	811	825	4146.245	6953.459	20.7	NA	NA	41419	696	F
10/11/10	LN	NA	NA	811	825	4146.245	6953.459	20.7	NA	NA	41420	769	M
10/11/10	LN	NA	NA	811	825	4146.245	6953.459	20.7	NA	NA	47342	761	M
10/11/10	LN	NA	NA	811	825	4146.245	6953.459	20.7	NA	NA	41421	746	M
10/11/10	LN	NA	NA	811	825	4146.245	6953.459	20.7	NA	NA	41422	751	M
10/11/10	LN	NA	NA	811	825	4146.245	6953.459	20.7	NA	NA	41423	749	M
10/11/10	LN	NA	NA	811	825	4146.245	6953.459	20.7	NA	NA	41424	726	M
10/11/10	LN	NA	NA	811	825	4146.245	6953.459	20.7	NA	NA	41425	725	M
10/11/10	LN	NA	NA	811	825	4146.245	6953.459	20.7	NA	NA	41426	771	M
10/11/10	LN	NA	NA	811	825	4146.245	6953.459	20.7	NA	NA	41427	970	F
10/11/10	LN	NA	NA	811	825	4146.245	6953.459	20.7	NA	NA	41428	751	M
10/11/10	LN	NA	NA	811	825	4146.245	6953.459	20.7	NA	NA	41429	734	M
10/11/10	LN	NA	NA	811	825	4146.245	6953.459	20.7	NA	NA	41430	759	M
10/11/10	LN	NA	NA	811	825	4146.245	6953.459	20.7	NA	NA	47343	762	M
10/11/10	LN	NA	NA	811	825	4146.245	6953.459	20.7	NA	NA	41431	762	M
10/11/10	LN	NA	NA	811	825	4146.245	6953.459	20.7	NA	NA	41432	778	M
10/11/10	LN	NA	NA	811	825	4146.245	6953.459	20.7	NA	NA	41433	734	M
10/11/10	LN	NA	NA	811	825	4146.245	6953.459	20.7	NA	NA	41434	745	M
10/11/10	LN	NA	NA	811	825	4146.245	6953.459	20.7	NA	NA	41435	786	M
10/11/10	LN	NA	NA	811	825	4146.245	6953.459	20.7	NA	NA	41436	754	M
10/11/10	LN	NA	NA	940	952	4146.003	6953.172	20.7	NA	NA	41437	754	M
10/11/10	LN	NA	NA	940	952	4146.003	6953.172	20.7	NA	NA	41438	705	M
10/11/10	LN	NA	NA	940	952	4146.003	6953.172	20.7	NA	NA	41439	653	F
10/11/10	LN	NA	NA	940	952	4146.003	6953.172	20.7	NA	NA	41440	752	M
10/11/10	LN	NA	NA	940	952	4146.003	6953.172	20.7	NA	NA	47344	565	M
10/11/10	LN	NA	NA	940	952	4146.003	6953.172	20.7	NA	NA	41441	795	M
10/11/10	LN	NA	NA	940	952	4146.003	6953.172	20.7	NA	NA	41442	758	M
10/11/10	LN	NA	NA	940	952	4146.003	6953.172	20.7	NA	NA	41443	760	M
10/11/10	LN	NA	NA	940	952	4146.003	6953.172	20.7	NA	NA	41444	755	M
10/11/10	LN	NA	NA	940	952	4146.003	6953.172	20.7	NA	NA	41445	763	M
10/11/10	LN	NA	NA	940	952	4146.003	6953.172	20.7	NA	NA	41446	705	M
10/11/10	LN	NA	NA	940	952	4146.003	6953.172	20.7	NA	NA	41447	725	M
10/11/10	LN	NA	NA	940	952	4146.003	6953.172	20.7	NA	NA	41448	755	M

Appendix B (continued)

Date	Gear	Gear Dp (m)	Gear T (°C)	Time set	Time pulled	Latitude	Longitude	Dp (m)	SST (°C)	SSS	Tag #	TL (mm)	Sex
10/11/10	LN	NA	NA	940	952	4146.003	6953.172	20.7	NA	NA	41449	740	M
10/11/10	LN	NA	NA	940	952	4146.003	6953.172	20.7	NA	NA	41450	780	M
10/11/10	LN	NA	NA	940	952	4146.003	6953.172	20.7	NA	NA	47345	760	M
10/11/10	LN	NA	NA	940	952	4146.003	6953.172	20.7	NA	NA	41451	703	M
10/11/10	LN	NA	NA	940	952	4146.003	6953.172	20.7	NA	NA	41452	750	M
10/11/10	LN	NA	NA	940	952	4146.003	6953.172	20.7	NA	NA	41453	725	M
10/11/10	LN	NA	NA	940	952	4146.003	6953.172	20.7	NA	NA	41454	740	M
10/11/10	LN	NA	NA	940	952	4146.003	6953.172	20.7	NA	NA	41455	750	M
10/11/10	LN	NA	NA	940	952	4146.003	6953.172	20.7	NA	NA	41456	740	M
10/11/10	LN	NA	NA	940	952	4146.003	6953.172	20.7	NA	NA	41457	702	M
10/11/10	LN	NA	NA	940	952	4146.003	6953.172	20.7	NA	NA	41458	718	M
10/11/10	LN	NA	NA	940	952	4146.003	6953.172	20.7	NA	NA	41459	696	M
10/11/10	LN	NA	NA	940	952	4146.003	6953.172	20.7	NA	NA	41460	775	M
10/11/10	LN	NA	NA	940	952	4146.003	6953.172	20.7	NA	NA	47346	670	M
10/11/10	LN	NA	NA	940	952	4146.003	6953.172	20.7	NA	NA	41461	760	M
10/11/10	LN	NA	NA	940	952	4146.003	6953.172	20.7	NA	NA	41462	724	M
10/11/10	LN	NA	NA	940	952	4146.003	6953.172	20.7	NA	NA	41463	695	M
10/11/10	LN	NA	NA	940	952	4146.003	6953.172	20.7	NA	NA	41464	738	M
10/11/10	LN	NA	NA	940	952	4146.003	6953.172	20.7	NA	NA	41465	728	M
10/11/10	LN	NA	NA	940	952	4146.003	6953.172	20.7	NA	NA	41466	805	M
10/11/10	LN	NA	NA	940	952	4146.003	6953.172	20.7	NA	NA	41467	750	M
10/11/10	LN	NA	NA	940	952	4146.003	6953.172	20.7	NA	NA	41468	730	M
10/11/10	LN	NA	NA	940	952	4146.003	6953.172	20.7	NA	NA	41469	775	M
10/11/10	LN	NA	NA	940	952	4146.003	6953.172	20.7	NA	NA	41470	580	M
10/11/10	LN	NA	NA	940	952	4146.003	6953.172	20.7	NA	NA	47347	765	M
10/11/10	LN	NA	NA	940	952	4146.003	6953.172	20.7	NA	NA	41471	743	M
10/11/10	LN	NA	NA	940	952	4146.003	6953.172	20.7	NA	NA	41472	803	M
10/11/10	LN	NA	NA	940	952	4146.003	6953.172	20.7	NA	NA	41473	800	M
10/11/10	LN	NA	NA	940	952	4146.003	6953.172	20.7	NA	NA	41474	736	M
10/11/10	LN	NA	NA	940	952	4146.003	6953.172	20.7	NA	NA	41475	770	M
10/11/10	LN	NA	NA	940	952	4146.003	6953.172	20.7	NA	NA	41476	760	M
10/11/10	LN	NA	NA	940	952	4146.003	6953.172	20.7	NA	NA	41477	738	M
10/11/10	LN	NA	NA	940	952	4146.003	6953.172	20.7	NA	NA	41478	735	M
10/11/10	LN	NA	NA	940	952	4146.003	6953.172	20.7	NA	NA	41479	680	M
10/11/10	LN	NA	NA	940	952	4146.003	6953.172	20.7	NA	NA	41480	695	M
10/11/10	LN	NA	NA	940	952	4146.003	6953.172	20.7	NA	NA	47348	725	M
10/11/10	LN	NA	NA	940	952	4146.003	6953.172	20.7	NA	NA	41481	760	M
10/11/10	LN	NA	NA	940	952	4146.003	6953.172	20.7	NA	NA	41482	740	M
10/11/10	LN	NA	NA	940	952	4146.003	6953.172	20.7	NA	NA	41483	770	M
10/11/10	LN	NA	NA	940	952	4146.003	6953.172	20.7	NA	NA	41484	721	M
10/11/10	LN	NA	NA	940	952	4146.003	6953.172	20.7	NA	NA	41485	747	M

Appendix B (continued)

Date	Gear	Gear Dp (m)	Gear T (°C)	Time set	Time pulled	Latitude	Longitude	Dp (m)	SST (°C)	SSS	Tag #	TL (mm)	Sex
10/11/10	LN	NA	NA	940	952	4146.003	6953.172	20.7	NA	NA	41486	757	M
10/11/10	LN	NA	NA	940	952	4146.003	6953.172	20.7	NA	NA	41487	690	M
10/11/10	LN	NA	NA	940	952	4146.003	6953.172	20.7	NA	NA	41488	761	M
10/11/10	LN	NA	NA	940	952	4146.003	6953.172	20.7	NA	NA	41489	710	M
10/11/10	LN	NA	NA	940	952	4146.003	6953.172	20.7	NA	NA	41490	793	M
10/11/10	LN	NA	NA	940	952	4146.003	6953.172	20.7	NA	NA	47349	752	M
10/11/10	LN	NA	NA	940	952	4146.003	6953.172	20.7	NA	NA	41491	711	F
10/11/10	LN	NA	NA	940	952	4146.003	6953.172	20.7	NA	NA	41492	784	M
10/11/10	LN	NA	NA	940	952	4146.003	6953.172	20.7	NA	NA	41493	801	M
10/11/10	LN	NA	NA	940	952	4146.003	6953.172	20.7	NA	NA	41494	734	M
10/11/10	LN	NA	NA	940	952	4146.003	6953.172	20.7	NA	NA	41495	781	M
10/11/10	LN	NA	NA	940	952	4146.003	6953.172	20.7	NA	NA	41496	794	M
10/11/10	LN	NA	NA	940	952	4146.003	6953.172	20.7	NA	NA	41497	756	M
10/11/10	LN	NA	NA	940	952	4146.003	6953.172	20.7	NA	NA	41498	768	M
10/11/10	LN	NA	NA	940	952	4146.003	6953.172	20.7	NA	NA	41499	774	M
10/11/10	LN	NA	NA	940	952	4146.003	6953.172	20.7	NA	NA	41500	751	M
10/11/10	LN	NA	NA	940	952	4146.003	6953.172	20.7	NA	NA	47350	758	M
10/11/10	LN	NA	NA	940	952	4146.003	6953.172	20.7	NA	NA	41501	782	M
10/11/10	LN	NA	NA	940	952	4146.003	6953.172	20.7	NA	NA	41502	784	M
10/11/10	LN	NA	NA	940	952	4146.003	6953.172	20.7	NA	NA	41503	759	M
10/11/10	LN	NA	NA	940	952	4146.003	6953.172	20.7	NA	NA	41504	858	F
10/11/10	LN	NA	NA	940	952	4146.003	6953.172	20.7	NA	NA	41505	776	M
10/11/10	LN	NA	NA	940	952	4146.003	6953.172	20.7	NA	NA	41506	779	M
10/11/10	LN	NA	NA	940	952	4146.003	6953.172	20.7	NA	NA	41507	741	M
10/11/10	LN	NA	NA	940	952	4146.003	6953.172	20.7	NA	NA	41508	831	F
10/11/10	LN	NA	NA	940	952	4146.003	6953.172	20.7	NA	NA	41509	831	F
10/11/10	LN	NA	NA	940	952	4146.003	6953.172	20.7	NA	NA	41510	765	M
10/11/10	LN	NA	NA	940	952	4146.003	6953.172	20.7	NA	NA	47351	772	M
10/11/10	LN	NA	NA	940	952	4146.003	6953.172	20.7	NA	NA	41511	714	M
10/11/10	LN	NA	NA	940	952	4146.003	6953.172	20.7	NA	NA	41512	773	M
10/11/10	LN	NA	NA	940	952	4146.003	6953.172	20.7	NA	NA	41513	759	M
10/11/10	LN	NA	NA	940	952	4146.003	6953.172	20.7	NA	NA	41514	755	M
10/11/10	LN	NA	NA	940	952	4146.003	6953.172	20.7	NA	NA	41515	783	M
10/11/10	LN	NA	NA	940	952	4146.003	6953.172	20.7	NA	NA	41516	789	M
10/11/10	LN	NA	NA	940	952	4146.003	6953.172	20.7	NA	NA	41517	754	M
10/11/10	LN	NA	NA	940	952	4146.003	6953.172	20.7	NA	NA	41518	751	M
10/11/10	LN	NA	NA	940	952	4146.003	6953.172	20.7	NA	NA	41519	771	M
10/11/10	LN	NA	NA	940	952	4146.003	6953.172	20.7	NA	NA	41520	731	M
10/11/10	LN	NA	NA	940	952	4146.003	6953.172	20.7	NA	NA	47352	714	M
10/11/10	LN	NA	NA	940	952	4146.003	6953.172	20.7	NA	NA	41521	724	M
10/11/10	LN	NA	NA	940	952	4146.003	6953.172	20.7	NA	NA	41522	772	M

Appendix B (continued)

Date	Gear	Gear Dp (m)	Gear T (°C)	Time set	Time pulled	Latitude	Longitude	Dp (m)	SST (°C)	SSS	Tag #	TL (mm)	Sex
10/11/10	LN	NA	NA	940	952	4146.003	6953.172	20.7	NA	NA	41523	767	M
10/11/10	LN	NA	NA	940	952	4146.003	6953.172	20.7	NA	NA	41524	735	M
10/11/10	LN	NA	NA	940	952	4146.003	6953.172	20.7	NA	NA	41525	791	M
10/11/10	LN	NA	NA	940	952	4146.003	6953.172	20.7	NA	NA	41526	731	M
10/11/10	LN	NA	NA	940	952	4146.003	6953.172	20.7	NA	NA	41527	809	F
10/11/10	LN	NA	NA	940	952	4146.003	6953.172	20.7	NA	NA	41528	734	M
10/11/10	LN	NA	NA	940	952	4146.003	6953.172	20.7	NA	NA	41529	781	M
10/11/10	LN	NA	NA	940	952	4146.003	6953.172	20.7	NA	NA	41530	754	M
10/11/10	LN	NA	NA	940	952	4146.003	6953.172	20.7	NA	NA	47353	765	M
10/11/10	LN	NA	NA	940	952	4146.003	6953.172	20.7	NA	NA	41531	754	M
10/11/10	LN	NA	NA	940	952	4146.003	6953.172	20.7	NA	NA	41532	711	M
10/11/10	LN	NA	NA	940	952	4146.003	6953.172	20.7	NA	NA	41533	700	M
10/11/10	LN	NA	NA	940	952	4146.003	6953.172	20.7	NA	NA	41534	760	M
10/11/10	LN	NA	NA	940	952	4146.003	6953.172	20.7	NA	NA	41535	735	M
10/11/10	LN	NA	NA	940	952	4146.003	6953.172	20.7	NA	NA	41536	830	M
10/11/10	LN	NA	NA	940	952	4146.003	6953.172	20.7	NA	NA	41537	785	M
10/11/10	LN	NA	NA	940	952	4146.003	6953.172	20.7	NA	NA	41538	725	M
10/11/10	LN	NA	NA	940	952	4146.003	6953.172	20.7	NA	NA	41539	760	M
10/11/10	LN	NA	NA	940	952	4146.003	6953.172	20.7	NA	NA	41540	755	M
10/11/10	LN	NA	NA	940	952	4146.003	6953.172	20.7	NA	NA	47354	669	M
10/11/10	LN	NA	NA	940	952	4146.003	6953.172	20.7	NA	NA	41541	751	M
10/11/10	LN	NA	NA	940	952	4146.003	6953.172	20.7	NA	NA	41542	749	M
10/11/10	LN	NA	NA	940	952	4146.003	6953.172	20.7	NA	NA	41543	759	M
10/11/10	LN	NA	NA	940	952	4146.003	6953.172	20.7	NA	NA	41544	781	M
10/11/10	LN	NA	NA	940	952	4146.003	6953.172	20.7	NA	NA	41545	734	M
10/11/10	LN	NA	NA	940	952	4146.003	6953.172	20.7	NA	NA	41546	759	M
10/11/10	LN	NA	NA	940	952	4146.003	6953.172	20.7	NA	NA	41547	769	M
10/11/10	LN	NA	NA	940	952	4146.003	6953.172	20.7	NA	NA	41548	760	M
10/11/10	LN	NA	NA	940	952	4146.003	6953.172	20.7	NA	NA	41549	779	M
10/11/10	LN	NA	NA	940	952	4146.003	6953.172	20.7	NA	NA	41550	781	M
10/11/10	LN	NA	NA	940	952	4146.003	6953.172	20.7	NA	NA	47355	755	M
10/11/10	LN	NA	NA	940	952	4146.003	6953.172	20.7	NA	NA	41551	714	M
10/11/10	LN	NA	NA	940	952	4146.003	6953.172	20.7	NA	NA	41552	782	M
10/11/10	LN	NA	NA	940	952	4146.003	6953.172	20.7	NA	NA	41553	740	M
10/11/10	LN	NA	NA	940	952	4146.003	6953.172	20.7	NA	NA	41554	755	M
10/11/10	LN	NA	NA	940	952	4146.003	6953.172	20.7	NA	NA	41555	741	M
10/11/10	LN	NA	NA	940	952	4146.003	6953.172	20.7	NA	NA	41556	754	M
10/11/10	LN	NA	NA	940	952	4146.003	6953.172	20.7	NA	NA	41557	782	M
10/11/10	LN	NA	NA	940	952	4146.003	6953.172	20.7	NA	NA	41558	751	M
10/11/10	LN	NA	NA	940	952	4146.003	6953.172	20.7	NA	NA	41559	763	M
10/11/10	LN	NA	NA	940	952	4146.003	6953.172	20.7	NA	NA	41560	811	M

Appendix B (continued)

Date	Gear	Gear Dp (m)	Gear T (°C)	Time set	Time pulled	Latitude	Longitude	Dp (m)	SST (°C)	SSS	Tag #	TL (mm)	Sex
10/11/10	LN	NA	NA	940	952	4146.003	6953.172	20.7	NA	NA	47356	797	M
10/11/10	LN	NA	NA	940	952	4146.003	6953.172	20.7	NA	NA	41561	759	M
10/11/10	LN	NA	NA	940	952	4146.003	6953.172	20.7	NA	NA	41562	632	M
10/11/10	LN	NA	NA	940	952	4146.003	6953.172	20.7	NA	NA	41563	783	M
10/11/10	LN	NA	NA	940	952	4146.003	6953.172	20.7	NA	NA	41564	716	M
10/11/10	LN	NA	NA	940	952	4146.003	6953.172	20.7	NA	NA	41565	796	M
10/11/10	LN	NA	NA	940	952	4146.003	6953.172	20.7	NA	NA	41566	765	M
10/11/10	LN	NA	NA	940	952	4146.003	6953.172	20.7	NA	NA	41567	760	M
10/11/10	LN	NA	NA	940	952	4146.003	6953.172	20.7	NA	NA	41568	762	M
10/11/10	LN	NA	NA	940	952	4146.003	6953.172	20.7	NA	NA	41569	780	M
10/11/10	LN	NA	NA	940	952	4146.003	6953.172	20.7	NA	NA	41570	732	M
10/11/10	LN	NA	NA	940	952	4146.003	6953.172	20.7	NA	NA	47357	726	M
10/11/10	LN	NA	NA	940	952	4146.003	6953.172	20.7	NA	NA	41571	875	M
10/11/10	LN	NA	NA	940	952	4146.003	6953.172	20.7	NA	NA	41572	740	M
10/11/10	LN	NA	NA	940	952	4146.003	6953.172	20.7	NA	NA	41573	769	M
10/11/10	LN	NA	NA	940	952	4146.003	6953.172	20.7	NA	NA	41574	751	M
10/11/10	LN	NA	NA	940	952	4146.003	6953.172	20.7	NA	NA	41575	751	M
10/11/10	LN	NA	NA	940	952	4146.003	6953.172	20.7	NA	NA	41576	734	M
10/11/10	LN	NA	NA	940	952	4146.003	6953.172	20.7	NA	NA	41577	751	M
10/11/10	LN	NA	NA	940	952	4146.003	6953.172	20.7	NA	NA	41578	780	M
10/11/10	LN	NA	NA	940	952	4146.003	6953.172	20.7	NA	NA	41579	802	M
10/11/10	LN	NA	NA	940	952	4146.003	6953.172	20.7	NA	NA	41580	703	M
10/11/10	LN	NA	NA	940	952	4146.003	6953.172	20.7	NA	NA	47358	720	M
10/11/10	LN	NA	NA	940	952	4146.003	6953.172	20.7	NA	NA	41581	765	M
10/11/10	LN	NA	NA	940	952	4146.003	6953.172	20.7	NA	NA	41582	761	M
10/11/10	LN	NA	NA	940	952	4146.003	6953.172	20.7	NA	NA	41583	791	M
10/11/10	LN	NA	NA	940	952	4146.003	6953.172	20.7	NA	NA	41584	755	M
10/11/10	LN	NA	NA	940	952	4146.003	6953.172	20.7	NA	NA	41585	719	M
10/11/10	LN	NA	NA	940	952	4146.003	6953.172	20.7	NA	NA	41586	723	M
10/11/10	LN	NA	NA	940	952	4146.003	6953.172	20.7	NA	NA	41587	720	M
10/11/10	LN	NA	NA	940	952	4146.003	6953.172	20.7	NA	NA	41588	781	M
10/11/10	LN	NA	NA	940	952	4146.003	6953.172	20.7	NA	NA	41589	752	M
10/11/10	LN	NA	NA	940	952	4146.003	6953.172	20.7	NA	NA	41590	776	M
10/11/10	LN	NA	NA	940	952	4146.003	6953.172	20.7	NA	NA	47359	780	M
10/11/10	LN	NA	NA	940	952	4146.003	6953.172	20.7	NA	NA	41591	771	M
10/11/10	LN	NA	NA	940	952	4146.003	6953.172	20.7	NA	NA	41592	745	M
10/11/10	LN	NA	NA	940	952	4146.003	6953.172	20.7	NA	NA	41593	770	M
10/11/10	LN	NA	NA	940	952	4146.003	6953.172	20.7	NA	NA	41594	770	M
10/11/10	LN	NA	NA	940	952	4146.003	6953.172	20.7	NA	NA	41595	831	M
10/11/10	LN	NA	NA	940	952	4146.003	6953.172	20.7	NA	NA	41596	792	M
10/11/10	LN	NA	NA	940	952	4146.245	6953.459	20.7	NA	NA	41597	753	M

Appendix B (continued)

Date	Gear	Gear Dp (m)	Gear T (°C)	Time set	Time pulled	Latitude	Longitude	Dp (m)	SST (°C)	SSS	Tag #	TL (mm)	Sex
10/11/10	LN	NA	NA	940	952	4146.245	6953.459	20.7	NA	NA	41598	794	M
10/11/10	LN	NA	NA	940	952	4146.245	6953.459	20.7	NA	NA	41599	729	M
10/11/10	LN	NA	NA	940	952	4146.245	6953.459	20.7	NA	NA	41600	713	M
10/11/10	LN	NA	NA	940	952	4146.245	6953.459	20.7	NA	NA	47360	841	M
10/11/10	LN	NA	NA	940	952	4146.245	6953.459	20.7	NA	NA	41601	750	M
10/11/10	LN	NA	NA	940	952	4146.245	6953.459	20.7	NA	NA	41602	685	M
10/11/10	LN	NA	NA	940	952	4146.245	6953.459	20.7	NA	NA	41603	742	M
10/11/10	LN	NA	NA	940	952	4146.245	6953.459	20.7	NA	NA	41604	792	M
10/11/10	LN	NA	NA	940	952	4146.245	6953.459	20.7	NA	NA	41605	730	M
10/11/10	LN	NA	NA	940	952	4146.245	6953.459	20.7	NA	NA	41606	735	M
10/11/10	LN	NA	NA	940	952	4146.245	6953.459	20.7	NA	NA	41607	775	M
10/11/10	LN	NA	NA	940	952	4146.245	6953.459	20.7	NA	NA	41608	750	M
10/11/10	LN	NA	NA	940	952	4146.245	6953.459	20.7	NA	NA	41609	726	M
10/11/10	LN	NA	NA	940	952	4146.245	6953.459	20.7	NA	NA	41610	820	M
10/11/10	LN	NA	NA	940	952	4145.87	6953.26	20.7	14.3	31.3	47361	885	F
10/11/10	LN	NA	NA	940	952	4145.87	6953.26	20.7	14.3	31.3	41611	870	F
10/11/10	LN	NA	NA	940	952	4145.87	6953.26	20.7	14.3	31.3	41612	825	M
10/11/10	LN	NA	NA	940	952	4145.87	6953.26	20.7	14.3	31.3	41613	734	M
10/11/10	LN	NA	NA	940	952	4145.87	6953.26	20.7	14.3	31.3	41614	850	M
10/11/10	LN	NA	NA	940	952	4145.87	6953.26	20.7	14.3	31.3	41615	700	M
10/11/10	LN	NA	NA	940	952	4145.87	6953.26	20.7	14.3	31.3	41616	740	M
10/11/10	LN	NA	NA	940	952	4145.87	6953.26	20.7	14.3	31.3	41617	781	M
10/11/10	LN	NA	NA	940	952	4145.87	6953.26	20.7	14.3	31.3	41618	695	M
10/11/10	LN	NA	NA	940	952	4145.87	6953.26	20.7	14.3	31.3	41619	819	F
10/11/10	LN	NA	NA	940	952	4145.87	6953.26	20.7	14.3	31.3	41620	742	M
10/11/10	LN	NA	NA	940	952	4145.87	6953.26	20.7	14.3	31.3	47362	727	F
10/11/10	LN	NA	NA	940	952	4145.87	6953.26	20.7	14.3	31.3	41621	737	M
10/11/10	LN	NA	NA	940	952	4145.87	6953.26	20.7	14.3	31.3	41622	751	M
10/11/10	LN	NA	NA	940	952	4145.87	6953.26	20.7	14.3	31.3	41623	770	M
10/11/10	LN	NA	NA	940	952	4145.87	6953.26	20.7	14.3	31.3	41624	805	F
10/11/10	LN	NA	NA	940	952	4145.87	6953.26	20.7	14.3	31.3	41625	717	M
10/11/10	LN	NA	NA	940	952	4145.87	6953.26	20.7	14.3	31.3	41626	831	F
10/11/10	LN	NA	NA	940	952	4145.87	6953.26	20.7	14.3	31.3	41627	855	M
10/11/10	LN	NA	NA	940	952	4145.87	6953.26	20.7	14.3	31.3	41628	751	M
10/11/10	LN	NA	NA	940	952	4145.87	6953.26	20.7	14.3	31.3	41629	767	M
10/11/10	LN	NA	NA	940	952	4145.87	6953.26	20.7	14.3	31.3	41630	865	F
10/11/10	LN	NA	NA	940	952	4145.87	6953.26	20.7	14.3	31.3	47363	784	M
10/11/10	LN	NA	NA	940	952	4145.87	6953.26	20.7	14.3	31.3	41631	750	M
10/11/10	LN	NA	NA	940	952	4145.87	6953.26	20.7	14.3	31.3	41632	781	M
10/11/10	LN	NA	NA	940	952	4145.87	6953.26	20.7	14.3	31.3	41633	725	M
10/11/10	LN	NA	NA	940	952	4145.87	6953.26	20.7	14.3	31.3	41634	645	F

Appendix B (continued)

Date	Gear	Gear Dp (m)	Gear T (°C)	Time set	Time pulled	Latitude	Longitude	Dp (m)	SST (°C)	SSS	Tag #	TL (mm)	Sex
10/11/10	LN	NA	NA	940	952	4145.87	6953.26	20.7	14.3	31.3	41635	775	F
10/11/10	LN	NA	NA	940	952	4145.87	6953.26	20.7	14.3	31.3	41636	800	M
10/11/10	LN	NA	NA	940	952	4145.87	6953.26	20.7	14.3	31.3	41637	751	M
10/11/10	LN	NA	NA	940	952	4145.87	6953.26	20.7	14.3	31.3	41638	750	M
10/11/10	LN	NA	NA	940	952	4145.87	6953.26	20.7	14.3	31.3	41639	756	M
10/11/10	LN	NA	NA	940	952	4145.87	6953.26	20.7	14.3	31.3	41640	796	M
10/11/10	LN	NA	NA	940	952	4145.87	6953.26	20.7	14.3	31.3	47364	803	F
10/11/10	LN	NA	NA	940	952	4145.87	6953.26	20.7	14.3	31.3	41641	700	M
10/11/10	LN	NA	NA	940	952	4146.245	6953.459	20.7	14.3	31.3	41642	761	M
10/11/10	LN	NA	NA	940	952	4146.245	6953.459	20.7	14.3	31.3	41643	750	M
10/11/10	LN	NA	NA	940	952	4146.245	6953.459	20.7	14.3	31.3	41644	832	F
10/11/10	LN	NA	NA	940	952	4146.245	6953.459	20.7	14.3	31.3	41645	721	M
10/11/10	LN	NA	NA	940	952	4146.245	6953.459	20.7	14.3	31.3	41646	773	M
10/11/10	LN	NA	NA	940	952	4146.245	6953.459	20.7	14.3	31.3	41647	750	M
10/11/10	LN	NA	NA	940	952	4146.245	6953.459	20.7	14.3	31.3	41648	770	M
10/11/10	LN	NA	NA	940	952	4146.245	6953.459	20.7	14.3	31.3	41649	787	M
10/11/10	LN	NA	NA	940	952	4146.245	6953.459	20.7	14.3	31.3	41650	895	F
10/11/10	LN	NA	NA	940	952	4146.245	6953.459	20.7	14.3	31.3	47365	765	M
10/11/10	LN	NA	NA	940	952	4146.245	6953.459	20.7	14.3	31.3	41651	854	F
10/11/10	LN	NA	NA	940	952	4146.245	6953.459	20.7	14.3	31.3	41652	770	M
10/11/10	LN	NA	NA	940	952	4146.245	6953.459	20.7	14.3	31.3	41653	716	M
10/11/10	LN	NA	NA	940	952	4146.245	6953.459	20.7	14.3	31.3	41654	760	M
10/11/10	LN	NA	NA	940	952	4146.245	6953.459	20.7	14.3	31.3	41655	823	M
10/11/10	LN	NA	NA	940	952	4146.245	6953.459	20.7	14.3	31.3	41656	718	M
10/11/10	LN	NA	NA	940	952	4146.245	6953.459	20.7	14.3	31.3	41657	735	M
10/11/10	LN	NA	NA	940	952	4146.245	6953.459	20.7	14.3	31.3	41658	821	F
10/11/10	LN	NA	NA	940	952	4146.245	6953.459	20.7	14.3	31.3	41659	720	M
10/11/10	LN	NA	NA	940	952	4146.245	6953.459	20.7	14.3	31.3	41660	739	M
10/11/10	LN	NA	NA	940	952	4146.245	6953.459	20.7	14.3	31.3	47366	850	F
10/11/10	LN	NA	NA	940	952	4146.245	6953.459	20.7	14.3	31.3	41661	775	M
10/11/10	LN	NA	NA	940	952	4146.245	6953.459	20.7	14.3	31.3	41662	782	M
10/11/10	LN	NA	NA	940	952	4146.245	6953.459	20.7	14.3	31.3	41663	810	M
10/11/10	LN	NA	NA	940	952	4146.245	6953.459	20.7	14.3	31.3	41664	749	M
10/11/10	LN	NA	NA	940	952	4146.245	6953.459	20.7	14.3	31.3	41665	786	M
10/11/10	LN	NA	NA	940	952	4146.245	6953.459	20.7	14.3	31.3	41666	849	F
10/11/10	LN	NA	NA	940	952	4146.245	6953.459	20.7	14.3	31.3	41667	812	F
10/11/10	LN	NA	NA	940	952	4146.245	6953.459	20.7	14.3	31.3	41668	800	M
10/11/10	LN	NA	NA	940	952	4146.245	6953.459	20.7	14.3	31.3	41669	860	F
10/11/10	LN	NA	NA	940	952	4146.245	6953.459	20.7	14.3	31.3	41670	732	M
10/11/10	LN	NA	NA	940	952	4146.245	6953.459	20.7	14.3	31.3	47367	745	M
10/11/10	LN	NA	NA	940	952	4146.245	6953.459	20.7	14.3	31.3	41671	772	M

Appendix B (continued)

Date	Gear	Gear Dp (m)	Gear T (°C)	Time set	Time pulled	Latitude	Longitude	Dp (m)	SST (°C)	SSS	Tag #	TL (mm)	Sex
10/11/10	LN	NA	NA	940	952	4146.245	6953.459	20.7	14.3	31.3	41672	930	F
10/11/10	LN	NA	NA	940	952	4146.245	6953.459	20.7	14.3	31.3	41673	760	M
10/11/10	LN	NA	NA	940	952	4146.245	6953.459	20.7	14.3	31.3	41674	753	M
10/11/10	LN	NA	NA	940	952	4146.245	6953.459	20.7	14.3	31.3	41675	710	F
10/11/10	LN	NA	NA	940	952	4146.245	6953.459	20.7	14.3	31.3	NA	855	F
10/11/10	LN	NA	NA	940	952	4146.245	6953.459	20.7	14.3	31.3	41676	812	M
10/11/10	LN	NA	NA	940	952	4146.245	6953.459	20.7	14.3	31.3	41677	720	M
10/11/10	LN	NA	NA	940	952	4146.245	6953.459	20.7	14.3	31.3	41678	765	M
10/11/10	LN	NA	NA	940	952	4146.245	6953.459	20.7	14.3	31.3	41679	865	F
10/11/10	LN	NA	NA	940	952	4146.245	6953.459	20.7	14.3	31.3	41680	710	M
10/11/10	LN	NA	NA	940	952	4146.245	6953.459	20.7	14.3	31.3	47368	855	F
10/11/10	LN	NA	NA	940	952	4146.245	6953.459	20.7	14.3	31.3	41681	755	F
10/11/10	LN	NA	NA	940	952	4146.245	6953.459	20.7	14.3	31.3	41682	790	M
10/11/10	LN	NA	NA	940	952	4146.245	6953.459	20.7	14.3	31.3	41683	735	M
10/11/10	LN	NA	NA	940	952	4146.245	6953.459	20.7	14.3	31.3	41684	770	M
10/11/10	LN	NA	NA	940	952	4146.245	6953.459	20.7	14.3	31.3	41685	850	F
10/11/10	LN	NA	NA	940	952	4146.245	6953.459	20.7	14.3	31.3	41686	760	M
10/11/10	LN	NA	NA	940	952	4146.245	6953.459	20.7	14.3	31.3	41687	720	M
10/11/10	LN	NA	NA	940	952	4146.245	6953.459	20.7	14.3	31.3	41688	780	M
10/11/10	LN	NA	NA	940	952	4146.245	6953.459	20.7	14.3	31.3	41689	824	F
10/11/10	LN	NA	NA	940	952	4146.245	6953.459	20.7	14.3	31.3	41690	760	M
10/11/10	LN	NA	NA	940	952	4146.245	6953.459	20.7	14.3	31.3	47369	740	M
10/11/10	LN	NA	NA	940	952	4146.245	6953.459	20.7	14.3	31.3	41691	830	M
10/11/10	LN	NA	NA	940	952	4146.245	6953.459	20.7	14.3	31.3	41692	825	F
10/11/10	LN	NA	NA	940	952	4146.245	6953.459	20.7	14.3	31.3	41693	750	M
10/11/10	LN	NA	NA	940	952	4146.245	6953.459	20.7	14.3	31.3	41694	786	M
10/11/10	LN	NA	NA	940	952	4146.245	6953.459	20.7	14.3	31.3	41695	830	F
10/11/10	LN	NA	NA	940	952	4146.245	6953.459	20.7	14.3	31.3	41696	748	M
10/11/10	LN	NA	NA	940	952	4146.245	6953.459	20.7	14.3	31.3	41697	790	M
10/11/10	LN	NA	NA	940	952	4146.245	6953.459	20.7	14.3	31.3	41698	780	M
10/11/10	LN	NA	NA	940	952	4146.245	6953.459	20.7	14.3	31.3	41699	750	M
10/11/10	LN	NA	NA	940	952	4146.245	6953.459	20.7	14.3	31.3	41700	754	M
10/11/10	LN	NA	NA	940	952	4146.245	6953.459	20.7	14.3	31.3	47370	710	M
10/11/10	LN	NA	NA	940	952	4146.245	6953.459	20.7	14.3	31.3	41701	727	M
10/11/10	LN	NA	NA	940	952	4146.245	6953.459	20.7	14.3	31.3	41702	744	M
10/11/10	LN	NA	NA	940	952	4146.245	6953.459	20.7	14.3	31.3	41703	750	M
10/11/10	LN	NA	NA	940	952	4146.245	6953.459	20.7	14.3	31.3	41704	856	F
10/11/10	LN	NA	NA	940	952	4146.245	6953.459	20.7	14.3	31.3	41705	860	F
10/11/10	LN	NA	NA	940	952	4146.245	6953.459	20.7	14.3	31.3	41706	728	M
10/11/10	LN	NA	NA	940	952	4146.245	6953.459	20.7	14.3	31.3	41707	635	M
10/11/10	LN	NA	NA	940	952	4146.245	6953.459	20.7	14.3	31.3	41708	802	M

Appendix B (continued)

Date	Gear	Gear Dp (m)	Gear T (°C)	Time set	Time pulled	Latitude	Longitude	Dp (m)	SST (°C)	SSS	Tag #	TL (mm)	Sex
10/11/10	LN	NA	NA	940	952	4146.245	6953.459	20.7	14.3	31.3	41709	855	F
10/11/10	LN	NA	NA	940	952	4146.245	6953.459	20.7	14.3	31.3	41710	708	M
10/11/10	LN	NA	NA	940	952	4146.245	6953.459	20.7	14.3	31.3	47371	730	M
10/11/10	LN	NA	NA	940	952	4146.245	6953.459	20.7	14.3	31.3	41711	910	F
10/11/10	LN	NA	NA	940	952	4146.245	6953.459	20.7	14.3	31.3	41712	840	F
10/11/10	LN	NA	NA	940	952	4146.245	6953.459	20.7	14.3	31.3	41713	754	F
10/11/10	LN	NA	NA	940	952	4146.245	6953.459	20.7	14.3	31.3	41714	808	M
10/11/10	LN	NA	NA	940	952	4146.245	6953.459	20.7	14.3	31.3	41715	780	M
10/11/10	LN	NA	NA	940	952	4146.245	6953.459	20.7	14.3	31.3	41716	841	F
10/11/10	LN	NA	NA	940	952	4146.245	6953.459	20.7	14.3	31.3	41717	771	M
10/11/10	LN	NA	NA	940	952	4146.245	6953.459	20.7	14.3	31.3	41718	760	M
10/11/10	LN	NA	NA	940	952	4146.245	6953.459	20.7	14.3	31.3	41719	743	M
10/11/10	LN	NA	NA	940	952	4146.245	6953.459	20.7	14.3	31.3	41720	860	F
10/11/10	LN	NA	NA	940	952	4146.245	6953.459	20.7	14.3	31.3	47372	784	M
10/11/10	LN	NA	NA	940	952	4146.245	6953.459	20.7	14.3	31.3	41721	922	F
10/11/10	LN	NA	NA	940	952	4146.245	6953.459	20.7	14.3	31.3	41722	755	M
10/11/10	LN	NA	NA	940	952	4146.245	6953.459	20.7	14.3	31.3	41723	810	M
10/11/10	LN	NA	NA	940	952	4146.245	6953.459	20.7	14.3	31.3	41724	820	M
10/11/10	LN	NA	NA	940	952	4146.245	6953.459	20.7	14.3	31.3	41725	898	F
10/11/10	LN	NA	NA	940	952	4146.245	6953.459	20.7	14.3	31.3	41726	731	M
10/11/10	LN	NA	NA	940	952	4146.245	6953.459	20.7	14.3	31.3	41727	811	M
10/11/10	LN	NA	NA	940	952	4146.245	6953.459	20.7	14.3	31.3	41728	758	M
10/11/10	LN	NA	NA	940	952	4146.245	6953.459	20.7	14.3	31.3	41729	852	F
10/11/10	LN	NA	NA	940	952	4146.245	6953.459	20.7	14.3	31.3	41730	833	F
10/11/10	LN	NA	NA	940	952	4146.245	6953.459	20.7	14.3	31.3	47373	775	M
10/11/10	LN	NA	NA	940	952	4146.245	6953.459	20.7	14.3	31.3	41731	800	M
10/11/10	LN	NA	NA	940	952	4146.245	6953.459	20.7	14.3	31.3	41732	800	M
10/11/10	LN	NA	NA	940	952	4146.245	6953.459	20.7	14.3	31.3	41733	815	F
10/11/10	LN	NA	NA	940	952	4146.245	6953.459	20.7	14.3	31.3	41734	855	F
10/11/10	LN	NA	NA	940	952	4146.245	6953.459	20.7	14.3	31.3	41735	720	M
10/11/10	LN	NA	NA	940	952	4146.245	6953.459	20.7	14.3	31.3	41736	730	M
10/11/10	LN	NA	NA	940	952	4146.245	6953.459	20.7	14.3	31.3	41737	755	M
10/11/10	LN	NA	NA	940	952	4146.245	6953.459	20.7	14.3	31.3	41738	835	F
10/11/10	LN	NA	NA	940	952	4146.245	6953.459	20.7	14.3	31.3	41739	788	M
10/11/10	LN	NA	NA	940	952	4146.245	6953.459	20.7	14.3	31.3	41740	780	M
10/11/10	LN	NA	NA	940	952	4146.245	6953.459	20.7	14.3	31.3	47374	781	M
10/11/10	LN	NA	NA	940	952	4146.245	6953.459	20.7	14.3	31.3	41741	840	F
10/11/10	LN	NA	NA	940	952	4146.245	6953.459	20.7	NA	NA	41742	835	F
10/11/10	LN	NA	NA	940	952	4146.245	6953.459	20.7	NA	NA	41743	830	F
10/11/10	LN	NA	NA	940	952	4146.245	6953.459	20.7	NA	NA	41744	760	M
10/11/10	LN	NA	NA	940	952	4146.245	6953.459	20.7	NA	NA	41745	784	M

Appendix B (continued)

Date	Gear	Gear Dp (m)	Gear T (°C)	Time set	Time pulled	Latitude	Longitude	Dp (m)	SST (°C)	SSS	Tag #	TL (mm)	Sex
10/11/10	LN	NA	NA	940	952	4146.245	6953.459	20.7	NA	NA	41746	784	M
10/11/10	LN	NA	NA	940	952	4146.245	6953.459	20.7	NA	NA	41747	910	F
10/11/10	LN	NA	NA	940	952	4146.245	6953.459	20.7	NA	NA	41748	740	M
10/11/10	LN	NA	NA	940	952	4146.245	6953.459	20.7	NA	NA	41749	750	M
10/11/10	LN	NA	NA	940	952	4146.245	6953.459	20.7	NA	NA	41750	751	M
10/11/10	LN	NA	NA	940	952	4146.245	6953.459	20.7	NA	NA	47375	770	M
10/11/10	LN	NA	NA	940	952	4146.245	6953.459	20.7	NA	NA	41751	860	F
10/11/10	LN	NA	NA	940	952	4146.245	6953.459	20.7	NA	NA	41752	860	F
10/11/10	LN	NA	NA	940	952	4146.245	6953.459	20.7	NA	NA	41753	876	F
10/11/10	LN	NA	NA	940	952	4146.245	6953.459	20.7	NA	NA	41754	842	F
10/11/10	LN	NA	NA	940	952	4146.245	6953.459	20.7	NA	NA	41755	664	F
10/11/10	LN	NA	NA	940	952	4146.245	6953.459	20.7	NA	NA	41756	776	M
10/11/10	LN	NA	NA	940	952	4146.245	6953.459	20.7	NA	NA	41757	856	F
10/11/10	LN	NA	NA	940	952	4146.245	6953.459	20.7	NA	NA	41758	761	M
10/11/10	LN	NA	NA	940	952	4146.245	6953.459	20.7	NA	NA	41759	750	M
10/11/10	LN	NA	NA	940	952	4146.245	6953.459	20.7	NA	NA	41760	765	M
10/11/10	LN	NA	NA	940	952	4146.245	6953.459	20.7	NA	NA	47376	750	M
10/11/10	LN	NA	NA	940	952	4146.245	6953.459	20.7	NA	NA	41761	862	F
10/11/10	LN	NA	NA	940	952	4146.245	6953.459	20.7	NA	NA	41762	750	M
10/11/10	LN	NA	NA	940	952	4146.245	6953.459	20.7	NA	NA	41763	774	M
10/11/10	LN	NA	NA	940	952	4146.245	6953.459	20.7	NA	NA	41764	761	M
10/11/10	LN	NA	NA	940	952	4146.245	6953.459	20.7	NA	NA	41765	787	M
10/11/10	LN	NA	NA	940	952	4146.245	6953.459	20.7	NA	NA	41766	723	M
10/11/10	LN	NA	NA	940	952	4146.245	6953.459	20.7	NA	NA	41767	746	M
10/11/10	LN	NA	NA	940	952	4146.245	6953.459	20.7	NA	NA	41768	716	M
10/11/10	LN	NA	NA	940	952	4146.245	6953.459	20.7	NA	NA	41769	874	F
10/11/10	LN	NA	NA	940	952	4146.245	6953.459	20.7	NA	NA	41770	713	M
10/11/10	LN	NA	NA	940	952	4146.245	6953.459	20.7	NA	NA	47377	745	M
10/11/10	LN	NA	NA	940	952	4146.245	6953.459	20.7	NA	NA	41771	953	F
10/11/10	LN	NA	NA	940	952	4146.245	6953.459	20.7	NA	NA	41772	772	M
10/11/10	LN	NA	NA	940	952	4146.245	6953.459	20.7	NA	NA	41773	866	F
10/11/10	LN	NA	NA	1155	1206	4145.81	6953.196	20.7	NA	NA	41774	710	M
10/11/10	LN	NA	NA	1155	1206	4145.81	6953.196	20.7	NA	NA	41775	779	M
10/11/10	LN	NA	NA	1155	1206	4145.81	6953.196	20.7	NA	NA	41776	775	M
10/11/10	LN	NA	NA	1155	1206	4145.81	6953.196	20.7	NA	NA	41777	849	F
10/11/10	LN	NA	NA	1155	1206	4145.81	6953.196	20.7	NA	NA	41778	795	M
10/11/10	LN	NA	NA	1155	1206	4145.81	6953.196	20.7	NA	NA	41779	748	M
10/11/10	LN	NA	NA	1155	1206	4145.81	6953.196	20.7	NA	NA	41780	700	M
10/11/10	LN	NA	NA	1155	1206	4145.81	6953.196	20.7	NA	NA	47378	855	F
10/11/10	LN	NA	NA	1155	1206	4145.81	6953.196	20.7	NA	NA	41781	720	M
10/11/10	LN	NA	NA	1155	1206	4145.81	6953.196	20.7	NA	NA	41782	750	F

Appendix B (continued)

Date	Gear	Gear Dp (m)	Gear T (°C)	Time set	Time pulled	Latitude	Longitude	Dp (m)	SST (°C)	SSS	Tag #	TL (mm)	Sex
10/11/10	LN	NA	NA	1155	1206	4145.81	6953.196	20.7	NA	NA	41783	845	F
10/11/10	LN	NA	NA	1155	1206	4145.81	6953.196	20.7	NA	NA	41784	803	F
10/11/10	LN	NA	NA	1155	1206	4145.81	6953.196	20.7	NA	NA	41785	772	M
10/11/10	LN	NA	NA	1155	1206	4145.81	6953.196	20.7	NA	NA	41786	720	M
10/11/10	LN	NA	NA	1155	1206	4145.81	6953.196	20.7	NA	NA	41787	725	M
10/11/10	LN	NA	NA	1155	1206	4145.81	6953.196	20.7	NA	NA	41788	846	F
10/11/10	LN	NA	NA	1155	1206	4145.81	6953.196	20.7	NA	NA	41789	905	F
10/11/10	LN	NA	NA	1155	1206	4145.81	6953.196	20.7	NA	NA	41790	755	M
10/11/10	LN	NA	NA	1155	1206	4145.81	6953.196	20.7	NA	NA	47379	829	F
10/11/10	LN	NA	NA	1155	1206	4145.81	6953.196	20.7	NA	NA	41791	850	F
10/11/10	LN	NA	NA	1155	1206	4145.81	6953.196	20.7	NA	NA	41792	730	M
10/11/10	LN	NA	NA	1155	1206	4145.81	6953.196	20.7	NA	NA	41793	742	M
10/11/10	LN	NA	NA	1155	1206	4145.81	6953.196	20.7	NA	NA	41794	899	F
10/11/10	LN	NA	NA	1155	1206	4145.81	6953.196	20.7	NA	NA	41795	750	M
10/11/10	LN	NA	NA	1155	1206	4145.81	6953.196	20.7	NA	NA	41796	751	M
10/11/10	LN	NA	NA	1155	1206	4145.81	6953.196	20.7	NA	NA	41797	775	M
10/11/10	LN	NA	NA	1155	1206	4145.81	6953.196	20.7	NA	NA	41798	748	M
10/11/10	LN	NA	NA	1155	1206	4145.81	6953.196	20.7	NA	NA	41799	790	M
10/11/10	LN	NA	NA	1155	1206	4145.81	6953.196	20.7	NA	NA	41800	805	M
10/11/10	LN	NA	NA	1155	1206	4145.81	6953.196	20.7	NA	NA	47380	781	M
10/11/10	LN	NA	NA	1155	1206	4145.81	6953.196	20.7	NA	NA	41801	806	F
10/11/10	LN	NA	NA	1155	1206	4145.81	6953.196	20.7	NA	NA	41802	771	M
10/11/10	LN	NA	NA	1155	1206	4145.81	6953.196	20.7	NA	NA	41803	724	M
10/11/10	LN	NA	NA	1155	1206	4145.81	6953.196	20.7	NA	NA	41804	769	M
10/11/10	LN	NA	NA	1155	1206	4145.81	6953.196	20.7	NA	NA	41805	755	M
10/11/10	LN	NA	NA	1155	1206	4145.81	6953.196	20.7	NA	NA	41806	789	M
10/11/10	LN	NA	NA	1155	1206	4145.81	6953.196	20.7	NA	NA	41807	720	M
10/11/10	LN	NA	NA	1155	1206	4145.81	6953.196	20.7	NA	NA	41808	771	M
10/11/10	LN	NA	NA	1155	1206	4145.81	6953.196	20.7	NA	NA	41809	726	F
10/11/10	LN	NA	NA	1155	1206	4145.81	6953.196	20.7	NA	NA	41810	672	M
10/11/10	LN	NA	NA	1155	1206	4145.81	6953.196	20.7	NA	NA	47381	771	M
10/11/10	LN	NA	NA	1155	1206	4145.81	6953.196	20.7	NA	NA	41811	774	M
10/11/10	LN	NA	NA	1155	1206	4145.81	6953.196	20.7	NA	NA	41812	695	M
10/11/10	LN	NA	NA	1155	1206	4145.81	6953.196	20.7	NA	NA	41813	775	M
10/11/10	LN	NA	NA	1155	1206	4145.81	6953.196	20.7	NA	NA	41814	725	M
10/11/10	LN	NA	NA	1155	1206	4145.81	6953.196	20.7	NA	NA	41815	781	M
10/11/10	LN	NA	NA	1155	1206	4145.81	6953.196	20.7	NA	NA	41816	779	M
10/11/10	LN	NA	NA	1155	1206	4145.81	6953.196	20.7	NA	NA	41817	800	F
10/11/10	LN	NA	NA	1155	1206	4145.81	6953.196	20.7	NA	NA	41818	745	F
10/11/10	LN	NA	NA	1155	1206	4145.81	6953.196	20.7	NA	NA	41819	705	M
10/11/10	LN	NA	NA	1155	1206	4145.81	6953.196	20.7	NA	NA	41820	794	M

Appendix B (continued)

Date	Gear	Gear Dp (m)	Gear T (°C)	Time set	Time pulled	Latitude	Longitude	Dp (m)	SST (°C)	SSS	Tag #	TL (mm)	Sex
10/11/10	LN	NA	NA	1155	1206	4145.81	6953.196	20.7	NA	NA	47382	771	M
10/11/10	LN	NA	NA	1155	1206	4145.81	6953.196	20.7	NA	NA	41821	780	M
10/11/10	LN	NA	NA	1155	1206	4145.81	6953.196	20.7	NA	NA	41822	754	M
10/11/10	LN	NA	NA	1155	1206	4145.81	6953.196	20.7	NA	NA	41823	720	M
10/11/10	LN	NA	NA	1155	1206	4145.81	6953.196	20.7	NA	NA	41824	719	M
10/11/10	LN	NA	NA	1155	1206	4145.81	6953.196	20.7	NA	NA	41825	783	M
10/11/10	LN	NA	NA	1155	1206	4145.81	6953.196	20.7	NA	NA	41826	791	M
10/11/10	LN	NA	NA	1155	1206	4145.81	6953.196	20.7	NA	NA	41827	749	M
10/11/10	LN	NA	NA	1155	1206	4145.81	6953.196	20.7	NA	NA	41828	731	M
10/11/10	LN	NA	NA	1155	1206	4145.81	6953.196	20.7	NA	NA	41829	762	M
10/11/10	LN	NA	NA	1155	1206	4145.81	6953.196	20.7	NA	NA	41830	780	M
10/11/10	LN	NA	NA	1155	1206	4145.81	6953.196	20.7	NA	NA	47383	711	M
10/11/10	LN	NA	NA	1155	1206	4145.81	6953.196	20.7	NA	NA	41831	756	M
10/11/10	LN	NA	NA	1155	1206	4145.81	6953.196	20.7	NA	NA	41832	750	M
10/11/10	LN	NA	NA	1155	1206	4145.81	6953.196	20.7	NA	NA	41833	731	M
10/11/10	LN	NA	NA	1155	1206	4145.81	6953.196	20.7	NA	NA	41834	811	M
10/11/10	LN	NA	NA	1155	1206	4145.81	6953.196	20.7	NA	NA	41835	848	F
10/11/10	LN	NA	NA	1155	1206	4145.81	6953.196	20.7	NA	NA	41836	741	M
10/11/10	LN	NA	NA	1155	1206	4145.81	6953.196	20.7	NA	NA	41837	824	M
10/11/10	LN	NA	NA	1155	1206	4145.81	6953.196	20.7	NA	NA	41838	745	M
10/11/10	LN	NA	NA	1155	1206	4145.81	6953.196	20.7	NA	NA	41839	768	M
10/11/10	LN	NA	NA	1155	1206	4145.81	6953.196	20.7	NA	NA	41840	785	M
10/11/10	LN	NA	NA	1155	1206	4145.81	6953.196	20.7	NA	NA	47384	920	F
10/11/10	LN	NA	NA	1155	1206	4145.81	6953.196	20.7	NA	NA	41841	815	F
10/11/10	LN	NA	NA	1155	1206	4145.81	6953.196	20.7	NA	NA	41842	779	M
10/11/10	LN	NA	NA	1155	1206	4145.81	6953.196	20.7	NA	NA	41843	812	M
10/11/10	LN	NA	NA	1155	1206	4145.81	6953.196	20.7	NA	NA	41844	785	F
10/11/10	LN	NA	NA	1155	1206	4145.81	6953.196	20.7	NA	NA	41845	744	M
10/11/10	LN	NA	NA	1155	1206	4145.81	6953.196	20.7	NA	NA	41846	661	M
10/11/10	LN	NA	NA	1155	1206	4145.81	6953.196	20.7	NA	NA	41847	749	M
10/11/10	LN	NA	NA	1155	1206	4145.81	6953.196	20.7	NA	NA	41848	795	F
10/11/10	LN	NA	NA	1155	1206	4145.81	6953.196	20.7	NA	NA	41849	765	M
10/11/10	LN	NA	NA	1155	1206	4145.81	6953.196	20.7	NA	NA	41850	770	M
10/11/10	LN	NA	NA	1155	1206	4145.81	6953.196	20.7	NA	NA	47385	780	M
10/11/10	LN	NA	NA	1155	1206	4145.81	6953.196	20.7	NA	NA	41851	714	F
10/11/10	LN	NA	NA	1155	1206	4145.81	6953.196	20.7	NA	NA	41852	842	F
10/11/10	LN	NA	NA	1155	1206	4145.81	6953.196	20.7	NA	NA	41853	735	M
10/11/10	LN	NA	NA	1155	1206	4145.81	6953.196	20.7	NA	NA	41854	771	M
10/11/10	LN	NA	NA	1155	1206	4145.81	6953.196	20.7	NA	NA	41855	755	M
10/11/10	LN	NA	NA	1155	1206	4145.81	6953.196	20.7	NA	NA	41856	851	F
10/11/10	LN	NA	NA	1155	1206	4145.81	6953.196	20.7	NA	NA	41857	740	M

Appendix B (continued)

Date	Gear	Gear Dp (m)	Gear T (°C)	Time set	Time pulled	Latitude	Longitude	Dp (m)	SST (°C)	SSS	Tag #	TL (mm)	Sex
10/11/10	GN	NA	NA	730	830	4116.27	7112.62	34.7	NA	NA	42001	859	F
10/11/10	GN	NA	NA	730	830	4116.27	7112.62	34.7	NA	NA	42002	846	F
10/11/10	GN	NA	NA	730	830	4116.27	7112.62	34.7	NA	NA	42003	907	F
10/11/10	GN	NA	NA	730	830	4116.27	7112.62	34.7	NA	NA	42004	847	F
10/11/10	GN	NA	NA	730	830	4116.27	7112.62	34.7	NA	NA	42005	918	F
10/11/10	GN	NA	NA	730	830	4116.27	7112.62	34.7	NA	NA	42006	849	F
10/11/10	GN	NA	NA	730	830	4116.27	7112.62	34.7	NA	NA	42007	798	F
10/11/10	GN	NA	NA	730	830	4116.27	7112.62	34.7	NA	NA	42008	876	F
10/11/10	GN	NA	NA	730	830	4116.27	7112.62	34.7	NA	NA	42009	895	F
10/11/10	GN	NA	NA	730	830	4116.27	7112.62	34.7	NA	NA	42010	854	F
10/11/10	GN	NA	NA	730	830	4116.27	7112.62	34.7	NA	NA	47401	971	F
10/11/10	GN	NA	NA	730	830	4116.27	7112.62	34.7	NA	NA	42011	915	F
10/11/10	GN	NA	NA	730	830	4116.27	7112.62	34.7	NA	NA	42012	855	F
10/11/10	GN	NA	NA	730	830	4116.27	7112.62	34.7	NA	NA	42013	960	F
10/11/10	GN	NA	NA	730	830	4116.27	7112.62	34.7	NA	NA	42014	884	F
10/11/10	GN	NA	NA	730	830	4116.27	7112.62	34.7	NA	NA	42015	856	F
10/11/10	GN	NA	NA	730	830	4116.27	7112.62	34.7	NA	NA	42016	940	F
10/11/10	GN	NA	NA	730	830	4116.27	7112.62	34.7	NA	NA	42017	859	F
10/11/10	GN	NA	NA	730	830	4116.27	7112.62	34.7	NA	NA	42018	931	F
10/11/10	GN	NA	NA	730	830	4116.27	7112.62	34.7	NA	NA	42019	949	F
10/11/10	GN	NA	NA	730	830	4116.27	7112.62	34.7	NA	NA	42020	883	F
10/11/10	GN	NA	NA	730	830	4116.27	7112.62	34.7	NA	NA	47402	915	F
10/11/10	GN	NA	NA	730	830	4116.27	7112.62	34.7	NA	NA	42021	939	F
10/11/10	GN	NA	NA	730	830	4116.27	7112.62	34.7	NA	NA	42022	964	F
10/11/10	GN	NA	NA	730	830	4116.27	7112.62	34.7	NA	NA	42023	915	F
10/11/10	GN	NA	NA	730	830	4116.27	7112.62	34.7	NA	NA	42024	847	F
10/11/10	GN	NA	NA	730	830	4116.27	7112.62	34.7	NA	NA	42025	915	F
10/11/10	GN	NA	NA	730	830	4116.27	7112.62	34.7	NA	NA	42026	990	F
10/11/10	GN	NA	NA	730	830	4116.27	7112.62	34.7	NA	NA	42027	906	F
10/11/10	GN	NA	NA	730	830	4116.27	7112.62	34.7	NA	NA	42028	890	F
10/11/10	GN	NA	NA	915	1030	4116.04	7112.86	36.6	NA	NA	42029	896	F
10/11/10	GN	NA	NA	915	1030	4116.04	7112.86	36.6	NA	NA	42030	821	F
10/11/10	GN	NA	NA	915	1030	4116.04	7112.86	36.6	NA	NA	47403	774	M
10/11/10	GN	NA	NA	915	1030	4116.04	7112.86	36.6	NA	NA	42031	744	M
10/11/10	GN	NA	NA	915	1030	4116.04	7112.86	36.6	NA	NA	42032	900	F
10/11/10	GN	NA	NA	915	1030	4116.04	7112.86	36.6	NA	NA	42033	784	F
10/11/10	GN	NA	NA	915	1030	4116.04	7112.86	36.6	NA	NA	42034	899	F
10/11/10	GN	NA	NA	915	1030	4116.04	7112.86	36.6	NA	NA	42035	878	F
10/11/10	GN	NA	NA	915	1030	4116.04	7112.86	36.6	NA	NA	42036	775	M
10/11/10	GN	NA	NA	915	1030	4116.04	7112.86	36.6	NA	NA	42037	878	F
10/11/10	GN	NA	NA	915	1030	4116.04	7112.86	36.6	NA	NA	42038	919	F

Appendix B (continued)

Date	Gear	Gear Dp (m)	Gear T (°C)	Time set	Time pulled	Latitude	Longitude	Dp (m)	SST (°C)	SSS	Tag #	TL (mm)	Sex
10/11/10	GN	NA	NA	915	1030	4116.04	7112.86	36.6	NA	NA	42039	821	F
10/11/10	GN	NA	NA	915	1030	4116.04	7112.86	36.6	NA	NA	42040	810	F
10/11/10	GN	NA	NA	915	1030	4116.04	7112.86	36.6	NA	NA	47404	936	F
10/11/10	GN	NA	NA	915	1030	4116.04	7112.86	36.6	NA	NA	42041	815	F
10/11/10	GN	NA	NA	915	1030	4116.04	7112.86	36.6	NA	NA	42042	953	F
10/11/10	GN	NA	NA	915	1030	4116.04	7112.86	36.6	NA	NA	42043	952	F
10/11/10	GN	NA	NA	915	1030	4116.04	7112.86	36.6	NA	NA	42044	805	F
10/11/10	GN	NA	NA	915	1030	4116.04	7112.86	36.6	NA	NA	42045	812	F
10/11/10	GN	NA	NA	915	1030	4116.04	7112.86	36.6	NA	NA	42046	895	M
10/11/10	GN	NA	NA	915	1030	4116.04	7112.86	36.6	NA	NA	42047	919	F
10/11/10	GN	NA	NA	915	1030	4116.04	7112.86	36.6	NA	NA	42048	922	F
10/11/10	GN	NA	NA	915	1030	4116.04	7112.86	36.6	NA	NA	42049	1025	F
10/11/10	GN	NA	NA	915	1030	4116.04	7112.86	36.6	NA	NA	42050	890	F
10/11/10	GN	NA	NA	1124	1230	4116.15	7112.74	34.7	NA	NA	47405	961	F
10/11/10	GN	NA	NA	1124	1230	4116.15	7112.74	34.7	NA	NA	42051	875	F
10/11/10	GN	NA	NA	1124	1230	4116.15	7112.74	34.7	NA	NA	42052	920	F
10/11/10	GN	NA	NA	1124	1230	4116.15	7112.74	34.7	NA	NA	42053	847	F
10/11/10	GN	NA	NA	1124	1230	4116.15	7112.74	34.7	NA	NA	42054	892	F
10/11/10	GN	NA	NA	1124	1230	4116.15	7112.74	34.7	NA	NA	42055	846	F
10/11/10	GN	NA	NA	1124	1230	4116.15	7112.74	34.7	NA	NA	42056	912	F
10/11/10	GN	NA	NA	1124	1230	4116.15	7112.74	34.7	NA	NA	42057	892	F
10/11/10	GN	NA	NA	1124	1230	4116.15	7112.74	34.7	NA	NA	42058	834	F
10/11/10	GN	NA	NA	1124	1230	4116.15	7112.74	34.7	NA	NA	42059	935	F
10/11/10	GN	NA	NA	1124	1230	4116.15	7112.74	34.7	NA	NA	42060	856	F
10/11/10	GN	NA	NA	1124	1230	4116.15	7112.74	34.7	NA	NA	47406	960	F
10/11/10	GN	NA	NA	1124	1230	4116.15	7112.74	34.7	NA	NA	42061	892	F
10/11/10	GN	NA	NA	1124	1230	4116.15	7112.74	34.7	NA	NA	42062	936	F
10/11/10	GN	NA	NA	1124	1230	4116.15	7112.74	34.7	NA	NA	42063	811	F
10/11/10	GN	NA	NA	1124	1230	4116.15	7112.74	34.7	NA	NA	42064	918	F
10/11/10	GN	NA	NA	1124	1230	4116.15	7112.74	34.7	NA	NA	42065	832	F
10/11/10	GN	NA	NA	1124	1230	4116.15	7112.74	34.7	NA	NA	42066	912	F
10/11/10	GN	NA	NA	1124	1230	4116.15	7112.74	34.7	NA	NA	42067	853	F
10/11/10	GN	NA	NA	1124	1230	4116.15	7112.74	34.7	NA	NA	42068	918	F
10/11/10	GN	NA	NA	1124	1230	4116.15	7112.74	34.7	NA	NA	42069	891	F
10/11/10	GN	NA	NA	1124	1230	4116.15	7112.74	34.7	NA	NA	42070	935	F
10/11/10	GN	NA	NA	1124	1230	4116.15	7112.74	34.7	NA	NA	47407	840	F
10/11/10	GN	NA	NA	1124	1230	4116.15	7112.74	34.7	NA	NA	42071	788	M
10/11/10	GN	NA	NA	1124	1230	4116.15	7112.74	34.7	NA	NA	42072	798	M
10/11/10	GN	NA	NA	1124	1230	4116.15	7112.74	34.7	NA	NA	42073	907	F
10/11/10	GN	NA	NA	1124	1230	4116.15	7112.74	34.7	NA	NA	42074	930	F
10/11/10	GN	NA	NA	1124	1230	4116.15	7112.74	34.7	NA	NA	42075	805	F

Appendix B (continued)

Date	Gear	Gear Dp (m)	Gear T (°C)	Time set	Time pulled	Latitude	Longitude	Dp (m)	SST (°C)	SSS	Tag #	TL (mm)	Sex
10/11/10	GN	NA	NA	1124	1230	4116.15	7112.74	34.7	NA	NA	42076	802	F
10/11/10	GN	NA	NA	1124	1230	4116.15	7112.74	34.7	NA	NA	42077	910	F
10/11/10	GN	NA	NA	1124	1230	4116.15	7112.74	34.7	NA	NA	42078	858	F
10/11/10	GN	NA	NA	1124	1230	4116.15	7112.74	34.7	NA	NA	42079	910	F
10/11/10	GN	NA	NA	1124	1230	4116.15	7112.74	34.7	NA	NA	42080	948	F
10/11/10	GN	NA	NA	1124	1230	4116.15	7112.74	34.7	NA	NA	47408	860	F
10/11/10	GN	NA	NA	1124	1230	4116.15	7112.74	34.7	NA	NA	42081	915	F
10/11/10	GN	NA	NA	1124	1230	4116.15	7112.74	34.7	NA	NA	42082	874	F
10/11/10	GN	NA	NA	1124	1230	4116.15	7112.74	34.7	NA	NA	42083	901	F
10/11/10	GN	NA	NA	1124	1230	4116.15	7112.74	34.7	NA	NA	42084	745	M
10/11/10	GN	NA	NA	1124	1230	4116.15	7112.74	34.7	NA	NA	42085	107	F
10/11/10	GN	NA	NA	1124	1230	4116.15	7112.74	34.7	NA	NA	42086	910	F
10/11/10	GN	NA	NA	1124	1230	4116.15	7112.74	34.7	NA	NA	42087	932	F
10/11/10	GN	NA	NA	1124	1230	4116.15	7112.74	34.7	NA	NA	42088	890	F
10/11/10	GN	NA	NA	1124	1230	4116.15	7112.74	34.7	NA	NA	42089	863	F
10/11/10	GN	NA	NA	1124	1230	4116.15	7112.74	34.7	NA	NA	42090	884	F
10/11/10	GN	NA	NA	1124	1230	4116.15	7112.74	34.7	NA	NA	47409	887	F
10/11/10	GN	NA	NA	1124	1230	4116.15	7112.74	34.7	NA	NA	42091	942	F
10/11/10	GN	NA	NA	1124	1230	4116.15	7112.74	34.7	NA	NA	42092	851	F
10/11/10	GN	NA	NA	1124	1230	4116.15	7112.74	34.7	NA	NA	42093	954	F
10/11/10	GN	NA	NA	1124	1230	4116.15	7112.74	34.7	NA	NA	42094	890	F
10/11/10	GN	NA	NA	1124	1230	4116.15	7112.74	34.7	NA	NA	42095	915	F
10/11/10	GN	NA	NA	1317	1415	4115.938	7112.797	35.3	NA	NA	42096	940	F
10/11/10	GN	NA	NA	1317	1415	4115.938	7112.797	35.3	NA	NA	42097	999	F
10/11/10	GN	NA	NA	1317	1415	4115.938	7112.797	35.3	NA	NA	42098	896	F
10/11/10	GN	NA	NA	1317	1415	4115.938	7112.797	35.3	NA	NA	42099	849	F
10/11/10	GN	NA	NA	1317	1415	4115.938	7112.797	35.3	NA	NA	42100	963	F
10/11/10	GN	NA	NA	1317	1415	4115.938	7112.797	35.3	NA	NA	47410	948	F
10/11/10	GN	NA	NA	1317	1415	4115.938	7112.797	35.3	NA	NA	42101	841	F
10/11/10	GN	NA	NA	1317	1415	4115.938	7112.797	35.3	NA	NA	42102	894	F
10/11/10	GN	NA	NA	1317	1415	4115.938	7112.797	35.3	NA	NA	42103	800	F
10/11/10	GN	NA	NA	1317	1415	4115.938	7112.797	35.3	NA	NA	42104	840	F
10/11/10	GN	NA	NA	1317	1415	4115.938	7112.797	35.3	NA	NA	42105	922	F
10/11/10	GN	NA	NA	1317	1415	4115.938	7112.797	35.3	NA	NA	42106	881	F
10/11/10	GN	NA	NA	1317	1415	4115.938	7112.797	35.3	NA	NA	42107	890	F
10/11/10	GN	NA	NA	1317	1415	4115.938	7112.797	35.3	NA	NA	42108	986	F
10/11/10	GN	NA	NA	1317	1415	4115.938	7112.797	35.3	NA	NA	42109	855	F
10/11/10	GN	NA	NA	1317	1415	4115.938	7112.797	35.3	NA	NA	42110	904	F
10/11/10	GN	NA	NA	1317	1415	4115.938	7112.797	35.3	NA	NA	47411	887	F
10/11/10	GN	NA	NA	1317	1415	4115.938	7112.797	35.3	NA	NA	42111	895	F
10/11/10	GN	NA	NA	1317	1415	4115.938	7112.797	35.3	NA	NA	42112	852	F

Appendix B (continued)

Date	Gear	Gear Dp (m)	Gear T (°C)	Time set	Time pulled	Latitude	Longitude	Dp (m)	SST (°C)	SSS	Tag #	TL (mm)	Sex
10/11/10	GN	NA	NA	1317	1415	4115.938	7112.797	35.3	NA	NA	42113	861	F
10/11/10	GN	NA	NA	1317	1415	4115.938	7112.797	35.3	NA	NA	42114	813	F
10/11/10	GN	NA	NA	1317	1415	4115.938	7112.797	35.3	NA	NA	42115	902	F
10/11/10	GN	NA	NA	1317	1415	4115.938	7112.797	35.3	NA	NA	42116	910	F
10/11/10	GN	NA	NA	1317	1415	4115.938	7112.797	35.3	NA	NA	42117	862	F
10/11/10	GN	NA	NA	1317	1415	4115.938	7112.797	35.3	NA	NA	42118	955	F
10/11/10	GN	NA	NA	1317	1415	4115.938	7112.797	35.3	NA	NA	42119	857	F
10/11/10	GN	NA	NA	1317	1415	4115.938	7112.797	35.3	NA	NA	42120	961	F
10/11/10	GN	NA	NA	1317	1415	4115.938	7112.797	35.3	NA	NA	47412	882	F
10/11/10	GN	NA	NA	1317	1415	4115.938	7112.797	35.3	NA	NA	42121	800	M
10/11/10	GN	NA	NA	1317	1415	4115.938	7112.797	35.3	NA	NA	42122	821	M
10/11/10	GN	NA	NA	1317	1415	4115.938	7112.797	35.3	NA	NA	42123	891	F
10/11/10	GN	NA	NA	1317	1415	4115.938	7112.797	35.3	NA	NA	42124	760	M
10/11/10	GN	NA	NA	1317	1415	4115.938	7112.797	35.3	NA	NA	42125	911	F
10/11/10	GN	NA	NA	1317	1415	4115.938	7112.797	35.3	NA	NA	42126	968	F
10/11/10	GN	NA	NA	1317	1415	4115.938	7112.797	35.3	NA	NA	42127	831	F
10/11/10	GN	NA	NA	1317	1415	4115.938	7112.797	35.3	NA	NA	42128	939	F
10/11/10	GN	NA	NA	1317	1415	4115.938	7112.797	35.3	NA	NA	42129	895	F
10/11/10	GN	NA	NA	1317	1415	4115.938	7112.797	35.3	NA	NA	42130	898	F
10/11/10	GN	NA	NA	1317	1415	4115.938	7112.797	35.3	NA	NA	47413	838	F
10/11/10	GN	NA	NA	1317	1415	4115.938	7112.797	35.3	NA	NA	42131	892	F
10/11/10	GN	NA	NA	1317	1415	4115.938	7112.797	35.3	NA	NA	42132	897	F
10/11/10	GN	NA	NA	1317	1415	4115.938	7112.797	35.3	NA	NA	42133	862	F
10/11/10	GN	NA	NA	1317	1415	4115.938	7112.797	35.3	NA	NA	42134	867	F
10/11/10	GN	NA	NA	1317	1415	4115.938	7112.797	35.3	NA	NA	42135	855	F
10/11/10	GN	NA	NA	1317	1415	4115.938	7112.797	35.3	NA	NA	42136	891	F
10/11/10	GN	NA	NA	1317	1415	4115.938	7112.797	35.3	NA	NA	42137	911	F
10/11/10	GN	NA	NA	1317	1415	4115.938	7112.797	35.3	NA	NA	42138	938	F
10/11/10	GN	NA	NA	1317	1415	4115.938	7112.797	35.3	NA	NA	42139	832	F
10/11/10	GN	NA	NA	1317	1415	4115.938	7112.797	35.3	NA	NA	42140	908	F
10/11/10	GN	NA	NA	1317	1415	4115.938	7112.797	35.3	NA	NA	47414	1002	F
10/11/10	GN	NA	NA	1317	1415	4115.938	7112.797	35.3	NA	NA	42141	866	F
10/11/10	GN	NA	NA	1317	1415	4115.938	7112.797	35.3	NA	NA	42142	897	F
10/11/10	GN	NA	NA	1317	1415	4115.938	7112.797	35.3	NA	NA	42143	975	F
10/11/10	GN	NA	NA	1317	1415	4115.938	7112.797	35.3	NA	NA	42144	842	F
10/12/10	GN	NA	NA	1500	811	4116.668	7112.705	38.4	NA	NA	42145	954	F
10/12/10	GN	NA	NA	1500	811	4116.668	7112.705	38.4	NA	NA	42146	939	F
10/12/10	GN	NA	NA	1500	811	4116.668	7112.705	38.4	NA	NA	42147	921	F
10/12/10	GN	NA	NA	1500	811	4116.668	7112.705	38.4	NA	NA	42148	915	F
10/12/10	GN	NA	NA	1500	811	4116.668	7112.705	38.4	NA	NA	42149	876	F
10/12/10	GN	NA	NA	1500	811	4116.668	7112.705	38.4	NA	NA	42150	839	F

Appendix B (continued)

Date	Gear	Gear Dp (m)	Gear T (°C)	Time set	Time pulled	Latitude	Longitude	Dp (m)	SST (°C)	SSS	Tag #	TL (mm)	Sex
10/12/10	GN	NA	NA	1500	811	4116.668	7112.705	38.4	NA	NA	47415	850	F
10/12/10	GN	NA	NA	1500	811	4116.668	7112.705	38.4	NA	NA	42151	802	F
10/12/10	GN	NA	NA	1500	811	4116.668	7112.705	38.4	NA	NA	42152	920	F
10/12/10	GN	NA	NA	1500	811	4116.668	7112.705	38.4	NA	NA	42153	835	F
10/12/10	GN	NA	NA	1500	811	4116.668	7112.705	38.4	NA	NA	42154	919	F
10/12/10	GN	NA	NA	1500	811	4116.668	7112.705	38.4	NA	NA	42155	821	F
10/12/10	GN	NA	NA	1500	811	4116.668	7112.705	38.4	NA	NA	42156	880	F
10/12/10	GN	NA	NA	1500	811	4116.668	7112.705	38.4	NA	NA	42157	965	F
10/12/10	GN	NA	NA	1500	811	4116.668	7112.705	38.4	NA	NA	42158	840	F
10/12/10	GN	NA	NA	1500	811	4116.668	7112.705	38.4	NA	NA	42159	840	F
10/12/10	GN	NA	NA	1500	811	4116.668	7112.705	38.4	NA	NA	42160	875	F
10/12/10	GN	NA	NA	1500	811	4116.668	7112.705	38.4	NA	NA	47416	944	F
10/12/10	GN	NA	NA	1500	811	4116.668	7112.705	38.4	NA	NA	42161	877	F
10/12/10	GN	NA	NA	1500	811	4116.668	7112.705	38.4	NA	NA	42162	870	F
10/12/10	GN	NA	NA	1500	811	4116.668	7112.705	38.4	NA	NA	42163	815	F
10/12/10	GN	NA	NA	1500	811	4116.668	7112.705	38.4	NA	NA	42164	879	F
10/12/10	GN	NA	NA	1500	811	4116.668	7112.705	38.4	NA	NA	42165	927	F
10/12/10	GN	NA	NA	1500	811	4116.668	7112.705	38.4	NA	NA	42166	890	F
10/12/10	GN	NA	NA	1500	811	4116.668	7112.705	38.4	NA	NA	42167	942	F
10/12/10	GN	NA	NA	1500	811	4116.668	7112.705	38.4	NA	NA	42168	875	F
10/12/10	GN	NA	NA	1500	811	4116.668	7112.705	38.4	NA	NA	42169	836	F
10/12/10	GN	NA	NA	1500	811	4116.668	7112.705	38.4	NA	NA	42170	780	F
10/12/10	GN	NA	NA	1500	811	4116.668	7112.705	38.4	NA	NA	47417	867	F
10/12/10	GN	NA	NA	1500	811	4116.668	7112.705	38.4	NA	NA	42171	895	F
10/12/10	GN	NA	NA	1500	811	4116.668	7112.705	38.4	NA	NA	42172	910	F
10/12/10	GN	NA	NA	1500	811	4116.668	7112.705	38.4	NA	NA	42173	911	F
10/12/10	GN	NA	NA	1500	811	4116.668	7112.705	38.4	NA	NA	42174	931	F
10/12/10	GN	NA	NA	1500	811	4116.668	7112.705	38.4	NA	NA	42175	900	F
10/12/10	GN	NA	NA	1500	811	4116.668	7112.705	38.4	NA	NA	42176	931	F
10/12/10	GN	NA	NA	1500	811	4116.668	7112.705	38.4	NA	NA	42177	835	F
10/12/10	GN	NA	NA	1500	811	4116.668	7112.705	38.4	NA	NA	42178	889	F
10/12/10	GN	NA	NA	1500	811	4116.668	7112.705	38.4	NA	NA	42179	844	F
10/12/10	GN	NA	NA	1500	811	4116.668	7112.705	38.4	NA	NA	42180	880	F
10/12/10	GN	NA	NA	1500	811	4116.668	7112.705	38.4	NA	NA	47418	830	F
10/12/10	GN	NA	NA	1500	811	4116.668	7112.705	38.4	NA	NA	42181	829	F
10/12/10	GN	NA	NA	1500	811	4116.668	7112.705	38.4	NA	NA	42182	854	F
10/12/10	GN	NA	NA	1500	811	4116.668	7112.705	38.4	NA	NA	42183	930	F
10/12/10	GN	NA	NA	1500	811	4116.668	7112.705	38.4	NA	NA	42184	810	F
10/12/10	GN	NA	NA	1500	811	4116.668	7112.705	38.4	NA	NA	42185	946	F
10/12/10	GN	NA	NA	1500	811	4116.668	7112.705	38.4	NA	NA	42186	970	F
10/12/10	GN	NA	NA	1500	811	4116.668	7112.705	38.4	NA	NA	42187	841	F

Appendix B (continued)

Date	Gear	Gear Dp (m)	Gear T (°C)	Time set	Time pulled	Latitude	Longitude	Dp (m)	SST (°C)	SSS	Tag #	TL (mm)	Sex
10/12/10	GN	NA	NA	1500	811	4116.668	7112.705	38.4	NA	NA	42188	885	F
10/12/10	GN	NA	NA	1500	811	4116.668	7112.705	38.4	NA	NA	42189	940	F
10/12/10	GN	NA	NA	1500	811	4116.668	7112.705	38.4	NA	NA	42190	864	F
10/12/10	GN	NA	NA	1500	811	4116.668	7112.705	38.4	NA	NA	47419	900	F
10/12/10	GN	NA	NA	1500	811	4116.668	7112.705	38.4	NA	NA	42191	945	F
10/12/10	GN	NA	NA	1500	811	4116.668	7112.705	38.4	NA	NA	42192	951	F
10/12/10	GN	NA	NA	1500	811	4116.668	7112.705	38.4	NA	NA	42193	935	F
10/12/10	GN	NA	NA	1500	811	4116.668	7112.705	38.4	NA	NA	42194	810	F
10/12/10	GN	NA	NA	1500	811	4116.668	7112.705	38.4	NA	NA	42195	970	F
10/12/10	GN	NA	NA	1500	811	4116.668	7112.705	38.4	NA	NA	42196	870	F
10/12/10	GN	NA	NA	1500	811	4116.668	7112.705	38.4	NA	NA	NA	760	M
10/12/10	GN	NA	NA	1500	811	4116.668	7112.705	38.4	NA	NA	42197	922	F
10/12/10	GN	NA	NA	1500	811	4116.668	7112.705	38.4	NA	NA	42198	915	F
10/12/10	GN	NA	NA	1500	811	4116.668	7112.705	38.4	NA	NA	42199	859	F
10/12/10	GN	NA	NA	1500	811	4116.668	7112.705	38.4	NA	NA	42200	970	F
10/12/10	GN	NA	NA	1500	811	4116.668	7112.705	38.4	NA	NA	47420	899	F
10/12/10	GN	NA	NA	1500	811	4116.668	7112.705	38.4	NA	NA	42201	944	F
10/12/10	GN	NA	NA	1500	811	4116.668	7112.705	38.4	NA	NA	42202	935	F
10/12/10	GN	NA	NA	1500	811	4116.668	7112.705	38.4	NA	NA	42203	955	F
10/12/10	GN	NA	NA	1500	811	4116.668	7112.705	38.4	NA	NA	42204	884	F
10/12/10	GN	NA	NA	1500	811	4116.668	7112.705	38.4	NA	NA	42205	919	F
10/12/10	GN	NA	NA	1500	811	4116.668	7112.705	38.4	NA	NA	42206	953	F
10/12/10	GN	NA	NA	1500	811	4116.668	7112.705	38.4	NA	NA	42207	851	F
10/12/10	GN	NA	NA	1500	811	4116.668	7112.705	38.4	NA	NA	42208	847	F
10/12/10	GN	NA	NA	737	940	4120.224	7112.711	38.4	NA	NA	42209	801	F
10/12/10	GN	NA	NA	737	940	4120.224	7112.711	38.4	NA	NA	42210	830	F
10/12/10	GN	NA	NA	737	940	4120.224	7112.711	38.4	NA	NA	47421	824	F
10/12/10	GN	NA	NA	737	940	4120.224	7112.711	38.4	NA	NA	42211	852	F
10/12/10	GN	NA	NA	737	940	4120.224	7112.711	38.4	NA	NA	42212	773	M
10/12/10	GN	NA	NA	737	940	4120.224	7112.711	38.4	NA	NA	42213	825	F
10/12/10	GN	NA	NA	737	940	4120.224	7112.711	38.4	NA	NA	42214	770	M
10/12/10	GN	NA	NA	737	940	4120.224	7112.711	38.4	NA	NA	42215	900	F
10/12/10	GN	NA	NA	737	940	4120.224	7112.711	38.4	NA	NA	42216	778	M
10/12/10	GN	NA	NA	737	940	4120.224	7112.711	38.4	NA	NA	42217	921	F
10/12/10	GN	NA	NA	737	940	4120.224	7112.711	38.4	NA	NA	42218	793	M
10/12/10	GN	NA	NA	737	940	4120.224	7112.711	38.4	NA	NA	42219	765	F
10/12/10	GN	NA	NA	737	940	4120.224	7112.711	38.4	NA	NA	42220	872	F
10/12/10	GN	NA	NA	737	940	4120.224	7112.711	38.4	NA	NA	47422	878	F
10/12/10	GN	NA	NA	737	940	4120.224	7112.711	38.4	NA	NA	42221	706	F
10/12/10	GN	NA	NA	737	940	4120.224	7112.711	38.4	NA	NA	42222	868	F
10/12/10	GN	NA	NA	737	940	4120.224	7112.711	38.4	NA	NA	42223	810	F

Appendix B (continued)

Date	Gear	Gear Dp (m)	Gear T (°C)	Time set	Time pulled	Latitude	Longitude	Dp (m)	SST (°C)	SSS	Tag #	TL (mm)	Sex
10/12/10	GN	NA	NA	737	940	4120.224	7112.711	38.4	NA	NA	42224	844	F
10/12/10	GN	NA	NA	737	940	4120.224	7112.711	38.4	NA	NA	42225	814	F
10/12/10	GN	NA	NA	737	940	4120.224	7112.711	38.4	NA	NA	42226	798	F
10/12/10	GN	NA	NA	737	940	4120.224	7112.711	38.4	NA	NA	42227	770	F
10/12/10	GN	NA	NA	737	940	4120.224	7112.711	38.4	NA	NA	42228	772	F
10/12/10	GN	NA	NA	737	940	4120.224	7112.711	38.4	NA	NA	42229	845	F
10/12/10	GN	NA	NA	737	940	4120.224	7112.711	38.4	NA	NA	42230	852	F
10/12/10	GN	NA	NA	737	940	4120.224	7112.711	38.4	NA	NA	47423	792	F
10/12/10	GN	NA	NA	737	940	4120.224	7112.711	38.4	NA	NA	42231	796	M
10/12/10	GN	NA	NA	737	940	4120.224	7112.711	38.4	NA	NA	42232	870	F
10/12/10	GN	NA	NA	737	940	4120.224	7112.711	38.4	NA	NA	42233	910	F
10/12/10	GN	NA	NA	737	940	4120.224	7112.711	38.4	NA	NA	42234	722	M
10/12/10	GN	NA	NA	737	940	4120.224	7112.711	38.4	NA	NA	42235	905	F
10/12/10	GN	NA	NA	923	1055	4118.933	7112.681	NA	NA	NA	42236	817	F
10/12/10	GN	NA	NA	923	1055	4118.933	7112.681	NA	NA	NA	42237	816	F
10/12/10	GN	NA	NA	1007	1258	4120.643	7112.436	NA	NA	NA	42238	812	M
10/12/10	GN	NA	NA	1007	1258	4120.643	7112.436	NA	NA	NA	42239	870	F
10/12/10	GN	NA	NA	1007	1258	4120.643	7112.436	NA	NA	NA	42240	763	M
10/12/10	GN	NA	NA	1007	1258	4120.643	7112.436	NA	NA	NA	47424	889	F
10/12/10	GN	NA	NA	1007	1258	4120.643	7112.436	NA	NA	NA	42241	834	F
10/12/10	GN	NA	NA	1007	1258	4120.643	7112.436	NA	NA	NA	42242	788	M
10/12/10	GN	NA	NA	1007	1258	4120.643	7112.436	NA	NA	NA	42243	878	F
10/12/10	GN	NA	NA	1007	1258	4120.643	7112.436	NA	NA	NA	42244	823	F
10/12/10	GN	NA	NA	1007	1258	4120.643	7112.436	NA	NA	NA	42245	830	F
10/12/10	GN	NA	NA	1007	1258	4120.643	7112.436	NA	NA	NA	42246	802	F
10/12/10	GN	NA	NA	1007	1258	4120.643	7112.436	NA	NA	NA	42247	908	F
10/12/10	GN	NA	NA	1007	1258	4120.643	7112.436	NA	NA	NA	42248	896	F
10/12/10	GN	NA	NA	1007	1258	4120.643	7112.436	NA	NA	NA	42249	780	F
10/12/10	GN	NA	NA	1141	1258	4121.06	7112.15	NA	NA	NA	42250	832	F
10/12/10	GN	NA	NA	1141	1258	4121.06	7112.15	NA	NA	NA	47425	854	F
10/13/10	GN	NA	NA	522	807	4108.07	7106.944	NA	NA	NA	41858	820	F
10/13/10	GN	NA	NA	522	807	4108.07	7106.944	NA	NA	NA	41859	909	F
10/13/10	GN	NA	NA	522	807	4108.07	7106.944	NA	NA	NA	41860	938	F
10/13/10	GN	NA	NA	522	807	4108.07	7106.944	NA	NA	NA	47386	886	F
10/13/10	GN	NA	NA	522	807	4108.07	7106.944	NA	NA	NA	41861	909	F
10/13/10	GN	NA	NA	522	807	4108.07	7106.944	NA	NA	NA	41862	853	F
10/13/10	GN	NA	NA	522	807	4108.07	7106.944	NA	NA	NA	41863	874	F
10/13/10	GN	NA	NA	522	807	4108.07	7106.944	NA	NA	NA	41864	921	F
10/13/10	GN	NA	NA	522	807	4108.07	7106.944	NA	NA	NA	41865	892	F
10/13/10	GN	NA	NA	522	807	4108.07	7106.944	NA	NA	NA	41866	919	F
10/13/10	GN	NA	NA	522	807	4108.07	7106.944	NA	NA	NA	41867	929	F

Appendix B (continued)

Date	Gear	Gear Dp (m)	Gear T (°C)	Time set	Time pulled	Latitude	Longitude	Dp (m)	SST (°C)	SSS	Tag #	TL (mm)	Sex
10/13/10	GN	NA	NA	522	807	4108.07	7106.944	NA	NA	NA	41868	846	F
10/13/10	GN	NA	NA	522	807	4108.07	7106.944	NA	NA	NA	41869	827	F
10/13/10	GN	NA	NA	522	807	4108.07	7106.944	NA	NA	NA	41870	990	F
10/13/10	GN	NA	NA	522	807	4108.07	7106.944	NA	NA	NA	47387	926	F
10/13/10	GN	NA	NA	522	807	4108.07	7106.944	NA	NA	NA	41871	934	F
10/13/10	GN	NA	NA	522	807	4108.07	7106.944	NA	NA	NA	41872	839	F
10/13/10	GN	NA	NA	522	807	4108.07	7106.944	NA	NA	NA	41873	870	F
10/13/10	GN	NA	NA	522	807	4108.07	7106.944	NA	NA	NA	41874	880	F
10/13/10	GN	NA	NA	522	807	4108.07	7106.944	NA	NA	NA	41875	924	F
10/13/10	GN	NA	NA	522	807	4108.07	7106.944	NA	NA	NA	41876	912	F
10/13/10	GN	NA	NA	522	807	4108.07	7106.944	NA	NA	NA	41877	840	F
10/13/10	GN	NA	NA	522	807	4108.07	7106.944	NA	NA	NA	41878	925	F
10/13/10	GN	NA	NA	522	807	4108.07	7106.944	NA	NA	NA	41879	954	F
10/13/10	GN	NA	NA	522	807	4108.07	7106.944	NA	NA	NA	41880	864	F
10/13/10	GN	NA	NA	522	807	4108.07	7106.944	NA	NA	NA	47388	896	F
10/13/10	GN	NA	NA	522	807	4108.07	7106.944	NA	NA	NA	41881	794	F
10/13/10	GN	NA	NA	522	807	4108.07	7106.944	NA	NA	NA	41882	892	F
10/13/10	GN	NA	NA	522	807	4108.07	7106.944	NA	NA	NA	41883	902	F
10/13/10	GN	NA	NA	522	807	4108.07	7106.944	NA	NA	NA	41884	883	F
10/13/10	GN	NA	NA	522	807	4108.07	7106.944	NA	NA	NA	41885	950	F
10/13/10	GN	NA	NA	522	807	4108.07	7106.944	NA	NA	NA	41886	898	F
10/13/10	GN	NA	NA	522	807	4108.07	7106.944	NA	NA	NA	41887	798	F
10/13/10	GN	NA	NA	522	807	4108.07	7106.944	NA	NA	NA	41888	907	F
10/13/10	GN	NA	NA	522	807	4108.07	7106.944	NA	NA	NA	41889	879	F
10/13/10	GN	NA	NA	522	807	4108.07	7106.944	NA	NA	NA	41890	905	F
10/13/10	GN	NA	NA	522	807	4108.07	7106.944	NA	NA	NA	47389	868	F
10/13/10	GN	NA	NA	522	807	4108.07	7106.944	NA	NA	NA	41891	822	F
10/13/10	GN	NA	NA	522	807	4108.07	7106.944	NA	NA	NA	41892	822	F
10/13/10	GN	NA	NA	522	807	4108.07	7106.944	NA	NA	NA	41893	905	F
10/13/10	GN	NA	NA	522	807	4108.07	7106.944	NA	NA	NA	41894	840	F
10/13/10	GN	NA	NA	522	807	4108.07	7106.944	NA	NA	NA	41895	969	F
10/13/10	GN	NA	NA	522	807	4108.07	7106.944	NA	NA	NA	41896	849	F
10/13/10	GN	NA	NA	522	807	4108.07	7106.944	NA	NA	NA	41897	872	F
10/13/10	GN	NA	NA	522	807	4108.07	7106.944	NA	NA	NA	41898	809	F
10/13/10	GN	NA	NA	522	807	4108.07	7106.944	NA	NA	NA	41899	884	F
10/13/10	GN	NA	NA	522	807	4108.07	7106.944	NA	NA	NA	41900	924	F
10/13/10	GN	NA	NA	522	807	4108.07	7106.944	NA	NA	NA	47390	848	F
10/13/10	GN	NA	NA	522	807	4108.07	7106.944	NA	NA	NA	42251	830	F
10/13/10	GN	NA	NA	522	807	4108.07	7106.944	NA	NA	NA	42252	842	F
10/13/10	GN	NA	NA	522	807	4108.07	7106.944	NA	NA	NA	42253	853	F
10/13/10	GN	NA	NA	522	807	4108.07	7106.944	NA	NA	NA	42254	879	F

Appendix B (continued)

Date	Gear	Gear Dp (m)	Gear T (°C)	Time set	Time pulled	Latitude	Longitude	Dp (m)	SST (°C)	SSS	Tag #	TL (mm)	Sex
10/13/10	GN	NA	NA	522	807	4108.07	7106.944	NA	NA	NA	42255	854	F
10/13/10	GN	NA	NA	522	807	4108.07	7106.944	NA	NA	NA	42256	890	F
10/13/10	GN	NA	NA	522	807	4108.07	7106.944	NA	NA	NA	42257	895	F
10/13/10	GN	NA	NA	522	807	4108.07	7106.944	NA	NA	NA	42258	854	F
10/13/10	GN	NA	NA	522	807	4108.07	7106.944	NA	NA	NA	42259	850	F
10/13/10	GN	NA	NA	522	807	4108.07	7106.944	NA	NA	NA	42260	844	F
10/13/10	GN	NA	NA	522	807	4108.07	7106.944	NA	NA	NA	47426	754	M
10/13/10	GN	NA	NA	522	807	4108.07	7106.944	NA	NA	NA	42261	839	F
10/13/10	GN	NA	NA	522	807	4108.07	7106.944	NA	NA	NA	42262	920	F
10/13/10	GN	NA	NA	522	807	4108.07	7106.944	NA	NA	NA	42263	893	F
10/13/10	GN	NA	NA	522	807	4108.07	7106.944	NA	NA	NA	42264	795	F
10/13/10	GN	NA	NA	522	807	4108.07	7106.944	NA	NA	NA	42265	850	F
10/13/10	GN	NA	NA	522	807	4108.07	7106.944	NA	NA	NA	42266	855	F
10/13/10	GN	NA	NA	522	807	4108.07	7106.944	NA	NA	NA	42267	857	F
10/13/10	GN	NA	NA	522	807	4108.07	7106.944	NA	NA	NA	42268	788	F
10/13/10	GN	NA	NA	522	807	4108.07	7106.944	NA	NA	NA	42269	840	F
10/13/10	GN	NA	NA	522	807	4108.07	7106.944	NA	NA	NA	42270	920	F
10/13/10	GN	NA	NA	522	807	4108.07	7106.944	NA	NA	NA	47427	885	F
10/13/10	GN	NA	NA	522	807	4108.07	7106.944	NA	NA	NA	42271	864	F
10/13/10	GN	NA	NA	522	807	4108.07	7106.944	NA	NA	NA	42272	923	F
10/13/10	GN	NA	NA	522	807	4108.07	7106.944	NA	NA	NA	42273	777	M
10/13/10	GN	NA	NA	522	807	4108.07	7106.944	NA	NA	NA	42274	866	F
10/13/10	GN	NA	NA	522	807	4108.07	7106.944	NA	NA	NA	42275	893	F
10/13/10	GN	NA	NA	522	807	4108.07	7106.944	NA	NA	NA	42276	881	F
10/13/10	GN	NA	NA	522	807	4108.07	7106.944	NA	NA	NA	42277	758	F
10/13/10	GN	NA	NA	522	807	4108.07	7106.944	NA	NA	NA	42278	788	F
10/13/10	GN	NA	NA	522	807	4108.07	7106.944	NA	NA	NA	42279	733	F
10/13/10	GN	NA	NA	522	807	4108.07	7106.944	NA	NA	NA	42280	869	F
10/13/10	GN	NA	NA	522	807	4108.07	7106.944	NA	NA	NA	47428	898	F
10/13/10	GN	NA	NA	522	807	4108.07	7106.944	NA	NA	NA	42281	776	M
10/13/10	GN	NA	NA	522	807	4108.07	7106.944	NA	NA	NA	42282	821	F
10/13/10	GN	NA	NA	522	807	4108.07	7106.944	NA	NA	NA	42283	879	F
10/13/10	GN	NA	NA	522	807	4108.07	7106.944	NA	NA	NA	42284	911	F
10/13/10	GN	NA	NA	522	807	4108.07	7106.944	NA	NA	NA	42285	914	F
10/13/10	GN	NA	NA	522	807	4108.07	7106.944	NA	NA	NA	42286	784	F
10/13/10	GN	NA	NA	522	807	4108.07	7106.944	NA	NA	NA	42287	890	F
10/13/10	GN	NA	NA	522	807	4108.07	7106.944	NA	NA	NA	42288	887	F
10/13/10	GN	NA	NA	522	807	4108.07	7106.944	NA	NA	NA	42289	808	F
10/13/10	GN	NA	NA	522	807	4108.07	7106.944	NA	NA	NA	42290	812	F
10/13/10	GN	NA	NA	522	807	4108.07	7106.944	NA	NA	NA	47429	800	F
10/13/10	GN	NA	NA	522	807	4108.07	7106.944	NA	NA	NA	42291	757	M

Appendix B (continued)

Date	Gear	Gear Dp (m)	Gear T (°C)	Time set	Time pulled	Latitude	Longitude	Dp (m)	SST (°C)	SSS	Tag #	TL (mm)	Sex
10/13/10	GN	NA	NA	522	807	4108.07	7106.944	NA	NA	NA	42292	829	F
10/13/10	GN	NA	NA	522	807	4108.07	7106.944	NA	NA	NA	42293	790	F
10/13/10	GN	NA	NA	522	807	4108.07	7106.944	NA	NA	NA	42294	888	F
10/13/10	GN	NA	NA	522	807	4108.07	7106.944	NA	NA	NA	42295	910	F
10/13/10	GN	NA	NA	522	807	4108.07	7106.944	NA	NA	NA	42296	884	F
10/13/10	GN	NA	NA	522	807	4108.07	7106.944	NA	NA	NA	42297	846	F
10/13/10	GN	NA	NA	522	807	4108.07	7106.944	NA	NA	NA	42298	830	F
10/13/10	GN	NA	NA	522	807	4108.07	7106.944	NA	NA	NA	42299	867	F
10/13/10	GN	NA	NA	522	807	4108.07	7106.944	NA	NA	NA	42300	780	F
10/13/10	GN	NA	NA	522	807	4108.07	7106.944	NA	NA	NA	47430	869	F
10/13/10	GN	NA	NA	522	807	4108.07	7106.944	NA	NA	NA	42301	820	F
10/13/10	GN	NA	NA	522	807	4108.07	7106.944	NA	NA	NA	42302	850	F
10/13/10	GN	NA	NA	522	807	4108.07	7106.944	NA	NA	NA	42303	814	F
10/13/10	GN	NA	NA	522	807	4108.07	7106.944	NA	NA	NA	42304	766	F
10/13/10	GN	NA	NA	522	807	4108.07	7106.944	NA	NA	NA	42305	841	F
10/13/10	GN	NA	NA	522	807	4108.07	7106.944	NA	NA	NA	42306	802	F
10/13/10	GN	NA	NA	522	807	4108.07	7106.944	NA	NA	NA	42307	840	F
10/13/10	GN	NA	NA	522	807	4108.07	7106.944	NA	NA	NA	42308	880	F
10/13/10	GN	NA	NA	522	807	4108.07	7106.944	NA	NA	NA	42309	868	F
10/13/10	GN	NA	NA	522	807	4108.07	7106.944	NA	NA	NA	42310	864	F
10/13/10	GN	NA	NA	522	807	4108.07	7106.944	NA	NA	NA	47431	875	F
10/13/10	GN	NA	NA	522	807	4108.07	7106.944	NA	NA	NA	42311	720	F
10/13/10	GN	NA	NA	522	807	4108.07	7106.944	NA	NA	NA	42312	740	M
10/13/10	GN	NA	NA	522	807	4108.07	7106.944	NA	NA	NA	42313	859	F
10/13/10	GN	NA	NA	522	807	4108.07	7106.944	NA	NA	NA	42314	846	F
10/13/10	GN	NA	NA	522	807	4108.07	7106.944	NA	NA	NA	42315	752	F
10/13/10	GN	NA	NA	522	807	4108.07	7106.944	NA	NA	NA	42316	848	F
10/13/10	GN	NA	NA	522	807	4108.07	7106.944	NA	NA	NA	42317	778	M
10/13/10	GN	NA	NA	522	807	4108.07	7106.944	NA	NA	NA	42318	888	F
10/13/10	GN	NA	NA	522	807	4108.07	7106.944	NA	NA	NA	42319	792	F
10/13/10	GN	NA	NA	522	807	4108.07	7106.944	NA	NA	NA	42320	834	F
10/13/10	GN	NA	NA	522	807	4108.07	7106.944	NA	NA	NA	47432	876	F
10/13/10	GN	NA	NA	522	807	4108.07	7106.944	NA	NA	NA	42321	886	F
10/13/10	GN	NA	NA	522	807	4108.07	7106.944	NA	NA	NA	42322	837	F
10/13/10	GN	NA	NA	522	807	4108.07	7106.944	NA	NA	NA	42323	879	F
10/13/10	GN	NA	NA	522	807	4108.07	7106.944	NA	NA	NA	42324	859	F
10/13/10	GN	NA	NA	522	807	4108.07	7106.944	NA	NA	NA	42325	813	F
10/13/10	GN	NA	NA	522	807	4108.07	7106.944	NA	NA	NA	42326	780	M
10/13/10	GN	NA	NA	522	807	4108.07	7106.944	NA	NA	NA	42327	959	F
10/13/10	GN	NA	NA	522	807	4108.07	7106.944	NA	NA	NA	42328	867	F
10/13/10	GN	NA	NA	522	807	4108.07	7106.944	NA	NA	NA	42329	913	F

Appendix B (continued)

Date	Gear	Gear Dp (m)	Gear T (°C)	Time set	Time pulled	Latitude	Longitude	Dp (m)	SST (°C)	SSS	Tag #	TL (mm)	Sex
10/13/10	GN	NA	NA	522	807	4108.07	7106.944	NA	NA	NA	42330	822	F
10/13/10	GN	NA	NA	522	807	4108.07	7106.944	NA	NA	NA	47433	858	F
10/13/10	GN	NA	NA	522	807	4108.07	7106.944	NA	NA	NA	42331	805	F
10/13/10	GN	NA	NA	522	807	4108.07	7106.944	NA	NA	NA	42332	730	F
10/13/10	GN	NA	NA	522	807	4108.07	7106.944	NA	NA	NA	42333	934	F
10/13/10	GN	NA	NA	522	807	4108.07	7106.944	NA	NA	NA	42334	889	F
10/13/10	GN	NA	NA	522	807	4108.07	7106.944	NA	NA	NA	42335	798	F
10/13/10	GN	NA	NA	522	807	4108.07	7106.944	NA	NA	NA	42336	821	F
10/13/10	GN	NA	NA	602	930	4107.682	7108.835	NA	NA	NA	42401	858	F
10/13/10	GN	NA	NA	602	930	4107.682	7108.835	NA	NA	NA	42402	832	F
10/13/10	GN	NA	NA	602	930	4107.682	7108.835	NA	NA	NA	42403	798	F
10/13/10	GN	NA	NA	602	930	4107.682	7108.835	NA	NA	NA	42404	878	F
10/13/10	GN	NA	NA	602	930	4107.682	7108.835	NA	NA	NA	42405	929	F
10/13/10	GN	NA	NA	602	930	4107.682	7108.835	NA	NA	NA	42406	904	F
10/13/10	GN	NA	NA	602	930	4107.682	7108.835	NA	NA	NA	42407	895	F
10/13/10	GN	NA	NA	602	930	4107.682	7108.835	NA	NA	NA	42408	874	F
10/13/10	GN	NA	NA	602	930	4107.682	7108.835	NA	NA	NA	42409	899	F
10/13/10	GN	NA	NA	602	930	4107.682	7108.835	NA	NA	NA	42410	955	F
10/13/10	GN	NA	NA	602	930	4107.682	7108.835	NA	NA	NA	47441	712	F
10/13/10	GN	NA	NA	602	930	4107.682	7108.835	NA	NA	NA	42411	885	F
10/13/10	GN	NA	NA	602	930	4107.682	7108.835	NA	NA	NA	42412	918	F
10/13/10	GN	NA	NA	602	930	4107.682	7108.835	NA	NA	NA	42413	920	F
10/13/10	GN	NA	NA	602	930	4107.682	7108.835	NA	NA	NA	42414	902	F
10/13/10	GN	NA	NA	602	930	4107.682	7108.835	NA	NA	NA	42415	770	M
10/13/10	GN	NA	NA	602	930	4107.682	7108.835	NA	NA	NA	42416	932	F
10/13/10	GN	NA	NA	602	930	4107.682	7108.835	NA	NA	NA	42417	804	F
10/13/10	GN	NA	NA	602	930	4107.682	7108.835	NA	NA	NA	42418	921	F
10/13/10	GN	NA	NA	602	930	4107.682	7108.835	NA	NA	NA	42419	718	M
10/13/10	GN	NA	NA	602	930	4107.682	7108.835	NA	NA	NA	42420	900	F
10/13/10	GN	NA	NA	602	930	4107.682	7108.835	NA	NA	NA	47442	794	F
10/13/10	GN	NA	NA	602	930	4107.682	7108.835	NA	NA	NA	42421	822	F
10/13/10	GN	NA	NA	602	930	4107.682	7108.835	NA	NA	NA	42422	870	F
10/13/10	GN	NA	NA	602	930	4107.682	7108.835	NA	NA	NA	42423	803	F
10/13/10	GN	NA	NA	602	930	4107.682	7108.835	NA	NA	NA	42424	790	F
10/13/10	GN	NA	NA	602	930	4107.682	7108.835	NA	NA	NA	42425	818	F
10/13/10	GN	NA	NA	602	930	4107.682	7108.835	NA	NA	NA	42426	865	F
10/13/10	GN	NA	NA	602	930	4107.682	7108.835	NA	NA	NA	42427	988	F
10/13/10	GN	NA	NA	602	930	4107.682	7108.835	NA	NA	NA	42428	764	F
10/13/10	GN	NA	NA	602	930	4107.682	7108.835	NA	NA	NA	42429	888	F
10/13/10	GN	NA	NA	602	930	4107.682	7108.835	NA	NA	NA	42430	884	F
10/13/10	GN	NA	NA	602	930	4107.682	7108.835	NA	NA	NA	47443	874	F

Appendix B (continued)

Date	Gear	Gear Dp (m)	Gear T (°C)	Time set	Time pulled	Latitude	Longitude	Dp (m)	SST (°C)	SSS	Tag #	TL (mm)	Sex
10/13/10	GN	NA	NA	602	930	4107.682	7108.835	NA	NA	NA	42431	743	F
10/13/10	GN	NA	NA	602	930	4107.682	7108.835	NA	NA	NA	42432	830	F
10/13/10	GN	NA	NA	602	930	4107.682	7108.835	NA	NA	NA	42433	861	F
10/13/10	GN	NA	NA	602	930	4107.682	7108.835	NA	NA	NA	42434	918	F
10/13/10	GN	NA	NA	602	930	4107.682	7108.835	NA	NA	NA	42435	1000	F
10/13/10	GN	NA	NA	602	930	4107.682	7108.835	NA	NA	NA	42436	851	F
10/13/10	GN	NA	NA	602	930	4107.682	7108.835	NA	NA	NA	42437	769	F
10/13/10	GN	NA	NA	602	930	4107.682	7108.835	NA	NA	NA	42438	862	F
10/13/10	GN	NA	NA	602	930	4107.682	7108.835	NA	NA	NA	42439	760	F
10/13/10	GN	NA	NA	602	930	4107.682	7108.835	NA	NA	NA	42440	855	F
10/13/10	GN	NA	NA	602	930	4107.682	7108.835	NA	NA	NA	47444	875	F
10/13/10	GN	NA	NA	602	930	4107.682	7108.835	NA	NA	NA	42441	879	F
10/13/10	GN	NA	NA	602	930	4107.682	7108.835	NA	NA	NA	42442	856	F
10/13/10	GN	NA	NA	602	930	4107.682	7108.835	NA	NA	NA	42443	820	F
10/13/10	GN	NA	NA	602	930	4107.682	7108.835	NA	NA	NA	42444	852	F
10/13/10	GN	NA	NA	917	1127	4107.928	7107.125	NA	NA	NA	42445	905	F
10/13/10	GN	NA	NA	917	1127	4107.928	7107.125	NA	NA	NA	42446	826	F
10/13/10	GN	NA	NA	917	1127	4107.928	7107.125	NA	NA	NA	42447	855	F
10/13/10	GN	NA	NA	917	1127	4107.928	7107.125	NA	NA	NA	42448	949	F
10/13/10	GN	NA	NA	917	1127	4107.928	7107.125	NA	NA	NA	42449	939	F
10/13/10	GN	NA	NA	917	1127	4107.928	7107.125	NA	NA	NA	42450	879	F
10/13/10	GN	NA	NA	917	1127	4107.928	7107.125	NA	NA	NA	47445	899	F
10/13/10	GN	NA	NA	917	1127	4107.928	7107.125	NA	NA	NA	42451	899	F
10/13/10	GN	NA	NA	917	1127	4107.928	7107.125	NA	NA	NA	42452	835	F
10/13/10	GN	NA	NA	917	1127	4107.928	7107.125	NA	NA	NA	42453	1010	F
10/13/10	GN	NA	NA	917	1127	4107.928	7107.125	NA	NA	NA	42454	865	F
10/13/10	GN	NA	NA	1014	1227	4107.86	7107.255	34.1	NA	NA	42455	889	F
10/13/10	GN	NA	NA	1014	1227	4107.86	7107.255	34.1	NA	NA	42456	871	F
10/13/10	GN	NA	NA	1014	1227	4107.86	7107.255	34.1	NA	NA	42457	922	F
10/13/10	GN	NA	NA	1014	1227	4107.86	7107.255	34.1	NA	NA	42458	861	F
10/13/10	GN	NA	NA	1014	1227	4107.86	7107.255	34.1	NA	NA	42459	875	F
10/13/10	GN	NA	NA	1014	1227	4107.86	7107.255	34.1	NA	NA	42460	916	F
10/13/10	GN	NA	NA	1014	1227	4107.86	7107.255	34.1	NA	NA	47446	878	F
10/13/10	GN	NA	NA	1014	1227	4107.86	7107.255	34.1	NA	NA	42461	874	F
10/13/10	GN	NA	NA	1014	1227	4107.86	7107.255	34.1	NA	NA	42462	761	F
10/13/10	GN	NA	NA	1014	1227	4107.86	7107.255	34.1	NA	NA	42463	829	F
10/13/10	GN	NA	NA	1014	1227	4107.86	7107.255	34.1	NA	NA	42464	867	F
10/13/10	GN	NA	NA	1014	1227	4107.86	7107.255	34.1	NA	NA	42465	920	F
10/13/10	GN	NA	NA	1014	1227	4107.86	7107.255	34.1	NA	NA	42466	885	F
10/13/10	GN	NA	NA	1014	1227	4107.86	7107.255	34.1	NA	NA	42467	910	F
10/13/10	GN	NA	NA	1014	1227	4107.86	7107.255	34.1	NA	NA	42468	899	F

Appendix B (continued)

Date	Gear	Gear Dp (m)	Gear T (°C)	Time set	Time pulled	Latitude	Longitude	Dp (m)	SST (°C)	SSS	Tag #	TL (mm)	Sex
10/13/10	GN	NA	NA	1014	1227	4107.86	7107.255	34.1	NA	NA	42469	974	F
10/13/10	GN	NA	NA	1014	1227	4107.86	7107.255	34.1	NA	NA	42470	891	F
10/13/10	GN	NA	NA	1014	1227	4107.86	7107.255	34.1	NA	NA	47447	905	F
10/13/10	GN	NA	NA	1014	1227	4107.86	7107.255	34.1	NA	NA	42471	877	F
10/13/10	GN	NA	NA	1014	1227	4107.86	7107.255	34.1	NA	NA	42472	908	F
10/13/10	GN	NA	NA	1014	1227	4107.86	7107.255	34.1	NA	NA	42473	955	F
10/13/10	GN	NA	NA	1014	1227	4107.86	7107.255	34.1	NA	NA	42474	866	F
10/13/10	GN	NA	NA	1014	1227	4107.86	7107.255	34.1	NA	NA	42475	880	F
10/13/10	GN	NA	NA	1014	1227	4107.86	7107.255	34.1	NA	NA	42476	895	F
10/13/10	GN	NA	NA	1014	1227	4107.86	7107.255	34.1	NA	NA	42477	911	F
10/13/10	GN	NA	NA	1014	1227	4107.86	7107.255	34.1	NA	NA	42478	861	F
10/13/10	GN	NA	NA	1014	1227	4107.86	7107.255	34.1	NA	NA	42479	916	F
10/13/10	GN	NA	NA	1014	1227	4107.86	7107.255	34.1	NA	NA	42480	854	F
10/13/10	GN	NA	NA	1014	1227	4107.86	7107.255	34.1	NA	NA	47448	860	F
10/13/10	GN	NA	NA	1014	1227	4107.86	7107.255	34.1	NA	NA	42481	905	F
10/13/10	GN	NA	NA	1014	1227	4107.86	7107.255	34.1	NA	NA	42482	894	F
10/13/10	GN	NA	NA	1014	1227	4107.86	7107.255	34.1	NA	NA	42483	932	F
10/13/10	GN	NA	NA	1014	1227	4107.86	7107.255	34.1	NA	NA	42484	868	F
10/13/10	GN	NA	NA	1014	1227	4107.86	7107.255	34.1	NA	NA	42485	939	F
10/13/10	GN	NA	NA	1014	1227	4107.86	7107.255	34.1	NA	NA	42486	831	F
10/13/10	GN	NA	NA	1014	1227	4107.86	7107.255	34.1	NA	NA	42487	901	F
10/13/10	GN	NA	NA	1014	1227	4107.86	7107.255	34.1	NA	NA	42488	808	F
10/13/10	GN	NA	NA	1014	1227	4107.86	7107.255	34.1	NA	NA	42489	972	F
10/13/10	GN	NA	NA	1014	1227	4107.86	7107.255	34.1	NA	NA	42490	895	F
10/13/10	GN	NA	NA	1014	1227	4107.86	7107.255	34.1	NA	NA	47449	856	F
10/13/10	GN	NA	NA	1014	1227	4107.86	7107.255	34.1	NA	NA	42491	910	F
10/13/10	GN	NA	NA	1014	1227	4107.86	7107.255	34.1	NA	NA	42492	892	F
10/13/10	GN	NA	NA	1014	1227	4107.86	7107.255	34.1	NA	NA	42493	822	F
10/13/10	GN	NA	NA	1014	1227	4107.86	7107.255	34.1	NA	NA	42494	825	F
10/13/10	GN	NA	NA	1014	1227	4107.86	7107.255	34.1	NA	NA	42495	887	F
10/13/10	GN	NA	NA	1014	1227	4107.86	7107.255	34.1	NA	NA	42496	872	F
10/13/10	GN	NA	NA	1014	1227	4107.86	7107.255	34.1	NA	NA	42497	912	F
10/13/10	GN	NA	NA	1014	1227	4107.86	7107.255	34.1	NA	NA	42498	888	F
10/13/10	GN	NA	NA	1014	1227	4107.86	7107.255	34.1	NA	NA	42499	800	F
10/13/10	GN	NA	NA	NA	NA	4108.167	7106.444	NA	NA	NA	42500	885	F
10/13/10	GN	NA	NA	NA	NA	4108.167	7106.444	NA	NA	NA	47450	848	F
10/13/10	GN	NA	NA	1145	1449	4108.268	7107.158	36	NA	NA	42337	731	M
10/13/10	GN	NA	NA	1145	1449	4108.268	7107.158	36	NA	NA	42338	962	F
10/13/10	GN	NA	NA	1145	1449	4108.268	7107.158	36	NA	NA	42339	866	F
10/13/10	GN	NA	NA	1145	1449	4108.268	7107.158	36	NA	NA	42340	885	F
10/13/10	GN	NA	NA	1145	1449	4108.268	7107.158	36	NA	NA	47434	889	F

Appendix B (continued)

Date	Gear	Gear Dp (m)	Gear T (°C)	Time set	Time pulled	Latitude	Longitude	Dp (m)	SST (°C)	SSS	Tag #	TL (mm)	Sex
10/13/10	GN	NA	NA	1145	1449	4108.268	7107.158	36	NA	NA	42341	805	F
10/13/10	GN	NA	NA	1145	1449	4108.268	7107.158	36	NA	NA	42342	880	F
10/13/10	GN	NA	NA	1145	1449	4108.268	7107.158	36	NA	NA	42343	881	F
10/13/10	GN	NA	NA	1145	1449	4108.268	7107.158	36	NA	NA	42344	906	F
10/13/10	GN	NA	NA	1145	1449	4108.268	7107.158	36	NA	NA	42345	919	F
10/13/10	GN	NA	NA	1145	1449	4108.268	7107.158	36	NA	NA	42346	855	F
10/13/10	GN	NA	NA	1145	1449	4108.268	7107.158	36	NA	NA	42347	873	F
10/13/10	GN	NA	NA	1145	1449	4108.268	7107.158	36	NA	NA	42348	875	F
10/13/10	GN	NA	NA	1145	1449	4108.268	7107.158	36	NA	NA	42349	926	F
10/13/10	GN	NA	NA	1145	1449	4108.268	7107.158	36	NA	NA	42350	881	F
10/13/10	GN	NA	NA	1145	1449	4108.268	7107.158	36	NA	NA	47435	830	F
10/13/10	GN	NA	NA	1145	1449	4108.268	7107.158	36	NA	NA	42351	846	F
10/13/10	GN	NA	NA	1145	1449	4108.268	7107.158	36	NA	NA	42352	895	F
10/13/10	GN	NA	NA	1145	1449	4108.268	7107.158	36	NA	NA	42353	932	F
10/13/10	GN	NA	NA	1145	1449	4108.268	7107.158	36	NA	NA	42354	907	F
10/13/10	GN	NA	NA	1145	1449	4108.268	7107.158	36	NA	NA	42355	1040	F
10/13/10	GN	NA	NA	1145	1449	4108.268	7107.158	36	NA	NA	42356	879	F
10/13/10	GN	NA	NA	1145	1449	4108.268	7107.158	36	NA	NA	42357	830	F
10/13/10	GN	NA	NA	1145	1449	4108.268	7107.158	36	NA	NA	42358	897	F
10/13/10	GN	NA	NA	1145	1449	4108.268	7107.158	36	NA	NA	42359	909	F
10/13/10	GN	NA	NA	1306	1519	4108.379	7107.076	34.7	NA	NA	42360	930	F
10/13/10	GN	NA	NA	1306	1519	4108.379	7107.076	34.7	NA	NA	47436	891	F
10/13/10	GN	NA	NA	1306	1519	4108.379	7107.076	34.7	NA	NA	42361	1008	F
10/13/10	GN	NA	NA	1306	1519	4108.379	7107.076	34.7	NA	NA	42362	902	F
10/13/10	GN	NA	NA	1306	1519	4108.379	7107.076	34.7	NA	NA	42363	909	F
10/13/10	GN	NA	NA	1306	1519	4108.379	7107.076	34.7	NA	NA	42364	887	F
10/13/10	GN	NA	NA	1306	1519	4108.379	7107.076	34.7	NA	NA	42365	867	F
10/13/10	GN	NA	NA	1306	1519	4108.379	7107.076	34.7	NA	NA	42366	967	F
10/13/10	GN	NA	NA	1306	1519	4108.379	7107.076	34.7	NA	NA	42367	865	F
10/13/10	GN	NA	NA	1306	1519	4108.379	7107.076	34.7	NA	NA	42368	854	F
10/13/10	GN	NA	NA	1306	1519	4108.379	7107.076	34.7	NA	NA	42369	882	F
10/13/10	GN	NA	NA	1306	1519	4108.379	7107.076	34.7	NA	NA	42370	856	F
10/13/10	GN	NA	NA	1306	1519	4108.379	7107.076	34.7	NA	NA	47437	870	F
10/13/10	GN	NA	NA	1306	1519	4108.379	7107.076	34.7	NA	NA	42371	880	F
10/13/10	GN	NA	NA	1306	1519	4108.379	7107.076	34.7	NA	NA	42372	925	F
10/13/10	GN	NA	NA	1306	1519	4108.379	7107.076	34.7	NA	NA	42373	852	F
10/13/10	GN	NA	NA	1306	1519	4108.379	7107.076	34.7	NA	NA	42374	849	F
10/13/10	GN	NA	NA	1306	1519	4108.379	7107.076	34.7	NA	NA	42375	877	F
10/13/10	GN	NA	NA	1306	1519	4108.379	7107.076	34.7	NA	NA	42376	869	F
10/13/10	GN	NA	NA	1306	1519	4108.379	7107.076	34.7	NA	NA	42377	937	F
10/13/10	GN	NA	NA	1306	1519	4108.379	7107.076	34.7	NA	NA	42378	860	F

Appendix B (continued)

Date	Gear	Gear Dp (m)	Gear T (°C)	Time set	Time pulled	Latitude	Longitude	Dp (m)	SST (°C)	SSS	Tag #	TL (mm)	Sex
10/13/10	GN	NA	NA	1306	1519	4108.379	7107.076	34.7	NA	NA	42379	1007	F
10/13/10	GN	NA	NA	1306	1519	4108.379	7107.076	34.7	NA	NA	42380	907	F
10/13/10	GN	NA	NA	1306	1519	4108.379	7107.076	34.7	NA	NA	47438	882	F
10/13/10	GN	NA	NA	1306	1519	4108.379	7107.076	34.7	NA	NA	42381	952	F
10/13/10	GN	NA	NA	1306	1519	4108.379	7107.076	34.7	NA	NA	42382	862	F
10/13/10	GN	NA	NA	1306	1519	4108.379	7107.076	34.7	NA	NA	42383	918	F
10/13/10	GN	NA	NA	1306	1519	4108.379	7107.076	34.7	NA	NA	42384	826	F
10/13/10	GN	NA	NA	1306	1519	4108.379	7107.076	34.7	NA	NA	42385	950	F
10/13/10	GN	NA	NA	1306	1519	4108.379	7107.076	34.7	NA	NA	42386	858	F
10/13/10	GN	NA	NA	1306	1519	4108.379	7107.076	34.7	NA	NA	42387	890	F
10/13/10	GN	NA	NA	1306	1519	4108.379	7107.076	34.7	NA	NA	42388	929	F
10/13/10	GN	NA	NA	1306	1519	4108.379	7107.076	34.7	NA	NA	42389	1077	F
10/13/10	GN	NA	NA	1306	1519	4108.379	7107.076	34.7	NA	NA	42390	885	F
10/13/10	GN	NA	NA	1306	1519	4108.379	7107.076	34.7	NA	NA	47439	845	F
5/13/11	LN	NA	NA	NA	NA	4154.381	7027.17	NA	NA	NA	42501	806	F
5/13/11	LN	NA	NA	NA	NA	4154.381	7027.17	NA	NA	NA	42502	890	F
5/13/11	LN	28.5	9.1	1155	1230	4154.469	7027.292	32.3	9.6	NA	41901	740	F
5/13/11	LN	28.5	9.1	1155	1230	4154.469	7027.292	32.3	9.6	NA	42503	805	F
5/13/11	LN	28.5	9.1	1155	1230	4154.469	7027.292	32.3	9.6	NA	42504	785	F
5/13/11	LN	28.5	9.1	1155	1230	4154.469	7027.292	32.3	9.6	NA	42505	799	F
5/13/11	LN	28.5	9.1	1155	1230	4154.469	7027.292	32.3	9.6	NA	42506	972	F
5/13/11	LN	28.5	9.1	1155	1230	4154.469	7027.292	32.3	9.6	NA	42507	794	F
5/13/11	LN	28.5	9.1	1155	1230	4154.469	7027.292	32.3	9.6	NA	42508	761	F
5/13/11	LN	28.5	9.1	1155	1230	4154.469	7027.292	32.3	9.6	NA	42509	782	F
5/13/11	LN	28.5	9.1	1155	1230	4154.469	7027.292	32.3	9.6	NA	42510	864	F
5/13/11	LN	28.5	9.1	1155	1230	4154.469	7027.292	32.3	9.6	NA	47451	864	F
5/13/11	LN	28.5	9.1	1155	1230	4154.469	7027.292	32.3	9.6	NA	42511	855	F
5/13/11	LN	28.5	9.1	1155	1230	4154.469	7027.292	32.3	9.6	NA	42512	802	F
5/13/11	LN	28.5	9.1	1155	1230	4154.469	7027.292	32.3	9.6	NA	42513	852	F
5/13/11	LN	28.5	9.1	1155	1230	4154.469	7027.292	32.3	9.6	NA	42514	796	F
5/13/11	LN	28.5	9.1	1155	1230	4154.469	7027.292	32.3	9.6	NA	42515	679	F
5/13/11	LN	28.5	9.1	1155	1230	4154.469	7027.292	32.3	9.6	NA	42516	870	F
5/13/11	LN	28.5	9.1	1155	1230	4154.469	7027.292	32.3	9.6	NA	42517	880	F
5/13/11	LN	28.5	9.1	1155	1230	4154.469	7027.292	32.3	9.6	NA	42518	548	F
5/13/11	LN	28.5	9.1	1155	1230	4154.469	7027.292	32.3	9.6	NA	42519	863	F
5/13/11	LN	28.5	9.1	1155	1230	4154.469	7027.292	32.3	9.6	NA	42520	854	F
5/13/11	LN	28.5	9.1	1155	1230	4154.469	7027.292	32.3	9.6	NA	47452	834	F
5/13/11	LN	28.5	9.1	1155	1230	4154.469	7027.292	32.3	9.6	NA	42521	805	F
5/13/11	LN	28.5	9.1	1155	1230	4154.469	7027.292	32.3	9.6	NA	42522	859	F
5/13/11	LN	28.5	9.1	1155	1230	4154.469	7027.292	32.3	9.6	NA	42523	837	F
5/13/11	LN	28.5	9.1	1155	1230	4154.469	7027.292	32.3	9.6	NA	42524	879	F

Appendix B (continued)

Date	Gear	Gear Dp (m)	Gear T (°C)	Time set	Time pulled	Latitude	Longitude	Dp (m)	SST (°C)	SSS	Tag #	TL (mm)	Sex
5/13/11	LN	28.5	9.1	1155	1230	4154.469	7027.292	32.3	9.6	NA	42525	920	F
5/13/11	LN	28.5	9.1	1155	1230	4154.469	7027.292	32.3	9.6	NA	42526	842	F
5/13/11	LN	28.5	9.1	1155	1230	4154.469	7027.292	32.3	9.6	NA	42527	841	F
5/13/11	LN	28.5	9.1	1155	1230	4154.469	7027.292	32.3	9.6	NA	42528	884	F
5/13/11	LN	28.5	9.1	1155	1230	4154.469	7027.292	32.3	9.6	NA	42529	762	F
5/13/11	LN	28.5	9.1	1155	1230	4154.469	7027.292	32.3	9.6	NA	42530	844	F
5/13/11	LN	28.5	9.1	1155	1230	4154.469	7027.292	32.3	9.6	NA	47453	787	F
5/13/11	LN	28.5	9.1	1155	1230	4154.469	7027.292	32.3	9.6	NA	42531	808	F
5/13/11	LN	28.5	9.1	1155	1230	4154.469	7027.292	32.3	9.6	NA	42532	958	F
5/13/11	LN	28.5	9.1	1155	1230	4154.469	7027.292	32.3	9.6	NA	42533	800	F
5/13/11	LN	28.5	9.1	1155	1230	4154.469	7027.292	32.3	9.6	NA	42534	873	F
5/13/11	LN	28.5	9.1	1155	1230	4154.469	7027.292	32.3	9.6	NA	42535	798	F
5/13/11	LN	28.5	9.1	1155	1230	4154.469	7027.292	32.3	9.6	NA	42536	810	F
5/13/11	LN	28.5	9.1	1155	1230	4154.469	7027.292	32.3	9.6	NA	42537	860	F
5/13/11	LN	28.5	9.1	1155	1230	4154.469	7027.292	32.3	9.6	NA	42538	801	F
5/13/11	LN	28.5	9.1	1155	1230	4154.469	7027.292	32.3	9.6	NA	42539	733	F
5/13/11	LN	28.5	9.1	1155	1230	4154.469	7027.292	32.3	9.6	NA	42540	836	F
5/13/11	LN	28.5	9.1	1155	1230	4154.469	7027.292	32.3	9.6	NA	47454	816	F
5/13/11	LN	28.5	9.1	1155	1230	4154.469	7027.292	32.3	9.6	NA	42541	878	F
5/13/11	LN	28.5	9.1	1155	1230	4154.469	7027.292	32.3	9.6	NA	42542	849	F
5/13/11	LN	28.5	9.1	1155	1230	4154.469	7027.292	32.3	9.6	NA	42543	871	F
5/13/11	LN	28.5	9.1	1155	1230	4154.469	7027.292	32.3	9.6	NA	42544	831	F
5/13/11	LN	28.5	9.1	1155	1230	4154.469	7027.292	32.3	9.6	NA	42545	888	F
5/13/11	LN	28.5	9.1	1155	1230	4154.469	7027.292	32.3	9.6	NA	42546	844	F
5/13/11	LN	28.5	9.1	1155	1230	4154.469	7027.292	32.3	9.6	NA	42547	796	F
5/13/11	LN	28.5	9.1	1155	1230	4154.469	7027.292	32.3	9.6	NA	42548	758	F
5/13/11	LN	28.5	9.1	1155	1230	4154.469	7027.292	32.3	9.6	NA	42549	844	F
5/13/11	LN	28.5	9.1	1155	1230	4154.469	7027.292	32.3	9.6	NA	42550	885	F
5/13/11	LN	28.5	9.1	1155	1230	4154.469	7027.292	32.3	9.6	NA	47455	795	F
5/13/11	LN	28.5	9.1	1155	1230	4154.469	7027.292	32.3	9.6	NA	42551	831	F
5/13/11	LN	28.5	9.1	1155	1230	4154.469	7027.292	32.3	9.6	NA	42552	722	F
5/13/11	LN	28.5	9.1	1155	1230	4154.469	7027.292	32.3	9.6	NA	42553	781	F
5/13/11	LN	28.5	9.1	1155	1230	4154.469	7027.292	32.3	9.6	NA	42554	819	F
5/13/11	LN	28.5	9.1	1155	1230	4154.469	7027.292	32.3	9.6	NA	42555	786	M
5/13/11	LN	28.5	9.1	1155	1230	4154.469	7027.292	32.3	9.6	NA	42556	883	F
5/13/11	LN	28.5	9.1	1155	1230	4154.469	7027.292	32.3	9.6	NA	42557	853	F
5/13/11	LN	28.5	9.1	1155	1230	4154.469	7027.292	32.3	9.6	NA	42558	884	F
5/13/11	LN	28.5	9.1	1155	1230	4154.469	7027.292	32.3	9.6	NA	42559	831	F
5/13/11	LN	28.5	9.1	1155	1230	4154.469	7027.292	32.3	9.6	NA	42560	910	F
5/13/11	LN	28.5	9.1	1155	1230	4154.469	7027.292	32.3	9.6	NA	47456	805	F
5/13/11	LN	28.5	9.1	1155	1230	4154.469	7027.292	32.3	9.6	NA	42561	833	F

Appendix B (continued)

Date	Gear	Gear Dp (m)	Gear T (°C)	Time set	Time pulled	Latitude	Longitude	Dp (m)	SST (°C)	SSS	Tag #	TL (mm)	Sex
5/13/11	LN	28.5	9.1	1155	1230	4154.469	7027.292	32.3	9.6	NA	42562	936	F
5/13/11	LN	28.5	9.1	1155	1230	4154.469	7027.292	32.3	9.6	NA	42563	864	F
5/13/11	LN	28.5	9.1	1155	1230	4154.469	7027.292	32.3	9.6	NA	42564	876	F
5/13/11	LN	28.5	9.1	1155	1230	4154.469	7027.292	32.3	9.6	NA	42565	835	F
5/13/11	LN	28.5	9.1	1155	1230	4154.469	7027.292	32.3	9.6	NA	42566	846	F
5/13/11	LN	28.5	9.1	1155	1230	4154.469	7027.292	32.3	9.6	NA	42567	781	F
5/13/11	LN	28.5	9.1	1155	1230	4154.469	7027.292	32.3	9.6	NA	42568	796	F
5/13/11	LN	28.5	9.1	1155	1230	4154.469	7027.292	32.3	9.6	NA	42569	798	F
5/13/11	LN	28.5	9.1	1155	1230	4154.469	7027.292	32.3	9.6	NA	42570	866	F
5/13/11	LN	28.5	9.1	1155	1230	4154.469	7027.292	32.3	9.6	NA	47457	850	F
5/13/11	LN	28.5	9.1	1155	1230	4154.469	7027.292	32.3	9.6	NA	42571	817	F
5/13/11	LN	28.5	9.1	1155	1230	4154.469	7027.292	32.3	9.6	NA	42572	756	F
5/13/11	LN	28.5	9.1	1155	1230	4154.469	7027.292	32.3	9.6	NA	42573	879	F
5/13/11	LN	28.5	9.1	1155	1230	4154.469	7027.292	32.3	9.6	NA	42574	922	F
5/13/11	LN	28.5	9.1	1155	1230	4154.469	7027.292	32.3	9.6	NA	42575	824	F
5/13/11	LN	28.5	9.1	1155	1230	4154.469	7027.292	32.3	9.6	NA	42576	807	F
5/13/11	LN	28.5	9.1	1155	1230	4154.469	7027.292	32.3	9.6	NA	42577	736	F
5/13/11	LN	28.5	9.1	1155	1230	4154.469	7027.292	32.3	9.6	NA	42578	871	F
5/13/11	LN	28.5	9.1	1155	1230	4154.469	7027.292	32.3	9.6	NA	42579	776	F
5/13/11	LN	28.5	9.1	1155	1230	4154.469	7027.292	32.3	9.6	NA	42580	795	F
5/13/11	LN	28.5	9.1	1155	1230	4154.469	7027.292	32.3	9.6	NA	47458	835	F
5/13/11	LN	28.5	9.1	1155	1230	4154.469	7027.292	32.3	9.6	NA	42581	779	F
5/13/11	LN	28.5	9.1	1155	1230	4154.469	7027.292	32.3	9.6	NA	42582	770	F
5/13/11	LN	28.5	9.1	1155	1230	4154.469	7027.292	32.3	9.6	NA	42583	819	F
5/13/11	LN	28.5	9.1	1155	1230	4154.469	7027.292	32.3	9.6	NA	42584	859	F
5/13/11	LN	28.5	9.1	1155	1230	4154.469	7027.292	32.3	9.6	NA	42585	846	F
5/13/11	LN	28.5	9.1	1155	1230	4154.469	7027.292	32.3	9.6	NA	42586	794	F
5/13/11	LN	28.5	9.1	1155	1230	4154.469	7027.292	32.3	9.6	NA	42587	821	F
5/13/11	LN	28.5	9.1	1155	1230	4154.469	7027.292	32.3	9.6	NA	42588	813	F
5/13/11	LN	28.5	9.1	1155	1230	4154.469	7027.292	32.3	9.6	NA	42589	816	F
5/13/11	LN	28.5	9.1	1155	1230	4154.469	7027.292	32.3	9.6	NA	42590	885	F
5/13/11	LN	28.5	9.1	1155	1230	4154.469	7027.292	32.3	9.6	NA	47459	834	F
5/13/11	LN	28.5	9.1	1155	1230	4154.469	7027.292	32.3	9.6	NA	42591	819	F
5/13/11	LN	28.5	9.1	1155	1230	4154.469	7027.292	32.3	9.6	NA	42592	850	F
5/13/11	LN	28.5	9.1	1155	1230	4154.469	7027.292	32.3	9.6	NA	42593	818	F
5/13/11	LN	28.5	9.1	1155	1230	4154.469	7027.292	32.3	9.6	NA	42594	750	F
5/13/11	LN	28.5	9.1	1155	1230	4154.469	7027.292	32.3	9.6	NA	42595	906	F
5/13/11	LN	28.5	9.1	1155	1230	4154.469	7027.292	32.3	9.6	NA	42596	805	F
5/13/11	LN	28.5	9.1	1155	1230	4154.469	7027.292	32.3	9.6	NA	42597	842	F
5/13/11	LN	28.5	9.1	1155	1230	4154.469	7027.292	32.3	9.6	NA	42598	775	F
5/13/11	LN	28.5	9.1	1155	1230	4154.469	7027.292	32.3	9.6	NA	42599	810	F

Appendix B (continued)

Date	Gear	Gear Dp (m)	Gear T (°C)	Time set	Time pulled	Latitude	Longitude	Dp (m)	SST (°C)	SSS	Tag #	TL (mm)	Sex
5/13/11	LN	28.5	9.1	1155	1230	4154.469	7027.292	32.3	9.6	NA	42600	726	F
5/13/11	LN	28.5	9.1	1155	1230	4154.469	7027.292	32.3	9.6	NA	47460	800	F
5/13/11	LN	28.5	9.1	1155	1310	4154.469	7027.292	32.3	9.6	NA	41901	905	F
5/13/11	LN	28.5	9.1	1155	1310	4154.469	7027.292	32.3	9.6	NA	41902	910	F
5/13/11	LN	28.5	9.1	1155	1310	4154.469	7027.292	32.3	9.6	NA	41903	770	F
5/13/11	LN	28.5	9.1	1155	1310	4154.469	7027.292	32.3	9.6	NA	41904	849	F
5/13/11	LN	28.5	9.1	1155	1310	4154.469	7027.292	32.3	9.6	NA	41905	831	F
5/13/11	LN	28.5	9.1	1155	1310	4154.469	7027.292	32.3	9.6	NA	41906	865	F
5/13/11	LN	28.5	9.1	1155	1310	4154.469	7027.292	32.3	9.6	NA	41907	870	F
5/13/11	LN	28.5	9.1	1155	1310	4154.469	7027.292	32.3	9.6	NA	41908	831	F
5/13/11	LN	28.5	9.1	1155	1310	4154.469	7027.292	32.3	9.6	NA	41909	790	F
5/13/11	LN	28.5	9.1	1155	1310	4154.469	7027.292	32.3	9.6	NA	41910	795	F
5/13/11	LN	28.5	9.1	1155	1310	4154.469	7027.292	32.3	9.6	NA	47391	682	F
5/13/11	LN	28.5	9.1	1155	1310	4154.469	7027.292	32.3	9.6	NA	41911	839	F
5/13/11	LN	28.5	9.1	1155	1310	4154.469	7027.292	32.3	9.6	NA	41912	826	F
5/13/11	LN	28.5	9.1	1155	1310	4154.469	7027.292	32.3	9.6	NA	41913	776	F
5/13/11	LN	28.5	9.1	1155	1310	4154.469	7027.292	32.3	9.6	NA	41914	873	F
5/13/11	LN	28.5	9.1	1155	1310	4154.469	7027.292	32.3	9.6	NA	41915	810	F
5/13/11	LN	28.5	9.1	1155	1310	4154.469	7027.292	32.3	9.6	NA	41916	822	F
5/13/11	LN	28.5	9.1	1155	1310	4154.469	7027.292	32.3	9.6	NA	41917	845	F
5/13/11	LN	28.5	9.1	1155	1310	4154.469	7027.292	32.3	9.6	NA	41918	870	F
5/13/11	LN	28.5	9.1	1155	1310	4154.469	7027.292	32.3	9.6	NA	41919	840	F
5/13/11	LN	28.5	9.1	1155	1310	4154.469	7027.292	32.3	9.6	NA	41920	791	F
5/13/11	LN	28.5	9.1	1155	1310	4154.469	7027.292	32.3	9.6	NA	47392	823	F
5/13/11	LN	28.5	9.1	1155	1310	4154.469	7027.292	32.3	9.6	NA	41921	886	F
5/13/11	LN	28.5	9.1	1155	1310	4154.469	7027.292	32.3	9.6	NA	41922	911	F
5/13/11	LN	28.5	9.1	1155	1310	4154.469	7027.292	32.3	9.6	NA	41923	832	F
5/13/11	LN	28.5	9.1	1155	1310	4154.469	7027.292	32.3	9.6	NA	41924	761	F
5/13/11	LN	28.5	9.1	1155	1310	4154.469	7027.292	32.3	9.6	NA	41925	767	M
5/13/11	LN	28.5	9.1	1155	1310	4154.469	7027.292	32.3	9.6	NA	41926	740	F
5/13/11	LN	28.5	9.1	1155	1310	4154.469	7027.292	32.3	9.6	NA	41927	811	F
5/13/11	LN	28.5	9.1	1155	1310	4154.469	7027.292	32.3	9.6	NA	41928	854	F
5/13/11	LN	28.5	9.1	1155	1310	4154.469	7027.292	32.3	9.6	NA	41929	762	F
5/13/11	LN	28.5	9.1	1155	1310	4154.469	7027.292	32.3	9.6	NA	41930	801	F
5/13/11	LN	28.5	9.1	1155	1310	4154.469	7027.292	32.3	9.6	NA	47393	855	F
5/13/11	LN	28.5	9.1	1155	1310	4154.469	7027.292	32.3	9.6	NA	41931	885	F
5/13/11	LN	28.5	9.1	1155	1310	4154.469	7027.292	32.3	9.6	NA	41932	865	F
5/13/11	LN	28.5	9.1	1155	1310	4154.469	7027.292	32.3	9.6	NA	41933	810	F
5/13/11	LN	28.5	9.1	1155	1310	4154.469	7027.292	32.3	9.6	NA	41934	935	F
5/13/11	LN	28.5	9.1	1155	1310	4154.469	7027.292	32.3	9.6	NA	41935	847	F
5/13/11	LN	28.5	9.1	1155	1310	4154.469	7027.292	32.3	9.6	NA	41936	870	F

Appendix B (continued)

Date	Gear	Gear Dp (m)	Gear T (°C)	Time set	Time pulled	Latitude	Longitude	Dp (m)	SST (°C)	SSS	Tag #	TL (mm)	Sex
5/13/11	LN	28.5	9.1	1155	1310	4154.469	7027.292	32.3	9.6	NA	41937	798	F
5/13/11	LN	28.5	9.1	1155	1310	4154.469	7027.292	32.3	9.6	NA	41938	793	F
5/13/11	LN	28.5	9.1	1155	1310	4154.469	7027.292	32.3	9.6	NA	41939	769	F
5/13/11	LN	28.5	9.1	1155	1310	4154.469	7027.292	32.3	9.6	NA	41940	754	F
5/13/11	LN	28.5	9.1	1155	1310	4154.469	7027.292	32.3	9.6	NA	47394	845	F
5/13/11	LN	28.5	9.1	1155	1310	4154.469	7027.292	32.3	9.6	NA	41941	904	F
5/13/11	LN	28.5	9.1	1155	1310	4154.469	7027.292	32.3	9.6	NA	41942	898	F
5/13/11	LN	28.5	9.1	1155	1310	4154.469	7027.292	32.3	9.6	NA	41943	788	F
5/13/11	LN	28.5	9.1	1155	1310	4154.469	7027.292	32.3	9.6	NA	41944	764	F
5/13/11	LN	28.5	9.1	1155	1310	4154.469	7027.292	32.3	9.6	NA	41945	911	F
5/13/11	LN	28.5	9.1	1155	1310	4154.469	7027.292	32.3	9.6	NA	41946	812	F
5/13/11	LN	28.5	9.1	1155	1310	4154.469	7027.292	32.3	9.6	NA	41947	815	F
5/13/11	LN	28.5	9.1	1155	1310	4154.469	7027.292	32.3	9.6	NA	41948	809	F
5/13/11	LN	28.5	9.1	1155	1310	4154.469	7027.292	32.3	9.6	NA	41949	810	F
5/13/11	LN	28.5	9.1	1155	1310	4154.469	7027.292	32.3	9.6	NA	41950	828	F
5/13/11	LN	28.5	9.1	1155	1310	4154.469	7027.292	32.3	9.6	NA	47395	775	F
5/13/11	LN	28.5	9.1	1155	1310	4154.469	7027.292	32.3	9.6	NA	41951	804	F
5/13/11	LN	28.5	9.1	1155	1310	4154.469	7027.292	32.3	9.6	NA	41952	851	F
5/13/11	LN	28.5	9.1	1155	1310	4154.469	7027.292	32.3	9.6	NA	41953	858	F
5/13/11	LN	28.5	9.1	1155	1310	4154.469	7027.292	32.3	9.6	NA	41954	825	F
5/13/11	LN	28.5	9.1	1155	1310	4154.469	7027.292	32.3	9.6	NA	41955	840	F
5/13/11	LN	28.5	9.1	1155	1310	4154.469	7027.292	32.3	9.6	NA	41956	860	F
5/13/11	LN	28.5	9.1	1155	1310	4154.469	7027.292	32.3	9.6	NA	41957	816	F
5/13/11	LN	28.5	9.1	1155	1310	4154.469	7027.292	32.3	9.6	NA	41958	807	F
5/13/11	LN	28.5	9.1	1155	1310	4154.469	7027.292	32.3	9.6	NA	41959	752	F
5/13/11	LN	28.5	9.1	1155	1310	4154.469	7027.292	32.3	9.6	NA	41960	923	F
5/13/11	LN	28.5	9.1	1155	1310	4154.469	7027.292	32.3	9.6	NA	47396	935	F
5/13/11	LN	28.5	9.1	1155	1310	4154.469	7027.292	32.3	9.6	NA	41961	749	F
5/13/11	LN	28.5	9.1	1155	1310	4154.469	7027.292	32.3	9.6	NA	41962	869	F
5/13/11	LN	28.5	9.1	1155	1310	4154.469	7027.292	32.3	9.6	NA	41963	914	F
5/13/11	LN	28.5	9.1	1155	1310	4154.469	7027.292	32.3	9.6	NA	41964	845	F
5/13/11	LN	28.5	9.1	1155	1310	4154.469	7027.292	32.3	9.6	NA	41965	827	F
5/13/11	LN	28.5	9.1	1155	1310	4154.469	7027.292	32.3	9.6	NA	41966	804	F
5/13/11	LN	28.5	9.1	1155	1310	4154.469	7027.292	32.3	9.6	NA	41967	871	F
5/13/11	LN	28.5	9.1	1155	1310	4154.469	7027.292	32.3	9.6	NA	41968	847	F
5/13/11	LN	28.5	9.1	1155	1310	4154.469	7027.292	32.3	9.6	NA	41969	882	F
5/13/11	LN	28.5	9.1	1155	1310	4154.469	7027.292	32.3	9.6	NA	41970	853	F
5/13/11	LN	28.5	9.1	1155	1310	4154.469	7027.292	32.3	9.6	NA	47397	867	F
5/13/11	LN	28.5	9.1	1155	1310	4154.469	7027.292	32.3	9.6	NA	41971	909	F
5/13/11	LN	28.5	9.1	1155	1310	4154.469	7027.292	32.3	9.6	NA	41972	900	F
5/13/11	LN	28.5	9.1	1155	1310	4154.469	7027.292	32.3	9.6	NA	41973	837	F

Appendix B (continued)

Date	Gear	Gear Dp (m)	Gear T (°C)	Time set	Time pulled	Latitude	Longitude	Dp (m)	SST (°C)	SSS	Tag #	TL (mm)	Sex
5/13/11	LN	28.5	9.1	1155	1310	4154.469	7027.292	32.3	9.6	NA	41974	754	F
5/13/11	LN	28.5	9.1	1155	1310	4154.469	7027.292	32.3	9.6	NA	41975	765	F
5/13/11	LN	28.5	9.1	1155	1310	4154.469	7027.292	32.3	9.6	NA	41976	906	F
5/13/11	LN	28.5	9.1	1155	1310	4154.469	7027.292	32.3	9.6	NA	41977	810	F
5/13/11	LN	28.5	9.1	1155	1310	4154.469	7027.292	32.3	9.6	NA	41978	830	F
5/13/11	LN	28.5	9.1	1155	1310	4154.469	7027.292	32.3	9.6	NA	41979	793	F
5/13/11	LN	28.5	9.1	1155	1310	4154.469	7027.292	32.3	9.6	NA	41980	862	F
5/13/11	LN	28.5	9.1	1155	1310	4154.469	7027.292	32.3	9.6	NA	47398	831	F
5/13/11	LN	28.5	9.1	1155	1310	4154.469	7027.292	32.3	9.6	NA	41981	807	F
5/13/11	LN	28.5	9.1	1155	1310	4154.469	7027.292	32.3	9.6	NA	41982	841	F
5/13/11	LN	28.5	9.1	1155	1310	4154.469	7027.292	32.3	9.6	NA	41983	862	F
5/13/11	LN	28.5	9.1	1155	1310	4154.469	7027.292	32.3	9.6	NA	41984	803	F
5/13/11	LN	28.5	9.1	1155	1310	4154.469	7027.292	32.3	9.6	NA	41985	790	F
5/13/11	LN	28.5	9.1	1155	1310	4154.469	7027.292	32.3	9.6	NA	41986	753	F
5/13/11	LN	28.5	9.1	1155	1310	4154.469	7027.292	32.3	9.6	NA	41987	810	F
5/13/11	LN	28.5	9.1	1155	1310	4154.469	7027.292	32.3	9.6	NA	41988	782	F
5/13/11	LN	28.5	9.1	1155	1310	4154.469	7027.292	32.3	9.6	NA	41990	913	F
5/13/11	LN	28.5	9.1	1155	1310	4154.469	7027.292	32.3	9.6	NA	47399	710	F
5/13/11	LN	28.5	9.1	1155	1310	4154.469	7027.292	32.3	9.6	NA	41991	825	F
5/13/11	LN	28.5	9.1	1155	1310	4154.469	7027.292	32.3	9.6	NA	41992	858	F
5/13/11	LN	28.5	9.1	1155	1310	4154.469	7027.292	32.3	9.6	NA	41993	859	F
5/13/11	LN	28.5	9.1	1155	1310	4154.469	7027.292	32.3	9.6	NA	41994	885	F
5/13/11	LN	28.5	9.1	1155	1310	4154.469	7027.292	32.3	9.6	NA	41995	839	F
5/13/11	LN	28.5	9.1	1155	1310	4154.469	7027.292	32.3	9.6	NA	41996	873	F
5/13/11	LN	28.5	9.1	1155	1310	4154.469	7027.292	32.3	9.6	NA	41997	875	F
5/13/11	LN	28.5	9.1	1155	1310	4154.469	7027.292	32.3	9.6	NA	41998	867	F
5/13/11	LN	28.5	9.1	1155	1310	4154.469	7027.292	32.3	9.6	NA	41999	846	F
5/13/11	LN	28.5	9.1	1155	1310	4154.469	7027.292	32.3	9.6	NA	42000	795	F
5/13/11	LN	28.5	9.1	1155	1310	4154.469	7027.292	32.3	9.6	NA	47400	810	F
5/13/11	LN	28.5	9.1	1155	1310	4154.469	7027.292	32.3	9.6	NA	42391	861	F
5/13/11	LN	28.5	9.1	1155	1310	4154.469	7027.292	32.3	9.6	NA	42392	881	F
5/13/11	LN	28.5	9.1	1155	1310	4154.469	7027.292	32.3	9.6	NA	42393	819	F
5/13/11	LN	28.5	9.1	1155	1310	4154.469	7027.292	32.3	9.6	NA	42394	813	F
5/13/11	LN	28.5	9.1	1155	1310	4154.469	7027.292	32.3	9.6	NA	42395	916	F
5/13/11	LN	28.5	9.1	1155	1310	4154.469	7027.292	32.3	9.6	NA	42396	842	F
5/13/11	LN	28.5	9.1	1155	1310	4154.469	7027.292	32.3	9.6	NA	42397	868	F
5/13/11	LN	28.5	9.1	1155	1310	4154.469	7027.292	32.3	9.6	NA	42398	863	F
5/13/11	LN	28.5	9.1	1155	1310	4154.469	7027.292	32.3	9.6	NA	42399	835	F
5/13/11	LN	28.5	9.1	1155	1310	4154.469	7027.292	32.3	9.6	NA	42400	770	F
5/13/11	LN	28.5	9.1	1155	1310	4154.469	7027.292	32.3	9.6	NA	47440	924	F
5/13/11	LN	28.5	9.1	1155	1310	4154.469	7027.292	32.3	9.6	NA	42601	868	F

Appendix B (continued)

Date	Gear	Gear Dp (m)	Gear T (°C)	Time set	Time pulled	Latitude	Longitude	Dp (m)	SST (°C)	SSS	Tag #	TL (mm)	Sex
5/13/11	LN	28.5	9.1	1155	1310	4154.469	7027.292	32.3	9.6	NA	42602	782	F
5/13/11	LN	28.5	9.1	1155	1310	4154.469	7027.292	32.3	9.6	NA	42603	755	F
5/13/11	LN	28.5	9.1	1155	1310	4154.469	7027.292	32.3	9.6	NA	42604	885	F
5/13/11	LN	28.5	9.1	1155	1310	4154.469	7027.292	32.3	9.6	NA	42605	885	F
5/13/11	LN	28.5	9.1	1155	1310	4154.469	7027.292	32.3	9.6	NA	42606	849	F
5/13/11	LN	28.5	9.1	1155	1310	4154.469	7027.292	32.3	9.6	NA	42607	890	F
5/13/11	LN	28.5	9.1	1155	1310	4154.469	7027.292	32.3	9.6	NA	42608	810	F
5/13/11	LN	28.5	9.1	1155	1310	4154.469	7027.292	32.3	9.6	NA	42609	814	F
5/13/11	LN	28.5	9.1	1155	1310	4154.469	7027.292	32.3	9.6	NA	42610	816	F
5/13/11	LN	28.5	9.1	1155	1310	4154.469	7027.292	32.3	9.6	NA	47461	878	F
5/13/11	LN	28.5	9.1	1155	1310	4154.469	7027.292	32.3	9.6	NA	42611	855	F
5/13/11	LN	28.5	9.1	1155	1310	4154.469	7027.292	32.3	9.6	NA	42612	840	F
5/13/11	LN	28.5	9.1	1155	1310	4154.469	7027.292	32.3	9.6	NA	42613	832	F
5/13/11	LN	28.5	9.1	1155	1310	4154.469	7027.292	32.3	9.6	NA	42614	781	F
5/13/11	LN	28.5	9.1	1155	1310	4154.469	7027.292	32.3	9.6	NA	42615	872	F
5/13/11	LN	28.5	9.1	1155	1310	4154.469	7027.292	32.3	9.6	NA	42616	833	F
5/13/11	LN	28.5	9.1	1155	1310	4154.469	7027.292	32.3	9.6	NA	42617	843	F
5/13/11	LN	28.5	9.1	1155	1310	4154.469	7027.292	32.3	9.6	NA	42618	916	F
5/13/11	LN	28.5	9.1	1155	1310	4154.469	7027.292	32.3	9.6	NA	42619	831	F
5/13/11	LN	28.5	9.1	1155	1310	4154.469	7027.292	32.3	9.6	NA	42620	731	F
5/13/11	LN	28.5	9.1	1155	1310	4154.469	7027.292	32.3	9.6	NA	47462	851	F
5/13/11	LN	28.5	9.1	1155	1310	4154.469	7027.292	32.3	9.6	NA	42621	655	F
5/13/11	LN	28.5	9.1	1155	1310	4154.469	7027.292	32.3	9.6	NA	42622	894	F
5/13/11	LN	28.5	9.1	1155	1310	4154.469	7027.292	32.3	9.6	NA	42623	778	F
5/13/11	LN	28.5	9.1	1155	1310	4154.469	7027.292	32.3	9.6	NA	42624	825	F
5/13/11	LN	28.5	9.1	1155	1310	4154.469	7027.292	32.3	9.6	NA	42625	865	F
5/13/11	LN	28.5	9.1	1155	1310	4154.469	7027.292	32.3	9.6	NA	42626	930	F
5/13/11	LN	28.5	9.1	1155	1310	4154.469	7027.292	32.3	9.6	NA	42627	774	F
5/13/11	LN	28.5	9.1	1155	1310	4154.469	7027.292	32.3	9.6	NA	42628	821	F
5/13/11	LN	28.5	9.1	1155	1310	4154.469	7027.292	32.3	9.6	NA	42629	814	F
5/13/11	LN	28.5	9.1	1155	1310	4154.469	7027.292	32.3	9.6	NA	42630	775	F
5/13/11	LN	28.5	9.1	1155	1330	4154.469	7027.292	32.3	9.6	NA	47463	842	F
5/13/11	LN	28.5	9.1	1155	1410	4154.469	7027.292	32.3	9.6	NA	42631	861	F
5/13/11	LN	28.5	9.1	1155	1410	4154.469	7027.292	32.3	9.6	NA	42632	793	F
5/13/11	LN	28.5	9.1	1155	1410	4154.469	7027.292	32.3	9.6	NA	42633	798	F
5/13/11	LN	28.5	9.1	1155	1410	4154.469	7027.292	32.3	9.6	NA	42634	724	F
5/13/11	LN	28.5	9.1	1155	1410	4154.469	7027.292	32.3	9.6	NA	42635	792	F
5/13/11	LN	28.5	9.1	1155	1410	4154.469	7027.292	32.3	9.6	NA	42636	814	F
5/13/11	LN	28.5	9.1	1155	1410	4154.469	7027.292	32.3	9.6	NA	42637	815	F
5/13/11	LN	28.5	9.1	1155	1410	4154.469	7027.292	32.3	9.6	NA	42638	874	F
5/13/11	LN	28.5	9.1	1155	1410	4154.469	7027.292	32.3	9.6	NA	42639	814	F

Appendix B (continued)

Date	Gear	Gear Dp (m)	Gear T (°C)	Time set	Time pulled	Latitude	Longitude	Dp (m)	SST (°C)	SSS	Tag #	TL (mm)	Sex
5/13/11	LN	28.5	9.1	1155	1410	4154.469	7027.292	32.3	9.6	NA	47464	795	F
5/13/11	LN	28.5	9.1	1155	1410	4154.469	7027.292	32.3	9.6	NA	42641	874	F
5/13/11	LN	28.5	9.1	1155	1410	4154.469	7027.292	32.3	9.6	NA	42642	864	F
5/13/11	LN	28.5	9.1	1155	1410	4154.469	7027.292	32.3	9.6	NA	42643	868	F
5/13/11	LN	28.5	9.1	1155	1410	4154.469	7027.292	32.3	9.6	NA	42644	872	F
5/13/11	LN	28.5	9.1	1155	1410	4154.469	7027.292	32.3	9.6	NA	42645	879	F
5/13/11	LN	28.5	9.1	1155	1410	4154.469	7027.292	32.3	9.6	NA	42646	866	F
5/13/11	LN	28.5	9.1	1155	1410	4154.469	7027.292	32.3	9.6	NA	42647	830	F
5/13/11	LN	28.5	9.1	1155	1410	4154.469	7027.292	32.3	9.6	NA	42648	878	F
5/13/11	LN	28.5	9.1	1155	1410	4154.469	7027.292	32.3	9.6	NA	42649	894	F
5/13/11	LN	28.5	9.1	1155	1410	4154.469	7027.292	32.3	9.6	NA	42650	820	F
5/13/11	LN	28.5	9.1	1155	1410	4154.469	7027.292	32.3	9.6	NA	47465	850	F
5/13/11	LN	28.5	9.1	1155	1410	4154.469	7027.292	32.3	9.6	NA	42651	875	F
5/13/11	LN	28.5	9.1	1155	1410	4154.469	7027.292	32.3	9.6	NA	42652	799	F
5/13/11	LN	28.5	9.1	1155	1410	4154.469	7027.292	32.3	9.6	NA	42653	838	F
5/13/11	LN	28.5	9.1	1155	1410	4154.469	7027.292	32.3	9.6	NA	42654	868	F
5/13/11	LN	28.5	9.1	1155	1410	4154.469	7027.292	32.3	9.6	NA	42655	863	F
5/13/11	LN	28.5	9.1	1155	1410	4154.469	7027.292	32.3	9.6	NA	42656	828	F
5/13/11	LN	28.5	9.1	1155	1410	4154.469	7027.292	32.3	9.6	NA	42657	780	F
5/13/11	LN	28.5	9.1	1155	1410	4154.469	7027.292	32.3	9.6	NA	42658	840	F
5/13/11	LN	28.5	9.1	1155	1410	4154.469	7027.292	32.3	9.6	NA	42659	860	F
5/13/11	LN	28.5	9.1	1155	1410	4154.469	7027.292	32.3	9.6	NA	42660	813	F
5/13/11	LN	28.5	9.1	1155	1410	4154.469	7027.292	32.3	9.6	NA	47466	794	F
5/13/11	LN	28.5	9.1	1155	1410	4154.469	7027.292	32.3	9.6	NA	42661	881	F
5/13/11	LN	28.5	9.1	1155	1410	4154.469	7027.292	32.3	9.6	NA	42662	812	F
5/13/11	LN	28.5	9.1	1155	1410	4154.469	7027.292	32.3	9.6	NA	42663	904	F
5/13/11	LN	28.5	9.1	1155	1410	4154.469	7027.292	32.3	9.6	NA	42664	826	F
5/13/11	LN	28.5	9.1	1155	1410	4154.469	7027.292	32.3	9.6	NA	42665	911	F
5/13/11	LN	28.5	9.1	1155	1410	4154.469	7027.292	32.3	9.6	NA	42666	889	F
5/13/11	LN	28.5	9.1	1155	1410	4154.469	7027.292	32.3	9.6	NA	42667	793	F
5/13/11	LN	28.5	9.1	1155	1410	4154.469	7027.292	32.3	9.6	NA	42668	830	F
5/13/11	LN	28.5	9.1	1155	1410	4154.469	7027.292	32.3	9.6	NA	42669	881	F
5/13/11	LN	28.5	9.1	1155	1410	4154.469	7027.292	32.3	9.6	NA	42670	894	F
5/13/11	LN	28.5	9.1	1155	1410	4154.469	7027.292	32.3	9.6	NA	47467	835	F
5/13/11	LN	28.5	9.1	1155	1410	4154.469	7027.292	32.3	9.6	NA	42671	856	F
5/13/11	LN	28.5	9.1	1155	1410	4154.469	7027.292	32.3	9.6	NA	42672	955	F
5/13/11	LN	28.5	9.1	1155	1410	4154.469	7027.292	32.3	9.6	NA	42673	886	F
5/13/11	LN	28.5	9.1	1155	1410	4154.469	7027.292	32.3	9.6	NA	42674	870	F
5/13/11	LN	28.5	9.1	1155	1410	4154.469	7027.292	32.3	9.6	NA	42675	816	F
5/13/11	LN	28.5	9.1	1155	1410	4154.469	7027.292	32.3	9.6	NA	42676	740	F
5/13/11	LN	28.5	9.1	1155	1410	4154.469	7027.292	32.3	9.6	NA	42677	865	F

Appendix B (continued)

Date	Gear	Gear Dp (m)	Gear T (°C)	Time set	Time pulled	Latitude	Longitude	Dp (m)	SST (°C)	SSS	Tag #	TL (mm)	Sex
5/13/11	LN	28.5	9.1	1155	1410	4154.469	7027.292	32.3	9.6	NA	42678	942	F
5/13/11	LN	28.5	9.1	1155	1410	4154.469	7027.292	32.3	9.6	NA	42679	859	F
5/13/11	LN	28.5	9.1	1155	1410	4154.469	7027.292	32.3	9.6	NA	42680	831	F
5/13/11	LN	28.5	9.1	1155	1410	4154.469	7027.292	32.3	9.6	NA	47468	834	F
5/13/11	LN	28.5	9.1	1155	1410	4154.469	7027.292	32.3	9.6	NA	42681	890	F
5/13/11	LN	28.5	9.1	1155	1410	4154.469	7027.292	32.3	9.6	NA	42682	839	F
5/13/11	LN	28.5	9.1	1155	1410	4154.469	7027.292	32.3	9.6	NA	42683	868	F
5/13/11	LN	28.5	9.1	1155	1410	4154.469	7027.292	32.3	9.6	NA	42684	847	F
5/13/11	LN	28.5	9.1	1155	1410	4154.469	7027.292	32.3	9.6	NA	42685	865	F
5/13/11	LN	28.5	9.1	1155	1410	4154.469	7027.292	32.3	9.6	NA	42686	845	F
5/13/11	LN	28.5	9.1	1155	1410	4154.469	7027.292	32.3	9.6	NA	42687	830	F
5/13/11	LN	28.5	9.1	1155	1410	4154.469	7027.292	32.3	9.6	NA	42688	790	F
5/13/11	LN	28.5	9.1	1155	1410	4154.469	7027.292	32.3	9.6	NA	42689	910	F
5/13/11	LN	28.5	9.1	1155	1410	4154.469	7027.292	32.3	9.6	NA	42690	786	F
5/13/11	LN	28.5	9.1	1155	1410	4154.469	7027.292	32.3	9.6	NA	47469	830	F
5/13/11	LN	28.5	9.1	1155	1410	4154.469	7027.292	32.3	9.6	NA	42691	919	F
5/13/11	LN	28.5	9.1	1155	1410	4154.469	7027.292	32.3	9.6	NA	42692	883	F
5/13/11	LN	28.5	9.1	1155	1410	4154.469	7027.292	32.3	9.6	NA	42693	835	F
5/13/11	LN	28.5	9.1	1155	1410	4154.469	7027.292	32.3	9.6	NA	42694	810	F
5/13/11	LN	28.5	9.1	1155	1410	4154.469	7027.292	32.3	9.6	NA	42695	819	F
5/13/11	LN	28.5	9.1	1155	1410	4154.469	7027.292	32.3	9.6	NA	42696	815	F
5/13/11	LN	28.5	9.1	1155	1410	4154.469	7027.292	32.3	9.6	NA	42697	850	F
5/13/11	LN	28.5	9.1	1155	1410	4154.469	7027.292	32.3	9.6	NA	42698	846	F
5/13/11	LN	28.5	9.1	1155	1410	4154.469	7027.292	32.3	9.6	NA	42699	889	F
5/13/11	LN	28.5	9.1	1155	1410	4154.469	7027.292	32.3	9.6	NA	42700	898	F
5/13/11	LN	28.5	9.1	1155	1410	4154.469	7027.292	32.3	9.6	NA	47470	869	F
5/13/11	LN	28.5	9.1	1155	1410	4154.469	7027.292	32.3	9.6	NA	42701	885	F
5/13/11	LN	28.5	9.1	1155	1410	4154.469	7027.292	32.3	9.6	NA	42702	798	F
5/13/11	LN	28.5	9.1	1155	1410	4154.469	7027.292	32.3	9.6	NA	42703	926	F
5/13/11	LN	28.5	9.1	1155	1410	4154.469	7027.292	32.3	9.6	NA	42704	878	F
5/13/11	LN	28.5	9.1	1155	1410	4154.469	7027.292	32.3	9.6	NA	42705	901	F
5/13/11	LN	28.5	9.1	1155	1410	4154.469	7027.292	32.3	9.6	NA	42706	849	F
5/13/11	LN	28.5	9.1	1155	1410	4154.469	7027.292	32.3	9.6	NA	42707	834	F
5/13/11	LN	28.5	9.1	1155	1410	4154.469	7027.292	32.3	9.6	NA	42708	909	F
5/13/11	LN	28.5	9.1	1155	1410	4154.469	7027.292	32.3	9.6	NA	42709	829	F
5/13/11	LN	28.5	9.1	1155	1410	4154.469	7027.292	32.3	9.6	NA	42710	819	F
5/13/11	LN	28.5	9.1	1155	1410	4154.469	7027.292	32.3	9.6	NA	47471	900	F
5/13/11	LN	28.5	9.1	1155	1410	4154.469	7027.292	32.3	9.6	NA	42711	835	F
5/13/11	LN	28.5	9.1	1155	1410	4154.469	7027.292	32.3	9.6	NA	42712	841	F
5/13/11	LN	28.5	9.1	1155	1410	4154.469	7027.292	32.3	9.6	NA	42713	815	F
5/13/11	LN	28.5	9.1	1155	1410	4154.469	7027.292	32.3	9.6	NA	42714	910	F

Appendix B (continued)

Date	Gear	Gear Dp (m)	Gear T (°C)	Time set	Time pulled	Latitude	Longitude	Dp (m)	SST (°C)	SSS	Tag #	TL (mm)	Sex
5/13/11	LN	28.5	9.1	1155	1410	4154.469	7027.292	32.3	9.6	NA	42715	787	F
5/13/11	LN	28.5	9.1	1155	1410	4154.469	7027.292	32.3	9.6	NA	42716	795	F
5/13/11	LN	28.5	9.1	1155	1410	4154.469	7027.292	32.3	9.6	NA	42717	812	F
5/13/11	LN	28.5	9.1	1155	1410	4154.469	7027.292	32.3	9.6	NA	42718	814	F
5/13/11	LN	28.5	9.1	1155	1410	4154.469	7027.292	32.3	9.6	NA	42719	897	F
5/13/11	LN	28.5	9.1	1155	1410	4154.469	7027.292	32.3	9.6	NA	42720	899	F
5/13/11	LN	28.5	9.1	1155	1410	4154.469	7027.292	32.3	9.6	NA	47472	894	F
5/13/11	LN	28.5	9.1	1155	1410	4154.469	7027.292	32.3	9.6	NA	42721	849	F
5/13/11	LN	28.5	9.1	1155	1410	4154.469	7027.292	32.3	9.6	NA	42722	899	F
5/13/11	LN	28.5	9.1	1155	1410	4154.469	7027.292	32.3	9.6	NA	42723	845	F
5/13/11	LN	28.5	9.1	1155	1410	4154.469	7027.292	32.3	9.6	NA	42724	876	F
5/13/11	LN	28.5	9.1	1155	1410	4154.469	7027.292	32.3	9.6	NA	42725	792	F
5/13/11	LN	28.5	9.1	1155	1410	4154.469	7027.292	32.3	9.6	NA	42726	818	F
5/13/11	LN	28.5	9.1	1155	1410	4154.469	7027.292	32.3	9.6	NA	42727	769	F
5/13/11	LN	28.5	9.1	1155	1410	4154.469	7027.292	32.3	9.6	NA	42728	849	F
5/13/11	LN	28.5	9.1	1155	1410	4154.469	7027.292	32.3	9.6	NA	42729	815	F
5/13/11	LN	28.5	9.1	1155	1410	4154.469	7027.292	32.3	9.6	NA	42730	820	F
5/13/11	LN	28.5	9.1	1155	1410	4154.469	7027.292	32.3	9.6	NA	47473	838	F
5/13/11	LN	28.5	9.1	1155	1410	4154.469	7027.292	32.3	9.6	NA	42731	859	F
5/13/11	LN	28.5	9.1	1155	1410	4154.469	7027.292	32.3	9.6	NA	42732	841	F
5/13/11	LN	28.5	9.1	1155	1410	4154.469	7027.292	32.3	9.6	NA	42733	848	F
5/13/11	LN	28.5	9.1	1155	1410	4154.469	7027.292	32.3	9.6	NA	42734	911	F
5/13/11	LN	28.5	9.1	1155	1410	4154.469	7027.292	32.3	9.6	NA	42735	892	F
5/13/11	LN	28.5	9.1	1155	1410	4154.469	7027.292	32.3	9.6	NA	42736	870	F
5/13/11	LN	28.5	9.1	1155	1410	4154.469	7027.292	32.3	9.6	NA	42737	785	F
5/13/11	LN	28.5	9.1	1155	1410	4154.469	7027.292	32.3	9.6	NA	42738	890	F
5/13/11	LN	28.5	9.1	1155	1410	4154.469	7027.292	32.3	9.6	NA	42739	818	F
5/13/11	LN	28.5	9.1	1155	1410	4154.469	7027.292	32.3	9.6	NA	42740	781	F
5/13/11	LN	28.5	9.1	1155	1410	4154.469	7027.292	32.3	9.6	NA	47474	904	F
5/13/11	LN	28.5	9.1	1155	1410	4154.469	7027.292	32.3	9.6	NA	42741	826	F
5/13/11	LN	28.5	9.1	1155	1410	4154.469	7027.292	32.3	9.6	NA	42742	849	F
5/13/11	LN	28.5	9.1	1155	1410	4154.469	7027.292	32.3	9.6	NA	42743	900	F
5/13/11	LN	28.5	9.1	1155	1410	4154.469	7027.292	32.3	9.6	NA	42744	807	F
5/13/11	LN	28.5	9.1	1155	1410	4154.469	7027.292	32.3	9.6	NA	42745	894	F
5/13/11	LN	28.5	9.1	1155	1410	4154.469	7027.292	32.3	9.6	NA	42746	843	F
5/13/11	LN	28.5	9.1	1155	1410	4154.469	7027.292	32.3	9.6	NA	42747	823	F
5/13/11	LN	28.5	9.1	1155	1410	4154.469	7027.292	32.3	9.6	NA	42748	910	F
5/13/11	LN	28.5	9.1	1155	1410	4154.469	7027.292	32.3	9.6	NA	42749	830	F
5/13/11	LN	28.5	9.1	1155	1410	4154.469	7027.292	32.3	9.6	NA	42750	841	F
5/13/11	LN	28.5	9.1	1155	1410	4154.469	7027.292	32.3	9.6	NA	47475	917	F
5/13/11	LN	28.5	9.1	1155	1410	4154.469	7027.292	32.3	9.6	NA	42751	841	F

Appendix B (continued)

Date	Gear	Gear Dp (m)	Gear T (°C)	Time set	Time pulled	Latitude	Longitude	Dp (m)	SST (°C)	SSS	Tag #	TL (mm)	Sex
5/13/11	LN	28.5	9.1	1155	1410	4154.469	7027.292	32.3	9.6	NA	42752	871	F
5/13/11	LN	28.5	9.1	1155	1410	4154.469	7027.292	32.3	9.6	NA	42753	830	F
5/13/11	LN	28.5	9.1	1155	1410	4154.469	7027.292	32.3	9.6	NA	42754	805	F
5/13/11	LN	28.5	9.1	1155	1410	4154.469	7027.292	32.3	9.6	NA	42755	774	F
5/13/11	LN	28.5	9.1	1155	1410	4154.469	7027.292	32.3	9.6	NA	42756	920	F
5/13/11	LN	28.5	9.1	1155	1410	4154.469	7027.292	32.3	9.6	NA	42757	915	F
5/13/11	LN	28.5	9.1	1155	1410	4154.469	7027.292	32.3	9.6	NA	42758	876	F
5/13/11	LN	28.5	9.1	1155	1455	4154.469	7027.292	32.3	9.8	29.5	42759	819	F
5/13/11	LN	28.5	9.1	1155	1455	4154.469	7027.292	32.3	9.8	29.5	42760	810	F
5/13/11	LN	28.5	9.1	1155	1455	4154.469	7027.292	32.3	9.8	29.5	47476	827	F
5/13/11	LN	28.5	9.1	1155	1455	4154.469	7027.292	32.3	9.8	29.5	42761	842	F
5/13/11	LN	28.5	9.1	1155	1455	4154.469	7027.292	32.3	9.8	29.5	42762	910	F
5/13/11	LN	28.5	9.1	1155	1455	4154.469	7027.292	32.3	9.8	29.5	42763	825	F
5/13/11	LN	28.5	9.1	1155	1455	4154.469	7027.292	32.3	9.8	29.5	42764	838	F
5/13/11	LN	28.5	9.1	1155	1455	4154.469	7027.292	32.3	9.8	29.5	42765	800	F
5/13/11	LN	28.5	9.1	1155	1455	4154.469	7027.292	32.3	9.8	29.5	42766	851	F
5/13/11	LN	28.5	9.1	1155	1455	4154.469	7027.292	32.3	9.8	29.5	42767	788	F
5/13/11	LN	28.5	9.1	1155	1455	4154.469	7027.292	32.3	9.8	29.5	42768	854	F
5/13/11	LN	28.5	9.1	1155	1455	4154.469	7027.292	32.3	9.8	29.5	42769	930	F
5/13/11	LN	28.5	9.1	1155	1455	4154.469	7027.292	32.3	9.8	29.5	42770	872	F
5/13/11	LN	28.5	9.1	1155	1455	4154.469	7027.292	32.3	9.8	29.5	47477	836	F
5/13/11	LN	28.5	9.1	1155	1455	4154.469	7027.292	32.3	9.8	29.5	42772	900	F
5/13/11	LN	28.5	9.1	1155	1455	4154.469	7027.292	32.3	9.8	29.5	42773	831	F
5/13/11	LN	28.5	9.1	1155	1455	4154.469	7027.292	32.3	9.8	29.5	42774	892	F
5/13/11	LN	28.5	9.1	1155	1455	4154.469	7027.292	32.3	9.8	29.5	42775	853	F
5/13/11	LN	28.5	9.1	1155	1455	4154.469	7027.292	32.3	9.8	29.5	42776	854	F
5/13/11	LN	28.5	9.1	1155	1455	4154.469	7027.292	32.3	9.8	29.5	42777	771	F
5/13/11	LN	28.5	9.1	1155	1455	4154.469	7027.292	32.3	9.8	29.5	42778	788	F
5/13/11	LN	28.5	9.1	1155	1455	4154.469	7027.292	32.3	9.8	29.5	42779	870	F
5/13/11	LN	28.5	9.1	1155	1455	4154.469	7027.292	32.3	9.8	29.5	42780	861	F
5/13/11	LN	28.5	9.1	1155	1455	4154.469	7027.292	32.3	9.8	29.5	47478	811	F
5/13/11	LN	28.5	9.1	1155	1455	4154.469	7027.292	32.3	9.8	29.5	42781	820	F
5/13/11	LN	28.5	9.1	1155	1455	4154.469	7027.292	32.3	9.8	29.5	42782	871	F
5/13/11	LN	28.5	9.1	1155	1455	4154.469	7027.292	32.3	9.8	29.5	42783	836	F
5/13/11	LN	28.5	9.1	1155	1455	4154.469	7027.292	32.3	9.8	29.5	42784	870	F
5/13/11	LN	28.5	9.1	1155	1455	4154.469	7027.292	32.3	9.8	29.5	42785	855	F
5/13/11	LN	28.5	9.1	1155	1455	4154.469	7027.292	32.3	9.8	29.5	42786	781	F
5/13/11	LN	28.5	9.1	1155	1455	4154.469	7027.292	32.3	9.8	29.5	42787	844	F
5/13/11	LN	28.5	9.1	1155	1455	4154.469	7027.292	32.3	9.8	29.5	42788	900	F
5/13/11	LN	28.5	9.1	1155	1455	4154.469	7027.292	32.3	9.8	29.5	42789	894	F
5/13/11	LN	28.5	9.1	1155	1455	4154.469	7027.292	32.3	9.8	29.5	42790	856	F

Appendix B (continued)

Date	Gear	Gear Dp (m)	Gear T (°C)	Time set	Time pulled	Latitude	Longitude	Dp (m)	SST (°C)	SSS	Tag #	TL (mm)	Sex
5/13/11	LN	28.5	9.1	1155	1455	4154.469	7027.292	32.3	9.8	29.5	47479	808	F
5/13/11	LN	28.5	9.1	1155	1455	4154.469	7027.292	32.3	9.8	29.5	42792	898	F
5/13/11	LN	28.5	9.1	1155	1455	4154.469	7027.292	32.3	9.8	29.5	42793	885	F
5/13/11	LN	28.5	9.1	1155	1455	4154.469	7027.292	32.3	9.8	29.5	42794	887	F
5/13/11	LN	28.5	9.1	1155	1455	4154.469	7027.292	32.3	9.8	29.5	42795	870	F
5/13/11	LN	28.5	9.1	1155	1455	4154.469	7027.292	32.3	9.8	29.5	42796	827	F
5/13/11	LN	28.5	9.1	1155	1455	4154.469	7027.292	32.3	9.8	29.5	42797	887	F
5/13/11	LN	28.5	9.1	1155	1455	4154.469	7027.292	32.3	9.8	29.5	42798	855	F
5/13/11	LN	28.5	9.1	1155	1455	4154.469	7027.292	32.3	9.8	29.5	42799	879	F
5/13/11	LN	28.5	9.1	1155	1455	4154.469	7027.292	32.3	9.8	29.5	42800	860	F
5/13/11	LN	28.5	9.1	1155	1455	4154.469	7027.292	32.3	9.8	29.5	47480	841	F
5/13/11	LN	28.5	9.1	1155	1455	4154.469	7027.292	32.3	9.8	29.5	42801	861	F
5/13/11	LN	28.5	9.1	1155	1455	4154.469	7027.292	32.3	9.8	29.5	42802	845	F
5/13/11	LN	28.5	9.1	1155	1455	4154.469	7027.292	32.3	9.8	29.5	42803	824	F
5/13/11	LN	28.5	9.1	1155	1455	4154.469	7027.292	32.3	9.8	29.5	42804	835	F
5/13/11	LN	28.5	9.1	1155	1455	4154.469	7027.292	32.3	9.8	29.5	42805	871	F
5/13/11	LN	28.5	9.1	1155	1455	4154.469	7027.292	32.3	9.8	29.5	42806	875	F
5/13/11	LN	28.5	9.1	1155	1455	4154.469	7027.292	32.3	9.8	29.5	42807	883	F
5/13/11	LN	28.5	9.1	1155	1455	4154.469	7027.292	32.3	9.8	29.5	42808	851	F
5/13/11	LN	28.5	9.1	1155	1455	4154.469	7027.292	32.3	9.8	29.5	42809	814	F
5/13/11	LN	28.5	9.1	1155	1455	4154.469	7027.292	32.3	9.8	29.5	42810	870	F
5/13/11	LN	28.5	9.1	1155	1455	4154.469	7027.292	32.3	9.8	29.5	47481	850	F
5/13/11	LN	28.5	9.1	1155	1455	4154.469	7027.292	32.3	9.8	29.5	42811	863	F
5/13/11	LN	28.5	9.1	1155	1455	4154.469	7027.292	32.3	9.8	29.5	42812	886	F
5/13/11	LN	28.5	9.1	1155	1455	4154.469	7027.292	32.3	9.8	29.5	42813	819	F
5/13/11	LN	28.5	9.1	1155	1455	4154.469	7027.292	32.3	9.8	29.5	42814	916	F
5/13/11	LN	28.5	9.1	1155	1455	4154.469	7027.292	32.3	9.8	29.5	42815	845	F
5/13/11	LN	28.5	9.1	1155	1455	4154.469	7027.292	32.3	9.8	29.5	42816	869	F
5/13/11	LN	28.5	9.1	1155	1455	4154.469	7027.292	32.3	9.8	29.5	42817	897	F
5/13/11	LN	28.5	9.1	1155	1455	4154.469	7027.292	32.3	9.8	29.5	42818	846	F
5/13/11	LN	28.5	9.1	1155	1455	4154.469	7027.292	32.3	9.8	29.5	42819	824	F
5/13/11	LN	28.5	9.1	1155	1455	4154.469	7027.292	32.3	9.8	29.5	42820	826	F
5/13/11	LN	28.5	9.1	1155	1455	4154.469	7027.292	32.3	9.8	29.5	47482	788	F
5/13/11	LN	28.5	9.1	1155	1455	4154.469	7027.292	32.3	9.8	29.5	42821	775	F
5/13/11	LN	28.5	9.1	1155	1455	4154.469	7027.292	32.3	9.8	29.5	42822	818	F
5/13/11	LN	28.5	9.1	1155	1455	4154.469	7027.292	32.3	9.8	29.5	42823	891	F
5/13/11	LN	28.5	9.1	1155	1455	4154.469	7027.292	32.3	9.8	29.5	42824	840	F
5/13/11	LN	28.5	9.1	1155	1455	4154.469	7027.292	32.3	9.8	29.5	42825	866	F
5/13/11	LN	28.5	9.1	1155	1455	4154.469	7027.292	32.3	9.8	29.5	42826	809	F
5/13/11	LN	28.5	9.1	1155	1455	4154.469	7027.292	32.3	9.8	29.5	42827	835	F
5/13/11	LN	28.5	9.1	1155	1455	4154.469	7027.292	32.3	9.8	29.5	42828	814	F

Appendix B (continued)

Date	Gear	Gear Dp (m)	Gear T (°C)	Time set	Time pulled	Latitude	Longitude	Dp (m)	SST (°C)	SSS	Tag #	TL (mm)	Sex
5/13/11	LN	28.5	9.1	1155	1455	4154.469	7027.292	32.3	9.8	29.5	42829	903	F
5/13/11	LN	28.5	9.1	1155	1455	4154.469	7027.292	32.3	9.8	29.5	42830	894	F
5/13/11	LN	28.5	9.1	1155	1455	4154.469	7027.292	32.3	9.8	29.5	47483	872	F
5/13/11	LN	28.5	9.1	1155	1455	4154.469	7027.292	32.3	9.8	29.5	42831	870	F
5/13/11	LN	28.5	9.1	1155	1455	4154.469	7027.292	32.3	9.8	29.5	42832	850	F
5/13/11	LN	28.5	9.1	1155	1455	4154.469	7027.292	32.3	9.8	29.5	42833	802	F
5/13/11	LN	28.5	9.1	1155	1455	4154.469	7027.292	32.3	9.8	29.5	42834	858	F
5/13/11	LN	28.5	9.1	1155	1455	4154.469	7027.292	32.3	9.8	29.5	42835	865	F
5/13/11	LN	28.5	9.1	1155	1455	4154.469	7027.292	32.3	9.8	29.5	42836	865	F
5/13/11	LN	28.5	9.1	1155	1455	4154.469	7027.292	32.3	9.8	29.5	42837	794	F
5/13/11	LN	28.5	9.1	1155	1455	4154.469	7027.292	32.3	9.8	29.5	42838	851	F
5/13/11	LN	28.5	9.1	1155	1455	4154.469	7027.292	32.3	9.8	29.5	42839	811	F
5/13/11	LN	28.5	9.1	1155	1455	4154.469	7027.292	32.3	9.8	29.5	42840	833	F
5/13/11	LN	28.5	9.1	1155	1455	4154.469	7027.292	32.3	9.8	29.5	47484	734	F
5/13/11	LN	28.5	9.1	1155	1455	4154.469	7027.292	32.3	9.8	29.5	42841	860	F
5/13/11	LN	28.5	9.1	1155	1455	4154.469	7027.292	32.3	9.8	29.5	42842	753	F
5/13/11	LN	28.5	9.1	1155	1455	4154.469	7027.292	32.3	9.8	29.5	42843	836	F
5/13/11	LN	28.5	9.1	1155	1455	4154.469	7027.292	32.3	9.8	29.5	42844	858	F
5/13/11	LN	28.5	9.1	1155	1455	4154.469	7027.292	32.3	9.8	29.5	42845	972	F
5/13/11	LN	28.5	9.1	1155	1455	4154.469	7027.292	32.3	9.8	29.5	42846	845	F
5/13/11	LN	28.5	9.1	1155	1455	4154.469	7027.292	32.3	9.8	29.5	42847	810	F
5/13/11	LN	28.5	9.1	1155	1455	4154.469	7027.292	32.3	9.8	29.5	42848	852	F
5/13/11	LN	28.5	9.1	1155	1455	4154.469	7027.292	32.3	9.8	29.5	42849	811	F
5/13/11	LN	28.5	9.1	1155	1455	4154.469	7027.292	32.3	9.8	29.5	42850	821	F
5/13/11	LN	28.5	9.1	1155	1455	4154.469	7027.292	32.3	9.8	29.5	47485	830	F
5/13/11	LN	28.5	9.1	1155	1455	4154.469	7027.292	32.3	9.8	29.5	42851	861	F
5/13/11	LN	28.5	9.1	1155	1455	4154.469	7027.292	32.3	9.8	29.5	42852	905	F
5/13/11	LN	28.5	9.1	1155	1455	4154.469	7027.292	32.3	9.8	29.5	42853	810	F
5/13/11	LN	28.5	9.1	1155	1455	4154.469	7027.292	32.3	9.8	29.5	42854	755	F
5/13/11	LN	28.5	9.1	1155	1455	4154.469	7027.292	32.3	9.8	29.5	42855	881	F
5/13/11	LN	28.5	9.1	1155	1455	4154.469	7027.292	32.3	9.8	29.5	42856	751	F
5/13/11	LN	28.5	9.1	1155	1455	4154.469	7027.292	32.3	9.8	29.5	42857	872	F
5/13/11	LN	28.5	9.1	1155	1455	4154.469	7027.292	32.3	9.8	29.5	42858	832	F
5/13/11	LN	28.5	9.1	1155	1455	4154.469	7027.292	32.3	9.8	29.5	42859	871	F
5/13/11	LN	28.5	9.1	1155	1455	4154.469	7027.292	32.3	9.8	29.5	42860	880	F
5/13/11	LN	28.5	9.1	1155	1455	4154.469	7027.292	32.3	9.8	29.5	47486	890	F
5/13/11	LN	28.5	9.1	1155	1455	4154.469	7027.292	32.3	9.8	29.5	42791	830	F
5/13/11	LN	28.5	9.1	1155	1455	4154.469	7027.292	32.3	9.8	29.5	42861	842	F
5/13/11	LN	28.5	9.1	1155	1455	4154.469	7027.292	32.3	9.8	29.5	42862	895	F
5/13/11	LN	28.5	9.1	1155	1455	4154.469	7027.292	32.3	9.8	29.5	42863	909	F
5/13/11	LN	28.5	9.1	1155	1455	4154.469	7027.292	32.3	9.8	29.5	42864	857	F

Appendix B (continued)

Date	Gear	Gear Dp (m)	Gear T (°C)	Time set	Time pulled	Latitude	Longitude	Dp (m)	SST (°C)	SSS	Tag #	TL (mm)	Sex
5/13/11	LN	28.5	9.1	1155	1455	4154.469	7027.292	32.3	9.8	29.5	42865	756	F
5/13/11	LN	28.5	9.1	1155	1455	4154.469	7027.292	32.3	9.8	29.5	42866	650	F
5/13/11	LN	28.5	9.1	1155	1455	4154.469	7027.292	32.3	9.8	29.5	42867	831	F
5/13/11	LN	28.5	9.1	1155	1455	4154.469	7027.292	32.3	9.8	29.5	42868	814	F
5/13/11	LN	28.5	9.1	1155	1455	4154.469	7027.292	32.3	9.8	29.5	42869	856	F
5/13/11	LN	28.5	9.1	1155	1455	4154.469	7027.292	32.3	9.8	29.5	42870	805	F
5/13/11	LN	28.5	9.1	1155	1455	4154.469	7027.292	32.3	9.8	29.5	47487	800	F
5/13/11	LN	28.5	9.1	1155	1455	4154.469	7027.292	32.3	9.8	29.5	42871	790	F
5/13/11	LN	28.5	9.1	1155	1455	4154.469	7027.292	32.3	9.8	29.5	42872	821	F
5/13/11	LN	28.5	9.1	1155	1455	4154.469	7027.292	32.3	9.8	29.5	42873	855	F
5/13/11	LN	28.5	9.1	1155	1455	4154.469	7027.292	32.3	9.8	29.5	42874	838	F
5/13/11	LN	28.5	9.1	1155	1455	4154.469	7027.292	32.3	9.8	29.5	42875	805	F
5/13/11	LN	28.5	9.1	1155	1455	4154.469	7027.292	32.3	9.8	29.5	42876	821	F
5/13/11	LN	28.5	9.1	1155	1455	4154.469	7027.292	32.3	9.8	29.5	42877	828	F
5/13/11	LN	28.5	9.1	1155	1455	4154.469	7027.292	32.3	9.8	29.5	42878	803	F
5/13/11	LN	28.5	9.1	1155	1455	4154.469	7027.292	32.3	9.8	29.5	42879	861	F
5/13/11	LN	28.5	9.1	1155	1455	4154.469	7027.292	32.3	9.8	29.5	42880	884	F
5/13/11	LN	28.5	9.1	1155	1455	4154.469	7027.292	32.3	9.8	29.5	47488	912	F
5/13/11	LN	28.5	9.1	1155	1455	4154.469	7027.292	32.3	9.8	29.5	42881	854	F
5/13/11	LN	28.5	9.1	1155	1455	4154.469	7027.292	32.3	9.8	29.5	42882	859	F
5/13/11	LN	28.5	9.1	1155	1455	4154.469	7027.292	32.3	9.8	29.5	42883	834	F
5/13/11	LN	28.5	9.1	1155	1455	4154.469	7027.292	32.3	9.8	29.5	42884	875	F
5/13/11	LN	28.5	9.1	1155	1455	4154.469	7027.292	32.3	9.8	29.5	42885	891	F
5/13/11	LN	28.5	9.1	1155	1455	4154.469	7027.292	32.3	9.8	29.5	42886	834	F
5/13/11	LN	28.5	9.1	1155	1455	4154.469	7027.292	32.3	9.8	29.5	42887	861	F
5/13/11	LN	28.5	9.1	1155	1455	4154.469	7027.292	32.3	9.8	29.5	42888	823	F
5/13/11	LN	28.5	9.1	1155	1455	4154.469	7027.292	32.3	9.8	29.5	42889	844	F
5/13/11	LN	28.5	9.1	1155	1455	4154.469	7027.292	32.3	9.8	29.5	42890	755	F
5/13/11	LN	28.5	9.1	1155	1455	4154.469	7027.292	32.3	9.8	29.5	47489	776	F
5/13/11	LN	28.5	9.1	1155	1455	4154.469	7027.292	32.3	9.8	29.5	42891	841	F
5/13/11	LN	28.5	9.1	1155	1455	4154.469	7027.292	32.3	9.8	29.5	42892	792	F
5/13/11	LN	28.5	9.1	1155	1455	4154.469	7027.292	32.3	9.8	29.5	42893	815	F
5/13/11	LN	28.5	9.1	1155	1455	4154.469	7027.292	32.3	9.8	29.5	42894	872	F
5/13/11	LN	28.5	9.1	1155	1455	4154.469	7027.292	32.3	9.8	29.5	42895	910	F
5/13/11	LN	28.5	9.1	1155	1455	4154.469	7027.292	32.3	9.8	29.5	42896	906	F
5/13/11	LN	28.5	9.1	1155	1455	4154.469	7027.292	32.3	9.8	29.5	42897	914	F
5/13/11	LN	28.5	9.1	1155	1455	4154.469	7027.292	32.3	9.8	29.5	42898	875	F
5/13/11	LN	28.5	9.1	1155	1455	4154.469	7027.292	32.3	9.8	29.5	42899	930	F
5/13/11	LN	28.5	9.1	1155	1455	4154.469	7027.292	32.3	9.8	29.5	42900	890	F
5/13/11	LN	28.5	9.1	1155	1455	4154.469	7027.292	32.3	9.8	29.5	47490	849	F
5/13/11	LN	28.5	9.1	1155	1455	4154.469	7027.292	32.3	9.8	29.5	42901	817	F

Appendix B (continued)

Date	Gear	Gear Dp (m)	Gear T (°C)	Time set	Time pulled	Latitude	Longitude	Dp (m)	SST (°C)	SSS	Tag #	TL (mm)	Sex
5/13/11	LN	28.5	9.1	1155	1455	4154.469	7027.292	32.3	9.8	29.5	42902	830	F
5/13/11	LN	28.5	9.1	1155	1455	4154.469	7027.292	32.3	9.8	29.5	42903	750	F
5/13/11	LN	28.5	9.1	1155	1455	4154.469	7027.292	32.3	9.8	29.5	42904	879	F
5/13/11	LN	28.5	9.1	1155	1455	4154.469	7027.292	32.3	9.8	29.5	42905	807	F
5/13/11	LN	28.5	9.1	1155	1455	4154.469	7027.292	32.3	9.8	29.5	42906	839	F
5/13/11	LN	28.5	9.1	1155	1455	4154.469	7027.292	32.3	9.8	29.5	42907	926	F
5/13/11	LN	28.5	9.1	1155	1455	4154.469	7027.292	32.3	9.8	29.5	42908	888	F
5/13/11	LN	28.5	9.1	1155	1455	4154.469	7027.292	32.3	9.8	29.5	42909	840	F
5/13/11	LN	28.5	9.1	1155	1455	4154.469	7027.292	32.3	9.8	29.5	42910	849	F
5/13/11	LN	28.5	9.1	1155	1455	4154.469	7027.292	32.3	9.8	29.5	47491	826	F
5/13/11	LN	28.5	9.1	1155	1455	4154.469	7027.292	32.3	9.8	29.5	42911	803	F
5/13/11	LN	28.5	9.1	1155	1455	4154.469	7027.292	32.3	9.8	29.5	42912	849	F
5/13/11	LN	28.5	9.1	1155	1455	4154.469	7027.292	32.3	9.8	29.5	42913	851	F
5/13/11	LN	28.5	9.1	1155	1455	4154.469	7027.292	32.3	9.8	29.5	42914	831	F
5/13/11	LN	28.5	9.1	1155	1455	4154.469	7027.292	32.3	9.8	29.5	42915	826	F
5/13/11	LN	28.5	9.1	1155	1455	4154.469	7027.292	32.3	9.8	29.5	42916	839	F
5/13/11	LN	28.5	9.1	1155	1455	4154.469	7027.292	32.3	9.8	29.5	42917	874	F
5/13/11	LN	28.5	9.1	1155	1455	4154.469	7027.292	32.3	9.8	29.5	42918	855	F
5/13/11	LN	28.5	9.1	1155	1455	4154.469	7027.292	32.3	9.8	29.5	42919	922	F
5/13/11	LN	28.5	9.1	1155	1455	4154.469	7027.292	32.3	9.8	29.5	42920	799	F
5/13/11	LN	28.5	9.1	1155	1455	4154.469	7027.292	32.3	9.8	29.5	47492	816	F
5/13/11	LN	28.5	9.1	1155	1455	4154.469	7027.292	32.3	9.8	29.5	42921	903	F
5/13/11	LN	28.5	9.1	1155	1455	4154.469	7027.292	32.3	9.8	29.5	42922	789	F
5/13/11	LN	28.5	9.1	1155	1455	4154.469	7027.292	32.3	9.8	29.5	42923	842	F
5/13/11	LN	28.5	9.1	1155	1455	4154.469	7027.292	32.3	9.8	29.5	42924	852	F
5/13/11	LN	28.5	9.1	1155	1455	4154.469	7027.292	32.3	9.8	29.5	42925	834	F
5/13/11	LN	28.5	9.1	1155	1455	4154.469	7027.292	32.3	9.8	29.5	42926	824	F
5/13/11	LN	28.5	9.1	1155	1455	4154.469	7027.292	32.3	9.8	29.5	42927	871	F
5/13/11	LN	28.5	9.1	1155	1455	4154.469	7027.292	32.3	9.8	29.5	42928	890	F
5/13/11	LN	28.5	9.1	1155	1455	4154.469	7027.292	32.3	9.8	29.5	42929	881	F
5/13/11	LN	28.5	9.1	1155	1455	4154.469	7027.292	32.3	9.8	29.5	42930	891	F
5/13/11	LN	28.5	9.1	1155	1455	4154.469	7027.292	32.3	9.8	29.5	47493	760	F
5/13/11	LN	28.5	9.1	1155	1455	4154.469	7027.292	32.3	9.8	29.5	42931	942	F
5/14/11	LN	38.4	6.4	1156	1354	4212.348	7010.401	42.6	9	30	47494	800	F
5/14/11	LN	38.4	6.4	1156	1354	4212.348	7010.401	42.6	9	30	47495	768	M
5/14/11	LN	38.4	6.4	1156	1354	4212.348	7010.401	42.6	9	30	47496	744	M
5/14/11	LN	38.4	6.4	1156	1354	4212.348	7010.401	42.6	9	30	47497	780	F
5/14/11	LN	38.4	6.4	1156	1354	4212.348	7010.401	42.6	9	30	42932	789	F
5/14/11	LN	38.4	6.4	1156	1354	4212.348	7010.401	42.6	9	30	42933	905	F
5/14/11	LN	38.4	6.4	1156	1354	4212.348	7010.401	42.6	9	30	42934	695	F
5/14/11	LN	38.4	6.4	1156	1354	4212.348	7010.401	42.6	9	30	42935	857	F

Appendix B (continued)

Date	Gear	Gear Dp (m)	Gear T (°C)	Time set	Time pulled	Latitude	Longitude	Dp (m)	SST (°C)	SSS	Tag #	TL (mm)	Sex
5/14/11	LN	38.4	6.4	1156	1354	4212.348	7010.401	42.6	9	30	42936	839	F
5/14/11	LN	38.4	6.4	1156	1354	4212.348	7010.401	42.6	9	30	42937	795	F
5/16/11	GN	NA	NA	NA	740	4224.851	7018.659	49	9.4	NA	42938	857	F
5/16/11	GN	NA	NA	NA	740	4224.851	7018.659	49	9.4	NA	42939	806	F
5/16/11	GN	NA	NA	NA	740	4224.851	7018.659	49	9.4	NA	42940	902	F
5/16/11	GN	NA	NA	NA	740	4224.851	7018.659	49	9.4	NA	42941	870	F
5/16/11	GN	NA	NA	NA	950	4224.329	7018.926	52.9	9.4	NA	42942	838	F
5/16/11	GN	NA	NA	NA	950	4224.329	7018.926	52.9	9.4	NA	42943	800	F
5/16/11	GN	NA	NA	NA	950	4224.329	7018.926	52.9	9.4	NA	42944	813	F
5/16/11	GN	NA	NA	NA	950	4224.329	7018.926	52.9	9.4	NA	42945	914	F
5/16/11	GN	NA	NA	NA	950	4224.329	7018.926	52.9	9.4	NA	42946	895	F
5/16/11	GN	NA	NA	NA	950	4224.329	7018.926	52.9	9.4	NA	42947	914	F
5/16/11	GN	NA	NA	NA	1131	4225.454	7017.971	56.9	5.5	NA	42948	832	F
5/16/11	GN	NA	NA	NA	1131	4225.454	7017.971	56.9	5.5	NA	42949	876	F
5/16/11	GN	NA	NA	NA	1131	4225.454	7017.971	56.9	5.5	NA	42950	851	F
5/16/11	GN	NA	NA	NA	1131	4225.454	7017.971	56.9	5.5	NA	42951	826	F
5/16/11	GN	NA	NA	NA	1131	4225.454	7017.971	56.9	5.5	NA	42952	927	F
5/16/11	GN	NA	NA	NA	1131	4225.454	7017.971	56.9	5.5	NA	42953	889	F
5/16/11	GN	NA	NA	NA	1131	4225.454	7017.971	56.9	5.5	NA	42954	927	F
5/16/11	GN	NA	NA	NA	1131	4225.454	7017.971	56.9	5.5	NA	42955	845	F
5/16/11	GN	NA	NA	NA	1131	4225.454	7017.971	56.9	5.5	NA	42956	851	F
5/16/11	GN	NA	NA	NA	1131	4225.454	7017.971	56.9	5.5	NA	42957	959	F
5/16/11	GN	NA	NA	NA	1329	4225.471	7018.167	55	9.7	NA	42958	953	F
5/16/11	GN	NA	NA	NA	1329	4225.471	7018.167	55	9.8	NA	42959	1003	F
5/16/11	GN	NA	NA	NA	1329	4225.471	7018.167	55	9.9	NA	42960	914	F
5/16/11	GN	NA	NA	NA	1329	4225.471	7018.167	55	9.10	NA	42961	927	F
5/17/11	GN	51.8	4.7	802	910	4208.085	7028.748	51.6	9.1	NA	42962	915	F
5/17/11	GN	51.8	4.7	802	910	4208.085	7028.748	51.6	9.1	NA	42963	901	F
5/17/11	GN	51.8	4.7	802	910	4208.085	7028.748	51.6	9.1	NA	42964	827	F
5/17/11	GN	50.4	5.7	1054	1124	4231.679	7024.604	50.1	9.4	NA	42965	830	F
5/17/11	GN	50.4	5.7	1054	1124	4231.679	7024.604	50.1	9.4	NA	42966	892	F
5/17/11	GN	50.4	5.7	1054	1124	4231.679	7024.604	50.1	9.4	NA	42967	915	F
5/17/11	GN	50.4	5.7	1054	1124	4231.679	7024.604	50.1	9.4	NA	42968	837	F
5/17/11	GN	50.4	5.7	1054	1124	4231.679	7024.604	50.1	9.4	NA	42969	815	F
5/17/11	GN	50.4	5.7	1054	1124	4231.679	7024.604	50.1	9.4	NA	42970	842	F
5/17/11	GN	50.4	5.7	1054	1124	4231.679	7024.604	50.1	9.4	NA	42971	795	F
5/17/11	GN	50.4	5.7	1054	1124	4231.679	7024.604	50.1	9.4	NA	42972	833	F
5/17/11	GN	50.4	5.7	1054	1124	4231.679	7024.604	50.1	9.4	NA	42973	980	F
5/17/11	GN	50.4	5.7	1054	1124	4231.679	7024.604	50.1	9.4	NA	42974	870	F
5/17/11	GN	50.4	5.7	1054	1124	4231.679	7024.604	50.1	9.4	NA	42975	806	F
5/17/11	GN	50.4	5.7	1054	1124	4231.679	7024.604	50.1	9.4	NA	42976	847	F

Appendix B (continued)

Date	Gear	Gear Dp (m)	Gear T (°C)	Time set	Time pulled	Latitude	Longitude	Dp (m)	SST (°C)	SSS	Tag #	TL (mm)	Sex
5/17/11	GN	50.4	5.7	1054	1124	4231.679	7024.604	50.1	9.4	NA	42977	874	F
5/17/11	GN	50.4	5.7	1054	1124	4231.679	7024.604	50.1	9.4	NA	42978	829	F
5/17/11	GN	50.4	5.7	1054	1124	4231.679	7024.604	50.1	9.4	NA	42979	820	F
5/17/11	GN	50.4	5.7	1054	1124	4231.679	7024.604	50.1	9.4	NA	42980	843	F
5/17/11	GN	50.4	5.7	1054	1124	4231.679	7024.604	50.1	9.4	NA	47498	856	F
5/17/11	GN	50.4	5.7	1054	1124	4231.679	7024.604	50.1	9.4	NA	42981	895	F
5/17/11	GN	50.4	5.7	1054	1124	4231.679	7024.604	50.1	9.4	NA	42982	862	F
5/17/11	GN	50.4	5.7	1054	1124	4231.679	7024.604	50.1	9.4	NA	42983	858	F
5/17/11	GN	50.4	5.7	1054	1124	4231.679	7024.604	50.1	9.4	NA	42984	872	F
5/17/11	GN	46.7	5.6	1108	1204	4200.668	7025.333	47.9	9.9	NA	42985	856	F
5/17/11	GN	46.7	5.6	1108	1204	4200.668	7025.333	47.9	9.9	NA	42986	885	F
5/17/11	GN	46.7	5.6	1108	1204	4200.668	7025.333	47.9	9.9	NA	42987	835	F
5/17/11	GN	46.7	5.6	1108	1204	4200.668	7025.333	47.9	9.9	NA	42988	830	F
5/17/11	GN	46.7	5.6	1108	1204	4200.668	7025.333	47.9	9.9	NA	42989	825	F
5/17/11	GN	46.7	5.6	1108	1204	4200.668	7025.333	47.9	9.9	NA	42990	861	F
5/17/11	GN	46.7	5.6	1108	1204	4200.668	7025.333	47.9	9.9	NA	47499	835	F
5/17/11	GN	46.7	5.6	1108	1204	4200.668	7025.333	47.9	9.9	NA	42991	845	F
5/17/11	GN	46.7	5.6	1108	1204	4200.668	7025.333	47.9	9.9	NA	42992	871	F
5/17/11	GN	46.7	5.6	1108	1204	4200.668	7025.333	47.9	9.9	NA	42993	832	F
5/17/11	GN	46.7	5.6	1108	1204	4200.668	7025.333	47.9	9.9	NA	42994	802	F
5/17/11	GN	46.7	5.6	1108	1204	4200.668	7025.333	47.9	9.9	NA	42995	950	F
5/17/11	GN	46.7	5.6	1108	1204	4200.668	7025.333	47.9	9.9	NA	42996	892	F
5/17/11	GN	46.7	5.6	1108	1204	4200.668	7025.333	47.9	9.9	NA	42997	820	F
5/17/11	GN	46.7	5.6	1108	1204	4200.668	7025.333	47.9	9.9	NA	42998	845	F
5/17/11	GN	46.7	5.6	1108	1204	4200.668	7025.333	47.9	9.9	NA	42999	855	F
5/17/11	GN	46.7	5.6	1108	1204	4200.668	7025.333	47.9	9.9	NA	43000	852	F
5/17/11	GN	46.7	5.6	1108	1204	4200.668	7025.333	47.9	9.9	NA	47500	816	F
5/17/11	GN	46.7	5.6	1108	1204	4200.668	7025.333	47.9	9.9	NA	43001	865	F
5/17/11	GN	46.7	5.6	1108	1204	4200.668	7025.333	47.9	9.9	NA	43002	820	F
5/17/11	GN	46.7	5.6	1108	1204	4200.668	7025.333	47.9	9.9	NA	43003	839	F
5/17/11	GN	46.7	5.6	1108	1204	4200.668	7025.333	47.9	9.9	NA	43004	794	F
5/17/11	GN	46.7	5.6	1108	1204	4200.668	7025.333	47.9	9.9	NA	43005	883	F
5/17/11	GN	46.7	5.6	1108	1204	4200.668	7025.333	47.9	9.9	NA	43006	841	F
5/17/11	GN	46.7	5.6	1108	1204	4200.668	7025.333	47.9	9.9	NA	43007	855	F
5/17/11	GN	46.7	5.6	1108	1204	4200.668	7025.333	47.9	9.9	NA	43008	919	F
5/17/11	GN	46.7	5.6	1108	1204	4200.668	7025.333	47.9	9.9	NA	43009	871	F
5/17/11	GN	46.7	5.6	1108	1204	4200.668	7025.333	47.9	9.9	NA	43010	848	F
5/17/11	GN	46.5	5.7	1242	1312	NA	NA	46	10.1	NA	47501	895	F
5/17/11	GN	46.5	5.7	1242	1312	NA	NA	46	10.1	NA	43011	852	F
5/17/11	GN	46.5	5.7	1242	1312	NA	NA	46	10.1	NA	43012	856	F
5/17/11	GN	46.5	5.7	1242	1312	NA	NA	46	10.1	NA	43013	915	F

Appendix B (continued)

Date	Gear	Gear Dp (m)	Gear T (°C)	Time set	Time pulled	Latitude	Longitude	Dp (m)	SST (°C)	SSS	Tag #	TL (mm)	Sex
5/17/11	GN	46.5	5.7	1242	1312	NA	NA	46	10.1	NA	43014	829	F
5/17/11	GN	46.5	5.7	1242	1312	NA	NA	46	10.1	NA	43015	870	F
5/17/11	GN	46.5	5.7	1242	1312	NA	NA	46	10.1	NA	43016	871	F
5/17/11	GN	46.5	5.7	1242	1312	NA	NA	46	10.1	NA	43017	891	F
5/17/11	GN	46.5	5.7	1242	1312	NA	NA	46	10.1	NA	43018	841	F
5/17/11	GN	46.5	5.7	1242	1312	NA	NA	46	10.1	NA	43019	866	F
5/17/11	GN	46.5	5.7	1242	1312	NA	NA	46	10.1	NA	43020	794	F
5/17/11	GN	46.5	5.7	1242	1312	NA	NA	46	10.1	NA	47502	851	F
5/17/11	GN	46.5	5.7	1242	1312	NA	NA	46	10.1	NA	43021	940	F
5/17/11	GN	46.5	5.7	1242	1312	NA	NA	46	10.1	NA	43022	796	F
5/17/11	GN	46.5	5.7	1242	1312	NA	NA	46	10.1	NA	43023	854	F
5/17/11	GN	46.5	5.7	1242	1312	NA	NA	46	10.1	NA	43024	918	F
5/17/11	GN	46.5	5.7	1242	1312	NA	NA	46	10.1	NA	43025	889	F
5/17/11	GN	46.5	5.7	1242	1312	NA	NA	46	10.1	NA	43026	905	F
5/17/11	GN	46.5	5.7	1242	1312	NA	NA	46	10.1	NA	43027	831	F
5/17/11	GN	46.5	5.7	1242	1312	NA	NA	46	10.1	NA	43028	895	F
5/17/11	GN	46.5	5.7	1242	1312	NA	NA	46	10.1	NA	43029	844	F
5/17/11	GN	NA	NA	NA	1350	4200.571	7025.393	47.2	10.3	NA	43030	840	F
5/17/11	GN	NA	NA	NA	1350	4200.571	7025.393	47.2	10.3	NA	47503	861	F
5/17/11	GN	NA	NA	NA	1350	4200.571	7025.393	47.2	10.3	NA	43031	861	F
5/17/11	GN	NA	NA	NA	1350	4200.571	7025.393	47.2	10.3	NA	43032	871	F
5/17/11	GN	NA	NA	NA	1350	4200.571	7025.393	47.2	10.3	NA	43033	926	F
5/17/11	GN	NA	NA	NA	1350	4200.571	7025.393	47.2	10.3	NA	43034	839	F
5/17/11	GN	NA	NA	NA	1350	4200.571	7025.393	47.2	10.3	NA	43035	829	F
5/17/11	GN	NA	NA	NA	1350	4200.571	7025.393	47.2	10.3	NA	43036	842	F
5/17/11	GN	NA	NA	NA	1350	4200.571	7025.393	47.2	10.3	NA	43037	914	F
5/17/11	GN	NA	NA	NA	1350	4200.571	7025.393	47.2	10.3	NA	43038	911	F
5/17/11	GN	NA	NA	NA	1350	4200.571	7025.393	47.2	10.3	NA	43039	865	F
5/17/11	GN	NA	NA	NA	1350	4200.571	7025.393	47.2	10.3	NA	43040	845	F
5/17/11	GN	NA	NA	NA	1350	4200.571	7025.393	47.2	10.3	NA	43041	889	F
5/17/11	GN	NA	NA	NA	1350	4200.571	7025.393	47.2	10.3	NA	43042	863	F
5/17/11	GN	NA	NA	NA	1350	4200.571	7025.393	47.2	10.3	NA	43043	887	F
5/17/11	GN	NA	NA	NA	1350	4200.571	7025.393	47.2	10.3	NA	43044	895	F
5/17/11	GN	NA	NA	NA	1350	4200.571	7025.393	47.2	10.3	NA	43045	921	F
5/17/11	GN	NA	NA	NA	1350	4200.571	7025.393	47.2	10.3	NA	43046	900	F
5/17/11	GN	NA	NA	NA	1350	4200.571	7025.393	47.2	10.3	NA	43047	869	F
5/17/11	GN	NA	NA	NA	1350	4200.571	7025.393	47.2	10.3	NA	43048	885	F
5/17/11	GN	NA	NA	NA	1350	4200.571	7025.393	47.2	10.3	NA	43049	859	F
5/17/11	GN	NA	NA	NA	1350	4200.571	7025.393	47.2	10.3	NA	43050	808	F
5/17/11	GN	NA	NA	NA	1350	4200.571	7025.393	47.2	10.3	NA	47505	835	F
5/17/11	GN	NA	NA	NA	1350	4200.571	7025.393	47.2	10.3	NA	43051	900	F

Appendix B (continued)

Date	Gear	Gear Dp (m)	Gear T (°C)	Time set	Time pulled	Latitude	Longitude	Dp (m)	SST (°C)	SSS	Tag #	TL (mm)	Sex
5/17/11	GN	NA	NA	NA	1350	4200.571	7025.393	47.2	10.3	NA	43052	774	F
5/17/11	GN	NA	NA	NA	1350	4200.571	7025.393	47.2	10.3	NA	43053	815	F
5/17/11	GN	NA	NA	1342	1504	4200.079	7027.551	44	10.1	NA	43054	875	F
5/17/11	GN	NA	NA	1342	1504	4200.079	7027.551	44	10.1	NA	43055	910	F
5/17/11	GN	NA	NA	1342	1504	4200.079	7027.551	44	10.1	NA	43056	854	F
5/17/11	GN	NA	NA	1342	1504	4200.079	7027.551	44	10.1	NA	43057	883	F
5/17/11	GN	NA	NA	1342	1504	4200.079	7027.551	44	10.1	NA	43058	875	F
5/17/11	GN	NA	NA	1342	1504	4200.079	7027.551	44	10.1	NA	43059	840	F
5/17/11	GN	NA	NA	1342	1504	4200.079	7027.551	44	10.1	NA	43060	872	F
5/17/11	GN	NA	NA	1342	1504	4200.079	7027.551	44	10.1	NA	47506	872	F
5/17/11	GN	NA	NA	1342	1504	4200.079	7027.551	44	10.1	NA	43061	815	F
5/17/11	GN	NA	NA	1342	1504	4200.079	7027.551	44	10.1	NA	43062	950	F
5/17/11	GN	NA	NA	1342	1504	4200.079	7027.551	44	10.1	NA	43063	884	F
5/17/11	GN	NA	NA	1342	1504	4200.079	7027.551	44	10.1	NA	43064	851	F
5/17/11	GN	NA	NA	1342	1504	4200.079	7027.551	44	10.1	NA	43065	851	F
5/17/11	GN	NA	NA	1342	1504	4200.079	7027.551	44	10.1	NA	43066	891	F
5/17/11	GN	26.7	9.3	1437	1542	4159.737	7030.146	30.2	10	NA	43067	906	F
5/17/11	GN	26.7	9.3	1437	1542	4159.737	7030.146	30.2	10	NA	43068	906	F
5/17/11	GN	26.7	9.3	1437	1542	4159.737	7030.146	30.2	10	NA	43069	859	F
5/17/11	GN	26.7	9.3	1437	1542	4159.737	7030.146	30.2	10	NA	43070	893	F
5/17/11	GN	26.7	9.3	1437	1542	4159.737	7030.146	30.2	10	NA	47507	905	F
5/17/11	GN	26.7	9.3	1437	1542	4159.737	7030.146	30.2	10	NA	43071	869	F
5/17/11	GN	26.7	9.3	1437	1542	4159.737	7030.146	30.2	10	NA	43072	831	F
5/17/11	GN	26.7	9.3	1437	1542	4159.737	7030.146	30.2	10	NA	43073	890	F
5/17/11	GN	26.7	9.3	1437	1542	4159.737	7030.146	30.2	10	NA	43074	879	F
5/17/11	GN	26.7	9.3	1437	1542	4159.737	7030.146	30.2	10	NA	43075	794	F
5/17/11	GN	26.7	9.3	1437	1542	4159.737	7030.146	30.2	10	NA	43076	961	F
5/17/11	GN	26.7	9.3	1437	1542	4159.737	7030.146	30.2	10	NA	43077	870	F
5/17/11	GN	26.7	9.3	1437	1542	4159.737	7030.146	30.2	10	NA	43078	926	F
5/17/11	GN	26.7	9.3	1437	1542	4159.737	7030.146	30.2	10	NA	43079	984	F
5/17/11	GN	26.7	9.3	1437	1542	4159.737	7030.146	30.2	10	NA	43080	850	F
5/17/11	GN	39.4	5.3	745	829	4208.241	7030.098	42	8.9	NA	43081	889	F
5/17/11	GN	39.4	5.3	745	829	4208.241	7030.098	42	8.9	NA	43082	960	F
5/17/11	GN	39.4	5.3	745	829	4208.241	7030.098	42	8.9	NA	43083	878	F
6/23/11	GN	38.9	6.8	650	720	4211.879	7073.475	34.7	16.9	29.4	43084	904	F
6/23/11	GN	38.9	6.8	650	720	4211.879	7073.475	34.7	16.9	29.4	43085	880	F
6/23/11	GN	38.9	6.8	650	720	4211.879	7073.475	34.7	16.9	29.4	43086	922	F
6/23/11	GN	38.9	6.8	650	720	4211.879	7073.475	34.7	16.9	29.4	43087	906	F
6/23/11	GN	38.9	6.8	650	720	4211.879	7073.475	34.7	16.9	29.4	43088	906	F
6/23/11	GN	38.9	6.8	650	720	4211.879	7073.475	34.7	16.9	29.4	43089	951	F
6/23/11	GN	38.9	6.8	650	720	4211.879	7073.475	34.7	16.9	29.4	43090	910	F

Appendix B (continued)

Date	Gear	Gear Dp (m)	Gear T (°C)	Time set	Time pulled	Latitude	Longitude	Dp (m)	SST (°C)	SSS	Tag #	TL (mm)	Sex
6/23/11	GN	38.9	6.8	650	720	4211.879	7073.475	34.7	16.9	29.4	43091	895	F
6/23/11	GN	38.9	6.8	650	720	4211.879	7073.475	34.7	16.9	29.4	43092	895	F
6/23/11	GN	38.9	6.8	650	720	4211.879	7073.475	34.7	16.9	29.4	43093	870	F
6/23/11	GN	38.9	6.8	650	720	4211.879	7073.475	34.7	16.9	29.4	43094	855	F
6/23/11	GN	38.9	6.8	650	720	4211.879	7073.475	34.7	16.9	29.4	43095	951	F
6/23/11	GN	38.9	6.8	650	720	4211.879	7073.475	34.7	16.9	29.4	43096	868	F
6/23/11	GN	38.9	6.8	650	720	4211.879	7073.475	34.7	16.9	29.4	43097	855	F
6/23/11	GN	38.9	6.8	650	720	4211.879	7073.475	34.7	16.9	29.4	43098	790	F
6/23/11	GN	38.9	6.8	650	720	4211.879	7073.475	34.7	16.9	29.4	43099	845	F
6/23/11	GN	38.9	6.8	650	720	4211.879	7073.475	34.7	16.9	29.4	43100	861	F
6/23/11	GN	38.9	6.8	650	720	4211.879	7073.475	34.7	16.9	29.4	43101	888	F
6/23/11	GN	38.9	6.8	650	720	4211.879	7073.475	34.7	16.9	29.4	43102	869	F
6/23/11	GN	38.9	6.8	650	720	4211.879	7073.475	34.7	16.9	29.4	43103	860	F
6/23/11	GN	38.9	6.8	650	720	4211.879	7073.475	34.7	16.9	29.4	43104	810	F
6/23/11	GN	38.9	6.8	650	720	4211.879	7073.475	34.7	16.9	29.4	43106	944	F
6/23/11	GN	38.9	6.8	650	720	4211.879	7073.475	34.7	16.9	29.4	43107	894	F
6/23/11	GN	38.9	6.8	650	720	4211.879	7073.475	34.7	16.9	29.4	43108	866	F
6/23/11	GN	38.9	6.8	650	720	4211.879	7073.475	34.7	16.9	29.4	43109	906	F
6/23/11	GN	38.9	6.8	650	720	4211.879	7073.475	34.7	16.9	29.4	43110	940	F
6/23/11	GN	38.9	6.8	650	720	4211.879	7073.475	34.7	16.9	29.4	47511	912	F
6/23/11	GN	38.9	6.8	650	720	4211.879	7073.475	34.7	16.9	29.4	43112	861	F
6/23/11	GN	38.9	6.8	650	720	4211.879	7073.475	34.7	16.9	29.4	43113	928	F
6/23/11	GN	38.9	6.8	650	720	4211.879	7073.475	34.7	16.9	29.4	43114	901	F
6/23/11	GN	38.9	6.8	650	720	4211.879	7073.475	34.7	16.9	29.4	43115	870	F
6/23/11	GN	38.9	6.8	650	720	4211.879	7073.475	34.7	16.9	29.4	43116	925	F
6/23/11	GN	38.9	6.8	650	720	4211.879	7073.475	34.7	16.9	29.4	43117	863	F
6/23/11	GN	38.9	6.8	650	720	4211.879	7073.475	34.7	16.9	29.4	43118	895	F
6/23/11	GN	38.9	6.8	650	720	4211.879	7073.475	34.7	16.9	29.4	43119	925	F
6/23/11	GN	38.9	6.8	650	720	4211.879	7073.475	34.7	16.9	29.4	43120	931	F
6/23/11	GN	38.9	6.8	650	720	4211.879	7073.475	34.7	16.9	29.4	47512	875	F
6/23/11	GN	38.9	6.8	650	720	4211.879	7073.475	34.7	16.9	29.4	43121	915	F
6/23/11	GN	38.9	6.8	650	720	4211.879	7073.475	34.7	16.9	29.4	43122	915	F
6/23/11	GN	38.9	6.8	650	720	4211.879	7073.475	34.7	16.9	29.4	43123	902	F
6/23/11	GN	38.9	6.8	650	720	4211.879	7073.475	34.7	16.9	29.4	43124	905	F
6/23/11	GN	38.9	6.8	650	720	4211.879	7073.475	34.7	16.9	29.4	43125	895	F
6/23/11	GN	38.9	6.8	650	720	4211.879	7073.475	34.7	16.9	29.4	43126	845	F
6/23/11	GN	38.9	6.8	650	720	4211.879	7073.475	34.7	16.9	29.4	43127	901	F
6/23/11	GN	38.9	6.8	650	720	4211.879	7073.475	34.7	16.9	29.4	43128	924	F
6/23/11	GN	38.9	6.8	650	720	4211.879	7073.475	34.7	16.9	29.4	43129	902	F
6/23/11	GN	38.9	6.8	650	720	4211.879	7073.475	34.7	16.9	29.4	43130	905	F
6/23/11	GN	38.9	6.8	650	720	4211.879	7073.475	34.7	16.9	29.4	43131	998	F

Appendix B (continued)

Date	Gear	Gear Dp (m)	Gear T (°C)	Time set	Time pulled	Latitude	Longitude	Dp (m)	SST (°C)	SSS	Tag #	TL (mm)	Sex
6/23/11	GN	38.9	6.8	650	720	4211.879	7073.475	34.7	16.9	29.4	43132	867	F
6/23/11	GN	38.9	6.8	650	720	4211.879	7073.475	34.7	16.9	29.4	43133	853	F
6/23/11	GN	38.9	6.8	650	720	4211.879	7073.475	34.7	16.9	29.4	43134	905	F
6/23/11	GN	38.9	6.8	650	720	4211.879	7073.475	34.7	16.9	29.4	43135	898	F
6/23/11	GN	38.9	6.8	650	720	4211.879	7073.475	34.7	16.9	29.4	43136	900	F
6/23/11	GN	38.9	6.8	650	720	4211.879	7073.475	34.7	16.9	29.4	43137	896	F
6/23/11	GN	38.9	6.8	650	720	4211.879	7073.475	34.7	16.9	29.4	43138	904	F
6/23/11	GN	38.9	6.8	650	720	4211.879	7073.475	34.7	16.9	29.4	43139	887	F
6/23/11	GN	38.9	6.8	650	720	4211.879	7073.475	34.7	16.9	29.4	43140	844	F
6/23/11	GN	38.9	6.8	650	720	4211.879	7073.475	34.7	16.9	29.4	47518	885	F
6/23/11	GN	38.9	6.8	650	720	4211.879	7073.475	34.7	16.9	29.4	43141	916	F
6/23/11	GN	38.9	6.8	650	720	4211.879	7073.475	34.7	16.9	29.4	43142	940	F
6/23/11	GN	38.9	6.8	650	720	4211.879	7073.475	34.7	16.9	29.4	43143	918	F
6/23/11	GN	38.9	6.8	650	720	4211.879	7073.475	34.7	16.9	29.4	43144	888	F
6/23/11	GN	38.9	6.8	650	720	4211.879	7073.475	34.7	16.9	29.4	43145	895	F
6/23/11	GN	38.9	6.8	650	720	4211.879	7073.475	34.7	16.9	29.4	43146	896	F
6/23/11	GN	38.9	6.8	650	720	4211.879	7073.475	34.7	16.9	29.4	43147	873	F
6/23/11	GN	38.9	6.8	650	720	4211.879	7073.475	34.7	16.9	29.4	43148	852	F
6/23/11	GN	38.9	6.8	650	720	4211.879	7073.475	34.7	16.9	29.4	43149	911	F
6/23/11	GN	38.9	6.8	650	720	4211.879	7073.475	34.7	16.9	29.4	43150	868	F
6/23/11	GN	38.9	6.8	650	720	4211.879	7073.475	34.7	16.9	29.4	43151	945	F
6/23/11	GN	38.9	6.8	650	720	4211.879	7073.475	34.7	16.9	29.4	43152	881	F
6/23/11	GN	38.9	6.8	650	720	4211.879	7073.475	34.7	16.9	29.4	43153	873	F
6/23/11	GN	38.9	6.8	650	720	4211.879	7073.475	34.7	16.9	29.4	43154	901	F
6/23/11	GN	38.9	6.8	650	720	4211.879	7073.475	34.7	16.9	29.4	43156	875	F
6/23/11	GN	38.9	6.8	650	720	4211.879	7073.475	34.7	16.9	29.4	43157	897	F
6/23/11	GN	38.9	6.8	650	720	4211.879	7073.475	34.7	16.9	29.4	43158	890	F
6/23/11	GN	38.9	6.8	650	720	4211.879	7073.475	34.7	16.9	29.4	43159	857	F
6/23/11	GN	38.9	6.8	650	720	4211.879	7073.475	34.7	16.9	29.4	43160	825	F
6/23/11	GN	38.9	6.8	650	720	4211.879	7073.475	34.7	16.9	29.4	47516	831	F
6/23/11	GN	38.9	6.8	650	720	4211.879	7073.475	34.7	16.9	29.4	43161	891	F
6/23/11	GN	38.9	6.8	650	720	4211.879	7073.475	34.7	16.9	29.4	43162	910	F
6/23/11	GN	38.9	6.8	650	720	4211.879	7073.475	34.7	16.9	29.4	43163	844	F
6/23/11	GN	38.9	6.8	650	720	4211.879	7073.475	34.7	16.9	29.4	43164	867	F
6/23/11	GN	38.9	6.8	650	720	4211.879	7073.475	34.7	16.9	29.4	43165	887	F
6/23/11	GN	38.9	6.8	650	720	4211.879	7073.475	34.7	16.9	29.4	43166	912	F
6/23/11	GN	38.9	6.8	650	720	4211.879	7073.475	34.7	16.9	29.4	43167	888	F
6/23/11	GN	38.9	6.8	650	720	4211.879	7073.475	34.7	16.9	29.4	43168	843	F
6/23/11	GN	38.9	6.8	650	720	4211.879	7073.475	34.7	16.9	29.4	43169	912	F
6/23/11	GN	38.9	6.8	650	720	4211.879	7073.475	34.7	16.9	29.4	43170	869	F
6/23/11	GN	38.9	6.8	650	720	4211.879	7073.475	34.7	16.9	29.4	47517	895	F

Appendix B (continued)

Date	Gear	Gear Dp (m)	Gear T (°C)	Time set	Time pulled	Latitude	Longitude	Dp (m)	SST (°C)	SSS	Tag #	TL (mm)	Sex
6/23/11	GN	38.9	6.8	650	720	4211.879	7073.475	34.7	16.9	29.4	43171	895	F
6/23/11	GN	38.9	6.8	650	720	4211.879	7073.475	34.7	16.9	29.4	43172	830	F
6/23/11	GN	38.9	6.8	650	720	4211.879	7073.475	34.7	16.9	29.4	43173	868	F
6/23/11	GN	38.9	6.8	650	720	4211.879	7073.475	34.7	16.9	29.4	43174	889	F
6/23/11	GN	38.9	6.8	650	720	4211.879	7073.475	34.7	16.9	29.4	43175	969	F
6/23/11	GN	38.9	6.8	650	720	4211.879	7073.475	34.7	16.9	29.4	43176	905	F
6/23/11	GN	38.9	6.8	650	720	4211.879	7073.475	34.7	16.9	29.4	43177	895	F
6/23/11	GN	38.9	6.8	650	720	4211.879	7073.475	34.7	16.9	29.4	43178	860	F
6/23/11	GN	38.9	6.8	650	720	4211.879	7073.475	34.7	16.9	29.4	43179	912	F
6/23/11	GN	38.9	6.8	650	720	4211.879	7073.475	34.7	16.9	29.4	43180	817	F
6/23/11	GN	38.9	6.8	650	720	4211.879	7073.475	34.7	16.9	29.4	43182	911	F
6/23/11	GN	38.9	6.8	650	720	4211.879	7073.475	34.7	16.9	29.4	43183	946	F
6/23/11	GN	38.9	6.8	650	720	4211.879	7073.475	34.7	16.9	29.4	43184	823	F
6/23/11	GN	38.9	6.8	650	720	4211.879	7073.475	34.7	16.9	29.4	43185	841	F
6/23/11	GN	38.9	6.8	650	720	4211.879	7073.475	34.7	16.9	29.4	43186	935	F
6/23/11	GN	38.9	6.8	650	720	4211.879	7073.475	34.7	16.9	29.4	43187	860	F
6/23/11	GN	38.9	6.8	650	720	4211.879	7073.475	34.7	16.9	29.4	43188	922	F
6/23/11	GN	38.9	6.8	650	720	4211.879	7073.475	34.7	16.9	29.4	43189	802	F
6/23/11	GN	38.9	6.8	650	720	4211.879	7073.475	34.7	16.9	29.4	43190	895	F
6/23/11	GN	38.9	6.8	650	720	4211.879	7073.475	34.7	16.9	29.4	47519	930	F
6/23/11	GN	38.9	6.8	650	720	4211.879	7073.475	34.7	16.9	29.4	43191	863	F
6/23/11	GN	38.9	6.8	650	720	4211.879	7073.475	34.7	16.9	29.4	43192	902	F
6/23/11	GN	38.9	6.8	650	720	4211.879	7073.475	34.7	16.9	29.4	43193	846	F
6/23/11	GN	38.9	6.8	650	720	4211.879	7073.475	34.7	16.9	29.4	43194	803	F
6/23/11	GN	38.9	6.8	650	720	4211.879	7073.475	34.7	16.9	29.4	43195	881	F
6/23/11	GN	38.9	6.8	650	720	4211.879	7073.475	34.7	16.9	29.4	43196	918	F
6/23/11	GN	38.9	6.8	650	720	4211.879	7073.475	34.7	16.9	29.4	43197	886	F
6/23/11	GN	38.9	6.8	650	720	4211.879	7073.475	34.7	16.9	29.4	43198	925	F
6/23/11	GN	38.9	6.8	650	720	4211.879	7073.475	34.7	16.9	29.4	43199	909	F
6/23/11	GN	38.9	6.8	650	720	4211.879	7073.475	34.7	16.9	29.4	43200	900	F
6/23/11	GN	38.9	6.8	650	720	4211.879	7073.475	34.7	16.9	29.4	47513	903	F
6/23/11	GN	38.9	6.8	650	720	4211.879	7073.475	34.7	16.9	29.4	43201	903	F
6/23/11	GN	38.9	6.8	650	720	4211.879	7073.475	34.7	16.9	29.4	43202	828	F
6/23/11	GN	38.9	6.8	650	720	4211.879	7073.475	34.7	16.9	29.4	43203	805	F
6/23/11	GN	38.9	6.8	650	720	4211.879	7073.475	34.7	16.9	29.4	43204	781	F
6/23/11	GN	38.9	6.8	650	720	4211.879	7073.475	34.7	16.9	29.4	43205	915	F
6/23/11	GN	38.9	6.8	650	720	4211.879	7073.475	34.7	16.9	29.4	43206	844	F
6/23/11	GN	38.9	6.8	650	720	4211.879	7073.475	34.7	16.9	29.4	43207	838	F
6/23/11	GN	38.9	6.8	650	720	4211.879	7073.475	34.7	16.9	29.4	43208	883	F
6/23/11	GN	38.9	6.8	650	720	4211.879	7073.475	34.7	16.9	29.4	43209	922	F
6/23/11	GN	38.9	6.8	650	720	4211.879	7073.475	34.7	16.9	29.4	43210	931	F

Appendix B (continued)

Date	Gear	Gear Dp (m)	Gear T (°C)	Time set	Time pulled	Latitude	Longitude	Dp (m)	SST (°C)	SSS	Tag #	TL (mm)	Sex
6/23/11	GN	38.9	6.8	650	720	4211.879	7073.475	34.7	16.9	29.4	47521	946	F
6/23/11	GN	38.6	6.7	850	910	4210.91	7031.15	38.4	16.7	29.4	43211	893	F
6/23/11	GN	38.6	6.7	850	910	4210.91	7031.15	38.4	16.7	29.4	43212	863	F
6/23/11	GN	32.9	6.6	1019	1043	4210.75	7032.97	43.3	16.6	29.5	43213	904	F
6/23/11	GN	32.9	6.6	1019	1043	4210.75	7032.97	43.3	16.6	29.5	43214	841	F
6/23/11	GN	32.9	6.6	1019	1043	4210.75	7032.97	43.3	16.6	29.5	43215	881	F
6/23/11	GN	32.9	6.6	1019	1043	4210.75	7032.97	43.3	16.6	29.5	43216	846	F
6/23/11	GN	32.9	6.6	1019	1043	4210.75	7032.97	43.3	16.6	29.5	43217	850	F
6/23/11	GN	32.9	6.6	1019	1043	4210.75	7032.97	43.3	16.6	29.5	43218	875	F
6/23/11	GN	32.9	6.6	1019	1043	4210.75	7032.97	43.3	16.6	29.5	43219	885	F
6/23/11	GN	32.9	6.6	1019	1043	4210.75	7032.97	43.3	16.6	29.5	43220	882	F
6/23/11	GN	32.9	6.6	1019	1043	4210.75	7032.97	43.3	16.6	29.5	43221	838	F
6/23/11	GN	32.9	6.6	1019	1043	4210.75	7032.97	43.3	16.6	29.5	43222	910	F
6/23/11	GN	32.9	6.6	1019	1043	4210.75	7032.97	43.3	16.6	29.5	43223	942	F
6/23/11	GN	32.9	6.6	1019	1043	4210.75	7032.97	43.3	16.6	29.5	43224	930	F
6/23/11	GN	32.9	6.6	1019	1043	4210.75	7032.97	43.3	16.6	29.5	43225	881	F
6/23/11	GN	32.9	6.6	1019	1043	4210.75	7032.97	43.3	16.6	29.5	43226	849	F
6/23/11	GN	32.9	6.6	1019	1043	4210.75	7032.97	43.3	16.6	29.5	43227	915	F
6/23/11	GN	32.9	6.6	1019	1043	4210.75	7032.97	43.3	16.6	29.5	43228	905	F
6/23/11	GN	32.9	6.6	1019	1043	4210.75	7032.97	43.3	16.6	29.5	43229	875	F
6/23/11	GN	32.9	6.6	1019	1043	4210.75	7032.97	43.3	16.6	29.5	43230	858	F
6/23/11	GN	32.9	6.6	1019	1043	4210.75	7032.97	43.3	16.6	29.5	43231	850	F
6/23/11	GN	32.9	6.6	1019	1043	4210.75	7032.97	43.3	16.6	29.5	43232	912	F
6/23/11	GN	32.9	6.6	1019	1043	4210.75	7032.97	43.3	16.6	29.5	43233	834	F
6/23/11	GN	32.9	6.6	1019	1043	4210.75	7032.97	43.3	16.6	29.5	43234	824	F
6/23/11	GN	32.9	6.6	1019	1043	4210.75	7032.97	43.3	16.6	29.5	43235	864	F
6/23/11	GN	32.9	6.6	1019	1043	4210.75	7032.97	43.3	16.6	29.5	43236	836	F
6/23/11	GN	32.9	6.6	1019	1043	4210.75	7032.97	43.3	16.6	29.5	43237	843	F
6/23/11	GN	32.9	6.6	1019	1043	4210.75	7032.97	43.3	16.6	29.5	43238	870	F
6/23/11	GN	32.9	6.6	1019	1043	4210.75	7032.97	43.3	16.6	29.5	43239	823	F
6/23/11	GN	32.9	6.6	1019	1043	4210.75	7032.97	43.3	16.6	29.5	43240	845	F
6/23/11	GN	32.9	6.6	1019	1043	4210.75	7032.97	43.3	16.6	29.5	43241	885	F
6/23/11	GN	32.9	6.6	1019	1043	4210.75	7032.97	43.3	16.6	29.5	43242	830	F
6/23/11	GN	32.9	6.6	1019	1043	4210.75	7032.97	43.3	16.6	29.5	43243	884	F
6/23/11	GN	32.9	6.6	1019	1043	4210.75	7032.97	43.3	16.6	29.5	43244	920	F
6/23/11	GN	32.9	6.6	1019	1043	4210.75	7032.97	43.3	16.6	29.5	43245	830	F
6/23/11	GN	32.9	6.6	1019	1043	4210.75	7032.97	43.3	16.6	29.5	43246	925	F
6/23/11	GN	32.9	6.6	1019	1043	4210.75	7032.97	43.3	16.6	29.5	43247	850	F
6/23/11	GN	32.9	6.6	1019	1043	4210.75	7032.97	43.3	16.6	29.5	43248	889	F
6/23/11	GN	32.9	6.6	1019	1043	4210.75	7032.97	43.3	16.6	29.5	43249	856	F
6/23/11	GN	32.9	6.6	1019	1043	4210.75	7032.97	43.3	16.6	29.5	43250	845	F

Appendix B (continued)

Date	Gear	Gear Dp (m)	Gear T (°C)	Time set	Time pulled	Latitude	Longitude	Dp (m)	SST (°C)	SSS	Tag #	TL (mm)	Sex
6/23/11	GN	32.9	6.6	1019	1043	4210.75	7032.97	43.3	16.6	29.5	47525	970	F
6/23/11	GN	32.9	6.6	1019	1043	4210.75	7032.97	43.3	16.6	29.5	43251	894	F
6/23/11	GN	32.9	6.6	1019	1043	4210.75	7032.97	43.3	16.6	29.5	43252	880	F
6/23/11	GN	32.9	6.6	1019	1043	4210.75	7032.97	43.3	16.6	29.5	43253	886	F
6/23/11	GN	32.9	6.6	1019	1043	4210.75	7032.97	43.3	16.6	29.5	43254	941	F
6/23/11	GN	32.9	6.6	1019	1043	4210.75	7032.97	43.3	16.6	29.5	43255	880	F
6/23/11	GN	32.9	6.6	1019	1043	4210.75	7032.97	43.3	16.6	29.5	43256	888	F
6/23/11	GN	32.9	6.6	1019	1043	4210.75	7032.97	43.3	16.6	29.5	43257	909	F
6/23/11	GN	32.9	6.6	1019	1043	4210.75	7032.97	43.3	16.6	29.5	43258	899	F
6/23/11	GN	32.9	6.6	1019	1043	4210.75	7032.97	43.3	16.6	29.5	43259	861	F
6/23/11	GN	32.9	6.6	1019	1043	4210.75	7032.97	43.3	16.6	29.5	43260	905	F
6/23/11	GN	32.9	6.6	1019	1043	4210.75	7032.97	43.3	16.6	29.5	47526	856	F
6/23/11	GN	32.9	6.6	1019	1043	4210.75	7032.97	43.3	16.6	29.5	43261	858	F
6/23/11	GN	32.9	6.6	1019	1043	4210.75	7032.97	43.3	16.6	29.5	43262	875	F
6/23/11	GN	32.9	6.6	1019	1043	4210.75	7032.97	43.3	16.6	29.5	43263	949	F
6/23/11	GN	32.9	6.6	1019	1043	4210.75	7032.97	43.3	16.6	29.5	43264	898	F
6/23/11	GN	32.9	6.6	1019	1043	4210.75	7032.97	43.3	16.6	29.5	43265	856	F
6/23/11	GN	32.9	6.6	1019	1043	4210.75	7032.97	43.3	16.6	29.5	43266	896	F
6/23/11	GN	32.9	6.6	1019	1043	4210.75	7032.97	43.3	16.6	29.5	43267	862	F
6/23/11	GN	32.9	6.6	1019	1043	4210.75	7032.97	43.3	16.6	29.5	43268	912	F
6/23/11	GN	32.9	6.6	1019	1043	4210.75	7032.97	43.3	16.6	29.5	43269	898	F
6/23/11	GN	32.9	6.6	1019	1043	4210.75	7032.97	43.3	16.6	29.5	43270	845	F
6/23/11	GN	32.9	6.6	1019	1043	4210.75	7032.97	43.3	16.6	29.5	47527	910	F
6/23/11	GN	32.9	6.6	1019	1043	4210.75	7032.97	43.3	16.6	29.5	43271	805	F
6/23/11	GN	32.9	6.6	1019	1043	4210.75	7032.97	43.3	16.6	29.5	43272	890	F
6/23/11	GN	32.9	6.6	1019	1043	4210.75	7032.97	43.3	16.6	29.5	43273	930	F
6/23/11	GN	32.9	6.6	1019	1043	4210.75	7032.97	43.3	16.6	29.5	43274	919	F
6/23/11	GN	32.9	6.6	1019	1043	4210.75	7032.97	43.3	16.6	29.5	43275	812	F
6/23/11	GN	32.9	6.6	1019	1043	4210.75	7032.97	43.3	16.6	29.5	43276	876	F
6/23/11	GN	32.9	6.6	1019	1043	4210.75	7032.97	43.3	16.6	29.5	43277	999	F
6/23/11	GN	32.9	6.6	1019	1043	4210.75	7032.97	43.3	16.6	29.5	43278	906	F
6/23/11	GN	32.9	6.6	1019	1043	4210.75	7032.97	43.3	16.6	29.5	43279	911	F
6/23/11	GN	32.9	6.6	1019	1043	4210.75	7032.97	43.3	16.6	29.5	43280	894	F
6/23/11	GN	32.9	6.6	1019	1043	4210.75	7032.97	43.3	16.6	29.5	47528	875	F
6/23/11	GN	32.9	6.6	1019	1043	4210.75	7032.97	43.3	16.6	29.5	43281	859	F
6/23/11	GN	32.9	6.6	1019	1043	4210.75	7032.97	43.3	16.6	29.5	43282	910	F
6/23/11	GN	32.9	6.6	1019	1043	4210.75	7032.97	43.3	16.6	29.5	43283	881	F
6/23/11	GN	32.9	6.6	1019	1043	4210.75	7032.97	43.3	16.6	29.5	43284	900	F
6/23/11	GN	32.9	6.6	1019	1043	4210.75	7032.97	43.3	16.6	29.5	43285	931	F
6/23/11	GN	32.9	6.6	1019	1043	4210.75	7032.97	43.3	16.6	29.5	43286	869	F
6/23/11	GN	32.9	6.6	1019	1043	4210.75	7032.97	43.3	16.6	29.5	43287	850	F

Appendix B (continued)

Date	Gear	Gear Dp (m)	Gear T (°C)	Time set	Time pulled	Latitude	Longitude	Dp (m)	SST (°C)	SSS	Tag #	TL (mm)	Sex
6/23/11	GN	32.9	6.6	1019	1043	4210.75	7032.97	43.3	16.6	29.5	43288	925	F
6/23/11	GN	32.9	6.6	1019	1043	4210.75	7032.97	43.3	16.6	29.5	43289	882	F
6/23/11	GN	32.9	6.6	1019	1043	4210.75	7032.97	43.3	16.6	29.5	43290	878	F
6/23/11	GN	32.9	6.6	1019	1043	4210.75	7032.97	43.3	16.6	29.5	47529	803	F
6/23/11	GN	32.9	6.6	1019	1043	4210.75	7032.97	43.3	16.6	29.5	43291	859	F
6/23/11	GN	32.9	6.6	1019	1043	4210.75	7032.97	43.3	16.6	29.5	43292	864	F
6/23/11	GN	32.9	6.6	1019	1043	4210.75	7032.97	43.3	16.6	29.5	43293	865	F
6/23/11	GN	32.9	6.6	1019	1043	4210.75	7032.97	43.3	16.6	29.5	43294	820	F
6/23/11	GN	32.9	6.6	1019	1043	4210.75	7032.97	43.3	16.6	29.5	43295	888	F
6/23/11	GN	32.9	6.6	1019	1043	4210.75	7032.97	43.3	16.6	29.5	43296	845	F
6/23/11	GN	32.9	6.6	1019	1043	4210.75	7032.97	43.3	16.6	29.5	43297	825	F
6/23/11	GN	32.9	6.6	1019	1043	4210.75	7032.97	43.3	16.6	29.5	43298	874	F
6/23/11	GN	32.9	6.6	1019	1043	4210.75	7032.97	43.3	16.6	29.5	43299	855	F
6/23/11	GN	32.9	6.6	1019	1043	4210.75	7032.97	43.3	16.6	29.5	43300	875	F
6/23/11	GN	32.9	6.6	1019	1043	4210.75	7032.97	43.3	16.6	29.5	47530	846	F
6/23/11	GN	32.9	6.6	1019	1043	4210.75	7032.97	43.3	16.6	29.5	43301	914	F
6/23/11	GN	32.9	6.6	1019	1043	4210.75	7032.97	43.3	16.6	29.5	43302	855	F
6/23/11	GN	32.9	6.6	1019	1043	4210.75	7032.97	43.3	16.6	29.5	43303	872	F
6/23/11	GN	32.9	6.6	1019	1043	4210.75	7032.97	43.3	16.6	29.5	43304	861	F
6/23/11	GN	32.9	6.6	1019	1043	4210.75	7032.97	43.3	16.6	29.5	43305	902	F
6/23/11	GN	32.9	6.6	1019	1043	4210.75	7032.97	43.3	16.6	29.5	43306	841	F
6/23/11	GN	32.9	6.6	1019	1043	4210.75	7032.97	43.3	16.6	29.5	43307	928	F
6/23/11	GN	32.9	6.6	1019	1043	4210.75	7032.97	43.3	16.6	29.5	43308	889	F
6/23/11	GN	32.9	6.6	1019	1043	4210.75	7032.97	43.3	16.6	29.5	43309	845	F
6/23/11	GN	32.9	6.6	1019	1043	4210.75	7032.97	43.3	16.6	29.5	43310	902	F
6/23/11	GN	32.9	6.6	1019	1043	4210.75	7032.97	43.3	16.6	29.5	47531	860	F
6/23/11	GN	32.9	6.6	1019	1043	4210.75	7032.97	43.3	16.6	29.5	43311	891	F
6/23/11	GN	32.9	6.6	1019	1043	4210.75	7032.97	43.3	16.6	29.5	43312	843	F
6/23/11	GN	32.9	6.6	1019	1043	4210.75	7032.97	43.3	16.6	29.5	43313	872	F
6/23/11	GN	32.9	6.6	1019	1043	4210.75	7032.97	43.3	16.6	29.5	43314	843	F
6/23/11	GN	32.9	6.6	1019	1043	4210.75	7032.97	43.3	16.6	29.5	43315	885	F
6/23/11	GN	32.9	6.6	1019	1043	4210.75	7032.97	43.3	16.6	29.5	43316	910	F
6/23/11	GN	32.9	6.6	1019	1043	4210.75	7032.97	43.3	16.6	29.5	43317	869	F
6/23/11	GN	32.9	6.6	1019	1043	4210.75	7032.97	43.3	16.6	29.5	43318	872	F
6/23/11	GN	32.9	6.6	1019	1043	4210.75	7032.97	43.3	16.6	29.5	43319	851	F
6/23/11	GN	32.9	6.6	1019	1043	4210.75	7032.97	43.3	16.6	29.5	43320	820	F
6/23/11	GN	32.9	6.6	1019	1043	4210.75	7032.97	43.3	16.6	29.5	47532	842	F
6/23/11	GN	32.9	6.6	1019	1043	4210.75	7032.97	43.3	16.6	29.5	43321	885	F
6/23/11	GN	32.9	6.6	1019	1043	4210.75	7032.97	43.3	16.6	29.5	43322	890	F
6/23/11	GN	32.9	6.6	1019	1043	4210.75	7032.97	43.3	16.6	29.5	43323	860	F
6/23/11	GN	32.9	6.6	1019	1043	4210.75	7032.97	43.3	16.6	29.5	43324	859	F

Appendix B (continued)

Date	Gear	Gear Dp (m)	Gear T (°C)	Time set	Time pulled	Latitude	Longitude	Dp (m)	SST (°C)	SSS	Tag #	TL (mm)	Sex
6/23/11	GN	32.9	6.6	1019	1043	4210.75	7032.97	43.3	16.6	29.5	43325	861	F
6/23/11	GN	32.9	6.6	1019	1043	4210.75	7032.97	43.3	16.6	29.5	43326	851	F
6/23/11	GN	32.9	6.6	1019	1043	4210.75	7032.97	43.3	16.6	29.5	43327	890	F
6/23/11	GN	32.9	6.6	1019	1043	4210.75	7032.97	43.3	16.6	29.5	43328	919	F
6/23/11	GN	32.9	6.6	1019	1043	4210.75	7032.97	43.3	16.6	29.5	43329	880	F
6/23/11	GN	32.9	6.6	1019	1043	4210.75	7032.97	43.3	16.6	29.5	43330	936	F
6/23/11	GN	32.9	6.6	1019	1043	4210.75	7032.97	43.3	16.6	29.5	47533	887	F
6/23/11	GN	32.9	6.6	1019	1043	4210.75	7032.97	43.3	16.6	29.5	43331	920	F
6/23/11	GN	32.9	6.6	1019	1043	4210.75	7032.97	43.3	16.6	29.5	43332	901	F
6/23/11	GN	34.4	6.5	1151	1209	4211.27	7034.33	39.9	17.4	29.6	43333	910	F
6/23/11	GN	32.9	6.6	1019	1043	4210.75	7032.97	43.3	16.6	29.5	43334	885	F
6/23/11	GN	32.9	6.6	1019	1043	4210.75	7032.97	43.3	16.6	29.5	43335	880	F
6/23/11	GN	32.9	6.6	1019	1043	4210.75	7032.97	43.3	16.6	29.5	43336	882	F
6/23/11	GN	32.9	6.6	1019	1043	4210.75	7032.97	43.3	16.6	29.5	43337	905	F
6/23/11	GN	32.9	6.6	1019	1043	4210.75	7032.97	43.3	16.6	29.5	43338	930	F
6/23/11	GN	32.9	6.6	1019	1043	4210.75	7032.97	43.3	16.6	29.5	43339	846	F
6/23/11	GN	32.9	6.6	1019	1043	4210.75	7032.97	43.3	16.6	29.5	43340	921	F
6/23/11	GN	32.9	6.6	1019	1043	4210.75	7032.97	43.3	16.6	29.5	47534	855	F
6/23/11	GN	32.9	6.6	1019	1043	4210.75	7032.97	43.3	16.6	29.5	43341	861	F
6/23/11	GN	32.9	6.6	1019	1043	4210.75	7032.97	43.3	16.6	29.5	43342	879	F
6/23/11	GN	32.9	6.6	1019	1043	4210.75	7032.97	43.3	16.6	29.5	43343	891	F
6/23/11	GN	32.9	6.6	1019	1043	4210.75	7032.97	43.3	16.6	29.5	43344	994	F
6/23/11	GN	32.9	6.6	1019	1043	4210.75	7032.97	43.3	16.6	29.5	43345	849	F
6/23/11	GN	32.9	6.6	1019	1043	4210.75	7032.97	43.3	16.6	29.5	43346	900	F
6/23/11	GN	32.9	6.6	1019	1043	4210.75	7032.97	43.3	16.6	29.5	43347	922	F
6/23/11	GN	32.9	6.6	1019	1043	4210.75	7032.97	43.3	16.6	29.5	43348	879	F
6/23/11	GN	32.9	6.6	1019	1043	4210.75	7032.97	43.3	16.6	29.5	43349	845	F
6/23/11	GN	32.9	6.6	1019	1043	4210.75	7032.97	43.3	16.6	29.5	43350	921	F
6/23/11	GN	32.9	6.6	1019	1043	4210.75	7032.97	43.3	16.6	29.5	47535	881	F
6/23/11	GN	32.9	6.6	1019	1043	4210.75	7032.97	43.3	16.6	29.5	43351	910	F
6/23/11	GN	32.9	6.6	1019	1043	4210.75	7032.97	43.3	16.6	29.5	43352	814	F
6/23/11	GN	32.9	6.6	1019	1043	4210.75	7032.97	43.3	16.6	29.5	43353	852	F
6/23/11	GN	32.9	6.6	1019	1043	4210.75	7032.97	43.3	16.6	29.5	43354	829	F
6/23/11	GN	32.9	6.6	1019	1043	4210.75	7032.97	43.3	16.6	29.5	43355	814	F
6/23/11	GN	32.9	6.6	1019	1043	4210.75	7032.97	43.3	16.6	29.5	43356	925	F
6/23/11	GN	32.9	6.6	1019	1043	4210.75	7032.97	43.3	16.6	29.5	43357	920	F
6/23/11	GN	32.9	6.6	1019	1043	4210.75	7032.97	43.3	16.6	29.5	43358	840	F
6/23/11	GN	32.9	6.6	1019	1043	4210.75	7032.97	43.3	16.6	29.5	43359	894	F
6/23/11	GN	32.9	6.6	1019	1043	4210.75	7032.97	43.3	16.6	29.5	43360	862	F
6/23/11	GN	32.9	6.6	1019	1043	4210.75	7032.97	43.3	16.6	29.5	47536	929	F
6/23/11	GN	32.9	6.6	1019	1043	4210.75	7032.97	43.3	16.6	29.5	43361	866	F

Appendix B (continued)

Date	Gear	Gear Dp (m)	Gear T (°C)	Time set	Time pulled	Latitude	Longitude	Dp (m)	SST (°C)	SSS	Tag #	TL (mm)	Sex
6/23/11	GN	32.9	6.6	1019	1043	4210.75	7032.97	43.3	16.6	29.5	43362	865	F
6/23/11	GN	32.9	6.6	1019	1043	4210.75	7032.97	43.3	16.6	29.5	43363	905	F
6/23/11	GN	32.9	6.6	1019	1043	4210.75	7032.97	43.3	16.6	29.5	43364	910	F
6/23/11	GN	32.9	6.6	1019	1043	4210.75	7032.97	43.3	16.6	29.5	43365	843	F
6/23/11	GN	32.9	6.6	1019	1043	4210.75	7032.97	43.3	16.6	29.5	43366	815	F
6/23/11	GN	32.9	6.6	1019	1043	4210.75	7032.97	43.3	16.6	29.5	43367	908	F
6/23/11	GN	32.9	6.6	1019	1043	4210.75	7032.97	43.3	16.6	29.5	43368	908	F
6/23/11	GN	32.9	6.6	1019	1043	4210.75	7032.97	43.3	16.6	29.5	43369	835	F
6/23/11	GN	34.4	6.5	1151	1209	4211.27	7034.33	39.9	17.4	29.6	43370	839	F
6/23/11	GN	34.4	6.5	1151	1209	4211.27	7034.33	39.9	17.4	29.6	47537	940	F
6/23/11	GN	34.4	6.5	1151	1209	4211.27	7034.33	39.9	17.4	29.6	43371	875	F
6/23/11	GN	34.4	6.5	1151	1209	4211.27	7034.33	39.9	17.4	29.6	43372	939	F
6/23/11	GN	34.4	6.5	1151	1209	4211.27	7034.33	39.9	17.4	29.6	43373	860	F
6/23/11	GN	34.4	6.5	1151	1209	4211.27	7034.33	39.9	17.4	29.6	43374	880	F
6/23/11	GN	34.4	6.5	1151	1209	4211.27	7034.33	39.9	17.4	29.6	43375	971	F
6/23/11	GN	34.4	6.5	1151	1209	4211.27	7034.33	39.9	17.4	29.6	43376	889	F
6/23/11	GN	34.4	6.5	1151	1209	4211.27	7034.33	39.9	17.4	29.6	43377	861	F
6/23/11	GN	34.4	6.5	1151	1209	4211.27	7034.33	39.9	17.4	29.6	43378	913	F
6/23/11	GN	34.4	6.5	1151	1209	4211.27	7034.33	39.9	17.4	29.6	43379	860	F
6/23/11	GN	34.4	6.5	1151	1209	4211.27	7034.33	39.9	17.4	29.6	43380	894	F
6/23/11	GN	34.4	6.5	1151	1209	4211.27	7034.33	39.9	17.4	29.6	47538	896	F
6/23/11	GN	34.4	6.5	1151	1209	4211.27	7034.33	39.9	17.4	29.6	43381	914	F
6/23/11	GN	34.4	6.5	1151	1209	4211.27	7034.33	39.9	17.4	29.6	43382	965	F
6/23/11	GN	34.4	6.5	1151	1209	4211.27	7034.33	39.9	17.4	29.6	43383	856	F
6/23/11	GN	34.4	6.5	1151	1209	4211.27	7034.33	39.9	17.4	29.6	43384	911	F
6/23/11	GN	34.4	6.5	1151	1209	4211.27	7034.33	39.9	17.4	29.6	43385	888	F
6/23/11	GN	34.4	6.5	1151	1209	4211.27	7034.33	39.9	17.4	29.6	43386	872	F
6/23/11	GN	34.4	6.5	1151	1209	4211.27	7034.33	39.9	17.4	29.6	43387	908	F
6/23/11	GN	34.4	6.5	1151	1209	4211.27	7034.33	39.9	17.4	29.6	43388	945	F
6/23/11	GN	34.4	6.5	1151	1209	4211.27	7034.33	39.9	17.4	29.6	43389	864	F
6/23/11	GN	34.4	6.5	1151	1209	4211.27	7034.33	39.9	17.4	29.6	43390	868	F
6/23/11	GN	34.4	6.5	1151	1209	4211.27	7034.33	39.9	17.4	29.6	43391	920	F
6/23/11	GN	34.4	6.5	1151	1209	4211.27	7034.33	39.9	17.4	29.6	43392	990	F
6/23/11	GN	34.4	6.5	1151	1209	4211.27	7034.33	39.9	17.4	29.6	43393	900	F
6/23/11	GN	34.4	6.5	1151	1209	4211.27	7034.33	39.9	17.4	29.6	43394	846	F
6/23/11	GN	34.4	6.5	1151	1209	4211.27	7034.33	39.9	17.4	29.6	43395	856	F
6/23/11	GN	34.4	6.5	1151	1209	4211.27	7034.33	39.9	17.4	29.6	43396	905	F
6/23/11	GN	34.4	6.5	1151	1209	4211.27	7034.33	39.9	17.4	29.6	43397	924	F
6/23/11	GN	34.4	6.5	1151	1209	4211.27	7034.33	39.9	17.4	29.6	43398	911	F
6/23/11	GN	34.4	6.5	1151	1209	4211.27	7034.33	39.9	17.4	29.6	43399	896	F
6/23/11	GN	34.4	6.5	1151	1209	4211.27	7034.33	39.9	17.4	29.6	43400	791	F

Appendix B (continued)

Date	Gear	Gear Dp (m)	Gear T (°C)	Time set	Time pulled	Latitude	Longitude	Dp (m)	SST (°C)	SSS	Tag #	TL (mm)	Sex
6/23/11	GN	34.4	6.5	1151	1209	4211.27	7034.33	39.9	17.4	29.6	47539	890	F
6/23/11	GN	34.4	6.5	1151	1209	4211.27	7034.33	39.9	17.4	29.6	43401	937	F
6/23/11	GN	34.4	6.5	1151	1209	4211.27	7034.33	39.9	17.4	29.6	43402	926	F
6/23/11	GN	34.4	6.5	1151	1209	4211.27	7034.33	39.9	17.4	29.6	43403	881	F
6/23/11	GN	34.4	6.5	1151	1209	4211.27	7034.33	39.9	17.4	29.6	43404	882	F
6/23/11	GN	34.4	6.5	1151	1209	4211.27	7034.33	39.9	17.4	29.6	43405	826	F
6/23/11	GN	34.4	6.5	1151	1209	4211.27	7034.33	39.9	17.4	29.6	43406	895	F
6/23/11	GN	34.4	6.5	1151	1209	4211.27	7034.33	39.9	17.4	29.6	43407	899	F
6/23/11	GN	34.4	6.5	1151	1209	4211.27	7034.33	39.9	17.4	29.6	43408	857	F
6/23/11	GN	34.4	6.5	1151	1209	4211.27	7034.33	39.9	17.4	29.6	43409	909	F
6/23/11	GN	34.4	6.5	1151	1209	4211.27	7034.33	39.9	17.4	29.6	43410	876	F
6/23/11	GN	34.4	6.5	1151	1209	4211.27	7034.33	39.9	17.4	29.6	47540	840	F
6/23/11	GN	34.4	6.5	1151	1209	4211.27	7034.33	39.9	17.4	29.6	43411	918	F
6/23/11	GN	34.4	6.5	1151	1209	4211.27	7034.33	39.9	17.4	29.6	43412	896	F
6/23/11	GN	34.4	6.5	1151	1209	4211.27	7034.33	39.9	17.4	29.6	43413	856	F
6/23/11	GN	34.4	6.5	1151	1209	4211.27	7034.33	39.9	17.4	29.6	43414	870	F
6/23/11	GN	34.4	6.5	1151	1209	4211.27	7034.33	39.9	17.4	29.6	43415	940	F
6/23/11	GN	34.4	6.5	1151	1209	4211.27	7034.33	39.9	17.4	29.6	43416	890	F
6/23/11	GN	34.4	6.5	1151	1209	4211.27	7034.33	39.9	17.4	29.6	43417	801	F
6/23/11	GN	34.4	6.5	1151	1209	4211.27	7034.33	39.9	17.4	29.6	43418	872	F
6/23/11	GN	34.4	6.5	1151	1209	4211.27	7034.33	39.9	17.4	29.6	43419	851	F
6/23/11	GN	34.4	6.5	1151	1209	4211.27	7034.33	39.9	17.4	29.6	43420	874	F
6/23/11	GN	34.4	6.5	1151	1209	4211.27	7034.33	39.9	17.4	29.6	47541	863	F
6/23/11	GN	34.4	6.5	1151	1209	4211.27	7034.33	39.9	17.4	29.6	43421	841	F
6/23/11	GN	34.4	6.5	1151	1209	4211.27	7034.33	39.9	17.4	29.6	43422	922	F
6/23/11	GN	34.4	6.5	1151	1209	4211.27	7034.33	39.9	17.4	29.6	43423	865	F
6/23/11	GN	39.8	6.7	1307	1320	4211.13	7033.88	41.8	16.9	29.6	43424	885	F
6/23/11	GN	39.8	6.7	1307	1320	4211.13	7033.88	41.8	16.9	29.6	43425	965	F
6/23/11	GN	39.8	6.7	1307	1320	4211.13	7033.88	41.8	16.9	29.6	43426	895	F
6/23/11	GN	39.8	6.7	1307	1320	4211.13	7033.88	41.8	16.9	29.6	43427	978	F
6/23/11	GN	39.8	6.7	1307	1320	4211.13	7033.88	41.8	16.9	29.6	43428	920	F
6/23/11	GN	39.8	6.7	1307	1320	4211.13	7033.88	41.8	16.9	29.6	43429	951	F
6/23/11	GN	39.8	6.7	1307	1320	4211.13	7033.88	41.8	16.9	29.6	43430	892	F
6/23/11	GN	34.4	6.5	1151	1209	4211.27	7034.33	41.8	17.4	29.6	47542	798	F
6/23/11	GN	39.8	6.7	1307	1320	4211.13	7033.88	41.8	16.9	29.6	47543	895	F
6/23/11	GN	39.8	6.7	1307	1320	4211.13	7033.88	41.8	16.9	29.6	43431	912	F
6/23/11	GN	39.8	6.7	1307	1320	4211.13	7033.88	41.8	16.9	29.6	43432	905	F
6/23/11	GN	39.8	6.7	1307	1320	4211.13	7033.88	41.8	16.9	29.6	43433	821	F
6/23/11	GN	39.8	6.7	1307	1320	4211.13	7033.88	41.8	16.9	29.6	43434	871	F
6/23/11	GN	39.8	6.7	1307	1320	4211.13	7033.88	41.8	16.9	29.6	43435	824	F
6/23/11	GN	39.8	6.7	1307	1320	4211.13	7033.88	41.8	16.9	29.6	43436	862	F

Appendix B (continued)

Date	Gear	Gear Dp (m)	Gear T (°C)	Time set	Time pulled	Latitude	Longitude	Dp (m)	SST (°C)	SSS	Tag #	TL (mm)	Sex
6/23/11	GN	39.8	6.7	1307	1320	4211.13	7033.88	41.8	16.9	29.6	43437	862	F
6/23/11	GN	39.8	6.7	1307	1320	4211.13	7033.88	41.8	16.9	29.6	43438	838	F
6/23/11	GN	39.8	6.7	1307	1320	4211.13	7033.88	41.8	16.9	29.6	43439	860	F
6/23/11	GN	39.8	6.7	1307	1320	4211.13	7033.88	41.8	16.9	29.6	43440	913	F
6/23/11	GN	39.8	6.7	1307	1320	4211.13	7033.88	41.8	16.9	29.6	43441	903	F
6/23/11	GN	39.8	6.7	1307	1320	4211.13	7033.88	41.8	16.9	29.6	43442	878	F
6/23/11	GN	39.8	6.7	1307	1320	4211.13	7033.88	41.8	16.9	29.6	43443	885	F
6/23/11	GN	40.7	6.5	1414	1434	4210.88	7032.88	44.2	16.9	29.6	43444	844	F
6/23/11	GN	40.7	6.5	1414	1434	4210.88	7032.88	44.2	16.9	29.6	43445	930	F
6/23/11	GN	40.7	6.5	1414	1434	4210.88	7032.88	44.2	16.9	29.6	43446	870	F
6/23/11	GN	40.7	6.5	1414	1434	4210.88	7032.88	44.2	16.9	29.6	43447	968	F
6/23/11	GN	40.7	6.5	1414	1434	4210.88	7032.88	44.2	16.9	29.6	43448	848	F
6/23/11	GN	40.7	6.5	1414	1434	4210.88	7032.88	44.2	16.9	29.6	43449	921	F
6/23/11	GN	40.7	6.5	1414	1434	4210.88	7032.88	44.2	16.9	29.6	43450	835	F
6/23/11	GN	NA	NA	NA	NA	NA	NA	NA	NA	NA	47545	913	F
6/23/11	GN	NA	NA	NA	NA	NA	NA	NA	NA	NA	43451	872	F
6/23/11	GN	NA	NA	NA	NA	NA	NA	NA	NA	NA	43452	846	F
6/23/11	GN	NA	NA	NA	NA	NA	NA	NA	NA	NA	43453	873	F
6/23/11	GN	NA	NA	NA	NA	NA	NA	NA	NA	NA	43454	804	F
6/23/11	GN	NA	NA	NA	NA	NA	NA	NA	NA	NA	43455	840	F
6/23/11	GN	NA	NA	NA	NA	NA	NA	NA	NA	NA	43456	881	F
6/23/11	GN	NA	NA	NA	NA	NA	NA	NA	NA	NA	43457	812	F
6/23/11	GN	NA	NA	NA	NA	NA	NA	NA	NA	NA	43458	895	F
6/23/11	GN	NA	NA	NA	NA	NA	NA	NA	NA	NA	43459	874	F
6/23/11	GN	NA	NA	NA	NA	NA	NA	NA	NA	NA	43460	871	F
6/23/11	GN	NA	NA	NA	NA	NA	NA	NA	NA	NA	47546	810	F
6/23/11	GN	NA	NA	NA	NA	NA	NA	NA	NA	NA	43461	890	F
6/23/11	GN	NA	NA	NA	NA	NA	NA	NA	NA	NA	43462	879	F
6/23/11	GN	NA	NA	NA	NA	NA	NA	NA	NA	NA	43463	905	F
6/23/11	GN	NA	NA	NA	NA	NA	NA	NA	NA	NA	43464	876	F
6/23/11	GN	NA	NA	NA	NA	NA	NA	NA	NA	NA	43465	866	F
6/23/11	GN	NA	NA	NA	NA	NA	NA	NA	NA	NA	43466	897	F
6/23/11	GN	NA	NA	NA	NA	NA	NA	NA	NA	NA	43467	830	F
6/23/11	GN	38.9	6.8	650	720	4211.879	7073.475	34.7	16.9	29.4	47515	880	F
6/23/11	GN	38.9	6.8	650	720	4211.879	7073.475	34.7	16.9	29.4	47514	894	F
6/23/11	GN	38.9	6.8	650	720	4211.879	7073.475	34.7	16.9	29.4	47520	940	F
6/23/11	GN	38.9	6.8	650	720	4211.879	7073.475	34.7	16.9	29.4	47522	881	F
6/23/11	GN	38.9	6.8	650	720	4211.879	7073.475	34.7	16.9	29.4	47523	855	F
6/23/11	GN	38.9	6.8	650	720	4211.879	7073.475	34.7	16.9	29.4	47524	NA	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43468	891	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43469	899	F

Appendix B (continued)

Date	Gear	Gear Dp (m)	Gear T (°C)	Time set	Time pulled	Latitude	Longitude	Dp (m)	SST (°C)	SSS	Tag #	TL (mm)	Sex
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43470	931	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	47547	832	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43471	799	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43472	842	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43473	876	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43474	851	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43475	995	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43476	852	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43477	841	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43478	876	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43479	885	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43480	852	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	47458	860	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43481	881	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43482	913	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43483	834	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43484	860	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43485	850	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43486	813	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43487	770	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43488	810	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43489	851	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43490	871	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	47549	822	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43491	920	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43492	855	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43493	949	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43494	851	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43495	915	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43496	815	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43497	775	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43498	823	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43499	845	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43500	879	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	47550	830	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43501	801	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43502	915	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43503	875	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43504	815	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43505	910	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43506	835	F

Appendix B (continued)

Date	Gear	Gear Dp (m)	Gear T (°C)	Time set	Time pulled	Latitude	Longitude	Dp (m)	SST (°C)	SSS	Tag #	TL (mm)	Sex
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43507	790	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43508	953	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43509	821	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43510	842	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	47551	842	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43511	845	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43512	885	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43513	655	M
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43514	908	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43515	825	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43516	879	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43517	820	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43518	875	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43519	777	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43520	848	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	47552	861	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43521	821	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43522	785	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43523	860	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43524	883	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43525	859	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43526	820	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43527	725	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43528	865	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43529	856	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43530	813	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	47553	873	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43531	893	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43532	805	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43533	851	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43534	925	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43535	731	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43536	815	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43537	785	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43538	880	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43539	894	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43540	816	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	47554	820	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43541	930	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43542	875	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43543	875	F

Appendix B (continued)

Date	Gear	Gear Dp (m)	Gear T (°C)	Time set	Time pulled	Latitude	Longitude	Dp (m)	SST (°C)	SSS	Tag #	TL (mm)	Sex
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43544	900	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43545	903	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43546	890	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43547	810	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43548	780	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43549	850	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43550	810	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	47555	860	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43551	860	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43552	847	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43553	933	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43554	881	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43555	739	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43556	845	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43557	890	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43558	892	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43559	895	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43560	850	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	47556	845	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43561	850	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43562	815	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43563	856	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43564	963	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43565	815	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43566	873	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43567	759	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43568	837	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43569	879	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43570	850	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	47557	931	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43571	885	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43572	730	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43573	858	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43574	720	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43575	886	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43576	845	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43577	855	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43578	968	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43579	845	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43580	823	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	47558	855	F

Appendix B (continued)

Date	Gear	Gear Dp (m)	Gear T (°C)	Time set	Time pulled	Latitude	Longitude	Dp (m)	SST (°C)	SSS	Tag #	TL (mm)	Sex
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43581	796	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43582	902	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43583	863	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43584	800	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43585	841	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43586	834	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43587	874	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43588	765	M
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43589	810	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43590	819	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	47559	849	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43591	821	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43592	888	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43593	861	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43594	836	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43595	903	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43596	760	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43597	935	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43598	930	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43599	903	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43600	869	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	47560	869	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43601	812	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43602	810	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43603	834	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43604	843	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43605	850	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43606	833	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43607	925	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43608	803	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43609	910	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43610	870	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	47561	993	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43611	868	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43612	927	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43613	839	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43614	908	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43615	839	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43616	717	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43617	839	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43618	838	F

Appendix B (continued)

Date	Gear	Gear Dp (m)	Gear T (°C)	Time set	Time pulled	Latitude	Longitude	Dp (m)	SST (°C)	SSS	Tag #	TL (mm)	Sex
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43619	890	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43620	885	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	47562	718	M
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43621	863	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43622	841	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43623	889	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43624	900	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43625	860	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43626	890	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43627	740	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43628	845	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43629	881	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43630	855	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	47563	910	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43631	830	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43632	820	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43633	850	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43634	884	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43635	794	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43636	875	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43637	879	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43638	881	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43639	821	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43640	883	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	47564	910	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43641	702	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43642	904	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43643	724	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43644	825	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43645	873	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43646	885	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43647	877	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43648	876	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43649	790	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43650	879	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	47565	879	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43651	838	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43652	861	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43653	858	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43654	910	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43655	872	F

Appendix B (continued)

Date	Gear	Gear Dp (m)	Gear T (°C)	Time set	Time pulled	Latitude	Longitude	Dp (m)	SST (°C)	SSS	Tag #	TL (mm)	Sex
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43656	872	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43657	891	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43658	692	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43659	841	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43660	880	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	47566	815	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43661	825	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43662	844	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43663	896	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43664	870	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43665	846	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43666	915	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43667	863	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43668	895	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43669	913	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43670	892	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	47567	856	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43671	875	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43672	816	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43673	900	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43674	851	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43675	869	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43676	933	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43677	879	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43678	NA	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43679	878	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43680	690	M
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	47568	938	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43681	759	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43682	811	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43683	920	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43684	811	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43685	855	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43686	900	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43687	890	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43688	840	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43689	891	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43690	937	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	47569	844	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43691	815	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43692	802	F

Appendix B (continued)

Date	Gear	Gear Dp (m)	Gear T (°C)	Time set	Time pulled	Latitude	Longitude	Dp (m)	SST (°C)	SSS	Tag #	TL (mm)	Sex
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43693	820	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43694	920	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43695	870	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43696	890	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43697	839	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43698	815	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43699	771	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43700	848	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	47510	801	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43701	860	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43702	861	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43703	935	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43704	910	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43705	871	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43706	831	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43707	850	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43708	815	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43709	810	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43710	870	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	47571	901	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43711	860	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43712	778	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43713	829	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43714	992	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43715	885	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43716	860	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43717	835	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43718	839	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43719	855	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43720	851	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	47572	855	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43721	819	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43722	851	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43723	820	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43724	876	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43725	850	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43726	895	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43727	821	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43728	836	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43729	891	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43730	876	F

Appendix B (continued)

Date	Gear	Gear Dp (m)	Gear T (°C)	Time set	Time pulled	Latitude	Longitude	Dp (m)	SST (°C)	SSS	Tag #	TL (mm)	Sex
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	47573	835	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43731	897	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43732	890	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43733	821	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43734	850	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43735	915	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43736	850	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43737	826	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43738	802	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43739	932	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43740	854	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	47574	750	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43741	865	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43742	NA	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43743	915	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43744	889	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43745	905	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43746	669	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43747	676	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43748	878	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43749	824	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43750	907	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	47575	900	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43751	815	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43752	869	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43753	879	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43754	855	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43755	855	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43756	892	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43757	874	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43758	921	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43759	901	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43760	792	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	47576	866	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43761	886	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43762	841	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43763	885	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43764	844	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43765	844	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43766	812	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43767	904	F

Appendix B (continued)

Date	Gear	Gear Dp (m)	Gear T (°C)	Time set	Time pulled	Latitude	Longitude	Dp (m)	SST (°C)	SSS	Tag #	TL (mm)	Sex
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43768	890	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43769	871	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43770	636	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	47577	860	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43771	962	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43772	894	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43773	854	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43774	846	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43775	874	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43776	822	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43777	905	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43778	880	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43779	953	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43780	889	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	47578	879	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43781	859	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43782	837	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43783	854	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43784	871	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43785	830	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43786	905	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43787	835	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43788	871	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43789	920	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43790	872	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	47579	770	M
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43791	910	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43792	835	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43793	832	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43794	890	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43795	822	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43796	861	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43797	860	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43798	810	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43799	805	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43800	890	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	47580	810	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43801	820	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43802	852	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43803	909	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43804	810	F

Appendix B (continued)

Date	Gear	Gear Dp (m)	Gear T (°C)	Time set	Time pulled	Latitude	Longitude	Dp (m)	SST (°C)	SSS	Tag #	TL (mm)	Sex
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43805	959	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43806	915	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43807	897	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43808	960	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43809	900	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43810	941	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	47581	889	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43811	835	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43812	802	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43813	847	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43815	882	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43816	890	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43817	923	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43818	814	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43819	891	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43820	921	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	47582	887	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43821	867	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43822	869	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43823	884	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43824	795	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43825	850	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43826	755	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43827	805	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43828	923	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43829	942	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43830	865	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	47583	809	M
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43831	878	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43832	952	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43833	805	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43834	861	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43835	876	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43836	778	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43837	871	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43838	889	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43839	831	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43840	830	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	47584	800	M
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43841	808	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43842	765	F

Appendix B (continued)

Date	Gear	Gear Dp (m)	Gear T (°C)	Time set	Time pulled	Latitude	Longitude	Dp (m)	SST (°C)	SSS	Tag #	TL (mm)	Sex
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43843	885	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43844	810	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43845	910	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43846	850	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43847	861	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43848	970	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43849	805	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43850	856	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	47585	869	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43851	808	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43852	908	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43853	920	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43854	770	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43855	803	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43856	916	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43857	876	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43858	866	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43859	851	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43860	841	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	47586	765	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43861	730	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43862	845	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43863	965	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43864	860	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43865	805	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43866	920	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43867	857	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43868	889	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43869	874	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43870	858	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	47587	842	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43871	814	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43872	824	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43873	867	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43874	864	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43875	835	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43876	845	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43877	841	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43878	738	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43879	895	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43880	850	F

Appendix B (continued)

Date	Gear	Gear Dp (m)	Gear T (°C)	Time set	Time pulled	Latitude	Longitude	Dp (m)	SST (°C)	SSS	Tag #	TL (mm)	Sex
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	47588	866	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43881	820	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43882	864	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43883	858	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43884	862	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43885	710	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43886	865	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43887	887	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43888	842	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43889	844	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43890	965	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	47589	700	M
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43891	887	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43892	922	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43893	924	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43894	841	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43895	866	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43896	895	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43897	910	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43898	842	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43899	903	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43900	850	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	47590	928	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43901	881	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43902	865	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43903	871	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43904	850	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43905	837	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43906	852	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43907	810	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43908	902	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43909	880	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43910	906	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	47591	850	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43911	825	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43912	860	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43913	875	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43914	883	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43915	830	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43916	850	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43917	846	F

Appendix B (continued)

Date	Gear	Gear Dp (m)	Gear T (°C)	Time set	Time pulled	Latitude	Longitude	Dp (m)	SST (°C)	SSS	Tag #	TL (mm)	Sex
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43918	906	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43919	810	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43920	795	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	47592	833	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43921	833	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43922	814	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43923	737	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43924	858	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43925	861	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43926	880	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43927	903	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43928	856	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43929	859	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43930	865	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	47593	810	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43931	862	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43932	863	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43933	878	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43934	921	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43935	913	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43936	815	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43937	886	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43938	760	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43939	815	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43940	826	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	47594	878	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43941	830	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43942	861	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43943	832	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43944	956	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43945	870	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43946	866	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43947	884	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43948	859	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43949	840	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43950	854	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	47595	861	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43951	799	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43952	831	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43953	866	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43954	848	F

Appendix B (continued)

Date	Gear	Gear Dp (m)	Gear T (°C)	Time set	Time pulled	Latitude	Longitude	Dp (m)	SST (°C)	SSS	Tag #	TL (mm)	Sex
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43955	898	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43956	805	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43957	900	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43958	871	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43959	846	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43960	838	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	47596	836	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43961	845	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43962	922	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43963	882	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43964	860	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43965	899	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43966	893	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43967	899	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43968	879	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43969	843	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43970	856	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	47597	825	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43971	890	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43972	910	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43973	889	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43974	977	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43975	975	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43976	905	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43977	840	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43978	897	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43979	855	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43980	775	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	47598	838	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43981	932	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43982	876	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43983	898	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43984	888	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43985	846	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43986	792	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43987	934	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43988	813	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43989	852	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43990	819	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	47599	941	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43991	879	F

Appendix B (continued)

Date	Gear	Gear Dp (m)	Gear T (°C)	Time set	Time pulled	Latitude	Longitude	Dp (m)	SST (°C)	SSS	Tag #	TL (mm)	Sex
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43992	823	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43993	967	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43994	859	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43995	885	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43996	911	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43997	909	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43998	870	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	43999	836	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	44000	816	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	47600	825	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	44001	827	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	44002	900	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	47601	857	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	47602	880	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	47603	875	F
6/24/11	LN	33.2	6.6	1026	1043	4141.212	6948.437	38.4	14.5	29.9	47604	806	F
6/27/11	GN	71.8	5.9	1507	1542	4156.74	6944.86	77.6	18.5	30.1	44003	835	F
6/27/11	GN	71.8	5.9	1507	1542	4156.74	6944.86	77.6	18.5	30.1	44004	928	F
6/27/11	GN	71.8	5.9	1507	1542	4156.74	6944.86	77.6	18.5	30.1	44005	847	F
6/27/11	GN	71.8	5.9	1507	1542	4156.74	6944.86	77.6	18.5	30.1	44006	855	F
6/27/11	GN	71.8	5.9	1507	1542	4156.74	6944.86	77.6	18.5	30.1	44007	874	F
6/27/11	GN	71.8	5.9	1507	1542	4156.74	6944.86	77.6	18.5	30.1	44008	894	F
6/27/11	GN	71.8	5.9	1507	1542	4156.74	6944.86	77.6	18.5	30.1	44009	887	F
6/27/11	GN	71.8	5.9	1507	1542	4156.74	6944.86	77.6	18.5	30.1	44010	883	F
6/27/11	GN	71.8	5.9	1507	1542	4156.74	6944.86	77.6	18.5	30.1	47605	868	F
6/27/11	GN	71.8	5.9	1507	1542	4156.74	6944.86	77.6	18.5	30.1	44011	880	F
6/27/11	GN	71.8	5.9	1507	1542	4156.74	6944.86	77.6	18.5	30.1	44012	785	F
6/27/11	GN	71.8	5.9	1507	1542	4156.74	6944.86	77.6	18.5	30.1	44013	858	F
6/27/11	GN	71.8	5.9	1507	1542	4156.74	6944.86	77.6	18.5	30.1	44014	866	F
6/27/11	GN	71.8	5.9	1507	1542	4156.74	6944.86	77.6	18.5	30.1	44015	837	F
6/27/11	GN	71.8	5.9	1507	1542	4156.74	6944.86	77.6	18.5	30.1	44016	810	F
6/27/11	GN	71.8	5.9	1507	1542	4156.74	6944.86	77.6	18.5	30.1	44017	871	F
6/27/11	GN	71.8	5.9	1507	1542	4156.74	6944.86	77.6	18.5	30.1	44018	850	F
6/27/11	GN	71.8	5.9	1507	1542	4156.74	6944.86	77.6	18.5	30.1	44019	865	F
6/27/11	GN	71.8	5.9	1507	1542	4156.74	6944.86	77.6	18.5	30.1	44020	925	F
6/27/11	GN	71.8	5.9	1507	1542	4156.74	6944.86	77.6	18.5	30.1	47606	884	F
6/27/11	GN	71.8	5.9	1507	1542	4156.74	6944.86	77.6	18.5	30.1	44021	850	F
6/27/11	GN	71.8	5.9	1507	1542	4156.74	6944.86	77.6	18.5	30.1	44022	850	F
6/27/11	GN	71.8	5.9	1507	1542	4156.74	6944.86	77.6	18.5	30.1	44023	845	F
6/27/11	GN	71.8	5.9	1507	1542	4156.74	6944.86	77.6	18.5	30.1	44024	930	F
6/27/11	GN	71.8	5.9	1507	1542	4156.74	6944.86	77.6	18.5	30.1	44025	800	F

Appendix B (continued)

Date	Gear	Gear Dp (m)	Gear T (°C)	Time set	Time pulled	Latitude	Longitude	Dp (m)	SST (°C)	SSS	Tag #	TL (mm)	Sex
6/27/11	GN	71.8	5.9	1507	1542	4156.74	6944.86	77.6	18.5	30.1	44026	872	F
6/27/11	GN	71.8	5.9	1507	1542	4156.74	6944.86	77.6	18.5	30.1	44027	870	F
6/27/11	GN	71.8	5.9	1507	1542	4156.74	6944.86	77.6	18.5	30.1	44028	921	F
6/27/11	GN	71.8	5.9	1507	1542	4156.74	6944.86	77.6	18.5	30.1	44029	893	F
6/27/11	GN	71.8	5.9	1507	1542	4156.74	6944.86	77.6	18.5	30.1	44030	848	F
6/27/11	GN	71.8	5.9	1507	1542	4156.74	6944.86	77.6	18.5	30.1	47607	881	F
6/27/11	GN	71.8	5.9	1507	1542	4156.74	6944.86	77.6	18.5	30.1	44031	971	F
6/27/11	GN	71.8	5.9	1507	1542	4156.74	6944.86	77.6	18.5	30.1	44032	865	F
6/27/11	GN	71.8	5.9	1507	1542	4156.74	6944.86	77.6	18.5	30.1	44033	870	F
6/27/11	GN	71.8	5.9	1507	1542	4156.74	6944.86	77.6	18.5	30.1	44034	860	F
6/27/11	GN	71.8	5.9	1507	1542	4156.74	6944.86	77.6	18.5	30.1	44035	785	F
6/27/11	GN	71.8	5.9	1507	1542	4156.74	6944.86	77.6	18.5	30.1	44036	938	F
6/27/11	GN	71.8	5.9	1507	1542	4156.74	6944.86	77.6	18.5	30.1	44037	882	F
6/27/11	GN	71.8	5.9	1507	1542	4156.74	6944.86	77.6	18.5	30.1	44038	855	F
6/27/11	GN	71.8	5.9	1507	1542	4156.74	6944.86	77.6	18.5	30.1	44039	864	F
6/27/11	GN	71.8	5.9	1507	1542	4156.74	6944.86	77.6	18.5	30.1	44041	933	F
6/27/11	GN	67.9	5.9	1522	1645	4157.14	6950.93	70	19.2	30	44042	901	F
6/27/11	GN	67.9	5.9	1522	1645	4157.14	6950.93	70	19.2	30	44043	845	F
6/27/11	GN	67.9	5.9	1522	1645	4157.14	6950.93	70	19.2	30	44044	880	F
6/27/11	GN	67.9	5.9	1522	1645	4157.14	6950.93	70	19.2	30	44045	920	F
6/27/11	GN	67.9	5.9	1522	1645	4157.14	6950.93	70	19.2	30	44046	920	F
6/27/11	GN	67.9	5.9	1522	1645	4157.14	6950.93	70	19.2	30	44047	922	F
6/27/11	GN	67.9	5.9	1522	1645	4157.14	6950.93	70	19.2	30	44048	860	F
6/27/11	GN	67.9	5.9	1522	1645	4157.14	6950.93	70	19.2	30	44049	865	F
6/27/11	GN	67.9	5.9	1522	1645	4157.14	6950.93	70	19.2	30	44051	902	F
6/27/11	GN	67.9	5.9	1522	1645	4157.14	6950.93	70	19.2	30	44052	870	F
6/27/11	GN	67.9	5.9	1522	1645	4157.14	6950.93	70	19.2	30	44053	880	F
6/27/11	GN	67.9	5.9	1522	1645	4157.14	6950.93	70	19.2	30	44054	920	F
6/27/11	GN	67.9	5.9	1522	1645	4157.14	6950.93	70	19.2	30	44055	873	F
6/27/11	GN	67.9	5.9	1522	1645	4157.14	6950.93	70	19.2	30	44056	868	F
6/27/11	GN	67.9	5.9	1522	1645	4157.14	6950.93	70	19.2	30	44057	955	F
6/27/11	GN	67.9	5.9	1522	1645	4157.14	6950.93	70	19.2	30	44058	879	F
6/27/11	GN	67.9	5.9	1522	1645	4157.14	6950.93	70	19.2	30	44059	833	F
6/27/11	GN	67.9	5.9	1522	1645	4157.14	6950.93	70	19.2	30	44060	887	F
6/27/11	GN	67.9	5.9	1522	1645	4157.14	6950.93	70	19.2	30	44061	871	F
6/27/11	GN	67.9	5.9	1522	1645	4157.14	6950.93	70	19.2	30	44062	880	F
6/27/11	GN	67.9	5.9	1522	1645	4157.14	6950.93	70	19.2	30	44063	852	F
6/27/11	GN	67.9	5.9	1522	1645	4157.14	6950.93	70	19.2	30	44064	860	F
6/27/11	GN	67.9	5.9	1522	1645	4157.14	6950.93	70	19.2	30	44065	873	F
6/27/11	GN	67.9	5.9	1522	1645	4157.14	6950.93	70	19.2	30	44066	850	F
6/27/11	GN	67.9	5.9	1522	1645	4157.14	6950.93	70	19.2	30	44067	879	F

Appendix B (continued)

Date	Gear	Gear Dp (m)	Gear T (°C)	Time set	Time pulled	Latitude	Longitude	Dp (m)	SST (°C)	SSS	Tag #	TL (mm)	Sex
6/27/11	GN	67.9	5.9	1522	1645	4157.14	6950.93	70	19.2	30	44068	892	F
6/27/11	GN	67.9	5.9	1522	1645	4157.14	6950.93	70	19.2	30	44069	890	F
6/27/11	GN	67.9	5.9	1522	1645	4157.14	6950.93	70	19.2	30	44070	890	F
6/27/11	GN	67.9	5.9	1522	1645	4157.14	6950.93	70	19.2	30	44071	866	F
6/27/11	GN	67.9	5.9	1522	1645	4157.14	6950.93	70	19.2	30	44072	887	F
6/27/11	GN	67.9	5.9	1522	1645	4157.14	6950.93	70	19.2	30	44073	882	F
6/27/11	GN	67.9	5.9	1522	1645	4157.14	6950.93	70	19.2	30	44075	848	F
6/27/11	GN	67.9	5.9	1522	1645	4157.14	6950.93	70	19.2	30	44076	875	F
6/27/11	GN	67.9	5.9	1522	1645	4157.14	6950.93	70	19.2	30	44077	900	F
6/27/11	GN	67.9	5.9	1522	1645	4157.14	6950.93	70	19.2	30	44078	853	F
6/27/11	GN	67.9	5.9	1522	1645	4157.14	6950.93	70	19.2	30	44079	864	F
6/27/11	GN	67.9	5.9	1522	1645	4157.14	6950.93	70	19.2	30	44080	824	F
6/27/11	GN	71.8	5.9	1507	1542	4156.74	6944.86	77.6	NA	30.1	47608	832	F
6/27/11	GN	67.9	5.9	1522	1645	4157.14	6950.93	70	19.2	30	44081	912	F
6/27/11	GN	67.9	5.9	1522	1645	4157.14	6950.93	70	19.2	30	44082	890	F
6/27/11	GN	67.9	5.9	1522	1645	4157.14	6950.93	70	19.2	30	44083	791	F
6/27/11	GN	67.9	5.9	1522	1645	4157.14	6950.93	70	19.2	30	44084	848	F
6/27/11	GN	67.9	5.9	1522	1645	4157.14	6950.93	70	19.2	30	44085	871	F
6/27/11	GN	67.9	5.9	1522	1645	4157.14	6950.93	70	19.2	30	44086	881	F
6/27/11	GN	67.9	5.9	1522	1645	4157.14	6950.93	70	19.2	30	44087	850	F
6/27/11	GN	67.9	5.9	1522	1645	4157.14	6950.93	70	19.2	30	44088	890	F
6/27/11	GN	67.9	5.9	1522	1645	4157.14	6950.93	70	19.2	30	44089	836	F
6/27/11	GN	67.9	5.9	1522	1645	4157.14	6950.93	70	19.2	30	44090	805	F
6/27/11	GN	67.9	5.9	1522	1645	4157.14	6950.93	70	19.2	30	47609	835	F
6/27/11	GN	67.9	5.9	1522	1645	4157.14	6950.93	70	19.2	30	44091	820	F
6/27/11	GN	67.9	5.9	1522	1645	4157.14	6950.93	70	19.2	30	44092	886	F
6/27/11	GN	67.9	5.9	1522	1645	4157.14	6950.93	70	19.2	30	44093	842	F
6/27/11	GN	67.9	5.9	1522	1645	4157.14	6950.93	70	19.2	30	44094	805	F
6/27/11	GN	67.9	5.9	1522	1645	4157.14	6950.93	70	19.2	30	44095	797	F
6/27/11	GN	67.9	5.9	1522	1645	4157.14	6950.93	70	19.2	30	44096	840	F
6/27/11	GN	67.9	5.9	1522	1645	4157.14	6950.93	70	19.2	30	44097	873	F
6/27/11	GN	67.9	5.9	1522	1645	4157.14	6950.93	70	19.2	30	44098	838	F
6/27/11	GN	67.9	5.9	1522	1645	4157.14	6950.93	70	19.2	30	44099	859	F
6/27/11	GN	71.8	5.9	1507	1542	4156.74	6944.86	77.6	NA	30.1	47610	922	F
6/27/11	GN	67.9	5.9	1522	1645	4157.14	6950.93	70	19.2	30	44101	974	F
6/27/11	GN	67.9	5.9	1522	1645	4157.14	6950.93	70	19.2	30	44102	853	F
6/27/11	GN	67.9	5.9	1522	1645	4157.14	6950.93	70	19.2	30	44103	837	F
6/27/11	GN	67.9	5.9	1522	1645	4157.14	6950.93	70	19.2	30	44104	845	F
6/27/11	GN	67.9	5.9	1522	1645	4157.14	6950.93	70	19.2	30	44105	838	F
6/27/11	GN	67.9	5.9	1522	1645	4157.14	6950.93	70	19.2	30	44106	840	F
6/27/11	GN	67.9	5.9	1522	1645	4157.14	6950.93	70	19.2	30	44107	845	F

Appendix B (continued)

Date	Gear	Gear Dp (m)	Gear T (°C)	Time set	Time pulled	Latitude	Longitude	Dp (m)	SST (°C)	SSS	Tag #	TL (mm)	Sex
6/27/11	GN	67.9	5.9	1522	1645	4157.14	6950.93	70	19.2	30	44108	920	F
6/27/11	GN	67.9	5.9	1522	1645	4157.14	6950.93	70	19.2	30	44109	871	F
6/27/11	GN	67.9	5.9	1522	1645	4157.14	6950.93	70	19.2	30	44110	891	F
6/27/11	GN	67.9	5.9	1522	1645	4157.14	6950.93	70	19.2	30	47611	901	F
6/27/11	GN	67.9	5.9	1522	1645	4157.14	6950.93	70	19.2	30	44111	777	F
6/27/11	GN	67.9	5.9	1522	1645	4157.14	6950.93	70	19.2	30	44112	913	F
6/27/11	GN	67.9	5.9	1522	1645	4157.14	6950.93	70	19.2	30	44113	964	F
6/27/11	GN	67.9	5.9	1522	1645	4157.14	6950.93	70	19.2	30	44114	911	F
6/27/11	GN	67.9	5.9	1522	1645	4157.14	6950.93	70	19.2	30	44115	855	F
6/27/11	GN	67.9	5.9	1522	1645	4157.14	6950.93	70	19.2	30	44116	873	F
6/27/11	GN	67.9	5.9	1522	1645	4157.14	6950.93	70	19.2	30	44117	930	F
6/27/11	GN	67.9	5.9	1522	1645	4157.14	6950.93	70	19.2	30	44118	825	F
6/27/11	GN	67.9	5.9	1522	1645	4157.14	6950.93	70	19.2	30	44119	890	F
6/27/11	GN	67.9	5.9	1522	1645	4157.14	6950.93	70	19.2	30	44120	886	F
6/27/11	GN	67.9	5.9	1522	1645	4157.14	6950.93	70	19.2	30	47612	785	F
6/27/11	GN	67.9	5.9	1522	1645	4157.14	6950.93	70	19.2	30	44121	788	F
6/27/11	GN	67.9	5.9	1522	1645	4157.14	6950.93	70	19.2	30	44122	738	F
6/27/11	GN	67.9	5.9	1522	1645	4157.14	6950.93	70	19.2	30	44123	840	F
6/27/11	GN	67.9	5.9	1522	1645	4157.14	6950.93	70	19.2	30	44124	810	F
6/27/11	GN	67.9	5.9	1522	1645	4157.14	6950.93	70	19.2	30	44125	866	F
6/27/11	GN	67.9	5.9	1522	1645	4157.14	6950.93	70	19.2	30	44126	825	F
6/27/11	GN	67.9	5.9	1522	1645	4157.14	6950.93	70	19.2	30	44127	817	F
6/27/11	GN	67.9	5.9	1522	1645	4157.14	6950.93	70	19.2	30	44128	860	F
6/27/11	GN	67.9	5.9	1522	1645	4157.14	6950.93	70	19.2	30	44129	923	F
6/27/11	GN	67.9	5.9	1522	1645	4157.14	6950.93	70	19.2	30	44130	943	F
6/27/11	GN	71.8	5.9	1507	1542	4156.74	6944.86	77.6	NA	30.1	47613	948	F
6/27/11	GN	67.9	5.9	1522	1645	4157.14	6950.93	70	19.2	30	44131	898	F
6/27/11	GN	67.9	5.9	1522	1645	4157.14	6950.93	70	19.2	30	44132	850	F
6/27/11	GN	67.9	5.9	1522	1645	4157.14	6950.93	70	19.2	30	44133	854	F
6/27/11	GN	67.9	5.9	1522	1645	4157.14	6950.93	70	19.2	30	44134	865	F
6/27/11	GN	67.9	5.9	1522	1645	4157.14	6950.93	70	19.2	30	44135	925	F
6/27/11	GN	67.9	5.9	1522	1645	4157.14	6950.93	70	19.2	30	44136	857	F
6/27/11	GN	67.9	5.9	1522	1645	4157.14	6950.93	70	19.2	30	44137	884	F
6/27/11	GN	67.9	5.9	1522	1645	4157.14	6950.93	70	19.2	30	44138	868	F
6/27/11	GN	67.9	5.9	1522	1645	4157.14	6950.93	70	19.2	30	44139	902	F
6/27/11	GN	67.9	5.9	1522	1645	4157.14	6950.93	70	19.2	30	44140	858	F
6/27/11	GN	67.9	5.9	1522	1645	4157.14	6950.93	70	19.2	30	47614	841	F
6/27/11	GN	67.9	5.9	1522	1645	4157.14	6950.93	70	19.2	30	44141	900	F
6/27/11	GN	67.9	5.9	1522	1645	4157.14	6950.93	70	19.2	30	44142	854	F
6/27/11	GN	67.9	5.9	1522	1645	4157.14	6950.93	70	19.2	30	44144	965	F
6/27/11	GN	67.9	5.9	1522	1645	4157.14	6950.93	70	19.2	30	44145	923	F

Appendix B (continued)

Date	Gear	Gear Dp (m)	Gear T (°C)	Time set	Time pulled	Latitude	Longitude	Dp (m)	SST (°C)	SSS	Tag #	TL (mm)	Sex
6/27/11	GN	67.9	5.9	1522	1645	4157.14	6950.93	70	19.2	30	44146	885	F
6/27/11	GN	67.9	5.9	1522	1645	4157.14	6950.93	70	19.2	30	44147	930	F
6/27/11	GN	67.9	5.9	1522	1645	4157.14	6950.93	70	19.2	30	44148	865	F
6/27/11	GN	67.9	5.9	1522	1645	4157.14	6950.93	70	19.2	30	44149	840	F
6/27/11	GN	67.9	5.9	1522	1645	4157.14	6950.93	70	19.2	30	44150	822	F
6/27/11	GN	67.9	5.9	1522	1645	4157.14	6950.93	70	19.2	30	47615	935	F
6/27/11	GN	77.7	5.8	1632	NA	4157	6949.92	78.8	19.4	30.5	44151	864	F
6/27/11	GN	77.7	5.8	1632	NA	4157	6949.92	78.8	19.4	30.5	44152	880	F
6/27/11	GN	77.7	5.8	1632	NA	4157	6949.92	78.8	19.4	30.5	44153	895	F
6/27/11	GN	77.7	5.8	1632	NA	4157	6949.92	78.8	19.4	30.5	44154	845	F
6/27/11	GN	77.7	5.8	1632	NA	4157	6949.92	78.8	19.4	30.5	44155	962	F
6/27/11	GN	77.7	5.8	1632	NA	4157	6949.92	78.8	19.4	30.5	44156	879	F
6/27/11	GN	77.7	5.8	1632	NA	4157	6949.92	78.8	19.4	30.5	44157	881	F
6/27/11	GN	77.7	5.8	1632	NA	4157	6949.92	78.8	19.4	30.5	44158	902	F
6/27/11	GN	77.7	5.8	1632	NA	4157	6949.92	78.8	19.4	30.5	44159	865	F
6/27/11	GN	77.7	5.8	1632	NA	4157	6949.92	78.8	19.4	30.5	44160	955	F
6/27/11	GN	71.8	5.9	1507	1542	4156.74	6944.86	77.6	NA	30.1	47616	884	F
6/27/11	GN	77.7	5.8	1632	NA	4157	6949.92	78.8	19.4	30.5	44161	861	F
6/27/11	GN	77.7	5.8	1632	NA	4157	6949.92	78.8	19.4	30.5	44162	858	F
6/27/11	GN	77.7	5.8	1632	NA	4157	6949.92	78.8	19.4	30.5	44163	895	F
6/27/11	GN	77.7	5.8	1632	NA	4157	6949.92	78.8	19.4	30.5	44164	890	F
6/27/11	GN	77.7	5.8	1632	NA	4157	6949.92	78.8	19.4	30.5	44165	893	F
6/27/11	GN	77.7	5.8	1632	NA	4157	6949.92	78.8	19.4	30.5	44166	1020	F
6/27/11	GN	77.7	5.8	1632	NA	4157	6949.92	78.8	19.4	30.5	44167	885	F
6/27/11	GN	77.7	5.8	1632	NA	4157	6949.92	78.8	19.4	30.5	44168	826	F
6/27/11	GN	77.7	5.8	1632	NA	4157	6949.92	78.8	19.4	30.5	44169	870	F
6/27/11	GN	77.7	5.8	1632	NA	4157	6949.92	78.8	19.4	30.5	44170	814	F
6/27/11	GN	77.7	5.8	1632	NA	4157	6949.92	78.8	19.4	30.5	44171	857	F
6/27/11	GN	77.7	5.8	1632	NA	4157	6949.92	78.8	19.4	30.5	44172	910	F
6/27/11	GN	77.7	5.8	1632	NA	4157	6949.92	78.8	19.4	30.5	44173	920	F
6/27/11	GN	77.7	5.8	1632	NA	4157	6949.92	78.8	19.4	30.5	44174	925	F
6/27/11	GN	77.7	5.8	1632	NA	4157	6949.92	78.8	19.4	30.5	44175	887	F
6/27/11	GN	77.7	5.8	1632	NA	4157	6949.92	78.8	19.4	30.5	44176	885	F
6/27/11	GN	77.7	5.8	1632	NA	4157	6949.92	78.8	19.4	30.5	44177	849	F
6/27/11	GN	77.7	5.8	1632	NA	4157	6949.92	78.8	19.4	30.5	44178	900	F
6/27/11	GN	77.7	5.8	1632	NA	4157	6949.92	78.8	19.4	30.5	44179	851	F
6/27/11	GN	77.7	5.8	1632	NA	4157	6949.92	78.8	19.4	30.5	44180	952	F
6/27/11	GN	71.8	5.9	1507	1542	4156.74	6944.86	77.6	NA	30.1	47618	925	F
6/27/11	GN	77.7	5.8	1632	NA	4157	6949.92	78.8	19.4	30.5	44181	833	F
6/27/11	GN	77.7	5.8	1632	NA	4157	6949.92	78.8	19.4	30.5	44182	853	F
6/27/11	GN	77.7	5.8	1632	NA	4157	6949.92	78.8	19.4	30.5	44183	896	F

Appendix B (continued)

Date	Gear	Gear Dp (m)	Gear T (°C)	Time set	Time pulled	Latitude	Longitude	Dp (m)	SST (°C)	SSS	Tag #	TL (mm)	Sex
6/27/11	GN	77.7	5.8	1632	NA	4157	6949.92	78.8	19.4	30.5	44184	858	F
6/27/11	GN	77.7	5.8	1632	NA	4157	6949.92	78.8	19.4	30.5	44185	854	F
6/27/11	GN	77.7	5.8	1632	NA	4157	6949.92	78.8	19.4	30.5	44186	858	F
6/27/11	GN	77.7	5.8	1632	NA	4157	6949.92	78.8	19.4	30.5	44187	919	F
6/27/11	GN	77.7	5.8	1632	NA	4157	6949.92	78.8	19.4	30.5	44188	938	F
6/27/11	GN	77.7	5.8	1632	NA	4157	6949.92	78.8	19.4	30.5	44189	807	F
6/27/11	GN	77.7	5.8	1632	NA	4157	6949.92	78.8	19.4	30.5	44190	543	F
6/27/11	GN	77.7	5.8	1632	NA	4157	6949.92	78.8	19.4	30.5	47619	872	F
6/27/11	GN	77.7	5.8	1632	NA	4157	6949.92	78.8	19.4	30.5	44191	890	F
6/27/11	GN	77.7	5.8	1632	NA	4157	6949.92	78.8	19.4	30.5	44192	841	F
6/27/11	GN	77.7	5.8	1632	NA	4157	6949.92	78.8	19.4	30.5	44193	833	F
6/27/11	GN	77.7	5.8	1632	NA	4157	6949.92	78.8	19.4	30.5	44194	866	F
6/27/11	GN	77.7	5.8	1632	NA	4157	6949.92	78.8	19.4	30.5	44195	805	F
6/27/11	GN	77.7	5.8	1632	NA	4157	6949.92	78.8	19.4	30.5	44196	912	F
6/27/11	GN	77.7	5.8	1632	NA	4157	6949.92	78.8	19.4	30.5	44197	855	F
6/27/11	GN	77.7	5.8	1632	NA	4157	6949.92	78.8	19.4	30.5	44198	886	F
6/27/11	GN	77.7	5.8	1632	NA	4157	6949.92	78.8	19.4	30.5	44199	918	F
6/27/11	GN	77.7	5.8	1632	NA	4157	6949.92	78.8	19.4	30.5	44200	841	F
6/27/11	GN	71.8	5.9	1507	1542	4156.74	6944.86	77.6	NA	30.1	47620	848	F
6/27/11	GN	77.7	5.8	1632	NA	4157	6949.92	78.8	19.4	30.5	44201	910	F
6/27/11	GN	77.7	5.8	1632	NA	4157	6949.92	78.8	19.4	30.5	44202	842	F
6/27/11	GN	77.7	5.8	1632	NA	4157	6949.92	78.8	19.4	30.5	44203	831	F
6/27/11	GN	77.7	5.8	1632	NA	4157	6949.92	78.8	19.4	30.5	44204	913	F
6/27/11	GN	77.7	5.8	1632	NA	4157	6949.92	78.8	19.4	30.5	44205	870	F
6/27/11	GN	77.7	5.8	1632	NA	4157	6949.92	78.8	19.4	30.5	44206	870	F
6/27/11	GN	77.7	5.8	1632	NA	4157	6949.92	78.8	19.4	30.5	44207	848	F
6/27/11	GN	77.7	5.8	1632	NA	4157	6949.92	78.8	19.4	30.5	44208	824	F
6/27/11	GN	77.7	5.8	1632	NA	4157	6949.92	78.8	19.4	30.5	44209	876	F
6/27/11	GN	77.7	5.8	1632	NA	4157	6949.92	78.8	19.4	30.5	44210	900	F
6/27/11	GN	77.7	5.8	1632	NA	4157	6949.92	78.8	19.4	30.5	47621	910	F
6/27/11	GN	77.7	5.8	1632	NA	4157	6949.92	78.8	19.4	30.5	44211	830	F
6/27/11	GN	77.7	5.8	1632	NA	4157	6949.92	78.8	19.4	30.5	44212	923	F
6/27/11	GN	77.7	5.8	1632	NA	4157	6949.92	78.8	19.4	30.5	44213	844	F
6/27/11	GN	77.7	5.8	1632	NA	4157	6949.92	78.8	19.4	30.5	44214	845	F
6/27/11	GN	77.7	5.8	1632	NA	4157	6949.92	78.8	19.4	30.5	44215	865	F
6/27/11	GN	77.7	5.8	1632	NA	4157	6949.92	78.8	19.4	30.5	44216	830	F
6/27/11	GN	77.7	5.8	1632	NA	4157	6949.92	78.8	19.4	30.5	44217	860	F
6/27/11	GN	77.7	5.8	1632	NA	4157	6949.92	78.8	19.4	30.5	44218	884	F
6/27/11	GN	77.7	5.8	1632	NA	4157	6949.92	78.8	19.4	30.5	44219	950	F
6/27/11	GN	77.7	5.8	1632	NA	4157	6949.92	78.8	19.4	30.5	44220	892	F
6/27/11	GN	77.7	5.8	1632	NA	4157	6949.92	78.8	19.4	30.5	47622	899	F

Appendix B (continued)

Date	Gear	Gear Dp (m)	Gear T (°C)	Time set	Time pulled	Latitude	Longitude	Dp (m)	SST (°C)	SSS	Tag #	TL (mm)	Sex
6/27/11	GN	77.7	5.8	1632	NA	4157	6949.92	78.8	19.4	30.5	44221	910	F
6/27/11	GN	77.7	5.8	1632	NA	4157	6949.92	78.8	19.4	30.5	44222	875	F
6/27/11	GN	77.7	5.8	1632	NA	4157	6949.92	78.8	19.4	30.5	44223	807	F
6/27/11	GN	77.7	5.8	1632	NA	4157	6949.92	78.8	19.4	30.5	44224	834	F
6/27/11	GN	77.7	5.8	1632	NA	4157	6949.92	78.8	19.4	30.5	44225	895	F
6/27/11	GN	77.7	5.8	1632	NA	4157	6949.92	78.8	19.4	30.5	44226	810	F
6/27/11	GN	77.7	5.8	1632	NA	4157	6949.92	78.8	19.4	30.5	44227	965	F
6/27/11	GN	77.7	5.8	1632	NA	4157	6949.92	78.8	19.4	30.5	44228	850	F
6/27/11	GN	77.7	5.8	1632	NA	4157	6949.92	78.8	19.4	30.5	44229	931	F
6/27/11	GN	77.7	5.8	1632	NA	4157	6949.92	78.8	19.4	30.5	44230	838	F
6/27/11	GN	71.8	5.9	1507	1542	4156.74	6944.86	77.6	NA	30.1	47623	810	F
6/27/11	GN	77.7	5.8	1632	NA	4157	6949.92	78.8	19.4	30.5	44231	876	F
6/27/11	GN	77.7	5.8	1632	NA	4157	6949.92	78.8	19.4	30.5	44232	901	F
6/27/11	GN	77.7	5.8	1632	NA	4157	6949.92	78.8	19.4	30.5	44233	832	F
6/27/11	GN	77.7	5.8	1632	NA	4157	6949.92	78.8	19.4	30.5	44234	935	F
6/27/11	GN	77.7	5.8	1632	NA	4157	6949.92	78.8	19.4	30.5	44235	839	F
6/27/11	GN	72	5.9	1751	1910	4157.36	6950.95	71.1	19.6	30.3	44236	863	F
6/27/11	GN	72	5.9	1751	1910	4157.36	6950.95	71.1	19.6	30.3	44237	868	F
6/27/11	GN	72	5.9	1751	1910	4157.36	6950.95	71.1	19.6	30.3	44238	911	F
6/27/11	GN	72	5.9	1751	1910	4157.36	6950.95	71.1	19.6	30.3	44239	887	F
6/27/11	GN	72	5.9	1751	1910	4157.36	6950.95	71.1	19.6	30.3	44240	932	F
6/27/11	GN	72	5.9	1751	1910	4157.36	6950.95	71.1	19.6	30.3	47624	861	F
6/27/11	GN	72	5.9	1751	1910	4157.36	6950.95	71.1	19.6	30.3	44241	870	F
6/27/11	GN	72	5.9	1751	1910	4157.36	6950.95	71.1	19.6	30.3	44242	878	F
6/27/11	GN	72	5.9	1751	1910	4157.36	6950.95	71.1	19.6	30.3	44243	879	F
6/27/11	GN	72	5.9	1751	1910	4157.36	6950.95	71.1	19.6	30.3	44244	872	F
6/27/11	GN	72	5.9	1751	1910	4157.36	6950.95	71.1	19.6	30.3	44245	959	F
6/27/11	GN	72	5.9	1751	1910	4157.36	6950.95	71.1	19.6	30.3	44246	920	F
6/27/11	GN	72	5.9	1751	1910	4157.36	6950.95	71.1	19.6	30.3	44247	820	F
6/27/11	GN	72	5.9	1751	1910	4157.36	6950.95	71.1	19.6	30.3	44248	868	F
6/27/11	GN	72	5.9	1751	1910	4157.36	6950.95	71.1	19.6	30.3	44249	861	F
6/27/11	GN	72	5.9	1751	1910	4157.36	6950.95	71.1	19.6	30.3	44250	817	F
6/27/11	GN	72	5.9	1751	1910	4157.36	6950.95	71.1	19.6	30.3	47625	867	F
6/27/11	GN	72	5.9	1751	1910	4157.36	6950.95	71.1	19.6	30.3	44251	932	F
6/27/11	GN	72	5.9	1751	1910	4157.36	6950.95	71.1	19.6	30.3	44252	806	M
6/27/11	GN	72	5.9	1751	1910	4157.36	6950.95	71.1	19.6	30.3	44253	815	F
6/27/11	GN	72	5.9	1751	1910	4157.36	6950.95	71.1	19.6	30.3	44254	840	F
6/27/11	GN	72	5.9	1751	1910	4157.36	6950.95	71.1	19.6	30.3	44255	781	F
6/27/11	GN	72	5.9	1751	1910	4157.36	6950.95	71.1	19.6	30.3	44256	865	F
6/27/11	GN	72	5.9	1751	1910	4157.36	6950.95	71.1	19.6	30.3	44257	910	F
6/27/11	GN	72	5.9	1751	1910	4157.36	6950.95	71.1	19.6	30.3	44258	910	F

Appendix B (continued)

Date	Gear	Gear Dp (m)	Gear T (°C)	Time set	Time pulled	Latitude	Longitude	Dp (m)	SST (°C)	SSS	Tag #	TL (mm)	Sex
6/27/11	GN	72	5.9	1751	1910	4157.36	6950.95	71.1	19.6	30.3	44259	925	F
6/27/11	GN	72	5.9	1751	1910	4157.36	6950.95	71.1	19.6	30.3	44260	910	F
6/27/11	GN	72	5.9	1751	1910	4157.36	6950.95	71.1	19.6	30.3	47626	868	F
6/27/11	GN	72	5.9	1751	1910	4157.36	6950.95	71.1	19.6	30.3	44261	910	F
6/27/11	GN	72	5.9	1751	1910	4157.36	6950.95	71.1	19.6	30.3	44262	878	F
6/27/11	GN	72	5.9	1751	1910	4157.36	6950.95	71.1	19.6	30.3	44263	877	F
6/27/11	GN	72	5.9	1751	1910	4157.36	6950.95	71.1	19.6	30.3	44264	892	F
6/27/11	GN	72	5.9	1751	1910	4157.36	6950.95	71.1	19.6	30.3	44265	842	F
6/27/11	GN	72	5.9	1751	1910	4157.36	6950.95	71.1	19.6	30.3	44266	895	F
6/27/11	GN	72	5.9	1751	1910	4157.36	6950.95	71.1	19.6	30.3	44267	829	F
6/27/11	GN	72	5.9	1751	1910	4157.36	6950.95	71.1	19.6	30.3	44268	920	F
6/27/11	GN	72	5.9	1751	1910	4157.36	6950.95	71.1	19.6	30.3	44269	795	F
6/27/11	GN	72	5.9	1751	1910	4157.36	6950.95	71.1	19.6	30.3	44270	779	F
6/27/11	GN	72	5.9	1751	1910	4157.36	6950.95	71.1	19.6	30.3	47627	845	F
6/27/11	GN	72	5.9	1751	1910	4157.36	6950.95	71.1	19.6	30.3	44271	877	F
6/27/11	GN	72	5.9	1751	1910	4157.36	6950.95	71.1	19.6	30.3	44272	835	F
6/27/11	GN	72	5.9	1751	1910	4157.36	6950.95	71.1	19.6	30.3	44273	901	F
6/27/11	GN	72	5.9	1751	1910	4157.36	6950.95	71.1	19.6	30.3	44274	847	F
6/27/11	GN	72	5.9	1751	1910	4157.36	6950.95	71.1	19.6	30.3	44275	760	M
6/27/11	GN	72	5.9	1751	1910	4157.36	6950.95	71.1	19.6	30.3	44276	849	F
6/27/11	GN	72	5.9	1751	1910	4157.36	6950.95	71.1	19.6	30.3	44277	778	F
6/27/11	GN	72	5.9	1751	1910	4157.36	6950.95	71.1	19.6	30.3	44278	887	F
6/27/11	GN	72	5.9	1751	1910	4157.36	6950.95	71.1	19.6	30.3	44279	875	F
6/27/11	GN	72	5.9	1751	1910	4157.36	6950.95	71.1	19.6	30.3	44280	892	F
6/27/11	GN	72	5.9	1751	1910	4157.36	6950.95	71.1	19.6	30.3	47628	891	F
6/27/11	GN	72	5.9	1751	1910	4157.36	6950.95	71.1	19.6	30.3	44281	833	F
6/27/11	GN	72	5.9	1751	1910	4157.36	6950.95	71.1	19.6	30.3	44282	1001	F
6/27/11	GN	72	5.9	1751	1910	4157.36	6950.95	71.1	19.6	30.3	44283	1040	F
6/27/11	GN	72	5.9	1751	1910	4157.36	6950.95	71.1	19.6	30.3	44284	901	F
6/27/11	GN	72	5.9	1751	1910	4157.36	6950.95	71.1	19.6	30.3	44285	890	F
6/27/11	GN	72	5.9	1751	1910	4157.36	6950.95	71.1	19.6	30.3	44286	887	F
6/27/11	GN	72	5.9	1751	1910	4157.36	6950.95	71.1	19.6	30.3	44287	930	F
6/27/11	GN	72	5.9	1751	1910	4157.36	6950.95	71.1	19.6	30.3	44288	811	F
6/27/11	GN	72	5.9	1751	1910	4157.36	6950.95	71.1	19.6	30.3	44289	921	F
6/27/11	GN	72	5.9	1751	1910	4157.36	6950.95	71.1	19.6	30.3	44290	818	F
6/27/11	GN	72	5.9	1751	1910	4157.36	6950.95	71.1	19.6	30.3	47629	872	F
6/27/11	GN	72	5.9	1751	1910	4157.36	6950.95	71.1	19.6	30.3	44291	869	F
6/27/11	GN	72	5.9	1751	1910	4157.36	6950.95	71.1	19.6	30.3	44292	832	F
6/27/11	GN	72	5.9	1751	1910	4157.36	6950.95	71.1	19.6	30.3	44293	835	F
6/27/11	GN	72	5.9	1751	1910	4157.36	6950.95	71.1	19.6	30.3	44294	920	F
6/27/11	GN	72	5.9	1751	1910	4157.36	6950.95	71.1	19.6	30.3	44295	921	F

Appendix B (continued)

Date	Gear	Gear Dp (m)	Gear T (°C)	Time set	Time pulled	Latitude	Longitude	Dp (m)	SST (°C)	SSS	Tag #	TL (mm)	Sex
6/27/11	GN	72	5.9	1751	1910	4157.36	6950.95	71.1	19.6	30.3	44296	848	F
6/27/11	GN	72	5.9	1751	1910	4157.36	6950.95	71.1	19.6	30.3	44297	958	F
6/27/11	GN	72	5.9	1751	1910	4157.36	6950.95	71.1	19.6	30.3	44298	896	F
6/27/11	GN	72	5.9	1751	1910	4157.36	6950.95	71.1	19.6	30.3	44299	824	F
6/27/11	GN	72	5.9	1751	1910	4157.36	6950.95	71.1	19.6	30.3	44300	841	F
6/27/11	GN	72	5.9	1751	1910	4157.36	6950.95	71.1	19.6	30.3	47630	790	F
6/27/11	GN	72	5.9	1751	1910	4157.36	6950.95	71.1	19.6	30.3	44301	895	F
6/27/11	GN	72	5.9	1751	1910	4157.36	6950.95	71.1	19.6	30.3	44302	931	F
6/27/11	GN	72	5.9	1751	1910	4157.36	6950.95	71.1	19.6	30.3	44303	920	F
6/27/11	GN	72	5.9	1751	1910	4157.36	6950.95	71.1	19.6	30.3	44304	827	F
6/27/11	GN	72	5.9	1751	1910	4157.36	6950.95	71.1	19.6	30.3	44305	892	F
6/27/11	GN	72	5.9	1751	1910	4157.36	6950.95	71.1	19.6	30.3	44306	962	F
6/27/11	GN	72	5.9	1751	1910	4157.36	6950.95	71.1	19.6	30.3	44307	840	F
6/27/11	GN	69.6	6.2	1900	2022	4157.18	6950.43	74.8	16.9	30.2	44308	851	F
6/27/11	GN	69.6	6.2	1900	2022	4157.18	6950.43	74.8	16.9	30.2	44309	879	F
6/27/11	GN	69.6	6.2	1900	2022	4157.18	6950.43	74.8	16.9	30.2	44310	861	F
6/27/11	GN	69.6	6.2	1900	2022	4157.18	6950.43	74.8	16.9	30.2	47631	811	F
6/27/11	GN	69.6	6.2	1900	2022	4157.18	6950.43	74.8	16.9	30.2	44311	862	F
6/27/11	GN	69.6	6.2	1900	2022	4157.18	6950.43	74.8	16.9	30.2	44312	849	F
6/27/11	GN	69.6	6.2	1900	2022	4157.18	6950.43	74.8	16.9	30.2	44313	890	F
6/27/11	GN	69.6	6.2	1900	2022	4157.18	6950.43	74.8	16.9	30.2	44314	851	F
6/27/11	GN	69.6	6.2	1900	2022	4157.18	6950.43	74.8	16.9	30.2	44315	825	F
6/27/11	GN	69.6	6.2	1900	2022	4157.18	6950.43	74.8	16.9	30.2	44316	910	F
6/27/11	GN	69.6	6.2	1900	2022	4157.18	6950.43	74.8	16.9	30.2	44317	942	F
6/27/11	GN	69.6	6.2	1900	2022	4157.18	6950.43	74.8	16.9	30.2	44318	763	F
6/27/11	GN	69.6	6.2	1900	2022	4157.18	6950.43	74.8	16.9	30.2	44319	751	F
6/27/11	GN	69.6	6.2	1900	2022	4157.18	6950.43	74.8	16.9	30.2	44320	746	M
6/27/11	GN	69.6	6.2	1900	2022	4157.18	6950.43	74.8	16.9	30.2	47632	835	F
6/27/11	GN	69.6	6.2	1900	2022	4157.18	6950.43	74.8	16.9	30.2	44321	932	F
6/27/11	GN	69.6	6.2	1900	2022	4157.18	6950.43	74.8	16.9	30.2	44322	864	F
6/27/11	GN	69.6	6.2	1900	2022	4157.18	6950.43	74.8	16.9	30.2	44323	847	F
6/27/11	GN	69.6	6.2	1900	2022	4157.18	6950.43	74.8	16.9	30.2	44324	792	F
6/27/11	GN	69.6	6.2	1900	2022	4157.18	6950.43	74.8	16.9	30.2	44325	905	F
6/27/11	GN	69.6	6.2	1900	2022	4157.18	6950.43	74.8	16.9	30.2	44326	851	F
6/27/11	GN	69.6	6.2	1900	2022	4157.18	6950.43	74.8	16.9	30.2	44327	902	F
6/27/11	GN	69.6	6.2	1900	2022	4157.18	6950.43	74.8	16.9	30.2	44328	890	F
6/27/11	GN	69.6	6.2	1900	2022	4157.18	6950.43	74.8	16.9	30.2	44329	891	F
6/27/11	GN	69.6	6.2	1900	2022	4157.18	6950.43	74.8	16.9	30.2	44330	811	F
6/27/11	GN	69.6	6.2	1900	2022	4157.18	6950.43	74.8	16.9	30.2	47633	874	F
6/27/11	GN	69.6	6.2	1900	2022	4157.18	6950.43	74.8	16.9	30.2	44331	842	F
6/27/11	GN	69.6	6.2	1900	2022	4157.18	6950.43	74.8	16.9	30.2	44332	934	F

Appendix B (continued)

Date	Gear	Gear Dp (m)	Gear T (°C)	Time set	Time pulled	Latitude	Longitude	Dp (m)	SST (°C)	SSS	Tag #	TL (mm)	Sex
6/27/11	GN	69.6	6.2	1900	2022	4157.18	6950.43	74.8	16.9	30.2	44333	847	F
6/27/11	GN	69.6	6.2	1900	2022	4157.18	6950.43	74.8	16.9	30.2	44334	919	F
6/28/11	GN	66	6	2005	510	4157.3	7951.16	70.4	NA	29.6	44335	792	M
6/28/11	GN	66	6	2005	510	4157.3	7951.16	70.4	NA	29.6	44336	790	M
6/28/11	GN	66	6	2005	510	4157.3	7951.16	70.4	NA	29.6	44337	796	M
6/28/11	GN	66	6	2005	510	4157.3	7951.16	70.4	NA	29.6	44338	934	F
6/28/11	GN	66	6	2005	510	4157.3	7951.16	70.4	NA	29.6	44339	831	F
6/28/11	GN	66	6	2005	510	4157.3	7951.16	70.4	NA	29.6	44340	835	F
6/28/11	GN	66	6	2005	510	4157.3	7951.16	70.4	NA	29.6	47634	852	F
6/28/11	GN	66	6	2005	510	4157.3	7951.16	70.4	NA	29.6	44341	831	F
6/28/11	GN	66	6	2005	510	4157.3	7951.16	70.4	NA	29.6	44342	961	F
6/28/11	GN	66	6	2005	510	4157.3	7951.16	70.4	NA	29.6	44343	874	F
6/28/11	GN	66	6	2005	510	4157.3	7951.16	70.4	NA	29.6	44344	871	F
6/28/11	GN	66	6	2005	510	4157.3	7951.16	70.4	NA	29.6	44345	897	F
6/28/11	GN	66	6	2005	510	4157.3	7951.16	70.4	NA	29.6	44346	892	F
6/28/11	GN	66	6	2005	510	4157.3	7951.16	70.4	NA	29.6	44347	845	F
6/28/11	GN	66	6	2005	510	4157.3	7951.16	70.4	NA	29.6	44348	879	F
6/28/11	GN	66	6	2005	510	4157.3	7951.16	70.4	NA	29.6	44349	726	M
6/28/11	GN	66	6	2005	510	4157.3	7951.16	70.4	NA	29.6	44350	845	F
6/28/11	GN	66	6	2005	510	4157.3	7951.16	70.4	NA	29.6	47635	922	F
6/28/11	GN	66	6	2005	510	4157.3	7951.16	70.4	NA	29.6	44351	879	F
6/28/11	GN	66	6	2005	510	4157.3	7951.16	70.4	NA	29.6	44352	820	F
6/28/11	GN	66	6	2005	510	4157.3	7951.16	70.4	NA	29.6	44353	762	F
6/28/11	GN	66	6	2005	510	4157.3	7951.16	70.4	NA	29.6	44354	895	F
6/28/11	GN	66	6	2005	510	4157.3	7951.16	70.4	NA	29.6	44355	853	F
6/28/11	GN	66	6	2005	510	4157.3	7951.16	70.4	NA	29.6	44356	793	F
6/28/11	GN	66	6	2005	510	4157.3	7951.16	70.4	NA	29.6	44357	872	F
6/28/11	GN	66	6	2005	510	4157.3	7951.16	70.4	NA	29.6	44358	782	M
6/28/11	GN	66	6	2005	510	4157.3	7951.16	70.4	NA	29.6	44359	805	M
6/28/11	GN	66	6	2005	510	4157.3	7951.16	70.4	NA	29.6	44360	932	F
6/28/11	GN	66	6	2005	510	4157.3	7951.16	70.4	NA	29.6	47636	886	F
6/28/11	GN	66	6	2005	510	4157.3	7951.16	70.4	NA	29.6	44361	791	M
6/28/11	GN	66	6	2005	510	4157.3	7951.16	70.4	NA	29.6	44362	910	F
6/28/11	GN	66	6	2005	510	4157.3	7951.16	70.4	NA	29.6	44363	876	F
6/28/11	GN	66	6	2005	510	4157.3	7951.16	70.4	NA	29.6	44364	808	F
6/28/11	GN	66	6	2005	510	4157.3	7951.16	70.4	NA	29.6	44365	906	F
6/28/11	GN	66	6	2005	510	4157.3	7951.16	70.4	NA	29.6	44366	848	F
6/28/11	GN	66	6	2005	510	4157.3	7951.16	70.4	NA	29.6	44367	887	F
6/28/11	GN	66	6	2005	510	4157.3	7951.16	70.4	NA	29.6	44368	868	F
6/28/11	GN	66	6	2005	510	4157.3	7951.16	70.4	NA	29.6	44369	952	F
6/28/11	GN	66	6	2005	510	4157.3	7951.16	70.4	NA	29.6	44370	872	F

Appendix B (continued)

Date	Gear	Gear Dp (m)	Gear T (°C)	Time set	Time pulled	Latitude	Longitude	Dp (m)	SST (°C)	SSS	Tag #	TL (mm)	Sex
6/28/11	GN	66	6	2005	510	4157.3	7951.16	70.4	NA	29.6	47637	893	F
6/28/11	GN	66	6	2005	510	4157.3	7951.16	70.4	NA	29.6	44371	870	F
6/28/11	GN	66	6	2005	510	4157.3	7951.16	70.4	NA	29.6	44372	838	F
6/28/11	GN	66	6	2005	510	4157.3	7951.16	70.4	NA	29.6	44373	881	F
6/28/11	GN	66	6	2005	510	4157.3	7951.16	70.4	NA	29.6	44374	881	F
6/28/11	GN	66	6	2005	510	4157.3	7951.16	70.4	NA	29.6	44375	851	F
6/28/11	GN	66	6	2005	510	4157.3	7951.16	70.4	NA	29.6	44376	911	F
6/28/11	GN	66	6	2005	510	4157.3	7951.16	70.4	NA	29.6	44377	892	F
6/28/11	GN	66	6	2005	510	4157.3	7951.16	70.4	NA	29.6	44378	901	F
6/28/11	GN	66	6	2005	510	4157.3	7951.16	70.4	NA	29.6	44379	752	M
6/28/11	GN	66	6	2005	510	4157.3	7951.16	70.4	NA	29.6	44380	779	F
6/28/11	GN	66	6	2005	510	4157.3	7951.16	70.4	NA	29.6	47638	780	M
6/28/11	GN	66	6	2005	510	4157.3	7951.16	70.4	NA	29.6	44381	872	F
6/28/11	GN	66	6	2005	510	4157.3	7951.16	70.4	NA	29.6	44382	760	M
6/28/11	GN	66	6	2005	510	4157.3	7951.16	70.4	NA	29.6	44383	872	F
6/28/11	GN	66	6	2005	510	4157.3	7951.16	70.4	NA	29.6	44384	808	M
6/28/11	GN	66	6	2005	510	4157.3	7951.16	70.4	NA	29.6	44385	758	M
6/28/11	GN	66	6	2005	510	4157.3	7951.16	70.4	NA	29.6	44386	782	M
6/28/11	GN	63.3	6.1	2120	623	4157.04	6951.51	66.2	NA	30.1	44387	870	F
6/28/11	GN	63.3	6.1	2120	623	4157.04	6951.51	66.2	NA	30.1	44388	889	F
6/28/11	GN	63.3	6.1	2120	623	4157.04	6951.51	66.2	NA	30.1	44389	945	F
6/28/11	GN	63.3	6.1	2120	623	4157.04	6951.51	66.2	NA	30.1	44390	840	F
6/28/11	GN	63.3	6.1	2120	623	4157.04	6951.51	66.2	NA	30.1	47639	905	F
6/28/11	GN	63.3	6.1	2120	623	4157.04	6951.51	66.2	NA	30.1	44391	749	M
6/28/11	GN	63.3	6.1	2120	623	4157.04	6951.51	66.2	NA	30.1	44392	802	F
6/28/11	GN	63.3	6.1	2120	623	4157.04	6951.51	66.2	NA	30.1	44393	875	F
6/28/11	GN	63.3	6.1	2120	623	4157.04	6951.51	66.2	NA	30.1	44394	904	F
6/28/11	GN	63.3	6.1	2120	623	4157.04	6951.51	66.2	NA	30.1	44395	830	F
6/28/11	GN	63.3	6.1	2120	623	4157.04	6951.51	66.2	NA	30.1	44396	810	F
6/28/11	GN	63.3	6.1	2120	623	4157.04	6951.51	66.2	NA	30.1	44397	890	F
6/28/11	GN	63.3	6.1	2120	623	4157.04	6951.51	66.2	NA	30.1	44398	894	F
6/28/11	GN	63.3	6.1	2120	623	4157.04	6951.51	66.2	NA	30.1	44399	849	F
6/28/11	GN	63.3	6.1	2120	623	4157.04	6951.51	66.2	NA	30.1	44400	820	F
6/28/11	GN	63.3	6.1	2120	623	4157.04	6951.51	66.2	NA	30.1	47640	791	M
6/28/11	GN	63.3	6.1	2120	623	4157.04	6951.51	66.2	NA	30.1	44401	734	M
6/28/11	GN	63.3	6.1	2120	623	4157.04	6951.51	66.2	NA	30.1	44402	763	M
6/28/11	GN	63.3	6.1	2120	623	4157.04	6951.51	66.2	NA	30.1	44403	800	F
6/28/11	GN	63.3	6.1	2120	623	4157.04	6951.51	66.2	NA	30.1	44404	802	M
6/28/11	GN	63.3	6.1	2120	623	4157.04	6951.51	66.2	NA	30.1	44405	851	F
6/28/11	GN	63.3	6.1	2120	623	4157.04	6951.51	66.2	NA	30.1	44406	901	F
6/28/11	GN	63.3	6.1	2120	623	4157.04	6951.51	66.2	NA	30.1	44407	915	F

Appendix B (continued)

Date	Gear	Gear Dp (m)	Gear T (°C)	Time set	Time pulled	Latitude	Longitude	Dp (m)	SST (°C)	SSS	Tag #	TL (mm)	Sex
6/28/11	GN	63.3	6.1	2120	623	4157.04	6951.51	66.2	NA	30.1	44408	836	F
6/28/11	GN	63.3	6.1	2120	623	4157.04	6951.51	66.2	NA	30.1	44409	895	F
6/28/11	GN	63.3	6.1	2120	623	4157.04	6951.51	66.2	NA	30.1	44410	754	M
6/28/11	GN	63.3	6.1	2120	623	4157.04	6951.51	66.2	NA	30.1	47641	957	F
6/28/11	GN	63.3	6.1	2120	623	4157.04	6951.51	66.2	NA	30.1	44411	740	M
6/28/11	GN	63.3	6.1	2120	623	4157.04	6951.51	66.2	NA	30.1	44412	916	F
6/28/11	GN	63.3	6.1	2120	623	4157.04	6951.51	66.2	NA	30.1	44413	839	F
6/28/11	GN	63.3	6.1	2120	623	4157.04	6951.51	66.2	NA	30.1	44414	879	F
6/28/11	GN	63.3	6.1	2120	623	4157.04	6951.51	66.2	NA	30.1	44415	929	F
6/28/11	GN	63.3	6.1	2120	623	4157.04	6951.51	66.2	NA	30.1	44416	822	F
6/28/11	GN	63.3	6.1	2120	623	4157.04	6951.51	66.2	NA	30.1	44417	846	F
6/28/11	GN	63.3	6.1	2120	623	4157.04	6951.51	66.2	NA	30.1	44418	830	F
6/28/11	GN	63.3	6.1	2120	623	4157.04	6951.51	66.2	NA	30.1	44419	850	F
6/28/11	GN	63.3	6.1	2120	623	4157.04	6951.51	66.2	NA	30.1	44420	871	F
6/28/11	GN	63.3	6.1	2120	623	4157.04	6951.51	66.2	NA	30.1	47642	901	F
6/28/11	GN	63.3	6.1	2120	623	4157.04	6951.51	66.2	NA	30.1	44421	829	F
6/28/11	GN	63.3	6.1	2120	623	4157.04	6951.51	66.2	NA	30.1	44422	756	M
6/28/11	GN	73.8	6.1	735	806	4157.69	6950.58	74.4	16.9	29.3	44423	905	F
6/28/11	GN	73.8	6.1	735	806	4157.69	6950.58	74.4	16.9	29.3	44424	891	F
6/28/11	GN	73.8	6.1	735	806	4157.69	6950.58	74.4	16.9	29.3	44425	910	F
6/28/11	GN	73.8	6.1	735	806	4157.69	6950.58	74.4	16.9	29.3	44426	909	F
6/28/11	GN	73.8	6.1	735	806	4157.69	6950.58	74.4	16.9	29.3	44427	900	F
6/28/11	GN	73.8	6.1	735	806	4157.69	6950.58	74.4	16.9	29.3	44428	865	F
6/28/11	GN	73.8	6.1	735	806	4157.69	6950.58	74.4	16.9	29.3	44429	831	F
6/28/11	GN	73.8	6.1	735	806	4157.69	6950.58	74.4	16.9	29.3	44430	877	F
6/28/11	GN	73.8	6.1	735	806	4157.69	6950.58	74.4	16.9	29.3	47643	896	F
6/28/11	GN	73.8	6.1	735	806	4157.69	6950.58	74.4	16.9	29.3	44431	580	F
6/28/11	GN	73.8	6.1	735	806	4157.69	6950.58	74.4	16.9	29.3	44432	875	F
6/28/11	GN	73.8	6.1	735	806	4157.69	6950.58	74.4	16.9	29.3	44433	883	F
6/28/11	GN	73.8	6.1	735	806	4157.69	6950.58	74.4	16.9	29.3	44434	874	F
6/28/11	GN	73.8	6.1	735	806	4157.69	6950.58	74.4	16.9	29.3	44435	910	F
6/28/11	GN	73.8	6.1	735	806	4157.69	6950.58	74.4	16.9	29.3	44436	992	F
6/28/11	GN	73.8	6.1	735	806	4157.69	6950.58	74.4	16.9	29.3	44437	870	F
6/28/11	GN	73.8	6.1	735	806	4157.69	6950.58	74.4	16.9	29.3	44438	825	F
6/28/11	GN	73.8	6.1	735	806	4157.69	6950.58	74.4	16.9	29.3	44439	881	F
6/28/11	GN	73.8	6.1	735	806	4157.69	6950.58	74.4	16.9	29.3	44440	938	F
6/28/11	GN	73.8	6.1	735	806	4157.69	6950.58	74.4	16.9	29.3	47644	898	F
6/28/11	GN	73.8	6.1	735	806	4157.69	6950.58	74.4	16.9	29.3	44441	876	F
6/28/11	GN	73.8	6.1	735	806	4157.69	6950.58	74.4	16.9	29.3	44442	872	F
6/28/11	GN	73.8	6.1	735	806	4157.69	6950.58	74.4	16.9	29.3	44443	830	F
6/28/11	GN	73.8	6.1	735	806	4157.69	6950.58	74.4	16.9	29.3	44444	845	F

Appendix B (continued)

Date	Gear	Gear Dp (m)	Gear T (°C)	Time set	Time pulled	Latitude	Longitude	Dp (m)	SST (°C)	SSS	Tag #	TL (mm)	Sex
6/28/11	GN	75.2	5.9	747	900	4156.84	6949.82	78.5	NA	NA	44445	839	F
6/28/11	GN	75.2	5.9	747	900	4156.84	6949.82	78.5	NA	NA	44446	881	F
6/28/11	GN	75.2	5.9	747	900	4156.84	6949.82	78.5	NA	NA	44447	820	F
6/28/11	GN	75.2	5.9	747	900	4156.84	6949.82	78.5	NA	NA	44448	894	F
6/28/11	GN	75.2	5.9	747	900	4156.84	6949.82	78.5	NA	NA	44449	949	F
6/28/11	GN	75.2	5.9	747	900	4156.84	6949.82	78.5	NA	NA	44450	885	F
6/28/11	GN	75.2	5.9	747	900	4156.84	6949.82	78.5	NA	NA	47645	921	F
6/28/11	GN	75.2	5.9	747	900	4156.84	6949.82	78.5	NA	NA	44451	895	F
6/28/11	GN	75.2	5.9	747	900	4156.84	6949.82	78.5	NA	NA	44452	876	F
6/28/11	GN	75.2	5.9	747	900	4156.84	6949.82	78.5	NA	NA	44453	819	F
6/28/11	GN	75.2	5.9	747	900	4156.84	6949.82	78.5	NA	NA	44454	861	F
6/28/11	GN	75.2	5.9	747	900	4156.84	6949.82	78.5	NA	NA	44455	925	F
6/28/11	GN	75.2	5.9	747	900	4156.84	6949.82	78.5	NA	NA	44456	924	F
6/28/11	GN	75.2	5.9	747	900	4156.84	6949.82	78.5	NA	NA	44457	941	F
6/28/11	GN	75.2	5.9	747	900	4156.84	6949.82	78.5	NA	NA	44458	727	F
6/28/11	GN	75.2	5.9	747	900	4156.84	6949.82	78.5	NA	NA	44459	899	F
6/28/11	GN	75.2	5.9	747	900	4156.84	6949.82	78.5	NA	NA	44460	846	F
6/28/11	GN	75.2	5.9	747	900	4156.84	6949.82	78.5	NA	NA	47646	921	F
6/28/11	GN	75.2	5.9	747	900	4156.84	6949.82	78.5	NA	NA	44461	891	F
6/28/11	GN	75.2	5.9	747	900	4156.84	6949.82	78.5	NA	NA	44462	823	F
6/28/11	GN	75.2	5.9	747	900	4156.84	6949.82	78.5	NA	NA	44463	890	F
6/28/11	GN	75.2	5.9	747	900	4156.84	6949.82	78.5	NA	NA	44464	865	F
6/28/11	GN	75.2	5.9	747	900	4156.84	6949.82	78.5	NA	NA	44465	865	F
6/28/11	GN	75.2	5.9	747	900	4156.84	6949.82	78.5	NA	NA	44466	871	F
6/28/11	GN	75.2	5.9	747	900	4156.84	6949.82	78.5	NA	NA	44467	861	F
6/28/11	GN	75.2	5.9	747	900	4156.84	6949.82	78.5	NA	NA	44468	882	F
6/28/11	GN	75.2	5.9	747	900	4156.84	6949.82	78.5	NA	NA	44469	842	F
6/28/11	GN	75.2	5.9	747	900	4156.84	6949.82	78.5	NA	NA	44470	881	F
6/28/11	GN	75.2	5.9	747	900	4156.84	6949.82	78.5	NA	NA	47647	850	F
6/28/11	GN	75.2	5.9	747	900	4156.84	6949.82	78.5	NA	NA	44471	965	F
6/28/11	GN	75.2	5.9	747	900	4156.84	6949.82	78.5	NA	NA	44472	818	F
6/28/11	GN	75.2	5.9	747	900	4156.84	6949.82	78.5	NA	NA	44473	710	M
6/28/11	GN	75.2	5.9	747	900	4156.84	6949.82	78.5	NA	NA	44474	905	F
6/28/11	GN	75.2	5.9	747	900	4156.84	6949.82	78.5	NA	NA	44475	878	F
6/28/11	GN	75.2	5.9	747	900	4156.84	6949.82	78.5	NA	NA	44476	811	F
6/28/11	GN	75.2	5.9	747	900	4156.84	6949.82	78.5	NA	NA	44477	832	F
6/28/11	GN	75.2	5.9	747	900	4156.84	6949.82	78.5	NA	NA	44478	836	F
6/28/11	GN	75.2	5.9	747	900	4156.84	6949.82	78.5	NA	NA	44479	859	F
6/28/11	GN	75.2	5.9	747	900	4156.84	6949.82	78.5	NA	NA	44480	777	F
6/28/11	GN	75.2	5.9	747	900	4156.84	6949.82	78.5	NA	NA	47648	870	F
6/28/11	GN	75.2	5.9	747	900	4156.84	6949.82	78.5	NA	NA	44481	900	F

Appendix B (continued)

Date	Gear	Gear Dp (m)	Gear T (°C)	Time set	Time pulled	Latitude	Longitude	Dp (m)	SST (°C)	SSS	Tag #	TL (mm)	Sex
6/28/11	GN	75.2	5.9	747	900	4156.84	6949.82	78.5	NA	NA	44482	958	F
6/28/11	GN	75.2	5.9	747	900	4156.84	6949.82	78.5	NA	NA	44483	840	F
6/28/11	GN	75.2	5.9	747	900	4156.84	6949.82	78.5	NA	NA	44484	743	M
6/28/11	GN	75.2	5.9	747	900	4156.84	6949.82	78.5	NA	NA	44485	815	F
6/28/11	GN	75.2	5.9	747	900	4156.84	6949.82	78.5	NA	NA	44486	840	F
6/28/11	GN	75.2	5.9	747	900	4156.84	6949.82	78.5	NA	NA	44487	902	F
6/28/11	GN	75.2	5.9	747	900	4156.84	6949.82	78.5	NA	NA	44488	809	F
6/28/11	GN	75.2	5.9	747	900	4156.84	6949.82	78.5	NA	NA	44489	878	F
6/28/11	GN	75.2	5.9	747	900	4156.84	6949.82	78.5	NA	NA	44490	821	F
6/28/11	GN	75.2	5.9	747	900	4156.84	6949.82	78.5	NA	NA	47649	898	F
6/28/11	GN	75.2	5.9	747	900	4156.84	6949.82	78.5	NA	NA	44491	825	F
6/28/11	GN	75.2	5.9	747	900	4156.84	6949.82	78.5	NA	NA	44492	746	F
6/28/11	GN	75.2	5.9	747	900	4156.84	6949.82	78.5	NA	NA	44493	888	F
6/28/11	GN	75.2	5.9	747	900	4156.84	6949.82	78.5	NA	NA	44494	881	F
6/28/11	GN	75.2	5.9	747	900	4156.84	6949.82	78.5	NA	NA	44495	861	F
6/28/11	GN	75.2	5.9	747	900	4156.84	6949.82	78.5	NA	NA	44496	806	F
6/28/11	GN	75.2	5.9	747	900	4156.84	6949.82	78.5	NA	NA	44497	818	F
6/28/11	GN	75.2	5.9	747	900	4156.84	6949.82	78.5	NA	NA	44498	884	F
6/28/11	GN	75.2	5.9	747	900	4156.84	6949.82	78.5	NA	NA	44499	920	F
6/28/11	GN	75.2	5.9	747	900	4156.84	6949.82	78.5	NA	NA	44500	866	F
6/28/11	GN	75.2	5.9	747	900	4156.84	6949.82	78.5	NA	NA	47650	785	F
6/28/11	GN	75.2	5.9	747	900	4156.84	6949.82	78.5	NA	NA	44501	860	F
6/28/11	GN	75.2	5.9	747	900	4156.84	6949.82	78.5	NA	NA	44502	745	F
6/28/11	GN	75.2	5.9	747	900	4156.84	6949.82	78.5	NA	NA	44503	834	F
6/28/11	GN	75.2	5.9	747	900	4156.84	6949.82	78.5	NA	NA	44504	846	F
6/28/11	GN	75.2	5.9	747	900	4156.84	6949.82	78.5	NA	NA	44505	833	F
6/28/11	GN	75.2	5.9	747	900	4156.84	6949.82	78.5	NA	NA	44506	794	F
6/28/11	GN	75.2	5.9	747	900	4156.84	6949.82	78.5	NA	NA	44507	893	F
6/28/11	GN	75.2	5.9	747	900	4156.84	6949.82	78.5	NA	NA	44508	874	F
6/28/11	GN	75.2	5.9	747	900	4156.84	6949.82	78.5	NA	NA	44509	807	F
6/28/11	GN	75.2	5.9	747	900	4156.84	6949.82	78.5	NA	NA	44510	850	F
6/28/11	GN	75.2	5.9	747	900	4156.84	6949.82	78.5	NA	NA	47651	936	F
6/28/11	GN	75.2	5.9	747	900	4156.84	6949.82	78.5	NA	NA	44511	849	F
6/28/11	GN	75.2	5.9	747	900	4156.84	6949.82	78.5	NA	NA	44512	875	F
6/28/11	GN	75.2	5.9	747	900	4156.84	6949.82	78.5	NA	NA	44513	891	F
6/28/11	GN	75.2	5.9	747	900	4156.84	6949.82	78.5	NA	NA	44514	820	F
6/28/11	GN	75.2	5.9	747	900	4156.84	6949.82	78.5	NA	NA	44515	868	F
6/28/11	GN	75.2	5.9	747	900	4156.84	6949.82	78.5	NA	NA	44516	790	F
6/28/11	GN	75.2	5.9	747	900	4156.84	6949.82	78.5	NA	NA	44517	905	F
6/28/11	GN	75.2	5.9	747	900	4156.84	6949.82	78.5	NA	NA	44518	872	F
6/28/11	GN	75.2	5.9	747	900	4156.84	6949.82	78.5	NA	NA	44519	760	M

Appendix B (continued)

Date	Gear	Gear Dp (m)	Gear T (°C)	Time set	Time pulled	Latitude	Longitude	Dp (m)	SST (°C)	SSS	Tag #	TL (mm)	Sex
6/28/11	GN	75.2	5.9	747	900	4156.84	6949.82	78.5	NA	NA	44520	870	F
6/28/11	GN	75.2	5.9	747	900	4156.84	6949.82	78.5	NA	NA	47652	845	F
6/28/11	GN	75.2	5.9	747	900	4156.84	6949.82	78.5	NA	NA	44521	880	F
6/28/11	GN	75.2	5.9	747	900	4156.84	6949.82	78.5	NA	NA	44522	732	F
6/28/11	GN	75.2	5.9	747	900	4156.84	6949.82	78.5	NA	NA	44523	755	M
6/28/11	GN	75.2	5.9	747	900	4156.84	6949.82	78.5	NA	NA	44524	930	F
6/28/11	GN	75.2	5.9	747	900	4156.84	6949.82	78.5	NA	NA	44525	850	F
6/28/11	GN	75.2	5.9	747	900	4156.84	6949.82	78.5	NA	NA	44526	840	F
6/28/11	GN	75.2	5.9	747	900	4156.84	6949.82	78.5	NA	NA	44527	922	F
6/28/11	GN	75.2	5.9	747	900	4156.84	6949.82	78.5	NA	NA	44528	876	F
6/28/11	GN	75.2	5.9	747	900	4156.84	6949.82	78.5	NA	NA	44529	925	F
6/28/11	GN	75.2	5.9	747	900	4156.84	6949.82	78.5	NA	NA	44530	849	F
6/28/11	GN	75.2	5.9	747	900	4156.84	6949.82	78.5	NA	NA	47653	836	F
6/28/11	GN	75.2	5.9	747	900	4156.84	6949.82	78.5	NA	NA	44531	780	F
6/28/11	GN	75.2	5.9	747	900	4156.84	6949.82	78.5	NA	NA	44532	865	F
6/28/11	GN	75.2	5.9	747	900	4156.84	6949.82	78.5	NA	NA	44533	795	F
6/28/11	GN	75.2	5.9	747	900	4156.84	6949.82	78.5	NA	NA	44534	829	F
6/28/11	GN	75.2	5.9	747	900	4156.84	6949.82	78.5	NA	NA	44535	913	F
6/28/11	GN	75.2	5.9	747	900	4156.84	6949.82	78.5	NA	NA	44536	889	F
6/28/11	GN	75.2	5.9	747	900	4156.84	6949.82	78.5	NA	NA	44537	715	M
6/28/11	GN	75.2	5.9	747	900	4156.84	6949.82	78.5	NA	NA	44538	870	F
6/28/11	GN	75.2	5.9	747	900	4156.84	6949.82	78.5	NA	NA	44539	905	F
6/28/11	GN	75.2	5.9	747	900	4156.84	6949.82	78.5	NA	NA	44540	915	F
6/28/11	GN	75.2	5.9	747	900	4156.84	6949.82	78.5	NA	NA	47654	782	M
6/28/11	GN	75.2	5.9	747	900	4156.84	6949.82	78.5	NA	NA	44541	850	F
6/28/11	GN	75.2	5.9	747	900	4156.84	6949.82	78.5	NA	NA	44542	884	F
6/28/11	GN	75.2	5.9	747	900	4156.84	6949.82	78.5	NA	NA	44543	858	F
6/28/11	GN	75.2	5.9	747	900	4156.84	6949.82	78.5	NA	NA	44544	849	F
6/28/11	GN	75.2	5.9	747	900	4156.84	6949.82	78.5	NA	NA	44545	972	F
6/28/11	GN	75.2	5.9	747	900	4156.84	6949.82	78.5	NA	NA	44546	850	F
6/28/11	GN	75.2	5.9	747	900	4156.84	6949.82	78.5	NA	NA	44547	946	F
6/28/11	GN	75.2	5.9	747	900	4156.84	6949.82	78.5	NA	NA	44548	880	F
6/28/11	GN	75.2	5.9	747	900	4156.84	6949.82	78.5	NA	NA	44549	811	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44551	691	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44552	820	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44553	864	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44554	775	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44555	924	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44556	884	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44557	843	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44558	846	F

Appendix B (continued)

Date	Gear	Gear Dp (m)	Gear T (°C)	Time set	Time pulled	Latitude	Longitude	Dp (m)	SST (°C)	SSS	Tag #	TL (mm)	Sex
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44559	855	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44560	844	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	47656	743	M
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44561	825	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44562	892	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44563	859	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44564	790	M
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44565	780	M
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44566	799	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44567	894	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44568	810	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44569	780	M
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44570	862	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	47657	919	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44571	803	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44572	882	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44573	846	M
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44574	690	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44575	803	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44576	849	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44577	824	M
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44578	905	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44579	789	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44580	825	M
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	47658	867	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44581	796	M
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44582	792	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44583	878	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44584	814	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44585	961	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44586	761	M
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44587	790	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44588	781	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44589	829	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44590	744	M
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	47659	863	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44591	784	M
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44592	881	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44593	871	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44594	836	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44595	745	M

Appendix B (continued)

Date	Gear	Gear Dp (m)	Gear T (°C)	Time set	Time pulled	Latitude	Longitude	Dp (m)	SST (°C)	SSS	Tag #	TL (mm)	Sex
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44596	791	M
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44597	837	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44598	812	M
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44599	769	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44600	862	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	47660	968	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44601	830	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44602	945	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44603	833	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44604	874	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44605	855	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44606	844	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44607	843	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44608	769	M
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44609	885	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44610	853	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	47661	906	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44611	756	M
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44612	904	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44613	915	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44614	896	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44615	819	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44616	892	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44617	902	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44618	751	M
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44619	880	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44620	853	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	47662	840	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44621	762	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44622	875	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44623	872	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44624	824	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44625	923	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44626	825	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44627	873	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44628	882	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44629	749	M
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44630	864	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	47663	828	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44631	854	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44632	787	F

Appendix B (continued)

Date	Gear	Gear Dp (m)	Gear T (°C)	Time set	Time pulled	Latitude	Longitude	Dp (m)	SST (°C)	SSS	Tag #	TL (mm)	Sex
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44633	858	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44634	881	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44635	773	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44636	921	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44637	820	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44638	829	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44639	860	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44640	842	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	47664	765	M
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44641	711	M
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44642	875	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44643	775	M
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44644	737	M
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44645	851	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44646	807	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44647	872	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44648	841	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44649	812	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44650	754	M
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	47665	922	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44651	754	M
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44652	789	M
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44653	708	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44654	751	M
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44655	763	M
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44656	839	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44657	857	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44658	899	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44659	825	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44660	781	M
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	47666	867	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44661	811	M
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44662	721	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44663	770	M
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44664	885	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44665	656	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44666	838	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44667	794	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44668	937	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44669	882	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44670	821	F

Appendix B (continued)

Date	Gear	Gear Dp (m)	Gear T (°C)	Time set	Time pulled	Latitude	Longitude	Dp (m)	SST (°C)	SSS	Tag #	TL (mm)	Sex
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	47667	853	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44671	919	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44672	715	M
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44673	951	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44674	920	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44675	734	M
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44676	872	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44677	754	M
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44678	885	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44679	839	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44680	744	M
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	47668	756	M
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44681	910	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44682	885	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44683	823	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44684	854	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44685	719	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44686	905	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44687	848	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44688	747	M
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44689	871	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44690	850	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	47669	791	M
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44691	884	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44692	841	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44693	913	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44694	944	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44695	799	M
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44696	917	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44697	775	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44698	724	M
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44699	736	M
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44700	691	M
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	47670	806	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44701	889	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44702	866	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44703	966	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44704	665	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44705	760	M
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44706	810	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44707	921	F

Appendix B (continued)

Date	Gear	Gear Dp (m)	Gear T (°C)	Time set	Time pulled	Latitude	Longitude	Dp (m)	SST (°C)	SSS	Tag #	TL (mm)	Sex
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44708	743	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44709	845	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44710	885	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	47671	854	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44711	724	M
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44712	742	M
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44713	907	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44714	899	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44715	839	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44716	860	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44717	847	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44718	874	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44719	885	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44720	815	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	47672	813	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44721	892	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44722	774	M
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44723	864	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44724	847	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44725	875	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44726	846	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44727	829	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44728	839	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44729	757	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44730	946	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	47673	809	M
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44731	876	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44732	827	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44733	783	M
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44734	685	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44735	810	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44736	877	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44737	865	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44738	878	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44739	840	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44740	878	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	47674	870	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44741	896	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44742	759	M
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44743	840	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44744	882	F

Appendix B (continued)

Date	Gear	Gear Dp (m)	Gear T (°C)	Time set	Time pulled	Latitude	Longitude	Dp (m)	SST (°C)	SSS	Tag #	TL (mm)	Sex
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44745	776	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44746	943	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44747	846	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44748	914	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44749	676	M
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44750	780	M
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	47675	896	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44751	704	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44752	890	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44753	837	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44754	824	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44755	796	M
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44756	915	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44757	782	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44758	883	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44759	805	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44760	786	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	47676	724	M
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44761	846	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44762	712	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44763	814	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44764	931	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44765	876	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44766	849	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44767	789	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44768	802	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44769	790	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44770	845	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	47677	839	M
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44771	860	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44772	845	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44773	792	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44774	815	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44775	846	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44776	830	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44777	925	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44778	851	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44779	830	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44780	854	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	47678	848	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44781	871	F

Appendix B (continued)

Date	Gear	Gear Dp (m)	Gear T (°C)	Time set	Time pulled	Latitude	Longitude	Dp (m)	SST (°C)	SSS	Tag #	TL (mm)	Sex
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44782	735	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44783	837	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44784	781	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44785	803	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44786	856	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44787	776	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44788	851	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44789	823	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44790	815	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	47679	701	M
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44791	840	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44792	840	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44793	856	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44794	932	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44795	840	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44796	748	M
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44797	895	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44798	830	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44799	786	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44800	745	M
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	47680	734	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44801	869	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44802	859	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44803	730	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44804	675	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44805	875	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44806	786	M
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44807	865	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44808	898	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44809	891	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44810	749	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	47681	739	M
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44811	769	M
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44812	905	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44813	846	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44814	871	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44815	1020	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44816	827	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44817	741	M
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44818	786	M
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44819	755	M

Appendix B (continued)

Date	Gear	Gear Dp (m)	Gear T (°C)	Time set	Time pulled	Latitude	Longitude	Dp (m)	SST (°C)	SSS	Tag #	TL (mm)	Sex
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44820	881	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	47682	912	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44821	745	M
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44822	813	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44823	863	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44824	809	M
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44825	853	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44826	859	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44827	760	M
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44828	791	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44829	871	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44830	771	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	47683	860	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44831	731	M
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44832	856	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44833	910	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44834	804	M
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44835	812	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44836	838	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44837	846	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44838	909	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44839	859	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44840	771	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	47684	905	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44841	885	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44842	841	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44843	876	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44844	871	M
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44845	808	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44846	699	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44847	986	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44848	785	M
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44849	763	M
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44850	901	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	47685	921	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44851	846	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44852	793	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44853	756	M
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44854	820	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44855	739	M
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44856	799	F

Appendix B (continued)

Date	Gear	Gear Dp (m)	Gear T (°C)	Time set	Time pulled	Latitude	Longitude	Dp (m)	SST (°C)	SSS	Tag #	TL (mm)	Sex
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44857	749	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44858	878	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44859	793	M
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44860	809	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	47686	730	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44861	921	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44862	792	M
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44863	784	M
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44864	800	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44865	861	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44866	821	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44867	764	M
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44868	934	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44869	773	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44870	866	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	47687	786	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44871	806	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44872	795	M
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44873	898	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44874	858	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44875	804	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44876	909	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44877	929	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44878	780	M
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44879	824	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44880	810	M
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	47658	823	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44881	799	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44882	814	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44883	888	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44884	890	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44885	898	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44886	900	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44887	749	M
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44888	791	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44889	881	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44890	800	M
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	47689	798	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44891	906	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44892	775	M
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44893	908	F

Appendix B (continued)

Date	Gear	Gear Dp (m)	Gear T (°C)	Time set	Time pulled	Latitude	Longitude	Dp (m)	SST (°C)	SSS	Tag #	TL (mm)	Sex
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44894	738	M
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44895	795	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44896	745	M
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44897	712	M
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44898	862	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44899	841	M
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44900	731	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	47690	874	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44901	839	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44902	912	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44903	750	M
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44904	764	M
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44905	882	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44906	915	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44907	825	M
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44908	725	M
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44909	749	M
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44910	768	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	47691	831	M
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44911	701	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44912	925	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44913	760	M
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44914	886	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44915	765	M
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44916	895	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44917	790	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44918	879	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44919	799	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44920	820	M
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	47692	862	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44921	935	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44922	692	M
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44923	887	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44924	821	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44925	767	M
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44926	954	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44927	857	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44928	922	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44929	782	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44930	760	M
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	47693	943	F

Appendix B (continued)

Date	Gear	Gear Dp (m)	Gear T (°C)	Time set	Time pulled	Latitude	Longitude	Dp (m)	SST (°C)	SSS	Tag #	TL (mm)	Sex
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44931	925	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44932	935	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44933	914	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44934	959	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44935	790	M
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44936	798	M
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44937	888	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44938	874	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44939	768	M
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44940	755	M
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	47694	740	M
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44941	772	M
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44942	871	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44943	824	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44944	845	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44945	814	M
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44946	755	M
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44947	778	M
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44948	761	M
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44949	817	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44950	818	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	47695	841	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44951	754	M
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44952	781	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44953	660	M
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44954	787	M
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44955	660	M
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44956	795	M
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44957	780	M
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44958	828	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44959	754	M
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44960	767	M
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	47696	860	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44961	811	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44962	820	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44963	791	M
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44964	803	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44965	842	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44966	920	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44967	990	M
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44968	848	F

Appendix B (continued)

Date	Gear	Gear Dp (m)	Gear T (°C)	Time set	Time pulled	Latitude	Longitude	Dp (m)	SST (°C)	SSS	Tag #	TL (mm)	Sex
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44969	761	M
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44970	771	M
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	47697	782	M
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44971	863	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44972	758	M
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44973	841	M
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44974	759	M
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44975	821	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44976	795	M
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44977	850	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44978	794	M
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44979	746	M
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44980	771	M
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	47698	849	F
8/9/11	LN	23.2	9.1	650	704	4206.43	7034.812	27.7	18	30.5	44981	859	F
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	44982	826	F
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	44983	860	F
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	44984	869	F
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	44985	901	F
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	44986	857	F
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	44987	904	F
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	44988	871	F
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	44989	796	F
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	44990	922	F
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	47699	788	F
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	44991	831	F
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	44992	920	F
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	44993	926	F
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	44994	834	F
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	44995	922	F
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	44996	796	F
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	44997	915	F
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	44998	841	F
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	44999	815	F
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	45000	874	F
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	47700	821	F
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	45001	971	F
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	45002	909	F
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	45003	845	F
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	45004	964	F
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	45005	983	F

Appendix B (continued)

Date	Gear	Gear Dp (m)	Gear T (°C)	Time set	Time pulled	Latitude	Longitude	Dp (m)	SST (°C)	SSS	Tag #	TL (mm)	Sex
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	45006	911	F
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	45007	925	F
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	45008	775	F
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	45009	861	F
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	45010	800	F
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	47701	805	M
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	45011	881	F
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	45012	800	F
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	45013	872	F
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	45014	800	F
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	45015	761	M
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	45016	885	F
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	45017	899	F
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	45018	845	F
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	45019	825	F
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	45020	752	F
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	47702	850	F
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	45021	877	F
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	45022	844	F
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	45023	831	F
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	45024	866	F
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	45025	842	F
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	45026	807	F
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	45027	833	F
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	45028	849	F
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	45029	825	F
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	45030	944	F
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	47703	874	F
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	45031	834	F
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	45032	836	F
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	45033	827	F
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	45034	817	F
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	45035	895	F
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	45036	928	F
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	45037	896	F
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	45038	837	F
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	45039	838	F
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	45040	897	F
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	47704	846	F
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	45041	812	F
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	45042	899	F

Appendix B (continued)

Date	Gear	Gear Dp (m)	Gear T (°C)	Time set	Time pulled	Latitude	Longitude	Dp (m)	SST (°C)	SSS	Tag #	TL (mm)	Sex
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	45043	829	F
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	45044	879	F
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	45045	881	F
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	45046	883	F
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	45047	820	F
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	45048	844	F
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	45049	855	F
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	45050	914	F
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	47705	865	F
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	45051	880	F
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	45052	819	F
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	45053	873	F
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	45054	793	F
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	45055	755	M
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	45056	868	F
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	45057	814	F
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	45058	778	F
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	45059	860	F
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	45060	848	F
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	47706	696	F
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	45061	785	M
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	45062	857	F
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	45063	902	F
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	45064	934	F
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	45065	858	F
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	45066	875	F
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	45067	857	F
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	45068	958	F
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	45069	878	F
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	45070	894	F
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	47707	882	F
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	45071	910	F
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	45072	808	M
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	45073	908	F
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	45074	811	F
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	45075	952	F
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	45076	869	F
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	45077	839	F
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	45078	842	F
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	45079	639	F
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	45080	885	F

Appendix B (continued)

Date	Gear	Gear Dp (m)	Gear T (°C)	Time set	Time pulled	Latitude	Longitude	Dp (m)	SST (°C)	SSS	Tag #	TL (mm)	Sex
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	47708	823	F
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	45081	825	F
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	45082	872	F
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	45083	815	F
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	45084	822	F
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	45085	897	F
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	45086	869	F
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	45087	728	M
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	45088	711	F
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	45089	878	F
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	45090	871	F
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	47709	754	M
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	45091	892	F
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	45092	842	F
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	45093	752	M
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	45094	902	F
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	45095	893	F
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	45096	835	F
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	45097	929	F
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	45098	922	F
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	45099	740	F
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	45100	725	F
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	47710	859	F
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	45101	863	F
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	45102	790	F
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	45103	791	F
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	45104	875	F
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	45105	791	F
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	45106	791	F
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	45107	874	F
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	45108	870	F
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	45109	835	F
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	45110	816	F
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	47711	803	F
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	45111	830	F
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	45112	775	M
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	45113	854	F
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	45114	840	F
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	45115	791	F
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	45116	798	F
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	45117	855	F

Appendix B (continued)

Date	Gear	Gear Dp (m)	Gear T (°C)	Time set	Time pulled	Latitude	Longitude	Dp (m)	SST (°C)	SSS	Tag #	TL (mm)	Sex
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	45118	845	F
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	45119	840	F
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	45120	875	F
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	47712	851	F
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	45121	842	F
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	45122	800	F
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	45123	860	F
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	45124	782	M
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	45125	870	F
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	45126	895	F
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	45127	811	F
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	45128	862	F
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	45129	905	F
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	45130	920	F
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	47713	908	F
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	45131	851	F
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	45132	862	F
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	45133	905	F
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	45134	860	F
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	45135	840	F
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	45136	841	F
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	45137	746	M
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	45138	891	F
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	45139	850	F
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	45140	848	F
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	47714	831	F
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	45141	640	F
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	45142	868	F
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	45143	866	F
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	45144	862	F
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	45145	861	F
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	45146	740	M
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	45147	796	M
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	45148	816	F
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	45149	882	F
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	45150	809	F
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	47715	872	F
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	45151	912	F
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	45152	880	F
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	45153	831	F
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	45154	879	F

Appendix B (continued)

Date	Gear	Gear Dp (m)	Gear T (°C)	Time set	Time pulled	Latitude	Longitude	Dp (m)	SST (°C)	SSS	Tag #	TL (mm)	Sex
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	45155	900	F
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	45156	790	F
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	45157	686	F
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	45158	782	F
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	45159	862	F
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	45160	893	F
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	47716	873	F
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	45161	830	F
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	45162	779	M
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	45163	805	F
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	45164	823	F
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	45165	849	F
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	45166	796	F
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	45167	904	F
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	45168	949	F
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	45169	856	F
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	45170	768	M
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	47717	809	F
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	45171	885	F
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	45172	841	F
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	45173	842	F
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	45174	885	F
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	45175	858	F
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	45176	855	F
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	45177	797	F
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	45178	860	F
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	45179	922	F
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	45180	891	F
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	47718	929	F
8/9/11	LN	17.5	10.3	1122	1140	4206.33	7036.77	21.9	19.2	29.7	45181	850	F
8/10/11	GN	NA	NA	430	710	4211.02	7034.23	39.3	17.2	30.5	45182	923	F
8/10/11	GN	NA	NA	430	710	4211.02	7034.23	39.3	17.2	30.5	45183	905	F
8/10/11	GN	NA	NA	430	710	4211.02	7034.23	39.3	17.2	30.5	45184	899	F
8/10/11	GN	NA	NA	430	710	4211.02	7034.23	39.3	17.2	30.5	45185	887	F
8/10/11	GN	NA	NA	430	710	4211.02	7034.23	39.3	17.2	30.5	45186	926	F
8/10/11	GN	NA	NA	430	710	4211.02	7034.23	39.3	17.2	30.5	45187	954	F
8/10/11	GN	NA	NA	430	710	4211.02	7034.23	39.3	17.2	30.5	45188	905	F
8/10/11	GN	NA	NA	430	710	4211.02	7034.23	39.3	17.2	30.5	45189	904	F
8/10/11	GN	NA	NA	430	710	4211.02	7034.23	39.3	17.2	30.5	45190	958	F
8/10/11	GN	NA	NA	430	710	4211.02	7034.23	39.3	17.2	30.5	47719	737	M
8/10/11	GN	NA	NA	430	710	4211.02	7034.23	39.3	17.2	30.5	47720	783	M

Appendix B (continued)

Date	Gear	Gear Dp (m)	Gear T (°C)	Time set	Time pulled	Latitude	Longitude	Dp (m)	SST (°C)	SSS	Tag #	TL (mm)	Sex
8/10/11	GN	NA	NA	430	710	4211.02	7034.23	39.3	17.2	30.5	47721	739	M
8/10/11	GN	NA	NA	430	710	4211.02	7034.23	39.3	17.2	30.5	47722	771	M
8/10/11	GN	NA	NA	430	710	4211.02	7034.23	39.3	17.2	30.5	45191	959	F
8/10/11	GN	NA	NA	430	710	4211.02	7034.23	39.3	17.2	30.5	45192	908	F
8/10/11	GN	NA	NA	430	710	4211.02	7034.23	39.3	17.2	30.5	45193	890	F
8/10/11	GN	NA	NA	430	710	4211.02	7034.23	39.3	17.2	30.5	45194	895	F
8/10/11	GN	NA	NA	430	710	4211.02	7034.23	39.3	17.2	30.5	45195	914	F
8/10/11	GN	NA	NA	430	710	4211.02	7034.23	39.3	17.2	30.5	45196	892	F
8/10/11	GN	NA	NA	430	710	4211.02	7034.23	39.3	17.2	30.5	45197	877	F
8/10/11	GN	NA	NA	430	710	4211.02	7034.23	39.3	17.2	30.5	45198	870	F
8/10/11	GN	NA	NA	430	710	4211.02	7034.23	39.3	17.2	30.5	45199	867	F
8/10/11	GN	NA	NA	430	710	4211.02	7034.23	39.3	17.2	30.5	45200	710	F
8/10/11	GN	NA	NA	430	710	4211.02	7034.23	39.3	17.2	30.5	45201	876	F
8/10/11	GN	NA	NA	430	710	4211.02	7034.23	39.3	17.2	30.5	45202	887	F
8/10/11	GN	NA	NA	430	710	4211.02	7034.23	39.3	17.2	30.5	45203	808	F
8/10/11	GN	NA	NA	430	710	4211.02	7034.23	39.3	17.2	30.5	45204	854	F
8/10/11	GN	NA	NA	430	710	4211.02	7034.23	39.3	17.2	30.5	45205	904	F
8/10/11	GN	NA	NA	430	710	4211.02	7034.23	39.3	17.2	30.5	45206	889	F
8/10/11	GN	NA	NA	430	710	4211.02	7034.23	39.3	17.2	30.5	45207	935	F
8/10/11	GN	NA	NA	430	710	4211.02	7034.23	39.3	17.2	30.5	45208	835	F
8/10/11	GN	NA	NA	430	710	4211.02	7034.23	39.3	17.2	30.5	45209	956	F
8/10/11	GN	NA	NA	430	710	4211.02	7034.23	39.3	17.2	30.5	45210	901	F
8/10/11	GN	NA	NA	430	710	4211.02	7034.23	39.3	17.2	30.5	47723	789	M
8/10/11	GN	NA	NA	430	710	4211.02	7034.23	39.3	17.2	30.5	45211	905	F
8/10/11	GN	NA	NA	430	710	4211.02	7034.23	39.3	17.2	30.5	45212	852	F
8/10/11	GN	NA	NA	430	710	4211.02	7034.23	39.3	17.2	30.5	45213	907	F
8/10/11	GN	NA	NA	430	710	4211.02	7034.23	39.3	17.2	30.5	45214	779	M
8/10/11	GN	NA	NA	430	710	4211.02	7034.23	39.3	17.2	30.5	45215	820	F
8/10/11	GN	NA	NA	430	710	4211.02	7034.23	39.3	17.2	30.5	45216	680	M
8/10/11	GN	NA	NA	430	710	4211.02	7034.23	39.3	17.2	30.5	45217	827	F
8/10/11	GN	NA	NA	430	710	4211.02	7034.23	39.3	17.2	30.5	45218	920	F
8/10/11	GN	NA	NA	430	710	4211.02	7034.23	39.3	17.2	30.5	45219	892	F
8/10/11	GN	NA	NA	430	710	4211.02	7034.23	39.3	17.2	30.5	45220	862	F
8/10/11	GN	NA	NA	430	710	4211.02	7034.23	39.3	17.2	30.5	47724	742	M
8/10/11	GN	NA	NA	430	710	4211.02	7034.23	39.3	17.2	30.5	45221	796	F
8/10/11	GN	NA	NA	430	710	4211.02	7034.23	39.3	17.2	30.5	45222	736	F
8/10/11	GN	NA	NA	430	710	4211.02	7034.23	39.3	17.2	30.5	45223	909	F
8/10/11	GN	NA	NA	430	710	4211.02	7034.23	39.3	17.2	30.5	45224	928	F
8/10/11	GN	NA	NA	430	710	4211.02	7034.23	39.3	17.2	30.5	45225	907	F
8/10/11	GN	NA	NA	430	710	4211.02	7034.23	39.3	17.2	30.5	45226	902	F
8/10/11	GN	NA	NA	430	710	4211.02	7034.23	39.3	17.2	30.5	45227	878	F

Appendix B (continued)

Date	Gear	Gear Dp (m)	Gear T (°C)	Time set	Time pulled	Latitude	Longitude	Dp (m)	SST (°C)	SSS	Tag #	TL (mm)	Sex
8/10/11	GN	NA	NA	430	710	4211.02	7034.23	39.3	17.2	30.5	45228	911	F
8/10/11	GN	NA	NA	430	710	4211.02	7034.23	39.3	17.2	30.5	45229	746	M
8/10/11	GN	NA	NA	430	710	4211.02	7034.23	39.3	17.2	30.5	45230	770	M
8/10/11	GN	NA	NA	430	710	4211.02	7034.23	39.3	17.2	30.5	45231	931	F
8/10/11	GN	NA	NA	430	710	4211.02	7034.23	39.3	17.2	30.5	45232	831	F
8/10/11	GN	NA	NA	430	710	4211.02	7034.23	39.3	17.2	30.5	45233	887	F
8/10/11	GN	NA	NA	430	710	4211.02	7034.23	39.3	17.2	30.5	45234	800	M
8/10/11	GN	NA	NA	430	710	4211.02	7034.23	39.3	17.2	30.5	45235	880	F
8/10/11	GN	NA	NA	430	710	4211.02	7034.23	39.3	17.2	30.5	45236	884	F
8/10/11	GN	NA	NA	430	710	4211.02	7034.23	39.3	17.2	30.5	45237	930	F
8/10/11	GN	NA	NA	430	710	4211.02	7034.23	39.3	17.2	30.5	45238	865	F
8/10/11	GN	NA	NA	430	710	4211.02	7034.23	39.3	17.2	30.5	45239	887	F
8/10/11	GN	NA	NA	430	710	4211.02	7034.23	39.3	17.2	30.5	45240	832	F
8/10/11	GN	NA	NA	430	710	4211.02	7034.23	39.3	17.2	30.5	45241	971	F
8/10/11	GN	NA	NA	430	710	4211.02	7034.23	39.3	17.2	30.5	45242	805	M
8/10/11	GN	NA	NA	430	710	4211.02	7034.23	39.3	17.2	30.5	45243	811	F
8/10/11	GN	NA	NA	430	710	4211.02	7034.23	39.3	17.2	30.5	45244	761	M
8/10/11	GN	NA	NA	430	710	4211.02	7034.23	39.3	17.2	30.5	45245	776	M
8/10/11	GN	NA	NA	430	710	4211.02	7034.23	39.3	17.2	30.5	45246	825	F
8/10/11	GN	NA	NA	430	710	4211.02	7034.23	39.3	17.2	30.5	45247	839	F
8/10/11	GN	NA	NA	430	710	4211.02	7034.23	39.3	17.2	30.5	45248	754	M
8/10/11	GN	NA	NA	430	710	4211.02	7034.23	39.3	17.2	30.5	45249	858	F
8/10/11	GN	NA	NA	430	710	4211.02	7034.23	39.3	17.2	30.5	45250	815	F
8/10/11	GN	NA	NA	430	710	4211.02	7034.23	39.3	17.2	30.5	47725	859	F
8/10/11	GN	NA	NA	430	710	4211.02	7034.23	39.3	17.2	30.5	45251	862	F
8/10/11	GN	NA	NA	430	710	4211.02	7034.23	39.3	17.2	30.5	45252	789	M
8/10/11	GN	NA	NA	430	710	4211.02	7034.23	39.3	17.2	30.5	45253	792	M
8/10/11	GN	NA	NA	430	710	4211.02	7034.23	39.3	17.2	30.5	45254	807	F
8/10/11	GN	NA	NA	430	710	4211.02	7034.23	39.3	17.2	30.5	45255	810	F
8/10/11	GN	NA	NA	430	710	4211.02	7034.23	39.3	17.2	30.5	45256	786	M
8/10/11	GN	NA	NA	430	710	4211.02	7034.23	39.3	17.2	30.5	45257	880	F
8/10/11	GN	NA	NA	430	710	4211.02	7034.23	39.3	17.2	30.5	45258	972	F
8/10/11	GN	NA	NA	430	710	4211.02	7034.23	39.3	17.2	30.5	45259	854	F
8/10/11	GN	NA	NA	430	710	4211.02	7034.23	39.3	17.2	30.5	45260	855	F
8/10/11	GN	NA	NA	430	710	4211.02	7034.23	39.3	17.2	30.5	47726	1002	F
8/10/11	GN	NA	NA	430	710	4211.02	7034.23	39.3	17.2	30.5	45261	903	F
8/10/11	GN	NA	NA	430	710	4211.02	7034.23	39.3	17.2	30.5	45262	919	F
8/10/11	GN	NA	NA	430	710	4211.02	7034.23	39.3	17.2	30.5	45263	874	F
8/10/11	GN	NA	NA	430	710	4211.02	7034.23	39.3	17.2	30.5	45264	826	F
8/10/11	GN	NA	NA	430	710	4211.02	7034.23	39.3	17.2	30.5	45265	871	F
8/10/11	GN	NA	NA	430	710	4211.02	7034.23	39.3	17.2	30.5	45266	887	F

Appendix B (continued)

Date	Gear	Gear Dp (m)	Gear T (°C)	Time set	Time pulled	Latitude	Longitude	Dp (m)	SST (°C)	SSS	Tag #	TL (mm)	Sex
8/10/11	GN	NA	NA	430	710	4211.02	7034.23	39.3	17.2	30.5	45267	875	F
8/10/11	GN	NA	NA	430	710	4211.02	7034.23	39.3	17.2	30.5	45268	879	F
8/10/11	GN	NA	NA	430	710	4211.02	7034.23	39.3	17.2	30.5	45269	858	F
8/10/11	GN	NA	NA	430	710	4211.02	7034.23	39.3	17.2	30.5	45270	848	F
8/10/11	GN	NA	NA	430	710	4211.02	7034.23	39.3	17.2	30.5	47727	876	F
8/10/11	GN	NA	NA	430	710	4211.02	7034.23	39.3	17.2	30.5	45271	898	F
8/10/11	GN	NA	NA	430	710	4211.02	7034.23	39.3	17.2	30.5	45272	924	F
8/10/11	GN	NA	NA	430	710	4211.02	7034.23	39.3	17.2	30.5	45273	795	M
8/10/11	GN	NA	NA	430	710	4211.02	7034.23	39.3	17.2	30.5	45274	823	F
8/10/11	GN	NA	NA	430	710	4211.02	7034.23	39.3	17.2	30.5	45275	950	F
8/10/11	GN	NA	NA	430	710	4211.02	7034.23	39.3	17.2	30.5	45276	824	F
8/10/11	GN	NA	NA	430	710	4211.02	7034.23	39.3	17.2	30.5	45277	860	F
8/10/11	GN	NA	NA	430	710	4211.02	7034.23	39.3	17.2	30.5	45278	889	F
8/10/11	GN	NA	NA	430	710	4211.02	7034.23	39.3	17.2	30.5	45279	878	F
8/10/11	GN	NA	NA	430	710	4211.02	7034.23	39.3	17.2	30.5	45280	842	F
8/10/11	GN	NA	NA	430	710	4211.02	7034.23	39.3	17.2	30.5	47728	858	F
8/10/11	GN	NA	NA	430	710	4211.02	7034.23	39.3	17.2	30.5	45281	862	F
8/10/11	GN	NA	NA	430	710	4211.02	7034.23	39.3	17.2	30.5	45282	897	F
8/10/11	GN	NA	NA	430	710	4211.02	7034.23	39.3	17.2	30.5	45283	941	F
8/10/11	GN	NA	NA	430	710	4211.02	7034.23	39.3	17.2	30.5	45284	845	F
8/10/11	GN	NA	NA	430	710	4211.02	7034.23	39.3	17.2	30.5	45285	886	F
8/10/11	GN	NA	NA	430	710	4211.02	7034.23	39.3	17.2	30.5	45286	801	M
8/10/11	GN	NA	NA	430	710	4211.02	7034.23	39.3	17.2	30.5	45287	883	F
8/10/11	GN	NA	NA	430	710	4211.02	7034.23	39.3	17.2	30.5	45288	969	F
8/10/11	GN	NA	NA	430	710	4211.02	7034.23	39.3	17.2	30.5	45289	876	F
8/10/11	GN	NA	NA	430	710	4211.02	7034.23	39.3	17.2	30.5	45290	722	F
8/10/11	GN	NA	NA	430	710	4211.02	7034.23	39.3	17.2	30.5	47729	846	F
8/10/11	GN	NA	NA	430	710	4211.02	7034.23	39.3	17.2	30.5	45291	731	M
8/10/11	GN	NA	NA	430	710	4211.02	7034.23	39.3	17.2	30.5	45292	874	F
8/10/11	GN	NA	NA	430	710	4211.02	7034.23	39.3	17.2	30.5	45293	870	F
8/10/11	GN	NA	NA	430	710	4211.02	7034.23	39.3	17.2	30.5	45294	819	M
8/10/11	GN	NA	NA	430	710	4211.02	7034.23	39.3	17.2	30.5	45295	905	F
8/10/11	GN	NA	NA	430	710	4211.02	7034.23	39.3	17.2	30.5	45296	896	F
8/10/11	GN	NA	NA	430	710	4211.02	7034.23	39.3	17.2	30.5	45297	830	M
8/10/11	GN	NA	NA	430	710	4211.02	7034.23	39.3	17.2	30.5	45298	817	F
8/10/11	GN	NA	NA	430	710	4211.02	7034.23	39.3	17.2	30.5	45299	870	F
8/10/11	GN	NA	NA	430	710	4211.02	7034.23	39.3	17.2	30.5	45300	788	F
8/10/11	GN	NA	NA	430	710	4211.02	7034.23	39.3	17.2	30.5	47730	825	F
8/10/11	GN	NA	NA	430	710	4211.02	7034.23	39.3	17.2	30.5	45301	931	F
8/10/11	GN	NA	NA	430	710	4211.02	7034.23	39.3	17.2	30.5	45302	889	F
8/10/11	GN	NA	NA	430	710	4211.02	7034.23	39.3	17.2	30.5	45303	894	F

Appendix B (continued)

Date	Gear	Gear Dp (m)	Gear T (°C)	Time set	Time pulled	Latitude	Longitude	Dp (m)	SST (°C)	SSS	Tag #	TL (mm)	Sex
8/10/11	GN	NA	NA	430	710	4211.02	7034.23	39.3	17.2	30.5	45304	805	M
8/10/11	GN	NA	NA	430	710	4211.02	7034.23	39.3	17.2	30.5	45305	966	F
8/10/11	GN	NA	NA	430	710	4211.02	7034.23	39.3	17.2	30.5	45306	937	F
8/10/11	GN	NA	NA	430	710	4211.02	7034.23	39.3	17.2	30.5	45307	852	F
8/10/11	GN	NA	NA	430	710	4211.02	7034.23	39.3	17.2	30.5	45308	857	F
8/10/11	GN	NA	NA	430	710	4211.02	7034.23	39.3	17.2	30.5	45309	789	M
8/10/11	GN	NA	NA	430	710	4211.02	7034.23	39.3	17.2	30.5	45310	899	F
8/10/11	GN	NA	NA	430	710	4211.02	7034.23	39.3	17.2	30.5	47731	862	F
8/10/11	GN	NA	NA	430	710	4211.02	7034.23	39.3	17.2	30.5	45311	879	F
8/10/11	GN	NA	NA	430	710	4211.02	7034.23	39.3	17.2	30.5	45312	930	F
8/10/11	GN	NA	NA	430	710	4211.02	7034.23	39.3	17.2	30.5	45313	885	F
8/10/11	GN	NA	NA	430	710	4211.02	7034.23	39.3	17.2	30.5	45314	914	F
8/10/11	GN	NA	NA	430	710	4211.02	7034.23	39.3	17.2	30.5	45315	1000	F
8/10/11	GN	NA	NA	430	710	4211.02	7034.23	39.3	17.2	30.5	45316	929	F
8/10/11	GN	NA	NA	450	843	4213.97	7032.22	NA	NA	NA	45317	881	F
8/10/11	GN	NA	NA	450	843	4213.97	7032.22	NA	NA	NA	45318	881	F
8/10/11	GN	NA	NA	450	843	4213.97	7032.22	NA	NA	NA	45319	960	F
8/10/11	GN	NA	NA	450	843	4213.97	7032.22	NA	NA	NA	45320	813	F
8/10/11	GN	NA	NA	450	843	4213.97	7032.22	NA	NA	NA	47732	893	F
8/10/11	GN	NA	NA	450	843	4213.97	7032.22	NA	NA	NA	45321	827	F
8/10/11	GN	NA	NA	450	843	4213.97	7032.22	NA	NA	NA	45322	880	F
8/10/11	GN	NA	NA	450	843	4213.97	7032.22	NA	NA	NA	45323	719	M
8/10/11	GN	NA	NA	450	843	4213.97	7032.22	NA	NA	NA	45324	913	F
8/10/11	GN	NA	NA	450	843	4213.97	7032.22	NA	NA	NA	45325	939	F
8/10/11	GN	NA	NA	450	843	4213.97	7032.22	NA	NA	NA	45326	915	F
8/10/11	GN	NA	NA	450	843	4213.97	7032.22	NA	NA	NA	45327	919	F
8/10/11	GN	NA	NA	450	843	4213.97	7032.22	NA	NA	NA	45328	853	M
8/10/11	GN	NA	NA	450	843	4213.97	7032.22	NA	NA	NA	45329	831	F
8/10/11	GN	NA	NA	450	843	4213.97	7032.22	NA	NA	NA	45330	757	F
8/10/11	GN	NA	NA	450	843	4213.97	7032.22	NA	NA	NA	47733	869	F
8/10/11	GN	NA	NA	450	843	4213.97	7032.22	NA	NA	NA	45331	862	F
8/10/11	GN	NA	NA	450	843	4213.97	7032.22	NA	NA	NA	45332	758	M
8/10/11	GN	NA	NA	450	843	4213.97	7032.22	NA	NA	NA	45333	739	M
8/10/11	GN	NA	NA	450	843	4213.97	7032.22	NA	NA	NA	45334	857	F
8/10/11	GN	NA	NA	450	843	4213.97	7032.22	NA	NA	NA	45335	875	M
8/10/11	GN	NA	NA	450	843	4213.97	7032.22	NA	NA	NA	45336	867	F
8/10/11	GN	NA	NA	450	843	4213.97	7032.22	NA	NA	NA	45337	869	F
8/10/11	GN	NA	NA	450	843	4213.97	7032.22	NA	NA	NA	45338	847	F
8/10/11	GN	NA	NA	450	843	4213.97	7032.22	NA	NA	NA	45339	839	F
8/10/11	GN	NA	NA	450	843	4213.97	7032.22	NA	NA	NA	45340	802	M
8/10/11	GN	NA	NA	450	843	4213.97	7032.22	NA	NA	NA	47734	840	F

Appendix B (continued)

Date	Gear	Gear Dp (m)	Gear T (°C)	Time set	Time pulled	Latitude	Longitude	Dp (m)	SST (°C)	SSS	Tag #	TL (mm)	Sex
8/10/11	GN	NA	NA	450	843	4213.97	7032.22	NA	NA	NA	45341	875	F
8/10/11	GN	NA	NA	450	843	4213.97	7032.22	NA	NA	NA	45342	772	F
8/10/11	GN	NA	NA	450	843	4213.97	7032.22	NA	NA	NA	45343	878	F
8/10/11	GN	NA	NA	450	843	4213.97	7032.22	NA	NA	NA	45344	801	M
8/10/11	GN	NA	NA	450	843	4213.97	7032.22	NA	NA	NA	45345	889	F
8/10/11	GN	NA	NA	450	843	4213.97	7032.22	NA	NA	NA	45346	822	M
8/10/11	GN	NA	NA	450	843	4213.97	7032.22	NA	NA	NA	45347	870	F
8/10/11	GN	NA	NA	450	843	4213.97	7032.22	NA	NA	NA	45348	850	F
8/10/11	GN	NA	NA	450	843	4213.97	7032.22	NA	NA	NA	45349	971	F
8/10/11	GN	NA	NA	450	843	4213.97	7032.22	NA	NA	NA	45350	861	F
8/10/11	GN	NA	NA	450	843	4213.97	7032.22	NA	NA	NA	47735	878	F
8/10/11	GN	NA	NA	450	843	4213.97	7032.22	NA	NA	NA	45351	838	F
8/10/11	GN	NA	NA	450	843	4213.97	7032.22	NA	NA	NA	45352	866	F
8/10/11	GN	NA	NA	450	843	4213.97	7032.22	NA	NA	NA	45353	885	F
8/10/11	GN	NA	NA	450	843	4213.97	7032.22	NA	NA	NA	45354	865	F
8/10/11	GN	NA	NA	450	843	4213.97	7032.22	NA	NA	NA	45355	865	F
8/10/11	GN	NA	NA	450	843	4213.97	7032.22	NA	NA	NA	45356	883	F
8/10/11	GN	NA	NA	450	843	4213.97	7032.22	NA	NA	NA	45357	869	F
8/10/11	GN	NA	NA	450	843	4213.97	7032.22	NA	NA	NA	45358	939	F
8/10/11	GN	NA	NA	450	843	4213.97	7032.22	NA	NA	NA	45359	756	M
8/10/11	GN	NA	NA	450	843	4213.97	7032.22	NA	NA	NA	45360	868	F
8/10/11	GN	NA	NA	450	843	4213.97	7032.22	NA	NA	NA	47736	882	F
8/10/11	GN	NA	NA	450	843	4213.97	7032.22	NA	NA	NA	45361	885	F
8/10/11	GN	NA	NA	450	843	4213.97	7032.22	NA	NA	NA	45362	760	M
8/10/11	GN	NA	NA	450	843	4213.97	7032.22	NA	NA	NA	45363	892	F
8/10/11	GN	NA	NA	450	843	4213.97	7032.22	NA	NA	NA	45364	881	F
8/10/11	GN	NA	NA	450	843	4213.97	7032.22	NA	NA	NA	45365	805	F
8/10/11	GN	NA	NA	450	843	4213.97	7032.22	NA	NA	NA	45366	794	M
8/10/11	GN	NA	NA	450	843	4213.97	7032.22	NA	NA	NA	45367	854	F
8/10/11	GN	NA	NA	450	843	4213.97	7032.22	NA	NA	NA	45368	750	M
8/10/11	GN	NA	NA	450	843	4213.97	7032.22	NA	NA	NA	45369	902	F
8/10/11	GN	NA	NA	450	843	4213.97	7032.22	NA	NA	NA	45370	767	M
8/10/11	GN	NA	NA	450	843	4213.97	7032.22	NA	NA	NA	47737	895	F
8/10/11	GN	NA	NA	450	843	4213.97	7032.22	NA	NA	NA	45371	892	F
8/10/11	GN	NA	NA	450	843	4213.97	7032.22	NA	NA	NA	45372	928	F
8/10/11	GN	NA	NA	450	843	4213.97	7032.22	NA	NA	NA	45373	935	F
8/10/11	GN	NA	NA	450	843	4213.97	7032.22	NA	NA	NA	45374	779	F
8/10/11	GN	NA	NA	450	843	4213.97	7032.22	NA	NA	NA	45375	900	F
8/10/11	GN	NA	NA	450	843	4213.97	7032.22	NA	NA	NA	45376	876	F
8/10/11	GN	NA	NA	450	843	4213.97	7032.22	NA	NA	NA	45377	793	M
8/10/11	GN	NA	NA	450	843	4213.97	7032.22	NA	NA	NA	45378	719	M

Appendix B (continued)

Date	Gear	Gear Dp (m)	Gear T (°C)	Time set	Time pulled	Latitude	Longitude	Dp (m)	SST (°C)	SSS	Tag #	TL (mm)	Sex
8/10/11	GN	NA	NA	450	843	4213.97	7032.22	NA	NA	NA	45379	740	M
8/10/11	GN	NA	NA	450	843	4213.97	7032.22	NA	NA	NA	45380	802	M
8/10/11	GN	NA	NA	450	843	4213.97	7032.22	NA	NA	NA	47738	920	F
8/10/11	GN	NA	NA	450	843	4213.97	7032.22	NA	NA	NA	45381	765	M
8/10/11	GN	NA	NA	450	843	4213.97	7032.22	NA	NA	NA	45382	838	F
8/10/11	GN	NA	NA	450	843	4213.97	7032.22	NA	NA	NA	45383	850	F
8/10/11	GN	NA	NA	450	843	4213.97	7032.22	NA	NA	NA	45384	871	F
8/10/11	GN	NA	NA	450	843	4213.97	7032.22	NA	NA	NA	45385	881	F
8/10/11	GN	NA	NA	450	843	4213.97	7032.22	NA	NA	NA	45386	796	M
8/10/11	GN	NA	NA	450	843	4213.97	7032.22	NA	NA	NA	45387	756	M
8/10/11	GN	NA	NA	450	843	4213.97	7032.22	NA	NA	NA	45388	899	F
8/10/11	GN	NA	NA	450	843	4213.97	7032.22	NA	NA	NA	45389	842	F
8/10/11	GN	NA	NA	450	843	4213.97	7032.22	NA	NA	NA	45390	708	M
8/10/11	GN	NA	NA	450	843	4213.97	7032.22	NA	NA	NA	47739	896	F
8/10/11	GN	NA	NA	450	843	4213.97	7032.22	NA	NA	NA	45391	847	F
8/10/11	GN	NA	NA	450	843	4213.97	7032.22	NA	NA	NA	45392	883	F
8/10/11	GN	NA	NA	450	843	4213.97	7032.22	NA	NA	NA	45393	821	F
8/10/11	GN	NA	NA	NA	NA	NA	NA	NA	NA	NA	45394	841	F
8/10/11	GN	NA	NA	NA	NA	NA	NA	NA	NA	NA	45395	789	M
8/10/11	GN	NA	NA	NA	NA	NA	NA	NA	NA	NA	45396	821	F
8/10/11	GN	NA	NA	NA	NA	NA	NA	NA	NA	NA	47740	807	F
8/10/11	GN	17.1	9.9	1133	1205	4207.74	7036.66	46.8	16.6	30.6	45397	796	F
8/10/11	GN	17.1	9.9	1133	1205	4207.74	7036.66	46.8	16.6	30.6	45398	878	F
8/10/11	GN	17.1	9.9	1133	1205	4207.74	7036.66	46.8	16.6	30.6	45399	878	F
8/10/11	GN	17.1	9.9	1133	1205	4207.74	7036.66	46.8	16.6	30.6	45400	917	F
8/10/11	GN	17.1	9.9	1133	1205	4207.74	7036.66	46.8	16.6	30.6	47741	903	F
8/10/11	GN	17.1	9.9	1133	1205	4207.74	7036.66	46.8	16.6	30.6	47742	871	F
8/10/11	GN	17.1	9.9	1133	1205	4207.74	7036.66	46.8	16.6	30.6	47743	878	F
8/10/11	GN	17.1	9.9	1133	1205	4207.74	7036.66	46.8	16.6	30.6	47744	837	F
8/10/11	GN	17.1	9.9	1133	1205	4207.74	7036.66	46.8	16.6	30.6	45401	842	F
8/10/11	GN	17.1	9.9	1133	1205	4207.74	7036.66	46.8	16.6	30.6	45402	856	F
8/10/11	GN	17.1	9.9	1133	1205	4207.74	7036.66	46.8	16.6	30.6	45403	936	F
8/10/11	GN	17.1	9.9	1133	1205	4207.74	7036.66	46.8	16.6	30.6	45404	896	F
8/10/11	GN	17.1	9.9	1133	1205	4207.74	7036.66	46.8	16.6	30.6	45405	940	F
8/10/11	GN	17.1	9.9	1133	1205	4207.74	7036.66	46.8	16.6	30.6	45406	871	F
8/10/11	GN	17.1	9.9	1133	1205	4207.74	7036.66	46.8	16.6	30.6	45407	898	F
8/10/11	GN	17.1	9.9	1133	1205	4207.74	7036.66	46.8	16.6	30.6	45408	841	F
8/10/11	GN	17.1	9.9	1133	1205	4207.74	7036.66	46.8	16.6	30.6	45409	920	F
8/10/11	GN	17.1	9.9	1133	1205	4207.74	7036.66	46.8	16.6	30.6	45410	812	F
8/10/11	GN	17.1	9.9	1133	1205	4207.74	7036.66	46.8	16.6	30.6	45411	784	F
8/10/11	GN	17.1	9.9	1133	1205	4207.74	7036.66	46.8	16.6	30.6	45412	941	F

Appendix B (continued)

Date	Gear	Gear Dp (m)	Gear T (°C)	Time set	Time pulled	Latitude	Longitude	Dp (m)	SST (°C)	SSS	Tag #	TL (mm)	Sex
8/10/11	GN	17.1	9.9	1133	1205	4207.74	7036.66	46.8	16.6	30.6	45413	860	F
8/10/11	GN	17.1	9.9	1133	1205	4207.74	7036.66	46.8	16.6	30.6	45414	764	F
8/10/11	GN	17.1	9.9	1133	1205	4207.74	7036.66	46.8	16.6	30.6	45415	738	F
8/10/11	GN	17.1	9.9	1133	1205	4207.74	7036.66	46.8	16.6	30.6	45416	821	F
8/10/11	GN	17.1	9.9	1133	1205	4207.74	7036.66	46.8	16.6	30.6	45417	758	F
8/10/11	GN	17.1	9.9	1133	1205	4207.74	7036.66	46.8	16.6	30.6	45418	907	F
8/10/11	GN	17.1	9.9	1133	1205	4207.74	7036.66	46.8	16.6	30.6	45419	697	F
8/10/11	GN	17.1	9.9	1133	1205	4207.74	7036.66	46.8	16.6	30.6	45420	861	F
8/10/11	GN	17.1	9.9	1133	1205	4207.74	7036.66	46.8	16.6	30.6	45421	889	F
8/10/11	GN	17.1	9.9	1133	1205	4207.74	7036.66	46.8	16.6	30.6	45422	802	F
8/10/11	GN	17.1	9.9	1133	1205	4207.74	7036.66	46.8	16.6	30.6	45423	859	F
8/10/11	GN	17.1	9.9	1133	1205	4207.74	7036.66	46.8	16.6	30.6	45424	801	F
8/10/11	GN	17.1	9.9	1133	1205	4207.74	7036.66	46.8	16.6	30.6	45425	890	F
8/10/11	GN	17.1	9.9	1133	1205	4207.74	7036.66	46.8	16.6	30.6	45426	849	F
8/10/11	GN	17.1	9.9	1133	1205	4207.74	7036.66	46.8	16.6	30.6	45427	815	F
8/10/11	GN	17.1	9.9	1133	1205	4207.74	7036.66	46.8	16.6	30.6	45428	842	F
8/10/11	GN	17.1	9.9	1133	1205	4207.74	7036.66	46.8	16.6	30.6	45429	813	F
8/10/11	GN	17.1	9.9	1133	1205	4207.74	7036.66	46.8	16.6	30.6	45430	865	F
8/10/11	GN	17.1	9.9	1133	1205	4207.74	7036.66	46.8	16.6	30.6	45431	811	F
8/10/11	GN	17.1	9.9	1133	1205	4207.74	7036.66	46.8	16.6	30.6	45432	825	F
8/10/11	GN	17.1	9.9	1133	1205	4207.74	7036.66	46.8	16.6	30.6	45433	860	F
8/10/11	GN	17.1	9.9	1133	1205	4207.74	7036.66	46.8	16.6	30.6	45434	843	F
8/10/11	GN	17.1	9.9	1133	1205	4207.74	7036.66	46.8	16.6	30.6	45435	878	F
8/10/11	GN	17.1	9.9	1133	1205	4207.74	7036.66	46.8	16.6	30.6	45436	836	F
8/10/11	GN	17.1	9.9	1133	1205	4207.74	7036.66	46.8	16.6	30.6	45437	775	F
8/10/11	GN	17.1	9.9	1133	1205	4207.74	7036.66	46.8	16.6	30.6	45438	875	F
8/10/11	GN	17.1	9.9	1133	1205	4207.74	7036.66	46.8	16.6	30.6	45439	904	F
8/10/11	GN	17.1	9.9	1133	1205	4207.74	7036.66	46.8	16.6	30.6	45440	790	F
8/10/11	GN	17.1	9.9	1133	1205	4207.74	7036.66	46.8	16.6	30.6	45441	816	F
8/10/11	GN	17.1	9.9	1133	1205	4207.74	7036.66	46.8	16.6	30.6	45442	798	F
8/10/11	GN	17.1	9.9	1133	1205	4207.74	7036.66	46.8	16.6	30.6	45443	911	F
8/10/11	GN	17.1	9.9	1133	1205	4207.74	7036.66	46.8	16.6	30.6	45444	887	F
8/10/11	GN	17.1	9.9	1133	1205	4207.74	7036.66	46.8	16.6	30.6	45445	836	F
8/10/11	GN	17.1	9.9	1133	1205	4207.74	7036.66	46.8	16.6	30.6	45446	1015	F
8/10/11	GN	17.1	9.9	1133	1205	4207.74	7036.66	46.8	16.6	30.6	45447	869	F
8/10/11	GN	17.1	9.9	1133	1205	4207.74	7036.66	46.8	16.6	30.6	45448	863	F
8/10/11	GN	17.1	9.9	1133	1205	4207.74	7036.66	46.8	16.6	30.6	45449	921	F
8/10/11	GN	17.1	9.9	1133	1205	4207.74	7036.66	46.8	16.6	30.6	45450	895	F
8/10/11	GN	17.1	9.9	1133	1205	4207.74	7036.66	46.8	16.6	30.6	47745	807	F
8/10/11	GN	17.1	9.9	1133	1205	4207.74	7036.66	46.8	16.6	30.6	45451	758	M
8/10/11	GN	17.1	9.9	1133	1205	4207.74	7036.66	46.8	16.6	30.6	45452	839	F

Appendix B (continued)

Date	Gear	Gear Dp (m)	Gear T (°C)	Time set	Time pulled	Latitude	Longitude	Dp (m)	SST (°C)	SSS	Tag #	TL (mm)	Sex
8/10/11	GN	17.1	9.9	1133	1205	4207.74	7036.66	46.8	16.6	30.6	45453	900	F
8/10/11	GN	17.1	9.9	1133	1205	4207.74	7036.66	46.8	16.6	30.6	45454	857	F
8/10/11	GN	17.1	9.9	1133	1205	4207.74	7036.66	46.8	16.6	30.6	45455	861	F
8/10/11	GN	17.1	9.9	1133	1205	4207.74	7036.66	46.8	16.6	30.6	45456	998	F
8/10/11	GN	17.1	9.9	1133	1205	4207.74	7036.66	46.8	16.6	30.6	45457	908	F
8/10/11	GN	17.1	9.9	1133	1205	4207.74	7036.66	46.8	16.6	30.6	45458	724	F
8/10/11	GN	17.1	9.9	1133	1205	4207.74	7036.66	46.8	16.6	30.6	45459	860	F
8/10/11	GN	17.1	9.9	1133	1205	4207.74	7036.66	46.8	16.6	30.6	45460	851	F
8/10/11	GN	17.1	9.9	1133	1205	4207.74	7036.66	46.8	16.6	30.6	47746	904	F
8/10/11	GN	17.1	9.9	1133	1205	4207.74	7036.66	46.8	16.6	30.6	45461	899	F
8/10/11	GN	17.1	9.9	1133	1205	4207.74	7036.66	46.8	16.6	30.6	45462	887	F
8/10/11	GN	17.1	9.9	1133	1205	4207.74	7036.66	46.8	16.6	30.6	45463	887	F
8/10/11	GN	17.1	9.9	1133	1205	4207.74	7036.66	46.8	16.6	30.6	45464	921	F
8/10/11	GN	17.1	9.9	1133	1205	4207.74	7036.66	46.8	16.6	30.6	45465	845	F
8/10/11	GN	17.1	9.9	1133	1205	4207.74	7036.66	46.8	16.6	30.6	45466	879	F
8/10/11	GN	17.1	9.9	1133	1205	4207.74	7036.66	46.8	16.6	30.6	45467	900	F
8/10/11	GN	17.1	9.9	1133	1205	4207.74	7036.66	46.8	16.6	30.6	45468	878	F
8/10/11	GN	17.1	9.9	1133	1205	4207.74	7036.66	46.8	16.6	30.6	45469	758	F
8/10/11	GN	15.9	10.1	1146	1220	4207.74	7036.56	43.8	16.6	30.6	45470	920	F
8/10/11	GN	15.9	10.1	1146	1220	4207.74	7036.56	43.8	16.6	30.6	47747	848	F
8/10/11	GN	15.9	10.1	1146	1220	4207.74	7036.56	43.8	16.6	30.6	45471	730	M
8/10/11	GN	15.9	10.1	1146	1220	4207.74	7036.56	43.8	16.6	30.6	45472	895	F
8/10/11	GN	15.9	10.1	1146	1220	4207.74	7036.56	43.8	16.6	30.6	45473	905	F
8/10/11	GN	15.9	10.1	1146	1220	4207.74	7036.56	43.8	16.6	30.6	45474	904	F
8/10/11	GN	15.9	10.1	1146	1220	4207.74	7036.56	43.8	16.6	30.6	45475	859	F
8/10/11	GN	15.9	10.1	1146	1220	4207.74	7036.56	43.8	16.6	30.6	45476	850	F
8/10/11	GN	15.9	10.1	1146	1220	4207.74	7036.56	43.8	16.6	30.6	45477	871	F
8/10/11	GN	15.9	10.1	1146	1220	4207.74	7036.56	43.8	16.6	30.6	45478	837	F
8/10/11	GN	15.9	10.1	1146	1220	4207.74	7036.56	43.8	16.6	30.6	45479	828	F
8/10/11	GN	15.9	10.1	1146	1220	4207.74	7036.56	43.8	16.6	30.6	45480	838	F
8/10/11	GN	15.9	10.1	1146	1220	4207.74	7036.56	43.8	16.6	30.6	47748	901	F
8/10/11	GN	15.9	10.1	1146	1220	4207.74	7036.56	43.8	16.6	30.6	45481	868	F
8/10/11	GN	15.9	10.1	1146	1220	4207.74	7036.56	43.8	16.6	30.6	45482	881	F
8/10/11	GN	15.9	10.1	1146	1220	4207.74	7036.56	43.8	16.6	30.6	45483	865	F
8/10/11	GN	15.9	10.1	1146	1220	4207.74	7036.56	43.8	16.6	30.6	45484	838	F
8/10/11	GN	15.9	10.1	1146	1220	4207.74	7036.56	43.8	16.6	30.6	45485	743	F
8/10/11	GN	15.9	10.1	1146	1220	4207.74	7036.56	43.8	16.6	30.6	45486	864	F
8/10/11	GN	15.9	10.1	1146	1220	4207.74	7036.56	43.8	16.6	30.6	45487	940	F
8/10/11	GN	15.9	10.1	1146	1220	4207.74	7036.56	43.8	16.6	30.6	45488	780	F
8/10/11	GN	15.9	10.1	1146	1220	4207.74	7036.56	43.8	16.6	30.6	45489	940	F
8/10/11	GN	15.9	10.1	1146	1220	4207.74	7036.56	43.8	16.6	30.6	45490	815	F

Appendix B (continued)

Date	Gear	Gear Dp (m)	Gear T (°C)	Time set	Time pulled	Latitude	Longitude	Dp (m)	SST (°C)	SSS	Tag #	TL (mm)	Sex
8/10/11	GN	15.9	10.1	1146	1220	4207.74	7036.56	43.8	16.6	30.6	47749	853	F
8/10/11	GN	15.9	10.1	1146	1220	4207.74	7036.56	43.8	16.6	30.6	45491	874	F
8/10/11	GN	15.9	10.1	1146	1220	4207.74	7036.56	43.8	16.6	30.6	45492	807	F
8/10/11	GN	15.9	10.1	1146	1220	4207.74	7036.56	43.8	16.6	30.6	45493	854	F
8/10/11	GN	15.9	10.1	1146	1220	4207.74	7036.56	43.8	16.6	30.6	45494	900	F
8/10/11	GN	15.9	10.1	1146	1220	4207.74	7036.56	43.8	16.6	30.6	45496	924	F
8/10/11	GN	15.9	10.1	1146	1220	4207.74	7036.56	43.8	16.6	30.6	45497	888	F
8/10/11	GN	15.9	10.1	1146	1220	4207.74	7036.56	43.8	16.6	30.6	45498	894	F
8/10/11	GN	15.9	10.1	1146	1220	4207.74	7036.56	43.8	16.6	30.6	45499	753	F
8/10/11	GN	15.9	10.1	1146	1220	4207.74	7036.56	43.8	16.6	30.6	45500	938	F
8/10/11	GN	15.9	10.1	1146	1220	4207.74	7036.56	43.8	16.6	30.6	47750	880	F
8/10/11	GN	15.9	10.1	1146	1220	4207.74	7036.56	43.8	16.6	30.6	45501	930	F
8/10/11	GN	15.9	10.1	1146	1220	4207.74	7036.56	43.8	16.6	30.6	45502	811	F
8/10/11	GN	15.9	10.1	1146	1220	4207.74	7036.56	43.8	16.6	30.6	45503	851	F
8/10/11	GN	15.9	10.1	1146	1220	4207.74	7036.56	43.8	16.6	30.6	45504	848	F
8/10/11	GN	15.9	10.1	1146	1220	4207.74	7036.56	43.8	16.6	30.6	45505	850	F
8/10/11	GN	15.9	10.1	1146	1220	4207.74	7036.56	43.8	16.6	30.6	45506	888	F
8/10/11	GN	15.9	10.1	1146	1220	4207.74	7036.56	43.8	16.6	30.6	45507	784	F
8/10/11	GN	15.9	10.1	1146	1220	4207.74	7036.56	43.8	16.6	30.6	45508	895	F
8/10/11	GN	15.9	10.1	1146	1220	4207.74	7036.56	43.8	16.6	30.6	45509	940	F
8/10/11	GN	15.9	10.1	1146	1220	4207.74	7036.56	43.8	16.6	30.6	45510	956	F
8/10/11	GN	15.9	10.1	1146	1220	4207.74	7036.56	43.8	16.6	30.6	47751	771	F
8/10/11	GN	15.9	10.1	1146	1220	4207.74	7036.56	43.8	16.6	30.6	45511	867	F
8/10/11	GN	15.9	10.1	1146	1220	4207.74	7036.56	43.8	16.6	30.6	45512	878	F
8/10/11	GN	15.9	10.1	1146	1220	4207.74	7036.56	43.8	16.6	30.6	45513	914	F
8/10/11	GN	15.9	10.1	1146	1220	4207.74	7036.56	43.8	16.6	30.6	45514	934	F
8/10/11	GN	15.9	10.1	1146	1220	4207.74	7036.56	43.8	16.6	30.6	45515	940	F
8/10/11	GN	15.9	10.1	1146	1220	4207.74	7036.56	43.8	16.6	30.6	45516	936	F
8/10/11	GN	15.9	10.1	1146	1220	4207.74	7036.56	43.8	16.6	30.6	45517	890	F
8/10/11	GN	15.9	10.1	1146	1220	4207.74	7036.56	43.8	16.6	30.6	45518	828	F
8/10/11	GN	15.9	10.1	1146	1220	4207.74	7036.56	43.8	16.6	30.6	45519	857	F
8/10/11	GN	15.9	10.1	1146	1220	4207.74	7036.56	43.8	16.6	30.6	45520	871	F
8/10/11	GN	15.9	10.1	1146	1220	4207.74	7036.56	43.8	16.6	30.6	47752	918	F
8/10/11	GN	15.9	10.1	1146	1220	4207.74	7036.56	43.8	16.6	30.6	45521	941	F
8/10/11	GN	15.9	10.1	1146	1220	4207.74	7036.56	43.8	16.6	30.6	45522	831	F
8/10/11	GN	15.9	10.1	1146	1220	4207.74	7036.56	43.8	16.6	30.6	45523	851	F
8/10/11	GN	15.9	10.1	1146	1220	4207.74	7036.56	43.8	16.6	30.6	45524	931	F
8/10/11	GN	12.7	10.8	1247	1400	4202.7	7038.52	60.6	17	30.3	45525	807	F
8/10/11	GN	12.7	10.8	1247	1400	4202.7	7038.52	60.6	17	30.3	45526	914	F
8/10/11	GN	12.7	10.8	1247	1400	4202.7	7038.52	60.6	17	30.3	45527	884	F
8/10/11	GN	12.7	10.8	1247	1400	4202.7	7038.52	60.6	17	30.3	45528	876	F

Appendix B (continued)

Date	Gear	Gear Dp (m)	Gear T (°C)	Time set	Time pulled	Latitude	Longitude	Dp (m)	SST (°C)	SSS	Tag #	TL (mm)	Sex
8/10/11	GN	12.7	10.8	1247	1400	4202.7	7038.52	60.6	17	30.3	45529	780	F
8/10/11	GN	12.7	10.8	1247	1400	4202.7	7038.52	60.6	17	30.3	45530	839	F
8/10/11	GN	12.7	10.8	1247	1400	4202.7	7038.52	60.6	17	30.3	47753	790	F
8/10/11	GN	12.7	10.8	1247	1400	4202.7	7038.52	60.6	17	30.3	45531	848	F
8/10/11	GN	12.7	10.8	1247	1400	4202.7	7038.52	60.6	17	30.3	45532	780	F
8/10/11	GN	12.7	10.8	1247	1400	4202.7	7038.52	60.6	17	30.3	45533	878	F
8/10/11	GN	12.7	10.8	1247	1400	4202.7	7038.52	60.6	17	30.3	45534	883	F
8/10/11	GN	12.7	10.8	1247	1400	4202.7	7038.52	60.6	17	30.3	45535	821	F
8/10/11	GN	12.7	10.8	1247	1400	4202.7	7038.52	60.6	17	30.3	45536	892	F
8/10/11	GN	12.7	10.8	1247	1400	4202.7	7038.52	60.6	17	30.3	45537	884	F
8/10/11	GN	12.7	10.8	1247	1400	4202.7	7038.52	60.6	17	30.3	45538	944	F
8/10/11	GN	12.7	10.8	1247	1400	4202.7	7038.52	60.6	17	30.3	45539	841	F
8/10/11	GN	12.7	10.8	1247	1400	4202.7	7038.52	60.6	17	30.3	45540	890	F
8/10/11	GN	12.7	10.8	1247	1400	4202.7	7038.52	60.6	17	30.3	47754	871	F
8/10/11	GN	12.7	10.8	1247	1400	4202.7	7038.52	60.6	17	30.3	45541	845	F
8/10/11	GN	12.7	10.8	1247	1400	4202.7	7038.52	60.6	17	30.3	45542	852	F
8/10/11	GN	12.7	10.8	1247	1400	4202.7	7038.52	60.6	17	30.3	45543	869	F
8/10/11	GN	12.7	10.8	1247	1400	4202.7	7038.52	60.6	17	30.3	45544	854	F
8/10/11	GN	12.7	10.8	1247	1400	4202.7	7038.52	60.6	17	30.3	45545	760	F
8/10/11	GN	12.7	10.8	1247	1400	4202.7	7038.52	60.6	17	30.3	45546	868	F
8/10/11	GN	12.7	10.8	1247	1400	4202.7	7038.52	60.6	17	30.3	45547	819	F
8/10/11	GN	12.7	10.8	1247	1400	4202.7	7038.52	60.6	17	30.3	45548	789	F
8/10/11	GN	12.7	10.8	1247	1400	4202.7	7038.52	60.6	17	30.3	45549	914	F
8/10/11	GN	12.7	10.8	1247	1400	4202.7	7038.52	60.6	17	30.3	45550	854	F
8/10/11	GN	12.7	10.8	1247	1400	4202.7	7038.52	60.6	17	30.3	47755	854	F
8/10/11	GN	12.7	10.8	1247	1400	4202.7	7038.52	60.6	17	30.3	45551	850	F
8/10/11	GN	12.7	10.8	1247	1400	4202.7	7038.52	60.6	17	30.3	45552	868	F
8/10/11	GN	12.7	10.8	1247	1400	4202.7	7038.52	60.6	17	30.3	45553	806	F
8/10/11	GN	12.7	10.8	1247	1400	4202.7	7038.52	60.6	17	30.3	45554	818	F
8/10/11	GN	12.7	10.8	1247	1400	4202.7	7038.52	60.6	17	30.3	45555	909	F
8/10/11	GN	12.7	10.8	1247	1400	4202.7	7038.52	60.6	17	30.3	45556	815	F
8/10/11	GN	12.7	10.8	1247	1400	4202.7	7038.52	60.6	17	30.3	45557	852	F
8/10/11	GN	12.7	10.8	1247	1400	4202.7	7038.52	60.6	17	30.3	45558	895	F
8/10/11	GN	12.7	10.8	1247	1400	4202.7	7038.52	60.6	17	30.3	45559	891	F
8/10/11	GN	12.7	10.8	1247	1400	4202.7	7038.52	60.6	17	30.3	45560	997	F
8/10/11	GN	12.7	10.8	1247	1400	4202.7	7038.52	60.6	17	30.3	47756	901	F
8/10/11	GN	12.7	10.8	1247	1400	4202.7	7038.52	60.6	17	30.3	45561	891	F
8/10/11	GN	12.7	10.8	1247	1400	4202.7	7038.52	60.6	17	30.3	45562	896	F
8/10/11	GN	12.7	10.8	1247	1400	4202.7	7038.52	60.6	17	30.3	45563	871	F
8/10/11	GN	12.7	10.8	1247	1400	4202.7	7038.52	60.6	17	30.3	45564	930	F
8/10/11	GN	12.7	10.8	1247	1400	4202.7	7038.52	60.6	17	30.3	45565	922	F

Appendix B (continued)

Date	Gear	Gear Dp (m)	Gear T (°C)	Time set	Time pulled	Latitude	Longitude	Dp (m)	SST (°C)	SSS	Tag #	TL (mm)	Sex
8/10/11	GN	12.7	10.8	1247	1400	4202.7	7038.52	60.6	17	30.3	45566	868	F
8/10/11	GN	12.7	10.8	1247	1400	4202.7	7038.52	60.6	17	30.3	45567	875	F
8/10/11	GN	12.7	10.8	1247	1400	4202.7	7038.52	60.6	17	30.3	45568	891	F
8/10/11	GN	12.7	10.8	1247	1400	4202.7	7038.52	60.6	17	30.3	45569	888	F
8/10/11	GN	12.7	10.8	1247	1400	4202.7	7038.52	60.6	17	30.3	45570	825	F
8/10/11	GN	12.7	10.8	1247	1400	4202.7	7038.52	60.6	17	30.3	47757	895	F
8/10/11	GN	18.6	9.9	1349	1510	4207.58	7038.28	63.6	17	30.1	45571	911	F
8/10/11	GN	18.6	9.9	1349	1510	4207.58	7038.28	63.6	17	30.1	45572	849	F
8/10/11	GN	18.6	9.9	1349	1510	4207.58	7038.28	63.6	17	30.1	45573	885	F
8/10/11	GN	18.6	9.9	1349	1510	4207.58	7038.28	63.6	17	30.1	45574	844	F
8/10/11	GN	18.6	9.9	1349	1510	4207.58	7038.28	63.6	17	30.1	45575	845	F
8/10/11	GN	18.6	9.9	1349	1510	4207.58	7038.28	63.6	17	30.1	45576	921	F
8/10/11	GN	18.6	9.9	1349	1510	4207.58	7038.28	63.6	17	30.1	45577	878	F
8/10/11	GN	18.6	9.9	1349	1510	4207.58	7038.28	63.6	17	30.1	45578	887	F
8/10/11	GN	18.6	9.9	1349	1510	4207.58	7038.28	63.6	17	30.1	45579	849	F
8/10/11	GN	18.6	9.9	1349	1510	4207.58	7038.28	63.6	17	30.1	45580	873	F
8/10/11	GN	18.6	9.9	1349	1510	4207.58	7038.28	63.6	17	30.1	47758	903	F
8/10/11	GN	18.6	9.9	1349	1510	4207.58	7038.28	63.6	17	30.1	45581	849	F
8/10/11	GN	18.6	9.9	1349	1510	4207.58	7038.28	63.6	17	30.1	45582	959	F
8/10/11	GN	18.6	9.9	1349	1510	4207.58	7038.28	63.6	17	30.1	45583	845	F
8/10/11	GN	18.6	9.9	1349	1510	4207.58	7038.28	63.6	17	30.1	45584	882	F
8/10/11	GN	18.6	9.9	1349	1510	4207.58	7038.28	63.6	17	30.1	45585	883	F
8/10/11	GN	18.6	9.9	1349	1510	4207.58	7038.28	63.6	17	30.1	45586	907	F
8/10/11	GN	18.6	9.9	1349	1510	4207.58	7038.28	63.6	17	30.1	45587	836	F
8/10/11	GN	18.6	9.9	1349	1510	4207.58	7038.28	63.6	17	30.1	45588	855	F
8/10/11	GN	18.6	9.9	1349	1510	4207.58	7038.28	63.6	17	30.1	45589	842	F
8/10/11	GN	18.6	9.9	1349	1510	4207.58	7038.28	63.6	17	30.1	45590	882	F
8/10/11	GN	18.6	9.9	1349	1510	4207.58	7038.28	63.6	17	30.1	47759	863	F
8/10/11	GN	18.6	9.9	1349	1510	4207.58	7038.28	63.6	17	30.1	45591	885	F
8/10/11	GN	18.6	9.9	1349	1510	4207.58	7038.28	63.6	17	30.1	45592	920	F
8/10/11	GN	18.6	9.9	1349	1510	4207.58	7038.28	63.6	17	30.1	45593	908	F
8/10/11	GN	18.6	9.9	1349	1510	4207.58	7038.28	63.6	17	30.1	45594	864	F
8/10/11	GN	18.6	9.9	1349	1510	4207.58	7038.28	63.6	17	30.1	45595	849	F
8/10/11	GN	18.6	9.9	1349	1510	4207.58	7038.28	63.6	17	30.1	45596	834	F
8/10/11	GN	18.6	9.9	1349	1510	4207.58	7038.28	63.6	17	30.1	45597	868	F
8/10/11	GN	18.6	9.9	1349	1510	4207.58	7038.28	63.6	17	30.1	45598	865	F
8/10/11	GN	18.6	9.9	1349	1510	4207.58	7038.28	63.6	17	30.1	45599	879	F
8/10/11	GN	18.6	9.9	1349	1510	4207.58	7038.28	63.6	17	30.1	45600	890	F
8/10/11	GN	18.6	9.9	1349	1510	4207.58	7038.28	63.6	17	30.1	47760	872	F
8/10/11	GN	18.6	9.9	1349	1510	4207.58	7038.28	63.6	17	30.1	45601	882	F
8/10/11	GN	18.6	9.9	1349	1510	4207.58	7038.28	63.6	17	30.1	45602	885	F

Appendix B (continued)

Date	Gear	Gear Dp (m)	Gear T (°C)	Time set	Time pulled	Latitude	Longitude	Dp (m)	SST (°C)	SSS	Tag #	TL (mm)	Sex
8/10/11	GN	18.6	9.9	1349	1510	4207.58	7038.28	63.6	17	30.1	45603	794	F
8/10/11	GN	18.6	9.9	1349	1510	4207.58	7038.28	63.6	17	30.1	45604	844	F
8/10/11	GN	18.6	9.9	1349	1510	4207.58	7038.28	63.6	17	30.1	45605	848	F
8/10/11	GN	18.6	9.9	1349	1510	4207.58	7038.28	63.6	17	30.1	45606	905	F
8/10/11	GN	18.6	9.9	1349	1510	4207.58	7038.28	63.6	17	30.1	45607	902	F
8/10/11	GN	18.6	9.9	1349	1510	4207.58	7038.28	63.6	17	30.1	45608	823	F
8/10/11	GN	18.6	9.9	1349	1510	4207.58	7038.28	63.6	17	30.1	45609	842	F
8/10/11	GN	18.6	9.9	1349	1510	4207.58	7038.28	63.6	17	30.1	45610	836	F
8/10/11	GN	10.1	10.9	1405	1602	4207.901	7038.7	58.8	17.8	30.5	47761	995	F
8/10/11	GN	10.1	10.9	1405	1602	4207.901	7038.7	58.8	17.8	30.5	45611	874	F
8/10/11	GN	10.1	10.9	1405	1602	4207.901	7038.7	58.8	17.8	30.5	45612	894	F
8/10/11	GN	10.1	10.9	1405	1602	4207.901	7038.7	58.8	17.8	30.5	45613	902	F
8/10/11	GN	10.1	10.9	1405	1602	4207.901	7038.7	58.8	17.8	30.5	45614	839	F
8/10/11	GN	10.1	10.9	1405	1602	4207.901	7038.7	58.8	17.8	30.5	45615	839	F
8/10/11	GN	10.1	10.9	1405	1602	4207.901	7038.7	58.8	17.8	30.5	45616	808	F
8/10/11	GN	10.1	10.9	1405	1602	4207.901	7038.7	58.8	17.8	30.5	45617	892	F
8/10/11	GN	10.1	10.9	1405	1602	4207.901	7038.7	58.8	17.8	30.5	45618	824	F
8/10/11	GN	10.1	10.9	1405	1602	4207.901	7038.7	58.8	17.8	30.5	45619	909	F
8/10/11	GN	10.1	10.9	1405	1602	4207.901	7038.7	58.8	17.8	30.5	45620	909	F
8/10/11	GN	10.1	10.9	1405	1602	4207.901	7038.7	58.8	17.8	30.5	47762	845	F
8/10/11	GN	10.1	10.9	1405	1602	4207.901	7038.7	58.8	17.8	30.5	45621	884	F
8/10/11	GN	10.1	10.9	1405	1602	4207.901	7038.7	58.8	17.8	30.5	45622	894	F
8/10/11	GN	10.1	10.9	1405	1602	4207.901	7038.7	58.8	17.8	30.5	45623	845	F
8/10/11	GN	10.1	10.9	1405	1602	4207.901	7038.7	58.8	17.8	30.5	45624	785	M
8/10/11	GN	10.1	10.9	1405	1602	4207.901	7038.7	58.8	17.8	30.5	45625	829	F
8/10/11	GN	10.1	10.9	1405	1602	4207.901	7038.7	58.8	17.8	30.5	45626	928	F
8/10/11	GN	10.1	10.9	1405	1602	4207.901	7038.7	58.8	17.8	30.5	45627	850	F
8/10/11	GN	10.1	10.9	1405	1602	4207.901	7038.7	58.8	17.8	30.5	45628	864	F
8/10/11	GN	10.1	10.9	1405	1602	4207.901	7038.7	58.8	17.8	30.5	45629	880	F
8/10/11	GN	10.1	10.9	1405	1602	4207.901	7038.7	58.8	17.8	30.5	45630	817	F
8/10/11	GN	10.1	10.9	1405	1602	4207.901	7038.7	58.8	17.8	30.5	47763	936	F
8/10/11	GN	10.1	10.9	1405	1602	4207.901	7038.7	58.8	17.8	30.5	45631	893	F
8/10/11	GN	10.1	10.9	1405	1602	4207.901	7038.7	58.8	17.8	30.5	45632	921	F
8/10/11	GN	10.1	10.9	1405	1602	4207.901	7038.7	58.8	17.8	30.5	45633	832	F
8/10/11	GN	10.1	10.9	1405	1602	4207.901	7038.7	58.8	17.8	30.5	45634	837	F
8/10/11	GN	10.1	10.9	1405	1602	4207.901	7038.7	58.8	17.8	30.5	45635	890	F
8/10/11	GN	10.1	10.9	1405	1602	4207.901	7038.7	58.8	17.8	30.5	45636	849	F
8/10/11	GN	10.1	10.9	1405	1602	4207.901	7038.7	58.8	17.8	30.5	45637	935	F
8/10/11	GN	10.1	10.9	1405	1602	4207.901	7038.7	58.8	17.8	30.5	45638	867	F
8/10/11	GN	10.1	10.9	1405	1602	4207.901	7038.7	58.8	17.8	30.5	45639	852	F
8/10/11	GN	10.1	10.9	1405	1602	4207.901	7038.7	58.8	17.8	30.5	45640	870	F

Appendix B (continued)

Date	Gear	Gear Dp (m)	Gear T (°C)	Time set	Time pulled	Latitude	Longitude	Dp (m)	SST (°C)	SSS	Tag #	TL (mm)	Sex
8/10/11	GN	10.1	10.9	1405	1602	4207.901	7038.7	58.8	17.8	30.5	47764	931	F
8/10/11	GN	10.1	10.9	1405	1602	4207.901	7038.7	58.8	17.8	30.5	45641	879	F
8/10/11	GN	10.1	10.9	1405	1602	4207.901	7038.7	58.8	17.8	30.5	45642	852	F
8/10/11	GN	10.1	10.9	1405	1602	4207.901	7038.7	58.8	17.8	30.5	45643	791	F
8/12/11	GN	NA	NA	430	712	4224.175	7017.42	50.3	18.3	30.8	45644	823	M
8/12/11	GN	NA	NA	430	712	4224.175	7017.42	50.3	18.3	30.8	45645	796	M
8/12/11	GN	NA	NA	430	712	4224.175	7017.42	50.3	18.3	30.8	45646	780	M
8/12/11	GN	NA	NA	430	712	4224.175	7017.42	50.3	18.3	30.8	45647	770	M
8/12/11	GN	NA	NA	430	712	4224.175	7017.42	50.3	18.3	30.8	45648	751	M
8/12/11	GN	NA	NA	430	712	4224.175	7017.42	50.3	18.3	30.8	45649	827	M
8/12/11	GN	NA	NA	430	712	4224.175	7017.42	50.3	18.3	30.8	45650	672	M
8/12/11	GN	NA	NA	430	712	4224.175	7017.42	50.3	18.3	30.8	47765	819	M
8/12/11	GN	NA	NA	430	712	4224.175	7017.42	50.3	18.3	30.8	45651	957	F
8/12/11	GN	NA	NA	430	712	4224.175	7017.42	50.3	18.3	30.8	45652	803	M
8/12/11	GN	NA	NA	430	712	4224.175	7017.42	50.3	18.3	30.8	45653	766	M
8/12/11	GN	NA	NA	430	712	4224.175	7017.42	50.3	18.3	30.8	45654	787	M
8/12/11	GN	NA	NA	430	712	4224.175	7017.42	50.3	18.3	30.8	45655	771	M
8/12/11	GN	NA	NA	430	712	4224.175	7017.42	50.3	18.3	30.8	45656	733	M
8/12/11	GN	NA	NA	430	712	4224.175	7017.42	50.3	18.3	30.8	45657	727	M
8/12/11	GN	NA	NA	430	712	4224.175	7017.42	50.3	18.3	30.8	45658	806	M
8/12/11	GN	NA	NA	430	712	4224.175	7017.42	50.3	18.3	30.8	45659	672	M
8/12/11	GN	NA	NA	430	712	4224.175	7017.42	50.3	18.3	30.8	45660	705	M
8/12/11	GN	NA	NA	430	712	4224.175	7017.42	50.3	18.3	30.8	47766	773	M
8/12/11	GN	NA	NA	430	712	4224.175	7017.42	50.3	18.3	30.8	45661	810	M
8/12/11	GN	NA	NA	430	712	4224.175	7017.42	50.3	18.3	30.8	45662	789	M
8/12/11	GN	NA	NA	430	712	4224.175	7017.42	50.3	18.3	30.8	45663	710	M
8/12/11	GN	NA	NA	430	712	4224.175	7017.42	50.3	18.3	30.8	45664	762	M
8/12/11	GN	NA	NA	430	712	4224.175	7017.42	50.3	18.3	30.8	45665	751	M
8/12/11	GN	NA	NA	430	712	4224.175	7017.42	50.3	18.3	30.8	45666	730	M
8/12/11	GN	NA	NA	430	712	4224.175	7017.42	50.3	18.3	30.8	45667	864	F
8/12/11	GN	NA	NA	430	712	4224.175	7017.42	50.3	18.3	30.8	45668	749	M
8/12/11	GN	NA	NA	430	712	4224.175	7017.42	50.3	18.3	30.8	45669	786	M
8/12/11	GN	NA	NA	430	712	4224.175	7017.42	50.3	18.3	30.8	45670	730	M
8/12/11	GN	NA	NA	430	712	4224.175	7017.42	50.3	18.3	30.8	47767	774	M
8/12/11	GN	NA	NA	430	712	4224.175	7017.42	50.3	18.3	30.8	45671	804	M
8/12/11	GN	NA	NA	430	712	4224.175	7017.42	50.3	18.3	30.8	45672	716	M
8/12/11	GN	NA	NA	430	712	4224.175	7017.42	50.3	18.3	30.8	45673	732	M
8/12/11	GN	NA	NA	430	712	4224.175	7017.42	50.3	18.3	30.8	45674	735	M
8/12/11	GN	NA	NA	430	712	4224.175	7017.42	50.3	18.3	30.8	45675	742	M
8/12/11	GN	NA	NA	430	712	4224.175	7017.42	50.3	18.3	30.8	45676	755	M
8/12/11	GN	NA	NA	430	712	4224.175	7017.42	50.3	18.3	30.8	45677	741	M

Appendix B (continued)

Date	Gear	Gear Dp (m)	Gear T (°C)	Time set	Time pulled	Latitude	Longitude	Dp (m)	SST (°C)	SSS	Tag #	TL (mm)	Sex
8/12/11	GN	NA	NA	430	712	4224.175	7017.42	50.3	18.3	30.8	45678	825	M
8/12/11	GN	NA	NA	430	712	4224.175	7017.42	50.3	18.3	30.8	45679	726	M
8/12/11	GN	NA	NA	430	712	4224.175	7017.42	50.3	18.3	30.8	45680	820	M
8/12/11	GN	NA	NA	430	712	4224.175	7017.42	50.3	18.3	30.8	47768	789	M
8/12/11	GN	NA	NA	430	712	4224.175	7017.42	50.3	18.3	30.8	45681	789	M
8/12/11	GN	NA	NA	430	712	4224.175	7017.42	50.3	18.3	30.8	45682	774	M
8/12/11	GN	NA	NA	430	712	4224.175	7017.42	50.3	18.3	30.8	45683	809	M
8/12/11	GN	NA	NA	430	712	4224.175	7017.42	50.3	18.3	30.8	45684	811	M
8/12/11	GN	NA	NA	430	712	4224.175	7017.42	50.3	18.3	30.8	45685	699	M
8/12/11	GN	NA	NA	430	712	4224.175	7017.42	50.3	18.3	30.8	45686	741	M
8/12/11	GN	NA	NA	430	712	4224.175	7017.42	50.3	18.3	30.8	45687	867	F
8/12/11	GN	NA	NA	430	712	4224.175	7017.42	50.3	18.3	30.8	45688	792	M
8/12/11	GN	NA	NA	430	712	4224.175	7017.42	50.3	18.3	30.8	45689	765	M
8/12/11	GN	NA	NA	430	712	4224.175	7017.42	50.3	18.3	30.8	45690	698	M
8/12/11	GN	NA	NA	430	712	4224.175	7017.42	50.3	18.3	30.8	47769	750	F
8/12/11	GN	NA	NA	430	712	4224.175	7017.42	50.3	18.3	30.8	45691	756	M
8/12/11	GN	NA	NA	430	712	4224.175	7017.42	50.3	18.3	30.8	45692	644	F
8/12/11	GN	NA	NA	430	712	4224.175	7017.42	50.3	18.3	30.8	45693	780	M
8/12/11	GN	NA	NA	430	712	4224.175	7017.42	50.3	18.3	30.8	45694	729	M
8/12/11	GN	NA	NA	430	712	4224.175	7017.42	50.3	18.3	30.8	45695	751	M
8/12/11	GN	NA	NA	430	712	4224.175	7017.42	50.3	18.3	30.8	45696	794	M
8/12/11	GN	NA	NA	430	712	4224.175	7017.42	50.3	18.3	30.8	45697	827	M
8/12/11	GN	NA	NA	430	712	4224.175	7017.42	50.3	18.3	30.8	45698	845	F
8/12/11	GN	NA	NA	430	712	4224.175	7017.42	50.3	18.3	30.8	45699	650	M
8/12/11	GN	NA	NA	430	712	4224.175	7017.42	50.3	18.3	30.8	45700	778	M
8/12/11	GN	NA	NA	430	712	4224.175	7017.42	50.3	18.3	30.8	47770	830	M
8/12/11	GN	NA	NA	430	712	4224.175	7017.42	50.3	18.3	30.8	45701	835	M
8/12/11	GN	NA	NA	430	712	4224.175	7017.42	50.3	18.3	30.8	45702	732	M
8/12/11	GN	NA	NA	430	712	4224.175	7017.42	50.3	18.3	30.8	45703	765	M
8/12/11	GN	NA	NA	430	712	4224.175	7017.42	50.3	18.3	30.8	45704	799	M
8/12/11	GN	NA	NA	430	712	4224.175	7017.42	50.3	18.3	30.8	45705	794	M
8/12/11	GN	NA	NA	430	712	4224.175	7017.42	50.3	18.3	30.8	45706	803	M
8/12/11	GN	NA	NA	430	712	4224.175	7017.42	50.3	18.3	30.8	45707	756	M
8/12/11	GN	NA	NA	430	712	4224.175	7017.42	50.3	18.3	30.8	45708	832	M
8/12/11	GN	NA	NA	445	917	4224.86	7016	NA	18.3	30.3	45709	808	M
8/12/11	GN	NA	NA	445	917	4224.86	7016	NA	18.3	30.3	45710	808	M
8/12/11	GN	NA	NA	445	917	4224.86	7016	NA	18.3	30.3	47771	752	M
8/12/11	GN	NA	NA	445	917	4224.86	7016	NA	18.3	30.3	45711	748	M
8/12/11	GN	NA	NA	445	917	4224.86	7016	NA	18.3	30.3	45712	814	M
8/12/11	GN	NA	NA	445	917	4224.86	7016	NA	18.3	30.3	45713	846	M
8/12/11	GN	NA	NA	445	917	4224.86	7016	NA	18.3	30.3	45714	715	M

Appendix B (continued)

Date	Gear	Gear Dp (m)	Gear T (°C)	Time set	Time pulled	Latitude	Longitude	Dp (m)	SST (°C)	SSS	Tag #	TL (mm)	Sex
8/12/11	GN	NA	NA	445	917	4224.86	7016	NA	18.3	30.3	45715	778	M
8/12/11	GN	NA	NA	445	917	4224.86	7016	NA	18.3	30.3	45716	750	M
8/12/11	GN	NA	NA	445	917	4224.86	7016	NA	18.3	30.3	45717	667	M
8/12/11	GN	NA	NA	445	917	4224.86	7016	NA	18.3	30.3	45718	767	M
8/12/11	GN	NA	NA	445	917	4224.86	7016	NA	18.3	30.3	45719	749	F
8/12/11	GN	NA	NA	445	917	4224.86	7016	NA	18.3	30.3	45720	810	M
8/12/11	GN	NA	NA	445	917	4224.86	7016	NA	18.3	30.3	47772	745	M
8/12/11	GN	NA	NA	445	917	4224.86	7016	NA	18.3	30.3	45721	752	M
8/12/11	GN	NA	NA	445	917	4224.86	7016	NA	18.3	30.3	45722	754	M
8/12/11	GN	NA	NA	445	917	4224.86	7016	NA	18.3	30.3	45723	768	M
8/12/11	GN	NA	NA	445	917	4224.86	7016	NA	18.3	30.3	45724	721	M
8/12/11	GN	NA	NA	445	917	4224.86	7016	NA	18.3	30.3	45725	727	M
8/12/11	GN	NA	NA	445	917	4224.86	7016	NA	18.3	30.3	45726	848	M
8/12/11	GN	NA	NA	445	917	4224.86	7016	NA	18.3	30.3	45727	792	M
8/12/11	GN	NA	NA	445	917	4224.86	7016	NA	18.3	30.3	45728	799	M
8/12/11	GN	NA	NA	445	917	4224.86	7016	NA	18.3	30.3	45729	781	M
8/12/11	GN	NA	NA	445	917	4224.86	7016	NA	18.3	30.3	45730	709	M
8/12/11	GN	NA	NA	445	917	4224.86	7016	NA	18.3	30.3	47773	919	F
8/12/11	GN	NA	NA	445	917	4224.86	7016	NA	18.3	30.3	45731	770	M
8/12/11	GN	NA	NA	445	917	4224.86	7016	NA	18.3	30.3	45732	804	M
8/12/11	GN	NA	NA	445	917	4224.86	7016	NA	18.3	30.3	45733	736	M
8/12/11	GN	NA	NA	445	917	4224.86	7016	NA	18.3	30.3	45734	786	M
8/12/11	GN	NA	NA	445	917	4224.86	7016	NA	18.3	30.3	45735	802	M
8/12/11	GN	NA	NA	445	917	4224.86	7016	NA	18.3	30.3	45736	791	M
8/12/11	GN	NA	NA	445	917	4224.86	7016	NA	18.3	30.3	45737	747	M
8/12/11	GN	NA	NA	445	917	4224.86	7016	NA	18.3	30.3	45738	769	M
8/12/11	GN	NA	NA	445	917	4224.86	7016	NA	18.3	30.3	45739	774	F
8/12/11	GN	NA	NA	445	917	4224.86	7016	NA	18.3	30.3	45740	751	M
8/12/11	GN	NA	NA	445	917	4224.86	7016	NA	18.3	30.3	47774	795	M
8/12/11	GN	NA	NA	445	917	4224.86	7016	NA	18.3	30.3	45741	715	M
8/12/11	GN	NA	NA	445	917	4224.86	7016	NA	18.3	30.3	45742	746	M
8/12/11	GN	NA	NA	445	917	4224.86	7016	NA	18.3	30.3	45743	776	M
8/12/11	GN	NA	NA	445	917	4224.86	7016	NA	18.3	30.3	45744	742	M
8/12/11	GN	NA	NA	445	917	4224.86	7016	NA	18.3	30.3	45745	785	M
8/12/11	GN	NA	NA	445	917	4224.86	7016	NA	18.3	30.3	45746	739	M
8/12/11	GN	NA	NA	445	917	4224.86	7016	NA	18.3	30.3	45747	780	M
8/12/11	GN	NA	NA	445	917	4224.86	7016	NA	18.3	30.3	45748	707	M
8/12/11	GN	NA	NA	445	917	4224.86	7016	NA	18.3	30.3	45749	890	F
8/12/11	GN	NA	NA	445	917	4224.86	7016	NA	18.3	30.3	45750	729	M
8/12/11	GN	NA	NA	445	917	4224.86	7016	NA	18.3	30.3	47775	885	F
8/12/11	GN	NA	NA	445	917	4224.86	7016	NA	18.3	30.3	45751	814	M

Appendix B (continued)

Date	Gear	Gear Dp (m)	Gear T (°C)	Time set	Time pulled	Latitude	Longitude	Dp (m)	SST (°C)	SSS	Tag #	TL (mm)	Sex
8/12/11	GN	NA	NA	445	917	4224.86	7016	NA	18.3	30.3	45752	782	M
8/12/11	GN	NA	NA	445	917	4224.86	7016	NA	18.3	30.3	45753	982	F
8/12/11	GN	NA	NA	445	917	4224.86	7016	NA	18.3	30.3	45754	720	M
8/12/11	GN	NA	NA	445	917	4224.86	7016	NA	18.3	30.3	45755	656	M
8/12/11	GN	NA	NA	445	917	4224.86	7016	NA	18.3	30.3	45756	785	M
8/12/11	GN	NA	NA	445	917	4224.86	7016	NA	18.3	30.3	45757	729	M
8/12/11	GN	NA	NA	445	917	4224.86	7016	NA	18.3	30.3	45758	800	M
8/12/11	GN	NA	NA	445	917	4224.86	7016	NA	18.3	30.3	45759	759	M
8/12/11	GN	NA	NA	445	917	4224.86	7016	NA	18.3	30.3	45760	740	M
8/12/11	GN	NA	NA	445	917	4224.86	7016	NA	18.3	30.3	47776	754	M
8/12/11	GN	NA	NA	445	917	4224.86	7016	NA	18.3	30.3	45761	639	M
8/12/11	GN	NA	NA	445	917	4224.86	7016	NA	18.3	30.3	45762	825	M
8/12/11	GN	NA	NA	445	917	4224.86	7016	NA	18.3	30.3	45763	876	M
8/12/11	GN	NA	NA	445	917	4224.86	7016	NA	18.3	30.3	45764	726	M
8/12/11	GN	NA	NA	445	917	4224.86	7016	NA	18.3	30.3	45765	729	M
8/12/11	GN	NA	NA	445	917	4224.86	7016	NA	18.3	30.3	45766	751	M
8/12/11	GN	NA	NA	445	917	4224.86	7016	NA	18.3	30.3	45767	733	M
8/12/11	GN	NA	NA	445	917	4224.86	7016	NA	18.3	30.3	45768	756	M
8/12/11	GN	NA	NA	445	917	4224.86	7016	NA	18.3	30.3	45769	764	M
8/12/11	GN	NA	NA	445	917	4224.86	7016	NA	18.3	30.3	45770	807	M
8/12/11	GN	NA	NA	445	917	4224.86	7016	NA	18.3	30.3	47777	751	M
8/12/11	GN	NA	NA	445	917	4224.86	7016	NA	18.3	30.3	45771	745	M
8/12/11	GN	NA	NA	445	917	4224.86	7016	NA	18.3	30.3	45772	719	M
8/12/11	GN	NA	NA	445	917	4224.86	7016	NA	18.3	30.3	45773	776	M
8/12/11	GN	NA	NA	445	917	4224.86	7016	NA	18.3	30.3	45774	792	M
8/12/11	GN	NA	NA	445	917	4224.86	7016	NA	18.3	30.3	45775	812	M
8/12/11	GN	NA	NA	445	917	4224.86	7016	NA	18.3	30.3	45776	746	M
8/12/11	GN	NA	NA	445	917	4224.86	7016	NA	18.3	30.3	45777	741	F
8/12/11	GN	NA	NA	445	917	4224.86	7016	NA	18.3	30.3	45778	752	M
8/12/11	GN	NA	NA	445	917	4224.86	7016	NA	18.3	30.3	45779	775	M
8/12/11	GN	NA	NA	445	917	4224.86	7016	NA	18.3	30.3	45780	778	M
8/12/11	GN	NA	NA	445	917	4224.86	7016	NA	18.3	30.3	47778	741	M
8/12/11	GN	NA	NA	445	917	4224.86	7016	NA	18.3	30.3	45781	726	M
8/12/11	GN	NA	NA	445	917	4224.86	7016	NA	18.3	30.3	45782	676	M
8/12/11	GN	NA	NA	445	917	4224.86	7016	NA	18.3	30.3	45783	757	M
8/12/11	GN	NA	NA	445	917	4224.86	7016	NA	18.3	30.3	45784	778	M
8/12/11	GN	NA	NA	445	917	4224.86	7016	NA	18.3	30.3	45785	786	M
8/12/11	GN	NA	NA	445	917	4224.86	7016	NA	18.3	30.3	45786	832	F
8/12/11	GN	NA	NA	445	917	4224.86	7016	NA	18.3	30.3	45787	760	M
8/12/11	GN	NA	NA	445	917	4224.86	7016	NA	18.3	30.3	45788	817	M
8/12/11	GN	NA	NA	445	917	4224.86	7016	NA	18.3	30.3	45789	872	F

Appendix B (continued)

Date	Gear	Gear Dp (m)	Gear T (°C)	Time set	Time pulled	Latitude	Longitude	Dp (m)	SST (°C)	SSS	Tag #	TL (mm)	Sex
8/12/11	GN	NA	NA	445	917	4224.86	7016	NA	18.3	30.3	45790	776	M
8/12/11	GN	NA	NA	445	917	4224.86	7016	NA	18.3	30.3	47779	919	F
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	45791	802	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	45792	765	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	45793	734	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	45794	790	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	45795	754	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	45796	758	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	45797	781	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	45798	724	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	45799	703	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	45800	760	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	47780	766	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	45801	743	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	45802	747	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	45803	699	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	45804	755	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	45805	736	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	45806	706	F
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	45807	710	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	45808	732	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	45809	734	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	45810	765	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	47781	819	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	45811	774	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	45812	746	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	45813	777	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	45814	719	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	45815	730	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	45816	754	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	45817	756	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	45818	751	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	45819	659	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	45820	782	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	47782	776	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	45821	730	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	45822	740	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	45823	788	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	45824	777	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	45825	777	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	45826	730	M

Appendix B (continued)

Date	Gear	Gear Dp (m)	Gear T (°C)	Time set	Time pulled	Latitude	Longitude	Dp (m)	SST (°C)	SSS	Tag #	TL (mm)	Sex
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	45827	774	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	45828	767	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	45829	764	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	45830	748	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	47783	756	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	45831	736	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	45832	710	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	45833	709	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	45834	735	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	45835	698	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	45836	723	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	45837	725	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	45838	720	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	45839	726	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	45840	746	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	47784	708	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	45841	770	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	45842	772	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	45843	732	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	45844	726	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	45845	765	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	45846	732	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	45847	786	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	45848	890	F
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	45849	768	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	45850	755	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	47785	790	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	45851	771	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	45852	779	F
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	45853	781	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	45854	806	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	45855	742	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	45856	766	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	45857	774	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	45858	759	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	45859	676	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	45860	790	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	47786	780	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	45861	726	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	45862	735	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	45863	743	M

Appendix B (continued)

Date	Gear	Gear Dp (m)	Gear T (°C)	Time set	Time pulled	Latitude	Longitude	Dp (m)	SST (°C)	SSS	Tag #	TL (mm)	Sex
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	45864	747	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	45865	752	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	45866	776	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	45867	740	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	45868	734	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	45869	760	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	45870	719	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	47787	739	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	45871	740	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	45872	798	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	45873	800	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	45874	739	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	45875	770	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	45876	741	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	45877	717	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	45878	740	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	45879	776	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	45880	765	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	47788	970	F
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	45881	717	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	45882	689	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	45883	787	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	45884	740	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	45885	817	F
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	45886	765	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	45887	751	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	45888	759	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	45889	754	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	45890	748	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	47789	778	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	45891	770	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	45892	783	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	45893	764	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	45894	702	F
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	45895	813	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	45896	716	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	45897	768	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	45898	828	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	45899	806	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	45900	772	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	47790	873	F

Appendix B (continued)

Date	Gear	Gear Dp (m)	Gear T (°C)	Time set	Time pulled	Latitude	Longitude	Dp (m)	SST (°C)	SSS	Tag #	TL (mm)	Sex
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	45901	746	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	45902	770	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	45903	774	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	45904	794	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	45905	777	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	45906	722	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	45907	743	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	45908	725	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	45909	741	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	45910	759	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	47791	780	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	45911	708	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	45912	758	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	45913	751	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	45914	727	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	45915	813	F
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	45916	726	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	45917	756	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	45918	790	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	45919	745	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	45920	765	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	47792	738	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	45921	715	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	45922	729	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	45923	771	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	45924	785	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	45925	764	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	45926	765	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	45927	705	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	45928	730	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	45929	800	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	45930	742	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	47793	750	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	45931	734	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	45932	751	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	45933	715	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	45934	715	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	45935	780	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	45936	709	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	45937	730	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	45938	773	M

Appendix B (continued)

Date	Gear	Gear Dp (m)	Gear T (°C)	Time set	Time pulled	Latitude	Longitude	Dp (m)	SST (°C)	SSS	Tag #	TL (mm)	Sex
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	45939	739	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	45940	705	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	47794	780	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	45941	760	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	45942	754	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	45943	723	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	45944	723	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	45945	815	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	45946	766	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	45947	726	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	45948	801	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	45949	768	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	45950	766	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	47795	750	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	45951	751	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	45952	755	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	45953	759	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	45954	752	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	45955	742	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	45956	725	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	45957	735	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	45958	767	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	45959	771	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	45960	743	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	47796	732	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	45961	792	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	45962	750	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	45963	765	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	45964	777	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	45965	719	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	45966	730	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	45967	765	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	45968	745	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	45969	722	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	45970	761	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	47797	793	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	45971	810	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	45972	756	F
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	45973	734	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	45974	765	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	45975	741	M

Appendix B (continued)

Date	Gear	Gear Dp (m)	Gear T (°C)	Time set	Time pulled	Latitude	Longitude	Dp (m)	SST (°C)	SSS	Tag #	TL (mm)	Sex
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	45976	726	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	45977	786	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	45978	735	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	45979	752	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	45980	710	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	47798	750	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	45981	755	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	45982	784	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	45983	714	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	45984	639	F
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	45985	784	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	45986	762	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	45987	794	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	45988	729	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	45989	825	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	45990	732	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	47799	755	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	45991	780	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	45992	771	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	45993	779	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	45994	753	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	45995	714	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	45996	756	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	45997	725	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	45998	751	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	45999	772	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46000	748	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	47800	743	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46001	804	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46002	766	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46003	774	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46004	758	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46005	781	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46006	742	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46007	845	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46008	734	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46009	719	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46010	815	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	47801	739	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46011	791	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46012	751	M

Appendix B (continued)

Date	Gear	Gear Dp (m)	Gear T (°C)	Time set	Time pulled	Latitude	Longitude	Dp (m)	SST (°C)	SSS	Tag #	TL (mm)	Sex
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46013	728	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46014	790	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46015	824	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46016	762	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46017	761	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46018	760	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46019	778	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46020	755	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	47802	753	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46021	766	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46022	800	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46023	784	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46024	787	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46025	791	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46026	764	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46027	772	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46028	743	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46029	778	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46030	756	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	47803	791	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46031	767	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46032	754	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46033	791	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46034	790	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46035	780	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46036	735	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46037	742	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46038	727	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46039	773	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46040	770	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	47804	796	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46041	792	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46042	717	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46043	761	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46044	716	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46045	729	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46046	749	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46047	678	F
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46048	830	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46049	732	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46050	781	M

Appendix B (continued)

Date	Gear	Gear Dp (m)	Gear T (°C)	Time set	Time pulled	Latitude	Longitude	Dp (m)	SST (°C)	SSS	Tag #	TL (mm)	Sex
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	47805	748	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46051	792	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46052	699	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46053	771	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46054	827	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46055	780	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46056	740	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46057	786	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46058	716	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46059	769	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46060	818	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	47806	804	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46061	766	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46062	815	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46063	738	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46064	716	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46065	762	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46066	745	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46067	760	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46068	807	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46069	745	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46070	759	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	47807	747	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46071	800	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46072	778	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46073	782	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46074	725	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46075	770	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46076	770	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46077	730	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46078	761	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46079	742	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46080	781	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	47808	761	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46081	712	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46082	741	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46083	740	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46084	739	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46085	787	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46086	742	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46087	756	M

Appendix B (continued)

Date	Gear	Gear Dp (m)	Gear T (°C)	Time set	Time pulled	Latitude	Longitude	Dp (m)	SST (°C)	SSS	Tag #	TL (mm)	Sex
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46088	727	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46089	790	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46090	760	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	47809	785	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46091	811	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46092	765	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46093	734	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46094	764	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46095	727	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46096	784	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46097	732	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46098	732	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46099	762	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46100	754	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	47810	798	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46101	796	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46102	701	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46103	731	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46104	738	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46105	729	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46106	695	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46107	771	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46108	700	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46109	797	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46110	768	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	47811	761	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46111	780	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46112	671	F
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46113	775	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46114	796	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46115	712	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46116	734	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46117	792	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46118	725	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46119	739	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46120	729	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	47812	732	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46121	739	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46122	728	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46123	730	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46124	832	M

Appendix B (continued)

Date	Gear	Gear Dp (m)	Gear T (°C)	Time set	Time pulled	Latitude	Longitude	Dp (m)	SST (°C)	SSS	Tag #	TL (mm)	Sex
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46125	743	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46126	746	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46127	770	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46128	762	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46129	748	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46130	766	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	47813	740	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46131	803	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46132	774	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46133	766	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46134	820	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46135	739	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46136	724	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46137	764	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46138	767	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46139	820	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46140	745	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	47814	721	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46141	750	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46142	778	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46143	740	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46144	765	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46145	791	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46146	771	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46147	783	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46148	723	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46149	684	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46150	784	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	47815	731	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46151	785	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46152	783	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46153	770	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46154	738	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46155	779	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46156	765	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46157	757	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46158	823	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46159	703	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46160	752	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	47816	717	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46161	799	M

Appendix B (continued)

Date	Gear	Gear Dp (m)	Gear T (°C)	Time set	Time pulled	Latitude	Longitude	Dp (m)	SST (°C)	SSS	Tag #	TL (mm)	Sex
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46162	762	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46163	712	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46164	740	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46165	707	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46166	765	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46167	743	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46168	796	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46169	672	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46170	757	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	47817	745	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46171	700	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46172	775	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46173	735	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46174	759	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46175	750	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46176	712	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46177	777	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46178	715	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46179	780	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46180	795	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	47818	718	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46181	725	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46182	745	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46183	744	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46184	820	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46185	729	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46186	759	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46187	770	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46188	801	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46189	748	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46190	848	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	47819	761	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46191	780	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46192	744	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46193	732	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46194	767	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46195	809	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46196	756	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46197	723	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46198	765	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46199	736	M

Appendix B (continued)

Date	Gear	Gear Dp (m)	Gear T (°C)	Time set	Time pulled	Latitude	Longitude	Dp (m)	SST (°C)	SSS	Tag #	TL (mm)	Sex
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46200	740	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	47820	782	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46201	746	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46202	745	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46203	766	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46204	780	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46205	709	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46206	701	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46207	756	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46208	801	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46209	790	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46210	754	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	47821	770	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46211	726	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46212	757	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46213	731	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46214	747	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46215	799	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46216	772	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46217	804	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46218	815	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46219	797	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46220	715	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	47822	765	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46221	777	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46222	736	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46223	711	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46224	753	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46225	762	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46226	732	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46227	740	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46228	751	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46229	787	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46230	805	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	47823	771	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46231	727	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46232	717	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46233	741	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46234	772	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46235	772	M
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46236	781	M

Appendix B (continued)

Date	Gear	Gear Dp (m)	Gear T (°C)	Time set	Time pulled	Latitude	Longitude	Dp (m)	SST (°C)	SSS	Tag #	TL (mm)	Sex
8/14/11	LN	25.4	9.9	744	800	4145.312	6952.287	26.9	17.6	29.7	46237	705	M
8/14/11	LN	28.9	8.4	1032	1049	4146.482	6952.302	32.9	18	30.3	46238	830	M
8/14/11	LN	28.9	8.4	1032	1049	4146.482	6952.302	32.9	18	30.3	46239	775	M
8/14/11	LN	28.9	8.4	1032	1049	4146.482	6952.302	32.9	18	30.3	46240	785	M
8/14/11	LN	28.9	8.4	1032	1049	4146.482	6952.302	32.9	18	30.3	47824	753	M
8/14/11	LN	28.9	8.4	1032	1049	4146.482	6952.302	32.9	18	30.3	46241	755	M
8/14/11	LN	28.9	8.4	1032	1049	4146.482	6952.302	32.9	18	30.3	46242	774	M
8/14/11	LN	28.9	8.4	1032	1049	4146.482	6952.302	32.9	18	30.3	46243	780	M
8/14/11	LN	28.9	8.4	1032	1049	4146.482	6952.302	32.9	18	30.3	46244	784	M
8/14/11	LN	28.9	8.4	1032	1049	4146.482	6952.302	32.9	18	30.3	46245	697	M
8/14/11	LN	28.9	8.4	1032	1049	4146.482	6952.302	32.9	18	30.3	46246	768	M
8/14/11	LN	28.9	8.4	1032	1049	4146.482	6952.302	32.9	18	30.3	46247	792	M
8/14/11	LN	28.9	8.4	1032	1049	4146.482	6952.302	32.9	18	30.3	46248	755	M
8/14/11	LN	28.9	8.4	1032	1049	4146.482	6952.302	32.9	18	30.3	46249	792	M
8/14/11	LN	28.9	8.4	1032	1049	4146.482	6952.302	32.9	18	30.3	46250	767	M
8/14/11	LN	28.9	8.4	1032	1049	4146.482	6952.302	32.9	18	30.3	47825	801	F
8/14/11	LN	28.9	8.4	1032	1049	4146.482	6952.302	32.9	18	30.3	46251	757	M
8/14/11	LN	28.9	8.4	1032	1049	4146.482	6952.302	32.9	18	30.3	46252	724	M
8/14/11	LN	28.9	8.4	1032	1049	4146.482	6952.302	32.9	18	30.3	46253	773	M
8/14/11	LN	28.9	8.4	1032	1049	4146.482	6952.302	32.9	18	30.3	46254	827	M
8/14/11	LN	28.9	8.4	1032	1049	4146.482	6952.302	32.9	18	30.3	46255	720	M
8/14/11	LN	28.9	8.4	1032	1049	4146.482	6952.302	32.9	18	30.3	46256	729	M
8/14/11	LN	28.9	8.4	1032	1049	4146.482	6952.302	32.9	18	30.3	46257	735	M
8/14/11	LN	28.9	8.4	1032	1049	4146.482	6952.302	32.9	18	30.3	46258	761	M
8/14/11	LN	28.9	8.4	1032	1049	4146.482	6952.302	32.9	18	30.3	46259	750	M
8/14/11	LN	28.9	8.4	1032	1049	4146.482	6952.302	32.9	18	30.3	46260	767	M
8/14/11	LN	28.9	8.4	1032	1049	4146.482	6952.302	32.9	18	30.3	47826	750	M
8/14/11	LN	28.9	8.4	1032	1049	4146.482	6952.302	32.9	18	30.3	46261	741	M
8/14/11	LN	28.9	8.4	1032	1049	4146.482	6952.302	32.9	18	30.3	46262	740	M
8/14/11	LN	28.9	8.4	1032	1049	4146.482	6952.302	32.9	18	30.3	46263	706	M
8/14/11	LN	28.9	8.4	1032	1049	4146.482	6952.302	32.9	18	30.3	46264	791	M
8/14/11	LN	28.9	8.4	1032	1049	4146.482	6952.302	32.9	18	30.3	46265	726	M
8/14/11	LN	28.9	8.4	1032	1049	4146.482	6952.302	32.9	18	30.3	46266	711	M
8/14/11	LN	28.9	8.4	1032	1049	4146.482	6952.302	32.9	18	30.3	46267	744	M
8/14/11	LN	28.9	8.4	1032	1049	4146.482	6952.302	32.9	18	30.3	46268	726	M
8/14/11	LN	28.9	8.4	1032	1049	4146.482	6952.302	32.9	18	30.3	46269	674	F
8/14/11	LN	28.9	8.4	1032	1049	4146.482	6952.302	32.9	18	30.3	46270	790	M
8/14/11	LN	28.9	8.4	1032	1049	4146.482	6952.302	32.9	18	30.3	47827	715	M
8/14/11	LN	28.9	8.4	1032	1049	4146.482	6952.302	32.9	18	30.3	46271	771	M
8/14/11	LN	28.9	8.4	1032	1049	4146.482	6952.302	32.9	18	30.3	46272	895	F
8/14/11	LN	28.9	8.4	1032	1049	4146.482	6952.302	32.9	18	30.3	46273	786	M

Appendix B (continued)

Date	Gear	Gear Dp (m)	Gear T (°C)	Time set	Time pulled	Latitude	Longitude	Dp (m)	SST (°C)	SSS	Tag #	TL (mm)	Sex
8/14/11	LN	28.9	8.4	1032	1049	4146.482	6952.302	32.9	18	30.3	46274	790	M
8/14/11	LN	28.9	8.4	1032	1049	4146.482	6952.302	32.9	18	30.3	46275	741	M
8/14/11	LN	28.9	8.4	1032	1049	4146.482	6952.302	32.9	18	30.3	46276	763	M
8/14/11	LN	28.9	8.4	1032	1049	4146.482	6952.302	32.9	18	30.3	46277	757	M
8/14/11	LN	28.9	8.4	1032	1049	4146.482	6952.302	32.9	18	30.3	46278	795	M
8/14/11	LN	28.9	8.4	1032	1049	4146.482	6952.302	32.9	18	30.3	46279	745	M
8/14/11	LN	28.9	8.4	1032	1049	4146.482	6952.302	32.9	18	30.3	46280	715	M
8/14/11	LN	28.9	8.4	1032	1049	4146.482	6952.302	32.9	18	30.3	47828	869	F
8/14/11	LN	28.9	8.4	1032	1049	4146.482	6952.302	32.9	18	30.3	46281	766	M
8/14/11	LN	28.9	8.4	1032	1049	4146.482	6952.302	32.9	18	30.3	46282	804	F
8/14/11	LN	28.9	8.4	1032	1049	4146.482	6952.302	32.9	18	30.3	46283	810	M
8/14/11	LN	28.9	8.4	1032	1049	4146.482	6952.302	32.9	18	30.3	46284	744	M
8/14/11	LN	28.9	8.4	1032	1049	4146.482	6952.302	32.9	18	30.3	46285	761	M
8/14/11	LN	28.9	8.4	1032	1049	4146.482	6952.302	32.9	18	30.3	46286	807	M
8/14/11	LN	28.9	8.4	1032	1049	4146.482	6952.302	32.9	18	30.3	46287	706	M
8/14/11	LN	28.9	8.4	1032	1049	4146.482	6952.302	32.9	18	30.3	46288	740	M
8/14/11	LN	28.9	8.4	1032	1049	4146.482	6952.302	32.9	18	30.3	46289	721	M
8/14/11	LN	28.9	8.4	1032	1049	4146.482	6952.302	32.9	18	30.3	46290	773	M
8/14/11	LN	28.9	8.4	1032	1049	4146.482	6952.302	32.9	18	30.3	47829	762	M
8/14/11	LN	28.9	8.4	1032	1049	4146.482	6952.302	32.9	18	30.3	46291	800	M
8/14/11	LN	28.9	8.4	1032	1049	4146.482	6952.302	32.9	18	30.3	46292	751	M
8/14/11	LN	28.9	8.4	1032	1049	4146.482	6952.302	32.9	18	30.3	46293	762	M
8/14/11	LN	28.9	8.4	1032	1049	4146.482	6952.302	32.9	18	30.3	46294	796	M
8/14/11	LN	28.9	8.4	1032	1049	4146.482	6952.302	32.9	18	30.3	46295	784	M
8/14/11	LN	28.9	8.4	1032	1049	4146.482	6952.302	32.9	18	30.3	46296	772	M
8/14/11	LN	28.9	8.4	1032	1049	4146.482	6952.302	32.9	18	30.3	46297	794	M
8/14/11	LN	28.9	8.4	1032	1049	4146.482	6952.302	32.9	18	30.3	46298	804	M
8/14/11	LN	28.9	8.4	1032	1049	4146.482	6952.302	32.9	18	30.3	46299	745	M
8/14/11	LN	28.9	8.4	1032	1049	4146.482	6952.302	32.9	18	30.3	46300	735	M
8/14/11	LN	28.9	8.4	1032	1049	4146.482	6952.302	32.9	18	30.3	47830	768	M
8/14/11	LN	28.9	8.4	1032	1049	4146.482	6952.302	32.9	18	30.3	46301	750	M
8/14/11	LN	28.9	8.4	1032	1049	4146.482	6952.302	32.9	18	30.3	46302	799	M
8/14/11	LN	28.9	8.4	1032	1049	4146.482	6952.302	32.9	18	30.3	46303	826	M
8/14/11	LN	28.9	8.4	1032	1049	4146.482	6952.302	32.9	18	30.3	46304	750	M
8/14/11	LN	28.9	8.4	1032	1049	4146.482	6952.302	32.9	18	30.3	46305	820	M
8/14/11	LN	28.9	8.4	1032	1049	4146.482	6952.302	32.9	18	30.3	46306	740	M
8/14/11	LN	28.9	8.4	1032	1049	4146.482	6952.302	32.9	18	30.3	46307	737	M
8/14/11	LN	28.9	8.4	1032	1049	4146.482	6952.302	32.9	18	30.3	46308	840	M
8/14/11	LN	28.9	8.4	1032	1049	4146.482	6952.302	32.9	18	30.3	46309	719	M
8/14/11	LN	28.9	8.4	1032	1049	4146.482	6952.302	32.9	18	30.3	46310	762	M
8/14/11	LN	28.9	8.4	1032	1049	4146.482	6952.302	32.9	18	30.3	47831	831	F

Appendix B (continued)

Date	Gear	Gear Dp (m)	Gear T (°C)	Time set	Time pulled	Latitude	Longitude	Dp (m)	SST (°C)	SSS	Tag #	TL (mm)	Sex
8/14/11	LN	28.9	8.4	1032	1049	4146.482	6952.302	32.9	18	30.3	46311	741	M
8/14/11	LN	28.9	8.4	1032	1049	4146.482	6952.302	32.9	18	30.3	46312	806	F
8/14/11	LN	28.9	8.4	1032	1049	4146.482	6952.302	32.9	18	30.3	46313	760	M
8/14/11	LN	28.9	8.4	1032	1049	4146.482	6952.302	32.9	18	30.3	46314	806	M
8/14/11	LN	28.9	8.4	1032	1049	4146.482	6952.302	32.9	18	30.3	46315	775	M
8/14/11	LN	28.9	8.4	1032	1049	4146.482	6952.302	32.9	18	30.3	46316	712	M
8/14/11	LN	28.9	8.4	1032	1049	4146.482	6952.302	32.9	18	30.3	46317	796	M
8/14/11	LN	28.9	8.4	1032	1049	4146.482	6952.302	32.9	18	30.3	46318	753	M
8/14/11	LN	28.9	8.4	1032	1049	4146.482	6952.302	32.9	18	30.3	46319	635	F
8/14/11	LN	28.9	8.4	1032	1049	4146.482	6952.302	32.9	18	30.3	46320	712	M
8/14/11	LN	28.9	8.4	1032	1049	4146.482	6952.302	32.9	18	30.3	47832	810	M
8/14/11	LN	28.9	8.4	1032	1049	4146.482	6952.302	32.9	18	30.3	46321	759	M
8/14/11	LN	28.9	8.4	1032	1049	4146.482	6952.302	32.9	18	30.3	46322	767	M
8/14/11	LN	28.9	8.4	1032	1049	4146.482	6952.302	32.9	18	30.3	46323	756	M
8/14/11	LN	28.9	8.4	1032	1049	4146.482	6952.302	32.9	18	30.3	46324	735	M
8/14/11	LN	28.9	8.4	1032	1049	4146.482	6952.302	32.9	18	30.3	46325	796	M
8/14/11	LN	28.9	8.4	1032	1049	4146.482	6952.302	32.9	18	30.3	46326	770	M
8/14/11	LN	28.9	8.4	1032	1049	4146.482	6952.302	32.9	18	30.3	46327	758	M
8/14/11	LN	28.9	8.4	1032	1049	4146.482	6952.302	32.9	18	30.3	46328	852	F
8/14/11	LN	28.9	8.4	1032	1049	4146.482	6952.302	32.9	18	30.3	46329	770	M
8/14/11	LN	28.9	8.4	1032	1049	4146.482	6952.302	32.9	18	30.3	46330	798	M
8/14/11	LN	28.9	8.4	1032	1049	4146.482	6952.302	32.9	18	30.3	47833	843	F
8/14/11	LN	28.9	8.4	1032	1049	4146.482	6952.302	32.9	18	30.3	46331	738	M
8/14/11	LN	28.9	8.4	1032	1049	4146.482	6952.302	32.9	18	30.3	46332	819	M
8/14/11	LN	28.9	8.4	1032	1049	4146.482	6952.302	32.9	18	30.3	46333	734	M
8/14/11	LN	28.9	8.4	1032	1049	4146.482	6952.302	32.9	18	30.3	46334	845	M
8/14/11	LN	28.9	8.4	1032	1049	4146.482	6952.302	32.9	18	30.3	46335	746	M
8/14/11	LN	28.9	8.4	1032	1049	4146.482	6952.302	32.9	18	30.3	46336	705	M
8/14/11	LN	28.9	8.4	1032	1049	4146.482	6952.302	32.9	18	30.3	46337	745	M
8/14/11	LN	28.9	8.4	1032	1049	4146.482	6952.302	32.9	18	30.3	46338	756	M
8/14/11	LN	28.9	8.4	1032	1049	4146.482	6952.302	32.9	18	30.3	46339	795	M
8/14/11	LN	28.9	8.4	1032	1049	4146.482	6952.302	32.9	18	30.3	46340	782	M
8/14/11	LN	28.9	8.4	1032	1049	4146.482	6952.302	32.9	18	30.3	47834	715	M
8/14/11	LN	28.9	8.4	1032	1049	4146.482	6952.302	32.9	18	30.3	46341	742	M
8/14/11	LN	28.9	8.4	1032	1049	4146.482	6952.302	32.9	18	30.3	46342	800	M
8/14/11	LN	28.9	8.4	1032	1049	4146.482	6952.302	32.9	18	30.3	46343	781	M
8/14/11	LN	28.9	8.4	1032	1049	4146.482	6952.302	32.9	18	30.3	46344	744	M
8/14/11	LN	28.9	8.4	1032	1049	4146.482	6952.302	32.9	18	30.3	46345	745	M
8/14/11	LN	28.9	8.4	1032	1049	4146.482	6952.302	32.9	18	30.3	46346	746	M
8/14/11	LN	28.9	8.4	1032	1049	4146.482	6952.302	32.9	18	30.3	46347	800	M
8/14/11	LN	28.9	8.4	1032	1049	4146.482	6952.302	32.9	18	30.3	46348	747	M

Appendix B (continued)

Date	Gear	Gear Dp (m)	Gear T (°C)	Time set	Time pulled	Latitude	Longitude	Dp (m)	SST (°C)	SSS	Tag #	TL (mm)	Sex
8/14/11	LN	28.9	8.4	1032	1049	4146.482	6952.302	32.9	18	30.3	46349	834	F
8/14/11	LN	28.9	8.4	1032	1049	4146.482	6952.302	32.9	18	30.3	46350	635	M
8/14/11	LN	28.9	8.4	1032	1049	4146.482	6952.302	32.9	18	30.3	47835	760	M
8/14/11	LN	28.9	8.4	1032	1049	4146.482	6952.302	32.9	18	30.3	46351	746	M
8/14/11	LN	28.9	8.4	1032	1049	4146.482	6952.302	32.9	18	30.3	46352	746	M
8/14/11	LN	28.9	8.4	1032	1049	4146.482	6952.302	32.9	18	30.3	46353	719	M
8/14/11	LN	24.7	9.1	1134	1144	4145.8	6952.6	28	17.9	30.5	46354	743	M
8/14/11	LN	24.7	9.1	1134	1144	4145.8	6952.6	28	17.9	30.5	46355	785	M
8/14/11	LN	24.7	9.1	1134	1144	4145.8	6952.6	28	17.9	30.5	46356	756	M
8/14/11	LN	24.7	9.1	1134	1144	4145.8	6952.6	28	17.9	30.5	46357	840	M
8/14/11	LN	24.7	9.1	1134	1144	4145.8	6952.6	28	17.9	30.5	46358	739	M
8/14/11	LN	24.7	9.1	1134	1144	4145.8	6952.6	28	17.9	30.5	46359	764	M
8/14/11	LN	24.7	9.1	1134	1144	4145.8	6952.6	28	17.9	30.5	46360	756	M
8/14/11	LN	24.7	9.1	1134	1144	4145.8	6952.6	28	17.9	30.5	47836	900	F
8/14/11	LN	24.7	9.1	1134	1144	4145.8	6952.6	28	17.9	30.5	46361	795	M
8/14/11	LN	24.7	9.1	1134	1144	4145.8	6952.6	28	17.9	30.5	46362	729	M
8/14/11	LN	24.7	9.1	1134	1144	4145.8	6952.6	28	17.9	30.5	46363	779	M
8/14/11	LN	24.7	9.1	1134	1144	4145.8	6952.6	28	17.9	30.5	46364	794	M
8/14/11	LN	24.7	9.1	1134	1144	4145.8	6952.6	28	17.9	30.5	46365	733	M
8/14/11	LN	24.7	9.1	1134	1144	4145.8	6952.6	28	17.9	30.5	46366	791	M
8/14/11	LN	24.7	9.1	1134	1144	4145.8	6952.6	28	17.9	30.5	46367	761	M
8/14/11	LN	24.7	9.1	1134	1144	4145.8	6952.6	28	17.9	30.5	46368	765	M
8/14/11	LN	24.7	9.1	1134	1144	4145.8	6952.6	28	17.9	30.5	46369	778	M
8/14/11	LN	24.7	9.1	1134	1144	4145.8	6952.6	28	17.9	30.5	46370	726	M
8/14/11	LN	24.7	9.1	1134	1144	4145.8	6952.6	28	17.9	30.5	47837	793	F
8/14/11	LN	24.7	9.1	1134	1144	4145.8	6952.6	28	17.9	30.5	46371	891	M
8/14/11	LN	24.7	9.1	1134	1144	4145.8	6952.6	28	17.9	30.5	46372	770	M
8/14/11	LN	24.7	9.1	1134	1144	4145.8	6952.6	28	17.9	30.5	46373	759	M
8/14/11	LN	24.7	9.1	1134	1144	4145.8	6952.6	28	17.9	30.5	46374	841	F
8/14/11	LN	24.7	9.1	1134	1144	4145.8	6952.6	28	17.9	30.5	46375	750	M
8/14/11	LN	24.7	9.1	1134	1144	4145.8	6952.6	28	17.9	30.5	46376	757	M
8/14/11	LN	24.7	9.1	1134	1144	4145.8	6952.6	28	17.9	30.5	46377	719	M
8/14/11	LN	24.7	9.1	1134	1144	4145.8	6952.6	28	17.9	30.5	46378	788	M
8/14/11	LN	24.7	9.1	1134	1144	4145.8	6952.6	28	17.9	30.5	46379	779	M
8/14/11	LN	24.7	9.1	1134	1144	4145.8	6952.6	28	17.9	30.5	46380	783	M
8/14/11	LN	24.7	9.1	1134	1144	4145.8	6952.6	28	17.9	30.5	47838	744	M
8/14/11	LN	24.7	9.1	1134	1144	4145.8	6952.6	28	17.9	30.5	46381	739	M
8/14/11	LN	24.7	9.1	1134	1144	4145.8	6952.6	28	17.9	30.5	46382	665	M
8/14/11	LN	24.7	9.1	1134	1144	4145.8	6952.6	28	17.9	30.5	46383	774	M
8/14/11	LN	24.7	9.1	1134	1144	4145.8	6952.6	28	17.9	30.5	46384	759	M
8/14/11	LN	24.7	9.1	1134	1144	4145.8	6952.6	28	17.9	30.5	46385	740	M

Appendix B (continued)

Date	Gear	Gear Dp (m)	Gear T (°C)	Time set	Time pulled	Latitude	Longitude	Dp (m)	SST (°C)	SSS	Tag #	TL (mm)	Sex
8/14/11	LN	24.7	9.1	1134	1144	4145.8	6952.6	28	17.9	30.5	46386	753	M
8/14/11	LN	24.7	9.1	1134	1144	4145.8	6952.6	28	17.9	30.5	46387	750	M
8/14/11	LN	24.7	9.1	1134	1144	4145.8	6952.6	28	17.9	30.5	46388	770	M
8/14/11	LN	24.7	9.1	1134	1144	4145.8	6952.6	28	17.9	30.5	46389	794	M
8/14/11	LN	24.7	9.1	1134	1144	4145.8	6952.6	28	17.9	30.5	46390	750	M
8/14/11	LN	24.7	9.1	1134	1144	4145.8	6952.6	28	17.9	30.5	47839	756	M
8/14/11	LN	24.7	9.1	1134	1144	4145.8	6952.6	28	17.9	30.5	46391	755	M
8/14/11	LN	24.7	9.1	1134	1144	4145.8	6952.6	28	17.9	30.5	46392	736	M
8/14/11	LN	24.7	9.1	1134	1144	4145.8	6952.6	28	17.9	30.5	46393	756	M
8/14/11	LN	24.7	9.1	1134	1144	4145.8	6952.6	28	17.9	30.5	46394	791	M
8/14/11	LN	24.7	9.1	1134	1144	4145.8	6952.6	28	17.9	30.5	46395	806	M
8/14/11	LN	24.7	9.1	1134	1144	4145.8	6952.6	28	17.9	30.5	46396	767	M
8/14/11	LN	24.7	9.1	1134	1144	4145.8	6952.6	28	17.9	30.5	46397	820	M
8/14/11	LN	24.7	9.1	1134	1144	4145.8	6952.6	28	17.9	30.5	46398	760	M
8/14/11	LN	24.7	9.1	1134	1144	4145.8	6952.6	28	17.9	30.5	46399	770	M
8/14/11	LN	24.7	9.1	1134	1144	4145.8	6952.6	28	17.9	30.5	46400	806	M
8/14/11	LN	24.7	9.1	1134	1144	4145.8	6952.6	28	17.9	30.5	47840	724	M
8/14/11	LN	24.7	9.1	1134	1144	4145.8	6952.6	28	17.9	30.5	46401	733	M
8/14/11	LN	24.7	9.1	1134	1144	4145.8	6952.6	28	17.9	30.5	46402	766	M
8/14/11	LN	24.7	9.1	1134	1144	4145.8	6952.6	28	17.9	30.5	46403	832	M
8/14/11	LN	24.7	9.1	1134	1144	4145.8	6952.6	28	17.9	30.5	46404	745	M
8/14/11	LN	24.7	9.1	1134	1144	4145.8	6952.6	28	17.9	30.5	46405	722	M
8/17/11	GN	27.9	9.6	256	746	4150.79	6953.38	37.1	15.9	30.8	46406	907	F
8/17/11	GN	27.9	9.6	256	746	4150.79	6953.38	37.1	15.9	30.8	46407	846	F
8/17/11	GN	27.9	9.6	256	746	4150.79	6953.38	37.1	15.9	30.8	46408	937	F
8/17/11	GN	27.9	9.6	256	746	4150.79	6953.38	37.1	15.9	30.8	46409	831	F
8/17/11	GN	27.9	9.6	256	746	4150.79	6953.38	37.1	15.9	30.8	46410	892	F
8/17/11	GN	27.9	9.6	256	746	4150.79	6953.38	37.1	15.9	30.8	47841	914	F
8/17/11	GN	27.9	9.6	256	746	4150.79	6953.38	37.1	15.9	30.8	46411	895	F
8/17/11	GN	27.9	9.6	256	746	4150.79	6953.38	37.1	15.9	30.8	46412	832	F
8/17/11	GN	27.9	9.6	256	746	4150.79	6953.38	37.1	15.9	30.8	46413	892	F
8/17/11	GN	27.9	9.6	256	746	4150.79	6953.38	37.1	15.9	30.8	46414	917	F
8/17/11	GN	27.9	9.6	256	746	4150.79	6953.38	37.1	15.9	30.8	46415	850	F
8/17/11	GN	27.9	9.6	256	746	4150.79	6953.38	37.1	15.9	30.8	46416	911	F
8/17/11	GN	27.9	9.6	256	746	4150.79	6953.38	37.1	15.9	30.8	46417	875	F
8/17/11	GN	27.9	9.6	256	746	4150.79	6953.38	37.1	15.9	30.8	46418	821	F
8/17/11	GN	27.9	9.6	256	746	4150.79	6953.38	37.1	15.9	30.8	46419	913	F
8/17/11	GN	27.9	9.6	256	746	4150.79	6953.38	37.1	15.9	30.8	46420	847	F
8/17/11	GN	27.9	9.6	256	746	4150.79	6953.38	37.1	15.9	30.8	47842	822	M
8/17/11	GN	27.9	9.6	256	746	4150.79	6953.38	37.1	15.9	30.8	46421	738	M
8/17/11	GN	27.9	9.6	256	746	4150.79	6953.38	37.1	15.9	30.8	46422	765	M

Appendix B (continued)

Date	Gear	Gear Dp (m)	Gear T (°C)	Time set	Time pulled	Latitude	Longitude	Dp (m)	SST (°C)	SSS	Tag #	TL (mm)	Sex
8/17/11	GN	27.9	9.6	256	746	4150.79	6953.38	37.1	15.9	30.8	46423	880	F
8/17/11	GN	27.9	9.6	256	746	4150.79	6953.38	37.1	15.9	30.8	46424	920	F
8/17/11	GN	27.9	9.6	256	746	4150.79	6953.38	37.1	15.9	30.8	46425	775	M
8/17/11	GN	27.9	9.6	256	746	4150.79	6953.38	37.1	15.9	30.8	46426	765	M
8/17/11	GN	27.9	9.6	256	746	4150.79	6953.38	37.1	15.9	30.8	46427	766	M
8/17/11	GN	27.9	9.6	256	746	4150.79	6953.38	37.1	15.9	30.8	46428	866	F
8/17/11	GN	27.9	9.6	256	746	4150.79	6953.38	37.1	15.9	30.8	46429	736	M
8/17/11	GN	27.9	9.6	256	746	4150.79	6953.38	37.1	15.9	30.8	46430	881	F
8/17/11	GN	27.9	9.6	256	746	4150.79	6953.38	37.1	15.9	30.8	47843	775	M
8/17/11	GN	27.9	9.6	256	746	4150.79	6953.38	37.1	15.9	30.8	46431	896	F
8/17/11	GN	27.9	9.6	256	746	4150.79	6953.38	37.1	15.9	30.8	46432	878	F
8/17/11	GN	27.9	9.6	256	746	4150.79	6953.38	37.1	15.9	30.8	46433	920	F
8/17/11	GN	27.9	9.6	256	746	4150.79	6953.38	37.1	15.9	30.8	46434	965	F
8/17/11	GN	27.9	9.6	256	746	4150.79	6953.38	37.1	15.9	30.8	46435	903	F
8/17/11	GN	27.9	9.6	256	746	4150.79	6953.38	37.1	15.9	30.8	46436	931	F
8/17/11	GN	27.9	9.6	256	746	4150.79	6953.38	37.1	15.9	30.8	46437	930	F
8/17/11	GN	27.9	9.6	256	746	4150.79	6953.38	37.1	15.9	30.8	46438	820	F
8/17/11	GN	27.9	9.6	256	746	4150.79	6953.38	37.1	15.9	30.8	46439	900	F
8/17/11	GN	27.9	9.6	256	746	4150.79	6953.38	37.1	15.9	30.8	46440	825	F
8/17/11	GN	27.9	9.6	256	746	4150.79	6953.38	37.1	15.9	30.8	47844	774	M
8/17/11	GN	27.9	9.6	256	746	4150.79	6953.38	37.1	15.9	30.8	46441	850	M
8/17/11	GN	27.9	9.6	256	746	4150.79	6953.38	37.1	15.9	30.8	46442	848	F
8/17/11	GN	27.9	9.6	256	746	4150.79	6953.38	37.1	15.9	30.8	46443	795	M
8/17/11	GN	27.9	9.6	256	746	4150.79	6953.38	37.1	15.9	30.8	46444	931	F
8/17/11	GN	27.9	9.6	256	746	4150.79	6953.38	37.1	15.9	30.8	46445	822	F
8/17/11	GN	27.9	9.6	256	746	4150.79	6953.38	37.1	15.9	30.8	46446	920	F
8/17/11	GN	27.9	9.6	256	746	4150.79	6953.38	37.1	15.9	30.8	46447	940	F
8/17/11	GN	27.9	9.6	256	746	4150.79	6953.38	37.1	15.9	30.8	46448	800	M
8/17/11	GN	27.9	9.6	256	746	4150.79	6953.38	37.1	15.9	30.8	46449	820	F
8/17/11	GN	27.9	9.6	256	746	4150.79	6953.38	37.1	15.9	30.8	46450	800	M
8/17/11	GN	27.9	9.6	256	746	4150.79	6953.38	37.1	15.9	30.8	47845	880	F
8/17/11	GN	27.9	9.6	256	746	4150.79	6953.38	37.1	15.9	30.8	46451	726	M
8/17/11	GN	27.9	9.6	256	746	4150.79	6953.38	37.1	15.9	30.8	46452	830	F
8/17/11	GN	27.9	9.6	256	746	4150.79	6953.38	37.1	15.9	30.8	46453	835	F
8/17/11	GN	27.9	9.6	256	746	4150.79	6953.38	37.1	15.9	30.8	46454	896	F
8/17/11	GN	27.9	9.6	256	746	4150.79	6953.38	37.1	15.9	30.8	46455	880	F
8/17/11	GN	27.9	9.6	256	746	4150.79	6953.38	37.1	15.9	30.8	46456	758	M
8/17/11	GN	27.9	9.6	256	746	4150.79	6953.38	37.1	15.9	30.8	46457	880	F
8/17/11	GN	27.9	9.6	256	746	4150.79	6953.38	37.1	15.9	30.8	46458	890	F
8/17/11	GN	27.9	9.6	256	746	4150.79	6953.38	37.1	15.9	30.8	46459	765	M
8/17/11	GN	27.9	9.6	256	746	4150.79	6953.38	37.1	15.9	30.8	46460	857	F

Appendix B (continued)

Date	Gear	Gear Dp (m)	Gear T (°C)	Time set	Time pulled	Latitude	Longitude	Dp (m)	SST (°C)	SSS	Tag #	TL (mm)	Sex
8/17/11	GN	27.9	9.6	256	746	4150.79	6953.38	37.1	15.9	30.8	47846	814	F
8/17/11	GN	27.9	9.6	256	746	4150.79	6953.38	37.1	15.9	30.8	46461	747	M
8/17/11	GN	27.9	9.6	256	746	4150.79	6953.38	37.1	15.9	30.8	46462	707	M
8/17/11	GN	27.9	9.6	256	746	4150.79	6953.38	37.1	15.9	30.8	46463	770	M
8/17/11	GN	37.8	8.5	234	915	4149.95	6952.85	39.7	15	30.2	46464	875	F
8/17/11	GN	37.8	8.5	234	915	4149.95	6952.85	39.7	15	30.2	46465	753	M
8/17/11	GN	37.8	8.5	234	915	4149.95	6952.85	39.7	15	30.2	46466	857	F
8/17/11	GN	37.8	8.5	234	915	4149.95	6952.85	39.7	15	30.2	46467	803	F
8/17/11	GN	37.8	8.5	234	915	4149.95	6952.85	39.7	15	30.2	46468	897	F
8/17/11	GN	37.8	8.5	234	915	4149.95	6952.85	39.7	15	30.2	46469	905	F
8/17/11	GN	37.8	8.5	234	915	4149.95	6952.85	39.7	15	30.2	46470	854	F
8/17/11	GN	37.8	8.5	234	915	4149.95	6952.85	39.7	15	30.2	47847	809	M
8/17/11	GN	37.8	8.5	234	915	4149.95	6952.85	39.7	15	30.2	46471	779	F
8/17/11	GN	37.8	8.5	234	915	4149.95	6952.85	39.7	15	30.2	46472	921	F
8/17/11	GN	37.8	8.5	234	915	4149.95	6952.85	39.7	15	30.2	46473	754	M
8/17/11	GN	37.8	8.5	234	915	4149.95	6952.85	39.7	15	30.2	46474	857	F
8/17/11	GN	37.8	8.5	234	915	4149.95	6952.85	39.7	15	30.2	46475	857	F
8/17/11	GN	37.8	8.5	234	915	4149.95	6952.85	39.7	15	30.2	46476	860	F
8/17/11	GN	37.8	8.5	234	915	4149.95	6952.85	39.7	15	30.2	46477	891	F
8/17/11	GN	37.8	8.5	234	915	4149.95	6952.85	39.7	15	30.2	46478	696	M
8/17/11	GN	37.8	8.5	234	915	4149.95	6952.85	39.7	15	30.2	46479	867	F
8/17/11	GN	37.8	8.5	234	915	4149.95	6952.85	39.7	15	30.2	46480	847	F
8/17/11	GN	37.8	8.5	234	915	4149.95	6952.85	39.7	15	30.2	47848	818	M
8/17/11	GN	37.8	8.5	234	915	4149.95	6952.85	39.7	15	30.2	46481	879	F
8/17/11	GN	37.8	8.5	234	915	4149.95	6952.85	39.7	15	30.2	46482	780	M
8/17/11	GN	37.8	8.5	234	915	4149.95	6952.85	39.7	15	30.2	46483	820	F
8/17/11	GN	37.8	8.5	234	915	4149.95	6952.85	39.7	15	30.2	46484	826	F
8/17/11	GN	37.8	8.5	234	915	4149.95	6952.85	39.7	15	30.2	46485	840	F
8/17/11	GN	37.8	8.5	234	915	4149.95	6952.85	39.7	15	30.2	46486	850	F
8/17/11	GN	37.8	8.5	234	915	4149.95	6952.85	39.7	15	30.2	46487	888	F
8/17/11	GN	37.8	8.5	234	915	4149.95	6952.85	39.7	15	30.2	46488	789	F
8/17/11	GN	37.8	8.5	234	915	4149.95	6952.85	39.7	15	30.2	46489	858	F
8/17/11	GN	37.8	8.5	234	915	4149.95	6952.85	39.7	15	30.2	46490	818	F
8/17/11	GN	37.8	8.5	234	915	4149.95	6952.85	39.7	15	30.2	47849	823	M
8/17/11	GN	37.8	8.5	234	915	4149.95	6952.85	39.7	15	30.2	46491	880	F
8/17/11	GN	37.8	8.5	234	915	4149.95	6952.85	39.7	15	30.2	46492	850	F
8/17/11	GN	37.8	8.5	234	915	4149.95	6952.85	39.7	15	30.2	46493	841	F
8/17/11	GN	37.8	8.5	234	915	4149.95	6952.85	39.7	15	30.2	46494	897	F
8/17/11	GN	37.8	8.5	234	915	4149.95	6952.85	39.7	15	30.2	46495	885	F
8/17/11	GN	37.8	8.5	234	915	4149.95	6952.85	39.7	15	30.2	46496	888	F
8/17/11	GN	37.8	8.5	234	915	4149.95	6952.85	39.7	15	30.2	46497	875	F

Appendix B (continued)

Date	Gear	Gear Dp (m)	Gear T (°C)	Time set	Time pulled	Latitude	Longitude	Dp (m)	SST (°C)	SSS	Tag #	TL (mm)	Sex
8/17/11	GN	37.8	8.5	234	915	4149.95	6952.85	39.7	15	30.2	46498	890	F
8/17/11	GN	37.8	8.5	234	915	4149.95	6952.85	39.7	15	30.2	46499	930	F
8/17/11	GN	37.8	8.5	234	915	4149.95	6952.85	39.7	15	30.2	46500	850	F
8/17/11	GN	37.8	8.5	234	915	4149.95	6952.85	39.7	15	30.2	47850	875	F
8/17/11	GN	37.8	8.5	234	915	4149.95	6952.85	39.7	15	30.2	47001	880	F
8/17/11	GN	37.8	8.5	234	915	4149.95	6952.85	39.7	15	30.2	47002	857	F
8/17/11	GN	37.8	8.5	234	915	4149.95	6952.85	39.7	15	30.2	47003	900	F
8/17/11	GN	37.8	8.5	234	915	4149.95	6952.85	39.7	15	30.2	47004	895	F
8/17/11	GN	37.8	8.5	234	915	4149.95	6952.85	39.7	15	30.2	47005	907	F
8/17/11	GN	37.8	8.5	234	915	4149.95	6952.85	39.7	15	30.2	47006	905	F
8/17/11	GN	37.8	8.5	234	915	4149.95	6952.85	39.7	15	30.2	47007	761	M
8/17/11	GN	37.8	8.5	234	915	4149.95	6952.85	39.7	15	30.2	47008	837	F
8/17/11	GN	37.8	8.5	234	915	4149.95	6952.85	39.7	15	30.2	47009	885	F
8/17/11	GN	37.8	8.5	234	915	4149.95	6952.85	39.7	15	30.2	47010	860	F
8/17/11	GN	37.8	8.5	234	915	4149.95	6952.85	39.7	15	30.2	47901	858	F
8/17/11	GN	37.8	8.5	234	915	4149.95	6952.85	39.7	15	30.2	47011	760	M
8/17/11	GN	37.8	8.5	234	915	4149.95	6952.85	39.7	15	30.2	47012	741	M
8/17/11	GN	37.8	8.5	234	915	4149.95	6952.85	39.7	15	30.2	47013	825	M
8/17/11	GN	37.8	8.5	234	915	4149.95	6952.85	39.7	15	30.2	47014	876	F
8/17/11	GN	37.8	8.5	234	915	4149.95	6952.85	39.7	15	30.2	47015	932	F
8/17/11	GN	37.8	8.5	234	915	4149.95	6952.85	39.7	15	30.2	47016	797	F
8/17/11	GN	37.8	8.5	234	915	4149.95	6952.85	39.7	15	30.2	47017	856	F
8/17/11	GN	37.8	8.5	234	915	4149.95	6952.85	39.7	15	30.2	47018	890	F
8/17/11	GN	37.8	8.5	234	915	4149.95	6952.85	39.7	15	30.2	47019	891	F
8/17/11	GN	37.8	8.5	234	915	4149.95	6952.85	39.7	15	30.2	47020	897	F
8/17/11	GN	37.8	8.5	234	915	4149.95	6952.85	39.7	15	30.2	47902	840	F
8/17/11	GN	37.8	8.5	234	915	4149.95	6952.85	39.7	15	30.2	47021	807	F
8/17/11	GN	37.8	8.5	234	915	4149.95	6952.85	39.7	15	30.2	47022	870	F
8/17/11	GN	37.8	8.5	234	915	4149.95	6952.85	39.7	15	30.2	47023	915	F
8/17/11	GN	37.8	8.5	234	915	4149.95	6952.85	39.7	15	30.2	47024	820	F
8/17/11	GN	37.8	8.5	234	915	4149.95	6952.85	39.7	15	30.2	47025	898	F
8/17/11	GN	37.8	8.5	234	915	4149.95	6952.85	39.7	15	30.2	47026	860	F
8/17/11	GN	37.8	8.5	234	915	4149.95	6952.85	39.7	15	30.2	47027	914	F
8/17/11	GN	37.8	8.5	234	915	4149.95	6952.85	39.7	15	30.2	47028	855	F
8/17/11	GN	37.8	8.5	234	915	4149.95	6952.85	39.7	15	30.2	47029	876	F
8/17/11	GN	37.8	8.5	234	915	4149.95	6952.85	39.7	15	30.2	47030	837	F
8/17/11	GN	37.8	8.5	234	915	4149.95	6952.85	39.7	15	30.2	47903	899	F
8/17/11	GN	37.8	8.5	234	915	4149.95	6952.85	39.7	15	30.2	47031	880	F
8/17/11	GN	37.8	8.5	234	915	4149.95	6952.85	39.7	15	30.2	47032	844	F
8/17/11	GN	37.8	8.5	234	915	4149.95	6952.85	39.7	15	30.2	47033	869	F
8/17/11	GN	37.8	8.5	234	915	4149.95	6952.85	39.7	15	30.2	47034	834	F

Appendix B (continued)

Date	Gear	Gear Dp (m)	Gear T (°C)	Time set	Time pulled	Latitude	Longitude	Dp (m)	SST (°C)	SSS	Tag #	TL (mm)	Sex
8/17/11	GN	37.8	8.5	234	915	4149.95	6952.85	39.7	15	30.2	47035	821	M
8/17/11	GN	37.8	8.5	234	915	4149.95	6952.85	39.7	15	30.2	47036	761	M
8/17/11	GN	37.8	8.5	234	915	4149.95	6952.85	39.7	15	30.2	47037	755	M
8/17/11	GN	37.8	8.5	234	915	4149.95	6952.85	39.7	15	30.2	47038	897	F
8/17/11	GN	37.8	8.5	234	915	4149.95	6952.85	39.7	15	30.2	47039	819	F
8/17/11	GN	37.8	8.5	234	915	4149.95	6952.85	39.7	15	30.2	47040	850	F
8/17/11	GN	37.8	8.5	234	915	4149.95	6952.85	39.7	15	30.2	47904	849	F
8/17/11	GN	37.8	8.5	234	915	4149.95	6952.85	39.7	15	30.2	47041	905	F
8/17/11	GN	37.8	8.5	234	915	4149.95	6952.85	39.7	15	30.2	47042	770	F
8/17/11	GN	37.8	8.5	234	915	4149.95	6952.85	39.7	15	30.2	47043	860	F
8/17/11	GN	37.8	8.5	234	915	4149.95	6952.85	39.7	15	30.2	47044	825	F
8/17/11	GN	37.8	8.5	234	915	4149.95	6952.85	39.7	15	30.2	47045	850	F
8/17/11	GN	37.8	8.5	234	915	4149.95	6952.85	39.7	15	30.2	47046	845	F
8/17/11	GN	37.8	8.5	234	915	4149.95	6952.85	39.7	15	30.2	47047	764	M
8/17/11	GN	37.8	8.5	234	915	4149.95	6952.85	39.7	15	30.2	47048	810	M
8/17/11	GN	37.8	8.5	234	915	4149.95	6952.85	39.7	15	30.2	47049	851	F
8/17/11	GN	37.8	8.5	234	915	4149.95	6952.85	39.7	15	30.2	47050	735	M
8/17/11	GN	37.8	8.5	234	915	4149.95	6952.85	39.7	15	30.2	47905	890	F
8/17/11	GN	37.8	8.5	234	915	4149.95	6952.85	39.7	15	30.2	47051	749	M
8/17/11	GN	37.8	8.5	234	915	4149.95	6952.85	39.7	15	30.2	47052	980	F
8/17/11	GN	37.8	8.5	234	915	4149.95	6952.85	39.7	15	30.2	47053	783	M
8/17/11	GN	37.8	8.5	234	915	4149.95	6952.85	39.7	15	30.2	47054	801	M
8/17/11	GN	37.8	8.5	234	915	4149.95	6952.85	39.7	15	30.2	47055	845	F
8/17/11	GN	37.8	8.5	234	915	4149.95	6952.85	39.7	15	30.2	47056	910	F
8/17/11	GN	37.8	8.5	234	915	4149.95	6952.85	39.7	15	30.2	47057	897	F
8/17/11	GN	37.8	8.5	234	915	4149.95	6952.85	39.7	15	30.2	47058	832	F
8/17/11	GN	37.8	8.5	234	915	4149.95	6952.85	39.7	15	30.2	47059	771	M
8/17/11	GN	37.8	8.5	234	915	4149.95	6952.85	39.7	15	30.2	47060	936	F
8/17/11	GN	37.8	8.5	234	915	4149.95	6952.85	39.7	15	30.2	47906	776	M
8/17/11	GN	37.8	8.5	234	915	4149.95	6952.85	39.7	15	30.2	47061	926	F
8/17/11	GN	37.8	8.5	234	915	4149.95	6952.85	39.7	15	30.2	47062	851	F
8/17/11	GN	37.8	8.5	234	915	4149.95	6952.85	39.7	15	30.2	47063	900	F
8/17/11	GN	37.8	8.5	234	915	4149.95	6952.85	39.7	15	30.2	47064	913	F
8/17/11	GN	37.8	8.5	234	915	4149.95	6952.85	39.7	15	30.2	47065	889	F
8/17/11	GN	37.8	8.5	234	915	4149.95	6952.85	39.7	15	30.2	47066	660	M
8/17/11	GN	37.8	8.5	234	915	4149.95	6952.85	39.7	15	30.2	47067	895	F
8/17/11	GN	37.8	8.5	234	915	4149.95	6952.85	39.7	15	30.2	47068	785	M
8/17/11	GN	37.8	8.5	234	915	4149.95	6952.85	39.7	15	30.2	47069	968	F
8/17/11	GN	37.8	8.5	234	915	4149.95	6952.85	39.7	15	30.2	47070	860	F
8/17/11	GN	37.8	8.5	234	915	4149.95	6952.85	39.7	15	30.2	47907	910	F
8/17/11	GN	37.8	8.5	234	915	4149.95	6952.85	39.7	15	30.2	47071	880	F

Appendix B (continued)

Date	Gear	Gear Dp (m)	Gear T (°C)	Time set	Time pulled	Latitude	Longitude	Dp (m)	SST (°C)	SSS	Tag #	TL (mm)	Sex
8/17/11	GN	37.8	8.5	234	915	4149.95	6952.85	39.7	15	30.2	47072	861	F
8/17/11	GN	37.8	8.5	234	915	4149.95	6952.85	39.7	15	30.2	47073	839	F
8/17/11	GN	37.8	8.5	234	915	4149.95	6952.85	39.7	15	30.2	47074	930	F
8/17/11	GN	37.8	8.5	234	915	4149.95	6952.85	39.7	15	30.2	47075	898	F
8/17/11	GN	37.8	8.5	234	915	4149.95	6952.85	39.7	15	30.2	47076	730	M
8/17/11	GN	37.8	8.5	234	915	4149.95	6952.85	39.7	15	30.2	47077	851	F
8/17/11	GN	37.8	8.5	234	915	4149.95	6952.85	39.7	15	30.2	47078	757	M
8/17/11	GN	37.8	8.5	234	915	4149.95	6952.85	39.7	15	30.2	47079	849	F
8/17/11	GN	37.8	8.5	234	915	4149.95	6952.85	39.7	15	30.2	47080	805	M
8/17/11	GN	37.8	8.5	234	915	4149.95	6952.85	39.7	15	30.2	47908	899	F
8/17/11	GN	37.8	8.5	234	915	4149.95	6952.85	39.7	15	30.2	47081	736	M
8/17/11	GN	37.8	8.5	234	915	4149.95	6952.85	39.7	15	30.2	47082	770	M
8/17/11	GN	37.8	8.5	234	915	4149.95	6952.85	39.7	15	30.2	47083	875	F
8/17/11	GN	37.8	8.5	234	915	4149.95	6952.85	39.7	15	30.2	47084	810	F
8/17/11	GN	37.8	8.5	234	915	4149.95	6952.85	39.7	15	30.2	47085	883	F
8/17/11	GN	37.8	8.5	234	915	4149.95	6952.85	39.7	15	30.2	47086	841	F
8/17/11	GN	37.8	8.5	234	915	4149.95	6952.85	39.7	15	30.2	47087	865	F
8/17/11	GN	37.8	8.5	234	915	4149.95	6952.85	39.7	15	30.2	47088	876	F
8/17/11	GN	37.8	8.5	234	915	4149.95	6952.85	39.7	15	30.2	47089	764	M
8/17/11	GN	37.8	8.5	234	915	4149.95	6952.85	39.7	15	30.2	47090	942	F
8/17/11	GN	37.8	8.5	234	915	4149.95	6952.85	39.7	15	30.2	47909	920	F
8/17/11	GN	37.8	8.5	234	915	4149.95	6952.85	39.7	15	30.2	47091	832	F
8/17/11	GN	37.8	8.5	234	915	4149.95	6952.85	39.7	15	30.2	47092	701	M
8/17/11	GN	37.8	8.5	234	915	4149.95	6952.85	39.7	15	30.2	47093	820	F
8/17/11	GN	37.8	8.5	234	915	4149.95	6952.85	39.7	15	30.2	47094	885	F
8/17/11	GN	37.8	8.5	234	915	4149.95	6952.85	39.7	15	30.2	47095	860	F
8/17/11	GN	37.8	8.5	234	915	4149.95	6952.85	39.7	15	30.2	47096	849	F
8/17/11	GN	37.8	8.5	234	915	4149.95	6952.85	39.7	15	30.2	47097	799	F
8/17/11	GN	37.8	8.5	234	915	4149.95	6952.85	39.7	15	30.2	47098	834	F
8/17/11	GN	37.8	8.5	234	915	4149.95	6952.85	39.7	15	30.2	47099	935	F
8/17/11	GN	37.8	8.5	234	915	4149.95	6952.85	39.7	15	30.2	47100	911	F
8/17/11	GN	37.8	8.5	234	915	4149.95	6952.85	39.7	15	30.2	47910	764	M
8/17/11	GN	37.8	8.5	234	915	4149.95	6952.85	39.7	15	30.2	46501	901	F
8/17/11	GN	37.8	8.5	234	915	4149.95	6952.85	39.7	15	30.2	46502	910	F
8/17/11	GN	37.8	8.5	234	915	4149.95	6952.85	39.7	15	30.2	46503	861	F
8/17/11	GN	37.8	8.5	234	915	4149.95	6952.85	39.7	15	30.2	46504	754	M
8/17/11	GN	37.8	8.5	234	915	4149.95	6952.85	39.7	15	30.2	46505	917	F
8/17/11	GN	37.8	8.5	234	915	4149.95	6952.85	39.7	15	30.2	46506	900	F
8/17/11	GN	37.8	8.5	234	915	4149.95	6952.85	39.7	15	30.2	46507	845	F
8/17/11	GN	37.8	8.5	234	915	4149.95	6952.85	39.7	15	30.2	46508	786	M
8/17/11	GN	37.8	8.5	234	915	4149.95	6952.85	39.7	15	30.2	46509	850	F

Appendix B (continued)

Date	Gear	Gear Dp (m)	Gear T (°C)	Time set	Time pulled	Latitude	Longitude	Dp (m)	SST (°C)	SSS	Tag #	TL (mm)	Sex
8/17/11	GN	37.8	8.5	234	915	4149.95	6952.85	39.7	15	30.2	46510	873	F
8/17/11	GN	37.8	8.5	234	915	4149.95	6952.85	39.7	15	30.2	47851	922	F
8/17/11	GN	37.8	8.5	234	915	4149.95	6952.85	39.7	15	30.2	46511	865	F
8/17/11	GN	37.8	8.5	234	915	4149.95	6952.85	39.7	15	30.2	46512	811	F
8/17/11	GN	37.8	8.5	234	915	4149.95	6952.85	39.7	15	30.2	46513	825	F
8/17/11	GN	37.8	8.5	234	915	4149.95	6952.85	39.7	15	30.2	46514	764	M
8/17/11	GN	37.8	8.5	234	915	4149.95	6952.85	39.7	15	30.2	46515	874	F
8/17/11	GN	37.8	8.5	234	915	4149.95	6952.85	39.7	15	30.2	46516	732	M
8/17/11	GN	37.8	8.5	234	915	4149.95	6952.85	39.7	15	30.2	46517	878	F
8/17/11	GN	37.8	8.5	234	915	4149.95	6952.85	39.7	15	30.2	46518	881	F
8/17/11	GN	37.8	8.5	234	915	4149.95	6952.85	39.7	15	30.2	46519	914	F
8/17/11	GN	37.8	8.5	234	915	4149.95	6952.85	39.7	15	30.2	46520	878	F
8/17/11	GN	37.8	8.5	234	915	4149.95	6952.85	39.7	15	30.2	47852	808	M
8/17/11	GN	37.8	8.5	234	915	4149.95	6952.85	39.7	15	30.2	46521	897	F
8/17/11	GN	37.8	8.5	234	915	4149.95	6952.85	39.7	15	30.2	46522	870	F
8/17/11	GN	37.8	8.5	234	915	4149.95	6952.85	39.7	15	30.2	46523	751	M
8/17/11	GN	37.8	8.5	234	915	4149.95	6952.85	39.7	15	30.2	46524	926	F
8/17/11	GN	37.8	8.5	234	915	4149.95	6952.85	39.7	15	30.2	46525	890	F
8/17/11	GN	37.8	8.5	234	915	4149.95	6952.85	39.7	15	30.2	46526	768	M
8/17/11	GN	37.8	8.5	234	915	4149.95	6952.85	39.7	15	30.2	46527	896	F
8/17/11	GN	37.8	8.5	234	915	4149.95	6952.85	39.7	15	30.2	46528	882	F
8/17/11	GN	37.8	8.5	234	915	4149.95	6952.85	39.7	15	30.2	46529	790	M
8/17/11	GN	37.8	8.5	234	915	4149.95	6952.85	39.7	15	30.2	46530	856	F
8/17/11	GN	37.8	8.5	234	915	4149.95	6952.85	39.7	15	30.2	47853	865	F
8/17/11	GN	37.8	8.5	234	915	4149.95	6952.85	39.7	15	30.2	46531	834	F
8/17/11	GN	37.8	8.5	234	915	4149.95	6952.85	39.7	15	30.2	46532	751	M
8/17/11	GN	37.8	8.5	234	915	4149.95	6952.85	39.7	15	30.2	46533	815	M
8/17/11	GN	37.8	8.5	234	915	4149.95	6952.85	39.7	15	30.2	46534	840	F
8/17/11	GN	37.8	8.5	234	915	4149.95	6952.85	39.7	15	30.2	46535	884	F
8/17/11	GN	37.8	8.5	234	915	4149.95	6952.85	39.7	15	30.2	46536	870	F
8/17/11	GN	37.8	8.5	234	915	4149.95	6952.85	39.7	15	30.2	46537	895	F
8/17/11	GN	37.8	8.5	234	915	4149.95	6952.85	39.7	15	30.2	46538	846	F
8/17/11	GN	37.8	8.5	234	915	4149.95	6952.85	39.7	15	30.2	46539	901	F
8/17/11	GN	37.8	8.5	234	915	4149.95	6952.85	39.7	15	30.2	46540	765	M
8/17/11	GN	37.8	8.5	234	915	4149.95	6952.85	39.7	15	30.2	47854	799	M
8/17/11	GN	37.8	8.5	234	915	4149.95	6952.85	39.7	15	30.2	46541	787	M
8/17/11	GN	37.8	8.5	234	915	4149.95	6952.85	39.7	15	30.2	46542	904	F
8/17/11	GN	37.8	8.5	234	915	4149.95	6952.85	39.7	15	30.2	46543	649	M
8/17/11	GN	37.8	8.5	234	915	4149.95	6952.85	39.7	15	30.2	46544	701	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46545	771	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46546	797	M

Appendix B (continued)

Date	Gear	Gear Dp (m)	Gear T (°C)	Time set	Time pulled	Latitude	Longitude	Dp (m)	SST (°C)	SSS	Tag #	TL (mm)	Sex
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46547	907	F
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46548	910	F
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46549	792	F
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46550	880	F
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	47855	762	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46551	735	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46552	725	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46553	881	F
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46554	732	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46555	760	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46556	900	F
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46557	922	F
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46558	726	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46559	780	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46560	734	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	47856	684	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46561	924	F
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46562	906	F
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46563	861	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46564	894	F
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46565	761	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46566	805	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46567	799	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46568	763	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46569	801	F
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46570	779	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	47857	801	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46571	800	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46572	804	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46573	914	F
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46574	773	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46575	790	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46576	928	F
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46577	882	F
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46578	924	F
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46579	910	F
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46580	770	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	47858	771	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46581	795	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46582	906	F
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46583	869	F

Appendix B (continued)

Date	Gear	Gear Dp (m)	Gear T (°C)	Time set	Time pulled	Latitude	Longitude	Dp (m)	SST (°C)	SSS	Tag #	TL (mm)	Sex
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46584	745	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46585	811	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46586	780	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46587	901	F
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46588	752	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46589	889	F
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46590	943	F
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	47859	905	F
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46591	813	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46592	754	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46593	860	F
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46594	632	F
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46595	761	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46596	796	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46597	881	F
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46598	710	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46599	859	F
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46600	820	F
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	47860	879	F
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46601	788	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46602	804	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46603	728	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46604	681	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46605	761	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46606	771	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46607	902	F
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46608	826	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46609	801	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46610	815	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	47861	763	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46611	791	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46612	745	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46613	876	F
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46614	778	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46615	815	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46616	934	F
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46617	752	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46618	895	F
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46619	792	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46620	816	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	47862	779	M

Appendix B (continued)

Date	Gear	Gear Dp (m)	Gear T (°C)	Time set	Time pulled	Latitude	Longitude	Dp (m)	SST (°C)	SSS	Tag #	TL (mm)	Sex
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46621	746	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46623	800	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46624	734	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46625	790	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46626	776	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46627	805	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46628	737	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46629	760	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46630	741	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	47863	755	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46631	809	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46632	771	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46633	779	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46634	779	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46635	690	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46636	788	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46637	795	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46638	742	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46639	736	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46640	771	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	47864	771	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46641	771	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46642	747	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46643	709	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46644	786	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46645	809	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46646	761	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46647	822	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46648	810	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46649	774	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46650	755	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	47865	731	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46651	780	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46652	938	F
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46653	779	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46654	759	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46655	719	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46656	781	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46657	819	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46658	786	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46659	761	M

Appendix B (continued)

Date	Gear	Gear Dp (m)	Gear T (°C)	Time set	Time pulled	Latitude	Longitude	Dp (m)	SST (°C)	SSS	Tag #	TL (mm)	Sex
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46660	797	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	47866	780	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46661	786	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46662	755	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46663	761	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46664	775	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46665	741	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46666	780	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46667	787	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46668	746	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46669	935	F
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46670	798	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	47867	780	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46671	793	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46672	765	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46673	820	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46674	756	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46675	813	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46676	773	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46677	784	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46678	755	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46679	801	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46680	747	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	47868	790	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46681	761	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46682	830	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46683	805	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46684	705	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46685	762	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46686	754	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46687	761	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46688	739	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46689	742	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46690	761	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	47869	774	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46691	759	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46692	681	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46693	844	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46694	797	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46695	875	F
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46696	840	M

Appendix B (continued)

Date	Gear	Gear Dp (m)	Gear T (°C)	Time set	Time pulled	Latitude	Longitude	Dp (m)	SST (°C)	SSS	Tag #	TL (mm)	Sex
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46697	771	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46698	735	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46699	775	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46700	801	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	47870	744	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46701	811	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46702	812	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46703	752	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46704	766	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46705	774	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46706	816	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46707	752	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46708	800	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46709	781	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46710	759	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	47871	912	F
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46711	780	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46712	801	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46713	827	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46714	834	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46715	881	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46716	794	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46717	809	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46718	760	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46719	867	F
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46720	711	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	47872	765	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46721	799	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46722	770	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46723	810	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46724	785	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46725	754	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46726	760	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46727	775	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46728	754	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46729	744	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46730	751	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	47873	800	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46731	872	F
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46732	714	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46733	704	M

Appendix B (continued)

Date	Gear	Gear Dp (m)	Gear T (°C)	Time set	Time pulled	Latitude	Longitude	Dp (m)	SST (°C)	SSS	Tag #	TL (mm)	Sex
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46734	805	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46735	809	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46736	784	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46737	824	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46738	773	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46739	761	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46740	820	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	47874	776	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46741	755	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46742	770	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46743	726	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46744	785	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46745	745	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46746	782	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46747	878	F
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46748	726	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46749	873	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46750	750	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	47875	762	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46751	746	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46752	745	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46753	791	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46754	744	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46755	841	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46756	739	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46757	665	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46758	765	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46759	901	F
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46760	806	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	47876	750	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46761	711	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46762	851	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46763	761	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46764	786	F
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46765	800	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46766	746	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46767	736	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46768	760	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46769	677	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46770	732	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	47877	780	M

Appendix B (continued)

Date	Gear	Gear Dp (m)	Gear T (°C)	Time set	Time pulled	Latitude	Longitude	Dp (m)	SST (°C)	SSS	Tag #	TL (mm)	Sex
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46771	901	F
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46772	766	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46773	838	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46774	756	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46775	767	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46776	799	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46777	721	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46778	768	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46779	785	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46780	747	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	47878	795	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46781	775	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46782	754	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46783	745	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46784	801	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46785	776	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46786	766	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46787	655	F
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46788	804	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46789	750	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46790	790	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	47879	780	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46791	734	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46792	810	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46793	820	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46794	790	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46795	782	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46796	776	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46797	897	F
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46798	735	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46799	766	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46800	796	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	47880	811	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46801	714	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46802	812	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46803	792	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46804	707	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46805	740	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46806	792	M
8/17/11	GN	28.3	10.5	857	1145	4150.95	6954.22	28.7	17	30.6	46807	781	M
8/17/11	GN	NA	NA	1131	1319	4150.56	6954.19	25.3	17.8	30.6	46808	770	M

Appendix B (continued)

Date	Gear	Gear Dp (m)	Gear T (°C)	Time set	Time pulled	Latitude	Longitude	Dp (m)	SST (°C)	SSS	Tag #	TL (mm)	Sex
8/17/11	GN	NA	NA	1131	1319	4150.56	6954.19	25.3	17.8	30.6	46809	774	M
8/17/11	GN	NA	NA	1131	1319	4150.56	6954.19	25.3	17.8	30.6	46810	758	M
8/17/11	GN	NA	NA	1131	1319	4150.56	6954.19	25.3	17.8	30.6	47881	831	F
8/17/11	GN	NA	NA	1131	1319	4150.56	6954.19	25.3	17.8	30.6	46811	679	M
8/17/11	GN	NA	NA	1131	1319	4150.56	6954.19	25.3	17.8	30.6	46812	745	M
8/17/11	GN	NA	NA	1131	1319	4150.56	6954.19	25.3	17.8	30.6	46813	776	M
8/17/11	GN	NA	NA	1131	1319	4150.56	6954.19	25.3	17.8	30.6	46814	613	M
8/17/11	GN	NA	NA	1131	1319	4150.56	6954.19	25.3	17.8	30.6	46815	775	M
8/17/11	GN	NA	NA	1131	1319	4150.56	6954.19	25.3	17.8	30.6	46816	730	M
8/17/11	GN	NA	NA	1131	1319	4150.56	6954.19	25.3	17.8	30.6	46817	762	M
8/17/11	GN	NA	NA	1131	1319	4150.56	6954.19	25.3	17.8	30.6	46818	740	M
8/17/11	GN	NA	NA	1131	1319	4150.56	6954.19	25.3	17.8	30.6	46819	757	M
8/17/11	GN	NA	NA	1131	1319	4150.56	6954.19	25.3	17.8	30.6	46820	806	M
8/17/11	GN	NA	NA	1131	1319	4150.56	6954.19	25.3	17.8	30.6	47882	729	M
8/17/11	GN	NA	NA	1131	1319	4150.56	6954.19	25.3	17.8	30.6	46821	727	M
8/17/11	GN	NA	NA	1131	1319	4150.56	6954.19	25.3	17.8	30.6	46822	790	M
8/17/11	GN	NA	NA	1131	1319	4150.56	6954.19	25.3	17.8	30.6	46823	777	M
8/17/11	GN	NA	NA	1131	1319	4150.56	6954.19	25.3	17.8	30.6	46824	795	M
8/17/11	GN	NA	NA	1131	1319	4150.56	6954.19	25.3	17.8	30.6	46825	774	M
8/17/11	GN	NA	NA	1131	1319	4150.56	6954.19	25.3	17.8	30.6	46826	770	M
8/17/11	GN	NA	NA	1131	1319	4150.56	6954.19	25.3	17.8	30.6	46827	790	M
8/17/11	GN	NA	NA	1131	1319	4150.56	6954.19	25.3	17.8	30.6	46828	760	M
8/17/11	GN	NA	NA	1131	1319	4150.56	6954.19	25.3	17.8	30.6	46829	787	M
8/17/11	GN	NA	NA	1131	1319	4150.56	6954.19	25.3	17.8	30.6	46830	779	M
8/17/11	GN	NA	NA	1131	1319	4150.56	6954.19	25.3	17.8	30.6	47883	777	M
8/17/11	GN	NA	NA	1131	1319	4150.56	6954.19	25.3	17.8	30.6	46831	785	M
8/17/11	GN	NA	NA	1131	1319	4150.56	6954.19	25.3	17.8	30.6	46832	800	M
8/17/11	GN	NA	NA	1131	1319	4150.56	6954.19	25.3	17.8	30.6	46833	843	M
8/17/11	GN	NA	NA	1131	1319	4150.56	6954.19	25.3	17.8	30.6	46834	803	M
8/17/11	GN	NA	NA	1131	1319	4150.56	6954.19	25.3	17.8	30.6	46835	735	M
8/17/11	GN	NA	NA	1131	1319	4150.56	6954.19	25.3	17.8	30.6	46836	820	M
8/17/11	GN	NA	NA	1131	1319	4150.56	6954.19	25.3	17.8	30.6	46837	810	M
8/17/11	GN	NA	NA	1131	1319	4150.56	6954.19	25.3	17.8	30.6	46838	750	M
8/17/11	GN	NA	NA	1131	1319	4150.56	6954.19	25.3	17.8	30.6	46839	833	M
8/17/11	GN	NA	NA	1131	1319	4150.56	6954.19	25.3	17.8	30.6	46840	759	M
8/17/11	GN	NA	NA	1131	1319	4150.56	6954.19	25.3	17.8	30.6	47884	759	M
8/17/11	GN	NA	NA	1131	1319	4150.56	6954.19	25.3	17.8	30.6	46841	760	M
8/17/11	GN	NA	NA	1131	1319	4150.56	6954.19	25.3	17.8	30.6	46842	781	M
8/17/11	GN	NA	NA	1131	1319	4150.56	6954.19	25.3	17.8	30.6	46843	810	M
8/17/11	GN	NA	NA	1131	1319	4150.56	6954.19	25.3	17.8	30.6	46844	736	M
8/17/11	GN	NA	NA	1131	1319	4150.56	6954.19	25.3	17.8	30.6	46845	730	M

Appendix B (continued)

Date	Gear	Gear Dp (m)	Gear T (°C)	Time set	Time pulled	Latitude	Longitude	Dp (m)	SST (°C)	SSS	Tag #	TL (mm)	Sex
8/17/11	GN	NA	NA	1131	1319	4150.56	6954.19	25.3	17.8	30.6	46846	770	M
8/17/11	GN	NA	NA	1131	1319	4150.56	6954.19	25.3	17.8	30.6	46847	775	M
8/17/11	GN	NA	NA	1131	1319	4150.56	6954.19	25.3	17.8	30.6	46848	755	M
8/17/11	GN	NA	NA	1131	1319	4150.56	6954.19	25.3	17.8	30.6	46849	750	M
8/17/11	GN	NA	NA	1131	1319	4150.56	6954.19	25.3	17.8	30.6	46850	761	M
8/17/11	GN	NA	NA	1131	1319	4150.56	6954.19	25.3	17.8	30.6	47885	826	F
8/17/11	GN	NA	NA	1131	1319	4150.56	6954.19	25.3	17.8	30.6	46851	790	M
8/17/11	GN	NA	NA	1131	1319	4150.56	6954.19	25.3	17.8	30.6	46852	816	F
8/17/11	GN	NA	NA	1131	1319	4150.56	6954.19	25.3	17.8	30.6	46853	800	M
8/17/11	GN	NA	NA	1131	1319	4150.56	6954.19	25.3	17.8	30.6	46854	738	M
8/17/11	GN	NA	NA	1131	1319	4150.56	6954.19	25.3	17.8	30.6	46855	777	M
8/17/11	GN	NA	NA	1131	1319	4150.56	6954.19	25.3	17.8	30.6	46856	781	M
8/17/11	GN	NA	NA	1131	1319	4150.56	6954.19	25.3	17.8	30.6	46857	753	M
8/17/11	GN	NA	NA	1131	1319	4150.56	6954.19	25.3	17.8	30.6	46858	763	M
8/17/11	GN	NA	NA	1131	1319	4150.56	6954.19	25.3	17.8	30.6	46859	800	M
8/17/11	GN	NA	NA	1131	1319	4150.56	6954.19	25.3	17.8	30.6	46860	788	M
8/17/11	GN	NA	NA	1131	1319	4150.56	6954.19	25.3	17.8	30.6	46861	748	M
8/17/11	GN	NA	NA	1131	1319	4150.56	6954.19	25.3	17.8	30.6	46862	714	M
8/17/11	GN	NA	NA	1131	1319	4150.56	6954.19	25.3	17.8	30.6	46863	740	M
8/17/11	GN	NA	NA	1131	1319	4150.56	6954.19	25.3	17.8	30.6	46864	746	M
8/17/11	GN	NA	NA	1131	1319	4150.56	6954.19	25.3	17.8	30.6	46865	760	M
8/17/11	GN	NA	NA	1131	1319	4150.56	6954.19	25.3	17.8	30.6	46866	722	M
8/17/11	GN	NA	NA	1131	1319	4150.56	6954.19	25.3	17.8	30.6	46867	748	M
8/17/11	GN	NA	NA	1131	1319	4150.56	6954.19	25.3	17.8	30.6	46868	792	M
8/17/11	GN	NA	NA	1131	1319	4150.56	6954.19	25.3	17.8	30.6	46869	757	M
8/17/11	GN	NA	NA	1131	1319	4150.56	6954.19	25.3	17.8	30.6	46870	806	M
8/17/11	GN	NA	NA	1131	1319	4150.56	6954.19	25.3	17.8	30.6	47887	704	M
8/17/11	GN	NA	NA	1131	1319	4150.56	6954.19	25.3	17.8	30.6	46871	791	M
8/17/11	GN	NA	NA	1131	1319	4150.56	6954.19	25.3	17.8	30.6	46872	756	M
8/17/11	GN	NA	NA	1131	1319	4150.56	6954.19	25.3	17.8	30.6	46873	800	M
8/17/11	GN	NA	NA	1131	1319	4150.56	6954.19	25.3	17.8	30.6	46874	800	M
8/17/11	GN	NA	NA	1131	1319	4150.56	6954.19	25.3	17.8	30.6	46875	806	M
8/17/11	GN	NA	NA	1131	1319	4150.56	6954.19	25.3	17.8	30.6	46876	774	M
8/17/11	GN	NA	NA	1131	1319	4150.56	6954.19	25.3	17.8	30.6	46877	747	M
8/17/11	GN	NA	NA	1131	1319	4150.56	6954.19	25.3	17.8	30.6	46878	755	M
8/17/11	GN	NA	NA	1131	1319	4150.56	6954.19	25.3	17.8	30.6	46879	747	M
8/17/11	GN	NA	NA	1131	1319	4150.56	6954.19	25.3	17.8	30.6	46880	718	M
8/17/11	GN	NA	NA	1131	1319	4150.56	6954.19	25.3	17.8	30.6	47888	850	M
8/17/11	GN	NA	NA	1131	1319	4150.56	6954.19	25.3	17.8	30.6	46881	775	M
8/17/11	GN	NA	NA	1131	1319	4150.56	6954.19	25.3	17.8	30.6	46882	760	M
8/17/11	GN	NA	NA	1131	1319	4150.56	6954.19	25.3	17.8	30.6	46883	773	M

Appendix B (continued)

Date	Gear	Gear Dp (m)	Gear T (°C)	Time set	Time pulled	Latitude	Longitude	Dp (m)	SST (°C)	SSS	Tag #	TL (mm)	Sex
8/17/11	GN	NA	NA	1131	1319	4150.56	6954.19	25.3	17.8	30.6	46884	726	M
8/17/11	GN	NA	NA	1131	1319	4150.56	6954.19	25.3	17.8	30.6	46885	775	M
8/17/11	GN	NA	NA	1131	1319	4150.56	6954.19	25.3	17.8	30.6	46886	817	M
8/17/11	GN	NA	NA	1131	1319	4150.56	6954.19	25.3	17.8	30.6	46887	790	M
8/17/11	GN	NA	NA	1131	1319	4150.56	6954.19	25.3	17.8	30.6	46888	760	M
8/17/11	GN	NA	NA	1131	1319	4150.56	6954.19	25.3	17.8	30.6	46889	781	M
8/17/11	GN	NA	NA	1131	1319	4150.56	6954.19	25.3	17.8	30.6	46890	795	M
8/17/11	GN	NA	NA	1131	1319	4150.56	6954.19	25.3	17.8	30.6	47889	783	M
8/17/11	GN	NA	NA	1131	1319	4150.56	6954.19	25.3	17.8	30.6	46891	776	M
8/17/11	GN	NA	NA	1131	1319	4150.56	6954.19	25.3	17.8	30.6	46892	784	M
8/17/11	GN	NA	NA	1131	1319	4150.56	6954.19	25.3	17.8	30.6	46893	763	M
8/17/11	GN	NA	NA	1131	1319	4150.56	6954.19	25.3	17.8	30.6	46894	796	M
8/17/11	GN	NA	NA	1131	1319	4150.56	6954.19	25.3	17.8	30.6	46895	792	M
8/17/11	GN	NA	NA	1131	1319	4150.56	6954.19	25.3	17.8	30.6	46896	796	M
8/17/11	GN	NA	NA	1131	1319	4150.56	6954.19	25.3	17.8	30.6	46897	730	M
8/17/11	GN	NA	NA	1131	1319	4150.56	6954.19	25.3	17.8	30.6	46898	685	M
8/17/11	GN	NA	NA	1131	1319	4150.56	6954.19	25.3	17.8	30.6	46899	764	M
8/17/11	GN	NA	NA	1131	1319	4150.56	6954.19	25.3	17.8	30.6	46900	760	M
8/17/11	GN	NA	NA	1131	1319	4150.56	6954.19	25.3	17.8	30.6	47890	744	M
8/17/11	GN	NA	NA	1131	1319	4150.56	6954.19	25.3	17.8	30.6	46901	740	M
8/17/11	GN	NA	NA	1131	1319	4150.56	6954.19	25.3	17.8	30.6	46902	779	M
8/17/11	GN	NA	NA	1131	1319	4150.56	6954.19	25.3	17.8	30.6	46903	754	M
8/17/11	GN	NA	NA	1131	1319	4150.56	6954.19	25.3	17.8	30.6	46904	814	M
8/17/11	GN	NA	NA	1131	1319	4150.56	6954.19	25.3	17.8	30.6	46905	775	M
8/17/11	GN	NA	NA	1131	1319	4150.56	6954.19	25.3	17.8	30.6	46906	810	M
8/17/11	GN	NA	NA	1131	1319	4150.56	6954.19	25.3	17.8	30.6	46907	765	M
8/17/11	GN	NA	NA	1131	1319	4150.56	6954.19	25.3	17.8	30.6	46908	747	M
8/17/11	GN	NA	NA	1131	1319	4150.56	6954.19	25.3	17.8	30.6	46909	813	M
8/17/11	GN	NA	NA	1131	1319	4150.56	6954.19	25.3	17.8	30.6	46910	820	M
8/17/11	GN	NA	NA	1131	1319	4150.56	6954.19	25.3	17.8	30.6	47891	790	M
8/17/11	GN	NA	NA	1131	1319	4150.56	6954.19	25.3	17.8	30.6	46911	720	M
8/17/11	GN	NA	NA	1131	1319	4150.56	6954.19	25.3	17.8	30.6	46912	989	M
8/17/11	GN	NA	NA	1131	1319	4150.56	6954.19	25.3	17.8	30.6	46913	761	M
8/17/11	GN	NA	NA	1131	1319	4150.56	6954.19	25.3	17.8	30.6	46914	784	M
8/17/11	GN	NA	NA	1131	1319	4150.56	6954.19	25.3	17.8	30.6	46915	761	M
8/17/11	GN	NA	NA	1131	1319	4150.56	6954.19	25.3	17.8	30.6	46916	748	M
8/17/11	GN	NA	NA	1131	1319	4150.56	6954.19	25.3	17.8	30.6	46917	759	M
8/17/11	GN	NA	NA	1131	1319	4150.56	6954.19	25.3	17.8	30.6	46918	790	M
8/17/11	GN	NA	NA	1131	1319	4150.56	6954.19	25.3	17.8	30.6	46919	794	M
8/17/11	GN	NA	NA	1131	1319	4150.56	6954.19	25.3	17.8	30.6	46920	750	M
8/17/11	GN	NA	NA	1131	1319	4150.56	6954.19	25.3	17.8	30.6	47892	806	M

Appendix B (continued)

Date	Gear	Gear Dp (m)	Gear T (°C)	Time set	Time pulled	Latitude	Longitude	Dp (m)	SST (°C)	SSS	Tag #	TL (mm)	Sex
8/17/11	GN	NA	NA	1131	1319	4150.56	6954.19	25.3	17.8	30.6	46921	770	M
8/17/11	GN	NA	NA	1131	1319	4150.56	6954.19	25.3	17.8	30.6	46922	750	M
8/17/11	GN	NA	NA	1131	1319	4150.56	6954.19	25.3	17.8	30.6	46923	819	M
8/17/11	GN	NA	NA	1131	1319	4150.56	6954.19	25.3	17.8	30.6	46924	781	M
8/17/11	GN	NA	NA	1131	1319	4150.56	6954.19	25.3	17.8	30.6	46925	749	M
8/17/11	GN	NA	NA	1131	1319	4150.56	6954.19	25.3	17.8	30.6	46926	767	M
8/17/11	GN	NA	NA	1131	1319	4150.56	6954.19	25.3	17.8	30.6	46927	787	M
8/17/11	GN	NA	NA	1131	1319	4150.56	6954.19	25.3	17.8	30.6	46928	730	M
8/17/11	GN	NA	NA	1131	1319	4150.56	6954.19	25.3	17.8	30.6	46929	790	M
8/17/11	GN	NA	NA	1131	1319	4150.56	6954.19	25.3	17.8	30.6	46930	777	M
8/17/11	GN	NA	NA	1131	1319	4150.56	6954.19	25.3	17.8	30.6	47893	739	M
8/17/11	GN	NA	NA	1131	1319	4150.56	6954.19	25.3	17.8	30.6	46931	780	M
8/17/11	GN	NA	NA	1131	1319	4150.56	6954.19	25.3	17.8	30.6	46932	760	M
8/17/11	GN	NA	NA	1131	1319	4150.56	6954.19	25.3	17.8	30.6	46933	778	M
8/17/11	GN	NA	NA	1131	1319	4150.56	6954.19	25.3	17.8	30.6	46934	776	M
8/17/11	GN	NA	NA	1131	1319	4150.56	6954.19	25.3	17.8	30.6	46935	776	M
8/17/11	GN	NA	NA	1131	1319	4150.56	6954.19	25.3	17.8	30.6	46936	740	M
8/17/11	GN	NA	NA	1131	1319	4150.56	6954.19	25.3	17.8	30.6	46937	784	M
8/17/11	GN	NA	NA	1131	1319	4150.56	6954.19	25.3	17.8	30.6	46938	775	M
8/17/11	GN	NA	NA	1131	1319	4150.56	6954.19	25.3	17.8	30.6	46939	740	M
8/17/11	GN	NA	NA	1131	1319	4150.56	6954.19	25.3	17.8	30.6	46940	764	M
8/17/11	GN	NA	NA	1131	1319	4150.56	6954.19	25.3	17.8	30.6	47894	746	M
8/17/11	GN	NA	NA	1131	1319	4150.56	6954.19	25.3	17.8	30.6	46941	720	M
8/17/11	GN	NA	NA	1131	1319	4150.56	6954.19	25.3	17.8	30.6	46942	743	M
8/17/11	GN	NA	NA	1131	1319	4150.56	6954.19	25.3	17.8	30.6	46943	745	M
8/17/11	GN	NA	NA	1131	1319	4150.56	6954.19	25.3	17.8	30.6	46944	754	M
8/17/11	GN	NA	NA	1131	1319	4150.56	6954.19	25.3	17.8	30.6	46945	719	M
8/17/11	GN	NA	NA	1131	1319	4150.56	6954.19	25.3	17.8	30.6	46946	835	M
8/17/11	GN	NA	NA	1131	1319	4150.56	6954.19	25.3	17.8	30.6	46947	801	M
8/17/11	GN	NA	NA	1131	1319	4150.56	6954.19	25.3	17.8	30.6	46948	778	M
8/17/11	GN	NA	NA	1131	1319	4150.56	6954.19	25.3	17.8	30.6	46949	722	M
8/17/11	GN	NA	NA	1131	1319	4150.56	6954.19	25.3	17.8	30.6	46950	732	M
8/17/11	GN	NA	NA	1131	1319	4150.56	6954.19	25.3	17.8	30.6	47895	692	F
8/17/11	GN	NA	NA	1131	1319	4150.56	6954.19	25.3	17.8	30.6	46951	821	M
8/17/11	GN	NA	NA	1131	1319	4150.56	6954.19	25.3	17.8	30.6	46952	749	M
8/17/11	GN	NA	NA	1131	1319	4150.56	6954.19	25.3	17.8	30.6	46953	711	M
8/17/11	GN	NA	NA	1131	1319	4150.56	6954.19	25.3	17.8	30.6	46954	784	M
8/17/11	GN	NA	NA	1131	1319	4150.56	6954.19	25.3	17.8	30.6	46955	741	M
8/17/11	GN	NA	NA	1131	1319	4150.56	6954.19	25.3	17.8	30.6	46956	738	M
8/17/11	GN	NA	NA	1131	1319	4150.56	6954.19	25.3	17.8	30.6	46957	795	M
8/17/11	GN	NA	NA	1131	1319	4150.56	6954.19	25.3	17.8	30.6	46958	777	M

Appendix B (continued)

Date	Gear	Gear Dp (m)	Gear T (°C)	Time set	Time pulled	Latitude	Longitude	Dp (m)	SST (°C)	SSS	Tag #	TL (mm)	Sex
8/17/11	GN	NA	NA	1131	1319	4150.56	6954.19	25.3	17.8	30.6	46959	780	M
8/17/11	GN	NA	NA	1131	1319	4150.56	6954.19	25.3	17.8	30.6	46960	739	M
8/17/11	GN	NA	NA	1131	1319	4150.56	6954.19	25.3	17.8	30.6	47896	732	M