

THE PIRATES OF CILICIA:
A GIS APPROACH TO CREATING A PREDICTIVE MODEL OF 1ST CENTURY B.C. PIRATE
MARITIME NETWORKS IN THE EASTERN AEGEAN SEA

by

William Carter Jakeman III

May, 2021

Director of Thesis: Frank E. Romer

Major Department: History Department

The Cilician Pirates dominated the Mediterranean during the late second and early first centuries B.C. Their homeland, Cilicia, was a rugged and tough mountainous region, and as such they expanded into the unguarded and unpoliced eastern Mediterranean waters, plaguing shipping lanes, coastal settlements, and raiding island communities for trade goods such as food, luxuries, and people for slaves. Eventually, Rome launched a campaign led and strategized by Gnaeus Pompey Magnus, (later one of the informal Triumvirate and rivals to Julius Caesar) to eradicate the Cilician pirates from the Mediterranean. Incredibly successful and thorough, Pompey eradicated the pirates, and piracy in general, from the Mediterranean. However, after his last siege against the pirate stronghold in Taurus Mountain of Cilicia, the terms of surrender mentioned the presence of multiple island forts and strongholds undiscovered or not yet besieged by Pompey during his campaign of purging of the pirates. This treaty and its descriptions in Plutarch's *Life of Pompey* raise multiple questions. Where were these other fortifications and safe havens? What did this pirate network look like, and how far did it truly extend? How did this network of pirate safe havens affect the development of island and coastal communities?

Such questions will only be answered through hands-on archaeological excavations and surveys. The purposes of creating a predictive model, the goal of this project, is to provide a hypothesis for future testing through the marriage of document analysis and interpolation with the application of GIS technology. The result is a predictive model of how part of the Cilician pirate network might have operated and how it might have looked when placed on a map.

Such GIS applications will inject previously gathered data from experimental archaeology projects such as the *Kyrenia II* sailing tests, which resulted in determining the speed and travel efficiency of ancient sailing vessels. Such sailing data, interlaced with geo-processual GIS modeling, will create a visualized representation of distance costs in terms of days for a sailing vessel to travel through the Dodecanese Island chain. Layering this with feature barriers, i.e. the major islands of the southern Dodecanese (this project's focus) along with modern sea lanes, create a predictive model which hypothesizes that Alimia, Chalki, Agios Theodoros Nisidia, Makry, Simi, and Saria are geographically advantageous islands that ancient mariners likely used. Their practice of island-hopping thus created a maritime network of havens and beacons of rest to be exploited by the Cilician pirates. The inclusion of satellite imagery uncovers unidentified remains on these islands, highlighted and affirmed by my predictive model, sit near sheltered beaches, with elevated plateaus and natural lookout points.

THE PIRATES OF CILICIA:

A GIS APPROACH TO CREATING A PREDICTIVE MODEL OF 1ST CENTURY B.C. PIRATE
MARITIME NETWORKS IN THE EASTERN AEGEAN SEA

A Thesis

Presented to the Faculty of the Department of History

East Carolina University

In Partial Fulfillment of the Requirements for the Degree

Master of Arts in Maritime Studies

by

William Carter Jakeman III

May 2021

© William Carter Jakeman III, 2021

THE PIRATES OF CILICIA:

A GIS APPROACH TO CREATING A PREDICTIVE MODEL OF 1ST CENTURY B.C.
PIRATE MARITIME NETWORKS IN THE EASTERN AEGEAN SEA

by

William C. Jakeman III

APPROVED BY:

DIRECTOR OF
THESIS:

Dr. Frank Romer, Professor

COMMITTEE MEMBER:

Dr. Jonathan Reid, Associate Professor

COMMITTEE MEMBER:

Dr. Karen Mulcahy, Associate Professor

CHAIR OF THE DEPARTMENT
OF
History

Dr. Christopher Oakley, Associate Professor

DEAN OF THE
GRADUATE SCHOOL:

Paul J. Gemperline, PhD

ACKNOWLEDGEMENTS

I would like to first thank my parents for providing support, assistance, and guidance throughout my academic career. Without them, the stormy seas that life brings would not have given way to clear skies as quickly as they did with their help. I also would like to thank my undergraduate thesis director, mentor, and friend, Dr. Andrea De Giorgi for giving me the opportunity to expand my knowledge of, and passion for, the classics which were the grassroots of this thesis. Last but not least, I would also like to thank both Dr. Frank Romer and Dr. Jonathan Reid for their invaluable assistance, support, and guidance to help me complete not only my thesis but also this chapter of my life, despite the many obstacles which persisted to the very end. It was a feat akin to David and Goliath, and I am extremely grateful and blessed to have received their input, and because of their determination to see me through the process, rain or shine, I would not have been as successful without their wisdom.

TABLE OF CONTENTS

ACKNOWLEDGEMENTS.....	iv
TABLE OF CONTENTS.....	v
LIST OF FIGURES	viii
CHAPTER 1: INTRODUCTION AND CONCEPT.....	1
Discussion on the Time Period Covered.....	1
Significance of the Cilician Pirates.....	2
GIS and its Applications	3
Conceptual Usage of GIS in Creating “Predictive Models”	3
CHAPTER 2: HISTORICAL BACKGROUND OF CILICIA	6
Cultural Origins	6
Hittite History	7
Assyrian Occupation.....	7
Greek Conquest and Re-colonization	9
Dichotomy of Cilicia.....	9
Cilicia Pedias	10
Expansion and Colonization Westward	11
Cilicia Trachea.....	11
Economic Comparisons Between Cilicia Trachea and Pedias	12
Cultural Differences.....	13
CHAPTER 3: HISTORY OF THE CILICIAN PIRATES	15
Carthage’s Fall and the Rise of Cilician Piracy	15
Increased Cilician Piracy Throughout the Aegean	17
The Cilician Pirates and Rome’s Slave Trade	18
Cilician Pirates and their Involvement in Wars Against Rome	20
Pompey’s Campaign Against the Pirates.....	22

CHAPTER 4: ANCIENT VESSELS, THEIR SPEED, AND TRAVEL EFFICIENCY	27
Aegean Islands and Island-Hopping	27
Types of Ancient Mediterranean Vessels and their Uses	31
Sailing Configurations and Type of Rigging	34
Points of Sail and their Efficiency in Square Rigging	35
Hypothesized Speeds of Mediterranean Vessels	36
Wind Speeds in the Dodecanese	39
Possible Vessels the Cilician Pirates Used	41
CHAPTER 5: BRIEF ADDRESSMENT OF LIMITATIONS	43
No Examples of Cilician Pirate Vessels in the Archaeological Record	43
Absence of Cilician Pirate Strongholds in the Archaeological Record	44
Little Archaeological Research on Cilician Pirate Culture.....	44
Inherent Theoretical Limitations in Predictive Modeling.....	45
CHAPTER 6: GIS AND ITS APPLICATIONS TOWARDS A PREDICTIVE MODEL ..	47
GIS Applications Throughout Archaeology	47
Usage of GIS to Create ‘Predictive Models’	48
Presentation of the GIS Process	49
CHAPTER 7: ANALYSIS OF GIS DATA.....	51
Analysis and Overview of the Dodecanese Island Chain	51
Islands of Interest	54
Review of Available Data.....	58
Identifiable & Unidentifiable Sites from Satellite Imagery	58
Mediterranean Travel Lanes, Currents, and Prevailing Winds.....	69
Discussion of GIS Figures	73
ArcGIS Time-Distance Figure from Rhodes	84
ArcGIS Time-Distance Figure from Chalki	85

CHAPTER 8: THE PREDICTIVE MODEL.....	86
Combining GIS Figures & Data into a Predictive Model.....	86
Analysis of Resultant Predictive Model	88
Discussion of Predictive Model Results	88
Discussion of the Limitations of this Predictive Model.....	89
Discussion of the Significance of the Predictive Model.....	90
ArcGIS Predictive Model from Rhodes.....	91
ArcGIS Predictive Model from Chalki	92
CHAPTER 9: SUMMARY AND CONCLUSION	93
REFERENCES	97

LIST OF FIGURES

Figure 1. Map showing the Aegean Sea, Greek mainland, Crete, and Anatolian coastline..	30
Figure 2. Two Rigging Diagrams showing lateen and square sail configurations	34
Figure 3. Diagram of the Points of Sail	38
Figure 4. ArcGIS Map depicting IDW interpolations of wind speed and direction	40
Figure 5. ArcGIS Map focus Dodecanese Island region of the Aegean Sea	52
Figure 6. Anna Shute. Photograph of Crete taken from Santorini	53
Figure 7. Map showing Rhodes and Simi sea traffic lanes/routes	56
Figure 8. Map showing Rhodes and Chalki sea traffic lanes/routes	57
Figure 9. Screenshot of Halki's port and sea traffic lanes/routes	58
Figure 10. Satellite imagery of Agios Theodoros Nisidia	60
Figure 11. Map of Tilos & Nikia sea traffic lanes/routes	61
Figure 12. Satellite imagery of Alimia	62
Figure 13. Satellite imagery of NE Alimia	62
Figure 14. Satellite imagery of unidentified structure ruins Chalki.....	63
Figure 15. Satellite imagery of unidentified structure ruins Chalki.....	63
Figure 16. Satellite imagery of unidentified structure ruins on NW Chalki.....	64
Figure 17. Satellite imagery of unidentified structure ruins and 'Socrates' Cave' near Halki, Chalki	65

Figure 18. Satellite imagery of plateau and unidentified rubble on Agios Theodoros Nisidia	66
Figure 19. Satellite imagery of unidentified rubble on Agios Theodoros Nisidia.....	67
Figure 20. Satellite imagery of unidentified linear structures on Makry.....	68
Figure 21. Map of sea lanes to Rhodes.....	70
Figure 22. Map of sea traffic lanes at Rhodes.....	71
Figure 23. Map of sea traffic lanes at Chalki.....	71
Figure 24. ArcGIS Map depicting IDW interpolations of averaged prevailing current speed and direction.....	76
Figure 25. Screenshot focus of Agios Theodoros Nisidia in proximity to Alimia (right) and Chalki (Left)... ..	81
Figure 26. ArcGIS Ship-Distance-Cost map model of Dodecanese Islands, Aegean Sea, depicting travel originating from Rhodes.....	84
Figure 27. ArcGIS Ship-Distance-Cost map model of the Dodecanese Islands, Aegean Sea, depicting travel originating from Chalki.....	85
Figure 28. ArcGIS Predictive Model Itineraries of Dodecanese Islands, Aegean Sea, depicting travel originating from Rhodes.....	91
Figure 29. ArcGIS Predictive Model Itineraries of Dodecanese Islands, Aegean Sea, depicting travel originating from Chalki.....	92

CHAPTER 1

INTRODUCTION AND CONCEPT

The Cilician pirates were a notorious group of sea bandits who preyed upon maritime traffic throughout the second and first centuries B.C. in the Mediterranean Sea. The most notable groups of these pirates traversed the waters of the Cilician, Aegean, Ionian, Tyrrhenian, and Libyan Seas, all during the period of the late Roman Republic. The Cilician Sea is located between the region of southeast Turkey known as Cilicia and the northern coast of Cyprus. The Cilician Sea was named after the Cilician peoples, a group that progressed to become one of the ancient Mediterranean's largest criminal maritime sea powers and slave traders during the second and first centuries B.C. (De Souza 2002: 98). Their power and influence extended from the eastern Mediterranean as far west as the Tyrrhenian Sea, disrupting shipping routes and raiding coastal and island settlements belonging to Rome and all her holdings in the early first century B.C.

It was during this period that Plutarch mentions the Cilicians multiple times in his biographies on the lives of the informal Roman triumvirate, namely Julius Caesar, Pompey, and Crassus. All three of these powerful Roman figures encountered the Cilician pirates at one or more points throughout their lives, most notably Pompey (Plutarch, *Life of Pompey*) and Caesar (Plutarch, *Life of Caesar*). Two passages from Plutarch, many of which shall be used and discussed in the proceeding chapters, highlight Cilician pirate dominance in the eastern Mediterranean; both come from his biographies on Caesar and Pompey. These passages are the initial foundation and literary evidence for making the Dodecanese Islands my thesis' area of interest. They not only show a pirate network existed in the eastern Mediterranean, mainly throughout the Aegean, but also hint at where to first begin looking for these networks.

In 75 B.C., Caesar was captured by pirates during his return journey from Bithynia. His itinerary led him southward out of the Black Sea and into the Aegean and propelled him into the northern islands of the Dodecanese. "... on his voyage back, [Caesar] was captured, near the island Pharmacusa, by pirates, who already at that time controlled the sea with large armaments and countless small vessels. In the next place, [Caesar] was left with one friend and two attendants, among them [were] Cilicians" (Plutarch, *Life of Caesar* 2). This quote not only states that this area was rife with piracy, but gives us our first hint for which region these pirates, most likely Cilician, heavily frequented: the Dodecanese. Pharmacusa (modern Pharmakonisi) is one of the northern islands within the Dodecanese and lies between the island of Leros to its west, Kos to its south, and the city of Miletus on the mainland to its east. Though this is the first, and only, mention of a specific island in the context to Cilician piracy, it is essential to choosing the focus of this thesis.

To press further, Caesar was held for little over a month by the pirates on an island in this region. It is uncertain whether Plutarch insinuates that this same island, Pharmacusa, is where Caesar was held, or was in fact just another island nearby. Nonetheless, it is clear that the immediate area around Pharmacusa is where Caesar was captured and held, for after his release he immediately came back with a naval force and crucified them. "But after his ransom had come from Miletus and he had paid it and was set free, he immediately manned vessels and put to sea from the harbor of Miletus against the robbers. He caught them, too, still lying at anchor off the island, and got most of them into his power" (Plutarch, *Life of Caesar* 2). This prompts another inquiry: holding a hostage for thirty-eight days must logically point to the existence and usage of infrastructure for shelter, and a food supply for sustenance, which means that there must

be a network of sorts that the pirates created, used, and exploited for them to implement and live in for at least a month.

Eight years later in the summer of 67 B.C., Pompey launched a massive campaign authorized by the Roman Senate to eradicate the Cilician pirates from the waters of the Mediterranean for good (De Souza 2008: 73). Plutarch briefly describes the nautical tactics that Pompey employed; for example, Pompey and his fleet tracked every sighted or known Cilician pirate presence. In three months (67 B.C.), Pompey managed to chase, root out, and cleanse Mediterranean trade lanes, ports, coastal and near-coastal towns of pirate activity, island to island, as he swept eastwards from Corsica, Sardinia, Crete, the Aegean, and finally to the Cilician coast of Asia Minor.

In the latter half of Plutarch's account of Pompey's campaign, he mentions a series of safe havens, an asset already mentioned in the capturing and imprisonment of Caesar, that Pompey and his fleet uncovered throughout his maritime campaign. He then set about besieging these places, swiftly executing all captured and roused pirates in his victory. It is the very end of this campaign as described by Plutarch, however, which raises further questions concerning the island assets controlled by Cilician pirates. After Pompey blockaded the entirety of the Cilician coast and laid siege to the pirate fortresses entrenched in the Taurus Mountains, he earned victory through the surrender of these fortresses and their Cilician occupants. This surrender included the "... cities and islands of which they (the Cilicians) were in control; these they had fortified, making them hard to get at and difficult to take by storm" (Plutarch, *Life of Pompey* 28)

Plutarch's biographies of Caesar and Pompey provide documentation that the Cilician pirates had some sort of network. The acknowledgement of this arrangement is by the Cilicians in their terms of surrender to Pompey, and indicates that despite Pompey's thorough sweep

across the Mediterranean there were still fortified, undiscovered, and unbroken chains of strongholds, safe havens, and islands controlled by those few who had survived Pompey's purge.

Of the islands and coastal settlements throughout the Mediterranean and especially the Aegean Sea, the Dodecanese presents the best area to begin this inquiry, firstly, because of Plutarch's attests to their activity in the region. Secondly, the Dodecanese Islands are geographically preferred for beginning our search because their geographic position acts as a gateway to the rest of the Aegean, Greece, and Crete, making most islands in the Dodecanese likely candidates where island-networking would have first occurred for vessels originating from eastern regions like Syria or Cilicia. The larger islands of Crete and Cyprus are also possible locations for elements of the Cilician pirate network, but the size of these islands suggests the existence of temporary out-of-the-way hideouts for pirates and bandits rather than established sites. For the sake of this paper's focus, Cyprus and Crete will not be extensively examined because it would create too wide an area to efficiently cover. To the west of Italy, Corsica and Sardinia provide evidence for how far west the pirate network reached, initially through the story of Spartacus and his interaction with a fleet of Cilician pirates just north of the Strait of Messina (discussed more in chapter 3). Additionally, since Pompey began his work in the Tyrrhenian Sea to drive out the pirates from all their established havens, it can be assumed that these two large islands held temporary hideouts for piracy in general and for Cilician pirates in particular. These islands, too, will not be covered as they fall out of the Aegean region that provides the focus for the present study.

The first third of this paper discusses and analyzes the history and origin of the pirates in question, and provides a narrative background about who this group was, what their ethnic and cultural origins were, and what influence they had on eastern Mediterranean affairs. The middle

and final third of this paper analyzes the possible whereabouts and likely presence of a Cilician pirate maritime network in the area of the Dodecanese Islands. The tools this paper uses to analyze and predict possible locations are satellite imagery and ArcGIS, a geoprocessing software that utilizes up-to-date global, topographical, and marine data. ArcGIS implements a combination of live-fed geoprocessing data via connection to the internet and raw input data to create a visualization of weighted interpolations of spatial analyses, which in turn can be used especially for archaeology and maritime archaeology to prove or disprove hypotheses on regional connectivity of ancient peoples. For example, various applications of GIS, or Geographic Information Systems, towards archaeological projects have aided analyzing the extent of ancient socioeconomic networks, maritime landscapes, costs and effects of variables in relation to a specific geographic area and the relative distances between multiple data points.

GIS applications will be implemented towards the purpose of this thesis, to create a predictive model of likely candidates which fit the scope of a Cilician pirate network of island strongholds and safe havens within the southern Dodecanese Island chain. In the creation of this predictive model, such visualizations will serve as potential starting points and directional guidance for conducting future surveys within the region—surveys which aim to further our understanding of Cilician pirate culture and, quite possibly, to delve into other pirate infrastructures in antiquity.

CHAPTER 2

HISTORICAL BACKGROUND OF CILICIA

Cilicia in antiquity was a coastal region of southeast Anatolia, with Cyprus to its immediate south and Syria as its eastern border. This region was once home to a community of raiders and pirates who preyed on the prosperous trade routes of the eastern Mediterranean, eventually creating a network of Cilician pirate warlords who faced little naval resistance. Their rise to power started around 200 B.C., just after the Second Punic War resulted in Carthage's defeat and destruction of its entire navy. Using both ancient historical accounts and recent archaeological surveys of the last century, this chapter examines and analyzes the creation of the Cilician peoples as background to the history of the Cilician pirates.

To understand the Cilician pirates and how they came to be, both their origin as a people and the formation of the original "land of Cilicia", a term early twentieth century archaeologists coined, must first be addressed and examined in order to identify contributing causes in the creation of the Cilician pirates. Archaeological evidence dates migrant activity to the end of the second millennium B.C. in the area that came to be regarded as eastern Cilicia. Within the basin of eastern Cilicia, Cilicia Pedias, these tribes were collectively known as the Hilakku, a Neo-Hittite group who settled in this basin by at least 1200 B.C. after migrating south from Cappadocia after the fall of the Hittite Empire (Schmitz 2009: 129). It is this eastern basin which both ancient historians and modern archaeologists attribute to the original land of Cilicia. By the end of the second millennium B.C., the Hilakku slowly transitioned from primarily hunter-gatherer societies to a collection of agriculturally-centered communities (Schmitz 2009: 130). Cilicia's basin is considerably flatter than the hilly and mountainous landscape of Cappadocia to its north and immediate west. Cilicia Pedias, additionally, is flatter than its western rugged

landscape—topics to be covered in detail later in this chapter. The topography of this basin was suitable for the settlement and colonization of agricultural societies; the gateway to the rest of Cilicia and southern Anatolia was, and still is, this large basin (Rauh 1999: 54).

Athenodoros, a Cilician writer of the late-first century B.C., discussed a local Cilician legend concerning an ancient campaign led by the king of Assyria, Sennacherib (Grayson 1991: 115-16). Surprisingly, Athenodoros does not provide much insight to Cilician piracy when reviewed by Grayson (1991) in his discussions of early Cilician history. This literary evidence reflects imperial Roman rule during Athenodoros' young adulthood and comes long after Assyrian migrants came from the eastern lands of Syria and Persia, personally led by Sennacherib (Sayce 1910: 1339). This event took place between 696 and 695 B.C. which resulted in Assyrian control, settlement, and colonization of eastern Cilicia, effectively supplanting the local Hilakku (Grayson 1991: 127). This campaign led to the development of four major cities within the eastern Cilician basin: Adanos, Anchialê, Illubri, and Tarsus. All four of these Assyrian cities were settled in the southernmost parts of the Hilakku's land. Their presence ultimately forced the inhabiting Hilakku either to assimilate and fall under Assyrian rule, or be driven north into the mountains of southern Cappadocia (Grayson 1991: 129).

Of the four Assyrian cities, only Adanos and Tarsus remain observable today in the archaeological record. The other two cities, Illubri and Anchialê, have not yet appeared in Cilician archaeological surveys of the last 50 years. It is these two cities, especially Illubri, which support the best argument for where the original land of Cilicia was, and thus by extension where the Cilician people originated. Despite this lack of archaeological evidence in pinpointing Illubri's and Anchialê's exact coordinates, Athenodoros indicates Illubri to be west of Adanos (Adana in modern-day Turkey) and that Anchialê was west of Tarsus (Sayce 1910: 1340). The

archaeological record shows this chronology of Assyrian settlement: Adanos was the first city to be settled by Sennacherib, with Illubri and Anchialê settled soon after Adanos. Finally, Tarsus was settled as the most recent and last colony under Sennacherib's rule; it was a direct colony of Anchialê (Sayce 1910: 1342). In addition, both Athenodoros and Plutarch regard Tarsus as a colony sent out from Anchialê, and archaeological evidence from Tarsus in the 1930's confirms this claim (Grayson 1991: 139).

Both Illubri and Tarsus, then, lie between Adanos and Anchialê, that is, the southernmost part of the recorded Hilakku homeland. Therefore, both Illubri and Tarsus were potentially mixed cities with Neo-Hittite and Assyrian populations, but with the latter group absorbing the former over time. Of the two cities, Illubri is the more likely candidate for being the original land of Cilicia. Since Tarsus was established after Illubri and Anchialê, as mentioned above, chronology disqualifies it from being considered the original land of Cilicia. Nonetheless, it is this larger combined area of Illubri and Tarsus, originally the land of the local Neo-Hittite Hilakku, which ultimately became the original land of Cilicia and the homeland of the Cilician peoples. First populated by the Neo-Hittite Hilakku, then colonized by the Assyrians during the early seventh century B.C., the society formed by this chain of events birthed the Iron Age Cilician peoples (Gjerstad 1934: 162). Yet the Cilicians of the Iron Age (1100-550 B.C.) were not quite the group of people who spawned the Cilician pirates.

After the breakup of the Assyrian Empire, Cilicia transitioned from varying monarchical kingdoms to the dominion of the Persian Empire, which fell under the control of Alexander the Great and the Greeks during the late fourth century B.C. Subsequently, after the death of Alexander and beginning of the Hellenistic Era, and because of Alexander's conquest and brief control of the region, Cilicia experienced an influx of Greek migrants, increased growth, and an

economic boom in the late-fourth century B.C. (Gates 2015: 83). The aftermath of Alexander's Anatolian campaign made Tarsus the new capital of Cilicia, transferring the title from a declining Illubri (Gjerstad 1934: 158). This resulted in the increase of Greek immigrants, most of whom were forcibly resettled by Alexander in Cilicia in order to bolster the region with supporters favoring Alexander's rule (Chisholm 1911: 365). It was at this point during the late fourth and early third centuries B.C. that eastern Cilicia, Cilicia Pedias, became populated by a mixed Greek-Assyrian-Hittite population. Progressing into the third century B.C., this cultural and genealogical mix of Hellenistic Cilicians became the group of people who, only a century later, would spawn the infamous pirates of Cilicia Trachea.

A quick note concerning the relative information about the Hellenistic and Persian periods is relative here. It has to be emphasized that Cilician history during the first half of the first millennium is not well documented due to a lack of primary accounts on that era of Cilician history. Rather, the region is treated as more of a floor mat for major historical figures of the period, such as Alexander the Great, to traverse in their travels eastward. Additionally, what documentation, research analysis, and discussion that does exist date to the early and mid-twentieth century, especially the 1920's and 30's, without much recent updated discussion or insight to the ancient history of Cilicia during this time. Cilician excavations post-1930 habitually focused on earlier or later periods than the Persian or Hellenistic Age, a limitation addressed by Charles Gates (2015: 81).

The regional names "Cilicia Trachea" and "Cilicia Pedias" were Greek designations adopted by the Romans in Latin literary accounts dating to the late second century B.C., advanced by Sulla, a Roman general and politician during the Social War (91-87 B.C.) and dictator at Rome (82-79 B.C.). As propraetor in Cilicia in 96 B.C., that is, as a provincial

governor, Sulla noted many differences between the region's eastern and western halves. He emphasized the division of Cilicia by splitting the region administratively into Cilicia Trachea and Cilicia Pedias, an attempt to refine the organization of Cilicia as a Roman province. In translation, the term *pedias* is the Greek word for "lowland", while the Latinized term *trachea* (for the Greek word *tracheia*) contextually refers to "rugged land" when used to describe mountainous and wooded topography (Smith 1856: 121). Cilicia Trachea, then, is the western and more mountainous part of Cilicia, with Cilicia Pedias being the large, flatter basin to the east and the ancestral homeland of the Cilician peoples. This geographical divide between Cilicia Trachea and Cilicia Pedias contributed to the cultural shift which arguably pigeonholed the new communities of Cilicia Trachea with livelihoods based on raiding and piracy.

The majority of Cilicia's growth took place during Alexander's conquest and just after his death, as stated above, because of the influx of Greek immigration (Gates 2015: 87-88). This growth expanded into the rest of the eastern Cilician basin, following the contours of the basin's many rivers and inland waterways. Eventually, Cilicia's growth spread all across the basin, which resulted in most of the irrigated land desirable for agriculture being claimed and taken. Towards the end of the third century B.C., population growth forced Cilician settlers to expand westwards into the rougher, more mountainous terrain (Rauh 1999: 54). The earlier expansion throughout eastern Cilicia had allowed for the development of infrastructure to support coastal trade for the basin communities, which in turn allowed easier access westward along the coastline of what would become western Cilicia (Rauh 1999: 55). Additional political complications and tensions throughout the region served to further separate and divide western Cilician colonists and settlers from their original eastern counterparts.

By 301 B.C., the Seleucid Empire had regained much of Alexander's original empire in the East, namely Syria, Persia, and eastern Cilicia which, by extension, also meant control over Cilicia Trachea and its colonists. By the turn of the third century B.C., and well into the mid-third century B.C., Cilicia became politically divided into east and west as Ptolemaic Egypt made incursions into Cilicia, conquering the western colonists as their prize. As other tensions rose and conflicts accelerated into sporadic wars between Egypt and the Seleucid Empire, tensions in and around Cilicia lessened, as eastern Cilicia fell under Seleucid control and the west officially fell under the Ptolemaic Kingdom. Continued conflict between Egypt and Seleucia meant that any economic support, developmental or infrastructure investments from Ptolemy I practically ceased. Cilicia Trachea did not suffer much incursion from the Seleucids after its seizure by Ptolemaic hands, and the region was left primarily independent under the rule of local kings and priests (Chisholm 1911: 365-66). Left to their own devices, the underdeveloped, ignored, and unsupported communities of Cilicia Trachea developed independently and survived by their own local means. Consequently, this stand-off created an environment which lacked sufficient policing. As a result, the communities of Cilicia Trachea turned to piracy as a means of economic sustenance and prosperity in order to survive and rise above of their poverty-stricken land.

Cilicia Pedias, the original land of Cilicia and the Cilician peoples, was and still is more advantageous for the development of agriculture when compared to the rough hilly terrain to its west and north. As its flat plains are naturally irrigated by lakes, seven major rivers, and multiple inland waterways, Cilicia Pedias promotes larger and more exploitable agricultural developments than does the ruggedness of Cilicia Trachea. This difference is highlighted by recorded macrobotanical remains dating to the Middle Bronze Age in the form of grape seeds, fruit stems,

and production of wine by societal elites in what was once Hittite Anatolia (White and Miller 2018: 213). These rivers, floodplains, and flatlands in Cilicia Pedias produced some of the region's main exports such as beans, fish, wine, cereals, and a rough cloth made of dark goat hair called cilicium used in the making of tents (Sayce 1910: 1340). It was the most prosperous and agriculturally industrious half of Cilicia because of the nourishing nature of the large basin (White and Miller 2018: 213-14). Quite simply, Cilicia Pedias was a powerhouse of agricultural goods.

The prosperity of Cilicia Pedias does not, however, imply that Cilicia Trachea was completely devoid of agricultural production. In and around Cilicia's western half are two main rivers which cut through its steep terrain and hills, and each river provides, just as it did in antiquity, flat banks in which fields were raised and tended (Broodbank 2013: 56). Away from these rivers, however, irrigation and ease of creating farmlands were not as exploitable as those in Cilicia Pedias. The productivity of Cilicia Trachea came more from a pastoral, lumber, and fishing based economy than from agriculture, wine, and grain production (Broodbank 2013: 55). In contrast to the agricultural fertility and prosperity of Cilicia Pedias, Cilicia Trachea's topography limits the acreage of agricultural coverage. The main exports of Cilicia Trachea were fish, livestock, and the previously mentioned cilicium, which were limited in their production and value compared to their eastern counterparts in Cilicia Pedias. The profitable foodstuffs coming from the industrious agriculture that the basin communities boasted most likely outweighed the production of Cilicia Trachea (White and Miller 2018: 214) and were more desirable compared to the limited options of Cilicia Trachea (Gjerstad 1934: 165). To this degree, if and when periods of drought consistently burdened and endangered a populace, foodstuff exports would diminish because of priority for sustainability rather than commercial

wealth. Such communities are sometimes forced to survive by stooping to dubious, and sometimes radical, means if food supplies become drastically low (Sherwin-White 1976: 12-13).

In a modern day parallel, an initial cause for Somalian piracy on modern trade routes along the eastern coast of Africa was due to the destruction and pollution of Somalian farmland and rivers from uncontrolled hazardous mining waste. On account of the majority of accessible land being tainted, farmland grew scarce and thus forced a number of Somalians to exploit the incredibly prosperous trade route just off the Somalian coast. A combination of envy and lack of advantageous agricultural space created incentives for piratical activity from those who would not otherwise engage in agricultural production. In antiquity, raiding and piracy did not necessarily just prey on the wealthier merchant vessels carrying valuable ingots and luxury goods. During times of need, Mediterranean sea-bandits more adamantly targeted merchant vessels laden with foodstuffs rather than luxury goods; the plunder would then benefit the well-being of the pirate's community and the pirates themselves (Sherwin-White 1976: 12). This logic then suggests that the communities of Cilicia Trachea fell on hard times, most likely through prolonged seasonal droughts, and were thus pushed into a large, unified community of opportunists seeking outside means of support, sustenance, and prosperity.

Thus, in times of dire need, drought, and economic depression, the fishermen and coastal communities of Cilicia Trachea turned seaward and saw a horizon of opportunity (De Souza 2002: 99). Towards the latter end of the second millennium B.C., a similar situation occurred when Cilicia Trachean communities experienced periods of drought and crop failure brought on by Middle Bronze Age climate change (Broodbank 2013: 539-40) and thus fell into difficult periods with harsh conditions. Consequently, communal and regional suffering stressfully press disadvantaged groups, with some yielding onto the dubious path of least resistance. Since the

growth and expansion of the late fourth century B.C., the coastal communities in Cilicia Trachea had at least a few generations of practice in shipbuilding because of their trade as fishermen: fishing communities of Cilicia Trachea must have had a means of sea travel in order to go out to fish. Shore fishing has sustainable, but limited, benefits and is subject to seasonal changes. Deep-sea fishing not only provides the potential for larger catches from varying “fishing holes”, but requires access to coastal and deep-water fishing. Shipbuilding trades and craftsmen were required to create fleets of appropriately built fishing vessels capable of sailing out farther from shore for better and bigger catches.

In hard times, the potential to exploit unprotected sea routes, coastal villages, or island settlements invites piracy once fishing and seafaring vessels are accessible. Those bold enough to attempt acts of piracy would have the tools they needed to modify fishing vessels as piratical predators (De Souza 2002: 122). However, there was a powerful maritime presence in the eastern Mediterranean throughout the third and second centuries B.C., which policed the trade routes of the eastern Mediterranean and thus deterred widespread piracy (Sherwin-White 1976: 11). The Carthaginian Empire, whose holdings and capital lay in the western Mediterranean throughout northern Africa and southern Spain, also had trade deals and economic interests which lay in the east—remnants of the Phoenician Empire. Such economic interests fell under the protection of the large, organized, and well-known might of the Carthaginian navy. These interests and their routes traveled roughly in a counter-clockwise exchange of goods in the eastern Mediterranean, running from Syria and Judea through the Cilician Sea and into the Aegean—an inviting route for prospective pirates to stage their assault on maritime trade.

CHAPTER 3

HISTORY OF THE CILICIAN PIRATES

Carthage's naval presence prior to the end of the Second Punic War created enough of a deterrent to piracy to dissuade many coastal and island communities throughout the eastern Mediterranean, like those in Cilicia Trachea, from becoming pirates or engaging in piratical actions (Lambert 2018: 36). Despite Carthage's foreign policy of policing and show of force, there are recorded cases of piracy, albeit few, during Carthage's reign over the seas of the Mediterranean. To avoid Carthaginian repercussions and naval retaliation, such piratical actions most likely were relegated to non-Carthaginian interests, such as coastal raiding in the Aegean and along the Levantine coastline (Lambert 2018:36-37). The circumstances of limited piracy and Carthaginian naval might occurred at the same time just after Cilicia Trachea was colonized in the late fourth-century B.C. After the eastern basin became more populated and the land claimed, the west fell into disarray and underdevelopment while the east remained profitable. However, this naval stability in the eastern Mediterranean came to an end as the time of the second war (218 to 201 B.C.) between Carthage and Rome.

Carthage was the dominant maritime power throughout the entire Mediterranean during the fourth and third centuries B.C. The empire controlled coastal territory throughout the modern-day nations of Tunisia, Libya, Algeria, and Morocco, with strategic colonies situated in eastern Spain, Sicily, and other islands. Carthage was originally a prominent Phoenician colony, benefiting from the maritime advancements made by Phoenician sailors and shipwrights. Much of Carthage's naval prowess came from its origin as a Phoenician maritime colony. Carthage maintained a significant naval and maritime presence throughout the Mediterranean to protect their trade interests in cereals, metals, ingots (copper and tin), glass, and wine.

Although the cost to maintain Carthage's navy was high, the payout in keeping a grasp on the profitable eastern Mediterranean outweighed the naval expenditures towards the end of the third century B.C. (Steinby 2014: 189). Unfortunately for Carthage, the Punic Wars of the third and second centuries B.C. pitted the naval might of the Carthaginian Empire against the highly experienced land armies of the Roman Republic. During the First Punic War (264-241 B.C.) Rome ground down Carthage's treasury, forcing Carthage into deficit spending in order to keep their powerful navy functioning and made paying their mercenaries problematic. By the Second Punic War, Carthage was unable to maintain their fleets of warships and naval construction programs.

Because of a lack of funds in the aftermath of the First Punic War, the uprising of Carthage's unpaid mercenaries left little, if any, room to fund the upkeep of its navy. Carthage's failure to defeat Rome during the Second Punic War required them to recall all their remaining fleets in order to serve as a defensive bulwark against Roman invasion. Carthage's inability to pay its mercenaries caused a major fracture in the makeup of the Carthaginian navy (Steinby 2014: 56). By 201 B.C., Carthage's navy was completely destroyed by a phenomenal Roman naval victory in the Battle of the Aegates off the western coast of Sicily. Until its final destruction in 146 B.C. at the end of the Third Punic War (149 to 146 B.C.), Carthage fell into an isolationist defense of the homeland and of its holdings in North Africa.

The presence of an organized naval response force to threats on Carthaginian maritime interests had discouraged bold, blatant, and large-scale piracy (De Souza 2008: 42). The stronger presence of an organized force to deter the disruption of sea lanes, the lower the presence of piracy. This parallel is equivalent to the concept of a barometer, and the notion of this relationship between piracy and policing presence is appropriately identified as a barometer of

sea power. The weaker the presence of such a policing force, the higher the activity and presence of piracy will occur because of the lack of significant deterrence. This absence of the Carthaginian navy after c. 200 B.C., resulted in a major loss to the deterrence of pirate activity. Significantly, Plutarch attributes the beginning and rise of Cilician piracy to roughly that period. He introduces the problem of Cilician piracy as a foreboding shadow, a problem highlighted during the First Mithridatic War (88 to 63 B.C.).

The power of the pirates had its seat in Cilicia at first, and at the outset it was venturesome and elusive but it took on more confidence and boldness during the Mithridatic war, because it lent itself to the king's (Mithridates') service. (Plutarch, *Life of Pompey* 24).

The homogeneity of the Cilician pirate state and its control of the eastern Mediterranean was not immediate. Slowly over the next century, the struggling communities of Cilicia Trachea sent out modified vessels with armed men to supply their otherwise forgotten and alienated communities once Carthaginian fleets dispersed. Foodstuffs taken by the increasing numbers of Cilician pirates alleviated concerns and fears brought on by the drought and hardships their communities felt at the time—catalysts which prompted initial venturesome and elusive Cilician raiding and exploitation. As discussed already, Cilicia Trachea's limited resources only added to the lack of outside help and trade from any of its immediate neighbors. The farm fields of Cilicia Trachea did not produce the same quantity as the fields of Cilicia Pedias, which constrained the growth of its population. Thus, the first generation of Cilician pirates were likely viewed locally as heroes. Slowly, between c. 200 and 103 B.C., the pirates extended their reach further into the Aegean Sea through the Cyclades and Dodecanese islands (De Souza 2008: 88), as well as along the coast of western Anatolia. Because of the absence of significant adversities like Carthage, the

tendrils of increased and organized piracy originating from Cilicia drove through the numerous and largely unprotected islands of the Aegean.

With reduced concern about survival and food supply, a society can focus on cohesion and internal development. The progress and development of infrastructure in Cilicia Trachea did not parallel that of Cilicia Pedias; instead, they focused on advancing the capabilities of Cilician pirate activity (Rauh 1999: 55). Concerning their eastern peers, the pirates of Cilicia Trachea swiftly strong-armed much of coastal Cilicia Pedias into providing what might be called “protection money”, an act comparable to criminal activity in immigrant communities of the early twentieth century in the United States. Extending from the Levantine Sea, the Cilician pirates gradually created a network of pirate safe havens, strongholds, and island communities from which they raided, stole, and exploited humans (Sherwin-White 1976: 8). During the mid- and-late second century B.C., this network of pirate-held or strong-armed islands and communities laid the foundation for the Cilician pirates to become Rome’s top supplier of slaves through the Mediterranean slave trade. Eventually, the slave trade became the Cilicians’ most valuable and exploited trade resource, trumping almost every other resource they acquired and supplying the slave markets of the Roman Republic (De Souza 2002: 139). The source for their supplies of slaves? Victims of Cilician and pirate raids throughout the unprotected islands of the Aegean.

The pirates had established naval power in the eastern Mediterranean with no major organized opposition. Carthage had been destroyed in 146 B.C., and the Cilician pirates had a considerable grasp on most of the eastern Mediterranean. Minor maritime powers such as Rhodes countered Cilician threats to their own interests by recruiting mercenaries to defuse an escalation of Cilician aggression. Moving south, the Cilician pirates began to disrupt important

shipping lanes from Egypt and Syria to the western Mediterranean and Rome. No region was safe from the pirates; all were potential victims no matter their nationality or ethnicity.

Economic disruption of any kind, but most notably maritime, affected Rome's granaries and food supplies as the Italian peninsula could not fully support the food needs of Rome's citizens. "This power extended its operations over the whole of our Mediterranean Sea, making it unnavigable and closed to all commerce. This was what most of all inclined the Romans, who were hard put to it to get provisions and expected a great scarcity" (Plutarch, *Life of Pompey*, 25) In 105 B.C., prior to Sulla's governorship of Cilicia, the Romans launched a campaign long after the last of their successful Macedonian Wars in 148 (or 146) B.C., to defuse and possibly dismantle the Cilician pirates by invading their homeland (De Souza 2002: 103). The Macedonian Wars were a series of campaigns which resulted in the conquest of Greece and Anatolia, ending in the creation of Cilicia Pedias as a Roman province in 103 B.C. by Marcus Antonius Orator, supervised and overseen by the then-praetor Sulla (Chisholm 1911: 365). This campaign, led by Marcus Antonius Orator, aimed to drive the Cilician pirates out of their strongholds and liberate the eastern Mediterranean from their clutches.

Using Cilicia Pedias as a staging ground, Marcus Antonius Orator invaded the mountainous region of Cilicia Trachea by way of the coast. He burned and destroyed many coastal pirate communities as well as any other communities considered supporters of the Cilician pirates. Some of the pirates fled to their strongholds in the Taurus Mountains, while most boarded their vessels and fled the region (Chisholm 1911: 366). Those that stayed were besieged and killed by Marcus Antonius Orator, who afterwards made an example of the survivors to deter further piracy. The remainder of those that had left their burning homes in Cilicia Trachea sailed to eastern Crete and disappeared.

For the next decade, neither Rome nor the eastern Mediterranean experienced outrageously frequent piracy, a direct and short-term result of Orator's Trachean campaign (De Souza 2002: 104). This was a brief and temporary relief. Crete was an ideal place for the Cilician pirates to hole up since it was a separate pirate haven rife with Cretan pirates already ill-disposed toward an invasive and conquering Rome (De Souza 2002: 105). The Cilician pirates eventually returned home within a decade of Marcus Antonius' scorched-earth invasion. They rebuilt their homes, farms, and ports in the years leading up to the outbreak of the First Mithridatic War (89-86 B.C.) (Rauh 1999: 55). Marcus Antonius had not succeeded in removing the Cilician threat; instead, he only temporarily relieved the pressure the pirates placed on Mediterranean maritime traffic. Sulla, meanwhile, became governor of Cilicia Pedias and replicated Ptolemy's treatment of Cilicia Trachea: he abandoned and ignored it.

De Souza (2008) claims the pirates returned from Crete to around 88 B.C., estimating that some possibly remained in Crete. Additional criminals, outcasts, and pirates from other parts of the eastern Mediterranean sporadically joined the resettlement. By the middle of the First Mithridatic War the problem of piracy and raiding ensued once more in much the same way as during the second century B.C. (De Souza 2008: 74). Because of Antonius' failure to eradicate them, the pirates began to adamantly and preferentially target Roman merchant vessels and trade routes. Any supposed Cilician pirate network prior, during, and after Marcus Antonius' campaign was not addressed, nor did Rome attempt to remove Cilician pirate influence from the many islands of the eastern Mediterranean. This is another reason why Antonius' campaign failed miserably in the long run: there was no long-range plan to clear out the pirates. Much like an infestation, all corners and areas had to be identified, investigated, and cleaned thoroughly. Acting as mercenaries during the first two Mithridatic Wars (88-81 B.C.) some Cilician pirates

actively took up arms against the Romans at sea while Mithridates battled them on land. “[The pirates] took on confidence and boldness during the Mithridatic War because they lent themselves to the king's service.” (Plutarch, *Life of Pompey* 24).

Eventually, by the early 70’s B.C. the Cilician pirates made so many incursions into Rome’s territorial waters of the Tyrrhenian and Ionian seas that they became almost commonplace. During the Italian Social War, Rome had to hold off on expansion and focus on the internal strife that plagued Roman society at this time (De Souza 2008: 71-72). Again, like the vacuum caused by Carthage’s defeat, this lack of efficient policing of the Mediterranean gave way to opportunists such as the Cilician pirates. Given that the ebb and flow of Cilician pirate activity correlated with the strength of weakness of naval policing of the seas, it is arguable that the Rome’s inattention and inefficiency caused much of the rampant piracy in the Mediterranean during the second and first centuries B.C.

Then, while the Romans were embroiled in civil wars at the gates of Rome, the sea was left unguarded, and gradually drew and enticed them on until they no longer attacked navigators only, but also laid waste to islands and maritime cities.

(Plutarch, *Life of Pompey* 24).

Rome did not focus much effort or attention on the Cilician pirates, their pirate networks, incursions, or the effects of their piracy on the maritime economy of the Mediterranean until stability returned after the Social War and early Mithridatic Wars (De Souza 2008: 75). The pirates of Cilicia Trachea went so far as to subsume Cilicia Pedias and take over the better-built and established harbors along the flatter, gentler coast of Cilicia Pedias—an act which cancelled out the tribute the people of Pedias offered in order to avoid the wrath of the Cilician pirates.

Caesar also crossed paths with the Cilician pirates during this period. He journeyed from Rome to Bithynia by sea to engage in politics and diplomatic interests with King Nicomedes. After concluding a series of semi-unfruitful talks, Caesar sailed out of the Black Sea and into the Aegean, destined for Rhodes. Midway in his itinerary, Caesar was captured by pirates near the island of Pharmacusa and held hostage for thirty-eight days. "... on his voyage back, [Caesar] was captured, near the island Pharmacusa, by pirates, who already at that time controlled the sea with large armaments and countless small vessels. In the next place, [Caesar] was left with one friend and two attendants, among them [were] Cilicians" (Plutarch, *Life of Caesar* 2).

The story of how Caesar handled the pirates, among them Cilicians, is amusing to say the least, but it is where he was captured and theoretically held that captures much interest. Pharmacusa is located within the Dodecanese Island chain, specifically in its northern area. The significance of this is highlighted in chapter 1 and reflects the pirates' influence in the region of the Dodecanese, perhaps in conjunction with other pirate groups. For Caesar and the pirates to reside on an island for little over a month indicates the existence of infrastructure, shelter, sustenance, and security—all factors which would be created and maintained by a network exploited by pirates, most likely the Cilician pirates. After his release and the ransom money given to his captors, Caesar immediately returned with a naval force from Miletus on the Anatolian mainland, roughly twenty-five miles from Pharmacusa and its surrounding area, to capture, imprison, and later crucify them.

Four years later in 71 B.C., evidence about the extent of Cilician piracy comes, again, from Plutarch (*Life of Crassus*, 10) as he accounts the Third Servile War (73-71 B.C.), or as he calls it the Gladiator War/War of Spartacus. The leader of the third slave rebellion against Rome, Spartacus, traveled to the southwesternmost tip of the Italian peninsula by 71 B.C. in an attempt

to jump over to Sicily and reignite slave tensions from the previous slave wars. He required transportation across the Strait of Messina and set out to search for anyone willing to receive payment for crossing, and found a fleet of Cilician pirates. “At the Straits [of Messina], he chanced upon some Cilician pirate craft, and determined to seize Sicily... But the Cilicians, after coming to terms with him and receiving his gifts, deceived him and sailed away.” (Plutarch, *Life of Crassus*, 10). Their presence in the southern Tyrrhenian Sea, and most likely in the rest of it after they leave Spartacus indicates the boldness of the pirates to venture into Rome’s home waters. It is also indicative of their seafaring capabilities to travel distances as far from Cilicia as to the shores of Italy; how they reached the Tyrrhenian Sea falls in line with the creation of a maritime network that allowed their exploits to reach into the western Mediterranean.

Another four years later, in 67 B.C., Gnaeus Pompey Magnus launched a campaign authorized by the Senate to eliminate the Cilician pirates once and for all after almost two decades of unguarded seas and rampant piracy, enabled by the Cilicians’ domination in the slave trade and Rome’s acceptance of it in favor of keeping their source for slaves. Pompey began his plan to sweep the entire Mediterranean from west to east with a newly built Roman fleet in the Tyrrhenian Sea; he sailed throughout it first, removing all Cilician pirate presence and safe havens in the island communities of Sardinia and Corsica.

... with his forces thus spread out in all quarters he [Pompey] encompassed whole fleets of piratical ships that fell in his way, and straightway hunted them down. [They] sought their hive, as it were, hurrying from all quarters into Cilicia... He did not, however, sail against them until he had entirely cleared of their pirates the Tyrrhenian Sea, the Libyan Sea, and the sea about Sardinia, Corsica, and Sicily, in forty days all told.

(Plutarch, *Life of Pompey* 31).

Afterwards, Pompey sailed east towards the Aegean Sea, scouring the waters for both Cilician and non-Cilician pirate vessels. Upon spotting one, Pompey would give the order to hunt down these ships and their crew until they were captured or killed. Moving eastward, Pompey routed many of the Cilician pirates and their fleets, all the way to Cilicia Pedias and Cilicia Trachea where the pirates set up useless defenses for the encroaching Romans. The pirates made a feeble attempt to prevent Pompey from setting foot onto the shores of Cilicia, and all ships scattered in the defensive line were utterly destroyed. “While they themselves manned their ships and awaited Pompey's attack near the promontory of Coracesium in Cilicia; here they were defeated in a battle and then besieged.” (Plutarch, *Life of Pompey* 28).

Arriving finally in Cilicia, Pompey disembarked his troops in Cilicia Pedias, and used it as a staging ground much like Marcus Antonius. However, Pompey had greater Roman sea power at his disposal, and with his fleet he aimed to trap and eliminate the Cilician pirates by blockading various strategic escape routes and ports that they used to escape Marcus Antonius three decades earlier. According to Plutarch, “[Pompey] divided the waters and the adjacent coasts of the Mediterranean Sea into thirteen districts, and assigned to each a certain number of ships with a commander...” (Plutarch, *Life of Pompey* 28). Not to repeat the same mistakes Antonius made in his initial campaign, Pompey organized an assault from both land and sea to eliminate the strongholds of Cilicia Trachea. The communities fled into the Taurus Mountains of northern Cilicia Trachea and awaited the arrival of Pompey and his legions: “... the most numerous and powerful had bestowed their families and treasures and useless folk in forts and strong citadels near the Taurus Mountains...” (Plutarch, *Life of Pompey* 28).

After a lengthy siege, the pirates of Cilicia Trachea surrendered to Pompey and relinquished all their cities, towns, and island havens. These pirate holdings, their management,

and sovereignty fell directly, as a result of the surrender, into the hands of Pompey. The name, location, infrastructure, and significance of these islands are not noted anywhere in Plutarch's writings, nor in any other source used in this research. His campaign against the Cilician pirates lasted only a quarter of a year, resulting in the eradication of Cilician piracy and its warlord status throughout the Mediterranean.

At last, however, they sent suppliant messages and surrendered themselves, together with the cities and islands of which they were in control; these they had fortified, making them hard to get at and difficult to take by storm. The war was therefore brought to an end and all piracy driven from the sea in less than three months, and besides many other ships, Pompey received in surrender ninety which had brazen beaks.

(Plutarch, *Life of Pompey* 28).

This last sentence in which Pompey received ninety brazen beaks is indicative of the receipt of bronze rams, a feature found mainly on military vessels such as triremes. As such, the variety of naval vessels the Cilician pirates evidently employed military assets, a topic which be covered extensively in chapter 4.

The Cilician pirates were once warlords of the Mediterranean who ruled a large network of island strongholds and pirate safe havens, engaging in one of the largest slave trade networks in the ancient Mediterranean. They evolved from humble beginnings as farmers, migrants, and fishermen when their lands outside the prosperous basin of eastern Cilicia fell short, and external support failed. Ignored and hemmed in a rough land, caught in the middle of ancient politics, over time the Cilicians become one of the Mediterranean's most infamous pirate groups. Their rise to power occurred after Rome's defeat of Carthage and its naval force, which policed the

Mediterranean up to their destruction by the Romans. Without Carthage, there was no policing to prevent the expansion of pirate activity.

The Cilicians filled this power vacuum with their own piracy, raiding, and tight rule over the eastern Mediterranean. Only through Pompey's planned and well-organized campaign did the pirates' reign come to an end. The shallow and inefficient campaign led by Marcus Antonius failed because he did not incorporate a naval force into his attempt to eliminate the maritime threat. Pompey did so, and as a result his campaign was successful through the use of a sea power to counteract, corral, and fully eliminate the Cilician pirates and their Mediterranean network.

CHAPTER 4

ANCIENT VESSELS, THEIR SPEED, AND TRAVEL EFFICIENCY

A maritime network ruled by the Cilician pirates existed throughout the Mediterranean by 67 B.C. Despite Pompey's purge and thorough sweep there were uncaptured, undiscovered strongholds and locations still under Cilician pirate control. These places were most likely refuges and hideouts spread out in the Aegean Sea, as the multitude of islands present favorable characteristics for hidden troves and places of rest tucked away by the nature of its environment (Broodbank 2013: 241). Midway points, rest stops, and havens all resulted from frequent, and necessary, island-hopping for travel in the Aegean was not necessarily to risk getting lost in an expanse of a watery horizon, but rather to run into island after island (Farr 2010: 21).

Island-hopping, a practice which dates back to at least the Paleolithic (Broodbank 2013: 439), was still common practice during the height of Cilician power and furthered the expanse and interconnectivity of an already connected Aegean world through socioeconomic maritime means. With this in mind, a question arises: how did the Cilicians partake in island-hopping, and by what means? What type of vessels did they potentially use to connect their maritime network of islands, strongholds, and contacts throughout the Mediterranean? *Attempting* to answer these questions has great impact on the end-goal of creating a predictive model. When such data is inputted into GIS software, appropriate extrapolation of such data can derive likely island candidates for future archaeologists to visit. The purpose of such investigations could determine if there are traces of maritime activity to determine what kind of activity, whether it might be piratical or even Cilician. Any findings would be contingent on the presence of material remains similar to those found in Rauh's *Rough Cilician Survey Project*. It is to be noted, however, that since the 1970's the Aegean has had numerous archaeological surveys conducted in and

throughout it as a result of its important role in Greek archaeology in the twentieth and twenty-first centuries.

The many islands in the Aegean's 83,000 square miles present a huge task for any archaeological survey if every single one is to be investigated for its traces of ancient remains. There have been surveys on more notable islands, but it is more than likely that a multitude of smaller islands slipped past the attention of archaeologists in favor of larger, more textually significant islands such as Rhodes, Santorini, Naxos, Samos, and others. For the purposes of this paper, the aim is to establish, through the creation of a predictive model, a focus on islands that might have escaped archaeological interest of the last century. To begin, one must first determine the best, and thus most average and common, hypothetical model to use and represent elusive Cilician pirate vessels, as well as what type of environmental elements should be addressed and implemented into the geoprocessing algorithms of a Geographic Information System (GIS).

Vessels during the first and second centuries B.C. differed in size and speed relative to their usage. This difference may seem somewhat unimportant to the creation of a predictive model for the Cilician pirate network in the eastern Aegean. But, in fact, the speed of a second/first century B.C. vessel has great impact when inputted into GIS software. As a piece of a large puzzle, the average speed of a vessel helps determine its hypothetical cruising distance per unit of time, not factoring in crew discipline, experience, environmental hazards, obstacles, currents, sea conditions, or weather. This cruising distance, then, helps establish the distance a vessel of this era can travel, how long it would take the vessel to cross that distance, with the end-result becoming a unit of time and cost equivalent to a day's worth of sea travel.

In addition, there is a custom common among ancient mariners. If, in the Aegean, a vessel's journey involved a multi-day voyage, the crew would camp ashore on one of the many

islands dotting the Aegean Sea (Morton J 2017: 17). A quick glance at satellite images over the Aegean Sea confirms that the likely risk for travel in this part of the Mediterranean is not running out of sight of land, but rather running *into* land because of the hundreds of islands as seen in Figure 1. This practice resulted from shipboard limitations concerning crew comfort, quartering, and protection against the elements (Casson 1995: 181).

On account of these inconveniences (compared to sleeping on the comfort and safety of land), fatigue became a significant risk to the safety of the crew and ship. Thus, sleep and rest came on the relative comfort of sand and grass rather than wood and board. Consequently, prolonged overnight travel would almost exclusively be limited to necessity. Another factor besides crew comfort and rest is the difficulty of nighttime navigation. Although not impossible, night travel is dangerous—even with modern technology assisting a helmsman, the risks night travel pose are considerable. Additionally, nighttime navigation was among the most commonly avoided periods of sailing to minimize the risk of foul weather, difficult sailing conditions, or other hazards (Morton 2017: 255)

For similar reasons, ancient mariners preferred travel close to the coast, at the very least within visible range of it, as opposed to open-sea navigation (Casson 1995: 342). This practice seems reasonable as tools for reliable ‘open-ocean’ navigation were not widespread, and the use of landmark navigation prevailed as such reference points rarely or significantly changed. Combined with the prospect of nighttime navigation, travel near and along the coast without sufficient lighting for a ship’s heading is a recipe for catastrophic consequences (Morton 2017: 255). Again, all that is said up to this point does not even begin to introduce environmental,

meteorological, and marine factors to which increased hazard and danger only add to and affect the average rate of travel.



Figure 1. Map showing the Aegean Sea, Greek mainland, Crete, and Anatolian coastline, 2020, Google Maps Screenshot, cropped and taken by William Jakeman.

Vessels in the Hellenistic Age and Roman Period served specialized maritime duties, and such usages are apparent when observing a vessel's framework (Katz 2008: 127). Specifically, the dimensions of a ship, its tonnage, its speed and handling, its cargo space, and method of propulsion, all identify the vessel's most probable usage. A bulk cargo vessel and a merchant ship have commonalities in their dimensions, and thus in their purpose and hull design (Westerdahl 1995: 217-218). For example, Bronze Age vessels are categorized as multi-purpose ships due to their semi-uniformity (Whitewright 2011: 4). In contrast, ships of the second and first centuries B.C. were built with specialized roles in mind and rarely deviated outside their built and intended purposes. This contrast highlights the conclusion of this chapter: to determine the most likely vessel with shared properties the Cilician pirates would have used, despite the lack of uniformity in their fleets. This most likely vessel will act as the hypothetical ship agent for our predictive model.

During the second and first centuries B.C., types of vessels were determined by their intended service and maritime duties—a facet of maritime life which holds true for all times. For instance, the building of a vessel was first initiated through a need or demand to perform specific and specialized duties based on the environment that the said duty would involve (Westerdahl 1995: 216). The environment in which a ship is intended to operate plays a substantial role in both its structure and its shape. If working in estuaries, up streams and in rivers, along coastal waterways, or across the sea, the construction of a vessel requires specialized construction for the specific role intended (Steffy 1994: 151). Flatter keel constructed boats fit such riverine categories and were largely trade-oriented, participating in local, inland, or limited regional logistics and enterprise. Their build and design were purposed not for endurance in rough or deep seas, but for relatively protected and predictable marine conditions.

Most Mediterranean vessels were not flat-bottomed, however, which prompts the question as to why this fact matters. To refine the search for a suitable model that will serve as a common template for the GIS predictive model (the significance, application, and specific data of which shall be covered in chapters six and seven), the search must eliminate ‘what-ifs’, anomalies, or outliers to better preserve the integrity of later data. Thus, it is appropriate to state simply that riverine boats would not fare well in distance trading, such as from Anatolia to Crete, or Cilicia to Cyprus. Such journeys are most often subject to choppy water conditions, as compared to estuaries or inland waterway, and thus were relegated to tasks and trading confined to shallow bodies of water (Westerdahl 1995: 221; Morton 2017: 19-20), as was the intention of their design prior to construction. For our purposes of identifying potential ships the Cilician pirates used in cross-Aegean travel, flat-bottomed, riverine vessels can confidently be excluded as their build, maneuverability, and purpose are not ideal in creating and maintaining a maritime network of islands throughout the Aegean, much less for island-hopping.

Vessels with wine-glass hulls provided better handling and stability during rough weather as they were not as liable to capsize when compared to flat-bottom boats (Westerdahl 1995: 223; Casson 1995: 331-32). Because of this design, such vessels were intended for open ocean travel and thus extended the possible range a ship could embark upon. Ships of this caliber most often involved international trading over sea, military expeditions or task forces purposed for raiding, troop transportation, or naval conflict (Gardiner 2004: 133). A deep-keeled vessel would not fare well in riverine work as the draft of such vessels risks damage or incapacitation for the vessel and its crew, and thus is limited in shallow water usage for fear of running aground or destruction.

The building techniques of ancient Mediterranean vessels varied throughout the millennia. There is, however, one building technique which is categorized by maritime architects and nautical archaeologists as one of the strongest and most durable ship construction techniques of the ancient western world. From the bottom up, each plank would be fitted to the one beneath it via tenons inserted into the edges of each strake and locked into place with pegs. Although this type of construction is inefficient in terms of time, cost, and resources, the performance and durability of mortise-and-tenon made up for such inconveniences (Mark 1991: 142). During the second and first centuries B.C., this mortise-and-tenon construction style was largely universal with most Mediterranean ship designs during this period (Mark 1991: 144).

This type of construction style is relevant in determining the most likely type of vessel Cilician pirates frequently used and/or likely preferred to maintain their maritime network and to engage in island-hopping. Concerning raiding, pirating, travel, and capacity for armed Cilician crew, a vessel intended for such use should fall in line with vessels that had similar usages and duties in a civilian facet. For instance, their origin should be bulk cargo for hauling captured goods, slaves, etc.; long-distance traders for extending and maintaining their maritime network; deep-water fishing's capacity for increased activity in and around deep-water trade routes. The variable for a ship's speed or efficiency would not necessarily be determined by its method of construction. Evidence of military vessels purposed for naval ship-to-ship combat or raiding comes mainly from media such as vases, friezes, and literature or from the incredibly rare archaeological find of a bronze prow, finds which allow archaeologists to reverse-engineer models, be they scale models or replicas like the *Olympias*. Other factors such as the quality of a ship's handiwork, the design of the vessel, the intended purpose of the vessel (which consequently affected its design), and its restrictions and limitations because of the design

outweigh the idea that the ship's style of construction heavily affects its travel efficiency. What does matter, however, is hull shape and method(s) of propulsion, which will be discussed next.

A factor to consider when formulating hypotheticals on ship travel efficiency is the type of rigging a vessel would have when crossing the Aegean or embarking on a multi-day cruise. Of the varying types of sail vessels had in antiquity, two of the most common were lateen and square-sail configuration, represented in Figure 2, the lateen triangular in its sail-canvas surface area and square-sails rectangular. For lateen-rigged vessels, their fore-and-aft rigging allowed for excellent maneuverability upwind, which was the primary strength for this type of rigging. Square-rigged vessels excelled when sailing downwind and had greater speed traveling downwind when compared to lateen-rigged vessels, but they perform negatively when sailing upwind.

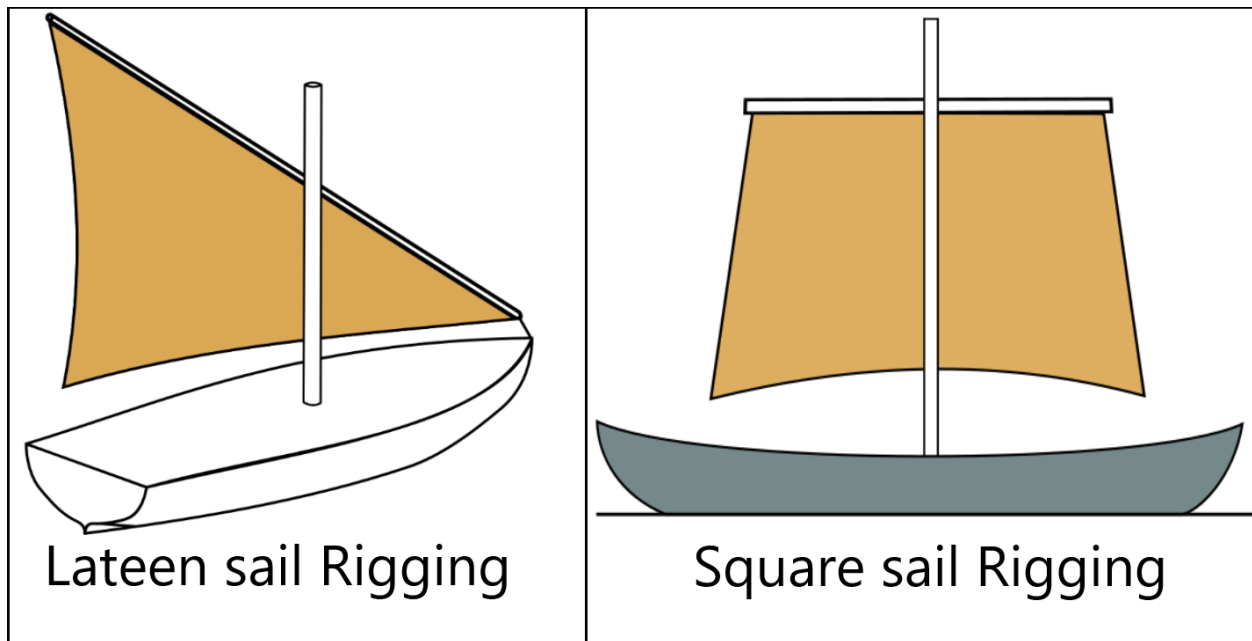


Figure 2. Akigka (Left) & Tomasz Rojek (Right), Two Rigging Diagrams showing lateen and square sail configurations, 2006, Wikipedia Commons, combined together by William Jakeman.

Of these two, each excels in the areas where the other is weak, and thus the preferred approach towards navigation and sailing tactics depends on prevailing winds and differs

accordingly, further affecting a vessel's capabilities on how far it can travel in a single day. Square-sail rigging excels in broad reach and running configurations because of wind direction in relation to the vessel's heading (see Figure 3). In addition, it has been hypothesized that lateen configured vessels could have the option of raising square sails to sail with the wind (Whitewright 2011: 5); however, it was a much lengthier and more taxing process to do so than on an originally square-rigged configured vessel. So then comes the argument: which is the more likely rig configuration for our hypothetical common vessel? One imperative aspect in all likelihood is the matter of rig handling. Square-rigs were generally easier to handle, once set, while fore-and-aft or lateen configurations required trimming and periodic manipulation, thus requiring more hands-on management. Square-sails by comparison require less need for intricate trimming, and once set and unfurled square-sail configurations could be left alone until a need for major correction (Casson 1995: 230). It may be assumed, for the sake of further refining our hypothetical ship, that the more common type of rigged vessels used by the Cilician pirates was the square-rigged configuration. Additionally, this is the most common type of rig seen in friezes, vases, and artwork depicting merchant vessels, cargo vessels, and especially military vessels such as the bireme or trireme.

Before continuing, a brief note is needed on the terminology and familiarity of sailing configurations and their potential impact on a vessel's top speed. The directions a vessel can make in reference to the wind (refer to Figure 3) can be interpreted in the manner of a unit circle, with the wind direction acting as 0° or 360° . Beam reaches present a navigational situation where the wind is hitting the mainsail at roughly a right angle, and in a unit circle this angle translates to a ship's bearing, in relation to the direction of the wind, and is 90° or 270° . This sailing configuration has better speed variance than those with a headwind closer to 0° , as the beam

reach angle that the wind hits, in our case a square-sail, impacts the canvas area to a larger responsive extent. Broad reach and ‘running’ configurations are where square-sails excel, as mentioned previously. In a ‘running’ configuration, the vessel’s heading is the same as the direction of the wind, translated to a unit circle this would be roughly 180° (refer to Figure 3). One might think that this configuration would garner the best outcome, but results from Leidwanger (2013: 3303) as well as the sea trials of the *Kyrenia II* show that this is not the case. In a broad reach configuration, square-sail vessels perform better than ‘running’ as the angle of impact in a broad reach provides a greater reaction on the sail-mast system. So then comes the next inquiry: Concerning square-rigged vessels in antiquity, what was their average speed downwind and upwind?

An in-depth research study highlighted and thoroughly discussed by Leidwanger in his “Modeling distance with time in ancient Mediterranean seafaring: a GIS application for the interpretation of maritime connectivity” presents a collection of reliable analyses and data. “Casson and Whitewright have each suggested that vessels could sail 4-6 kn across open water in helpful winds, and at best 1.5-2 kn in the intended direction (‘velocity made good’) when operating against the wind, achieved by tacking or gybing” (Leidwanger 2013: pp. 3305). In combination with data from the sea trials of *Kyrenia II*, a full-size replica of a square-rigged merchant vessel from the third century B.C. of which the speed tallied at an average of 3-4 kn (a good estimate to use), the average speeds of civilian/merchant ships during this period can range between 3-6 kn. We now have our estimated speed. He continues by discussing the sail configurations during the sea trials completed by the *Kyrenia II*, during which the vessel encountered the best possible sailing condition for a square-rigged, 47ft long by 14ft wide trading vessel—broad reach. In this configuration, the vessel’s angular heading lay 30° and 70°

or 225° and 135°, all in relation to the direction of the wind (Leidwanger 2013: 3306). All the heading configurations a ship employs are in reference to the direction from which the wind blows, and to better visualize this configuration, refer to Figure 3.

Next to be covered, most logically, is the wind factor; without which the only method of propulsion is manpower through rowing. It is a variable which changes constantly, hour by hour, day to day, and can greatly affect a ship's speed and velocity, negatively or positively, with only extreme circumstances compromising stability and maneuverability, and thus impacting the travel costs (in days) of a ship traveling in the Aegean Sea. Sources ranging from the Hydrographic Office (2008), Colin Palmer (2009), Leidwanger (2013), and W.M. Murray (1987) show that prevailing winds in the Aegean Sea can be identified, discussed, and incorporated into the analysis at hand. For much of the history of the region, prevailing Aegean northerly winds, or 'northerlies', have not changed drastically from ancient accounts and neither have the speeds of the current, of which are negligible, ranging from 0.25 kn to 0.5 kn. (Hydrographic Office 2008).

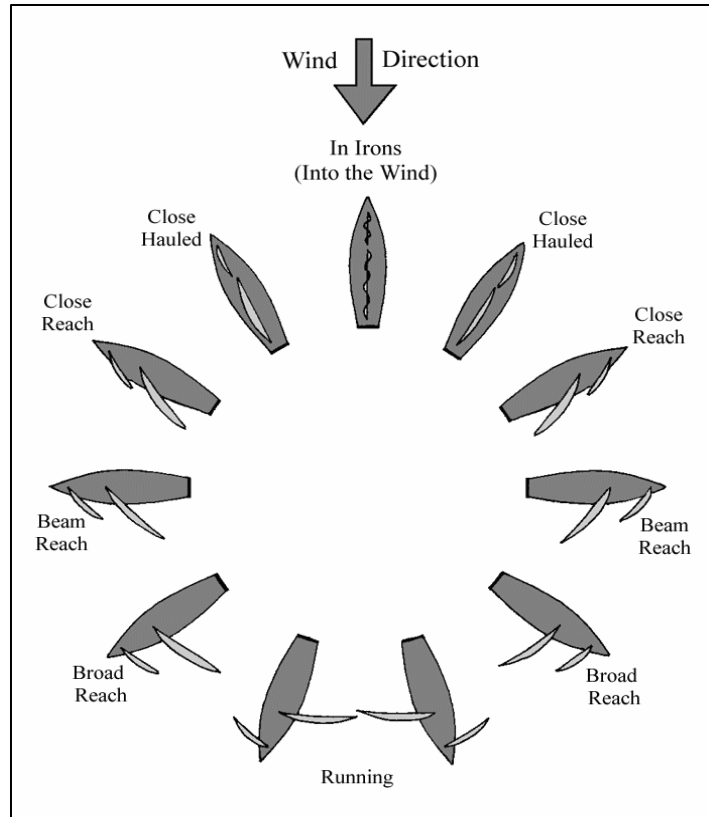


Figure 3. Nathan W. Diagram of the Points of Sail, 2015, Sailing Basics, WordPress.

The prevailing winds in the Aegean blew primarily from north-to-south, as viewed in Figure 4, with major changes in direction only occurring the closer one gets to the coast of Anatolia. We even know the ancient names of some these winds, and during each season these winds largely would not change direction until the next season (Casson 1995: 271). These factors concerning ship types, construction types, hypothetical crafting quality, rigging and sail configurations, estimated average speed, and prevailing wind directions, all combine to give an educated assessment as to what type of vessel the Cilician pirates used, its specifications, and original intended function. The most common vessel that the Cilician pirates used in the second and first centuries B.C. would most likely have been re-purposed, deep-water, trade vessels.

It is to be noted, that such vessels, previously used as “civilian” or trade vessels, could, in times of crisis or opportunity, be quickly reconfigured and modified into a vessel capable of

piracy. This is not to say, however, that there were no pirate galleys, triremes or biremes, acting individually as Cicero indicates most notably from Illyria. Instead, hypothetically, the majority of re-purposed Cilician pirate vessels were repurposed trade, merchant, or fishing vessels. The most common, and thus more likely, rigging configuration would be a single-masted square-rig. These initial specifications, when paired with the prevailing northerly winds in the Aegean Sea, make this re-purposed vessel capable of achieving an average speed of 5 knots downwind but only 1.5 knots upwind—making it a slow and clunky vessel (as compared to sleeker vessels such as galleys or triremes). It is most likely that the pirates modified such vessels, as they were not originally designed for chasing down prey (De Souza 2002: 152). Ancient writers such as Cicero and Plutarch discussing pirates and their nuisance, highlight the “need for speed” in battle, which suggests the premise for modification.

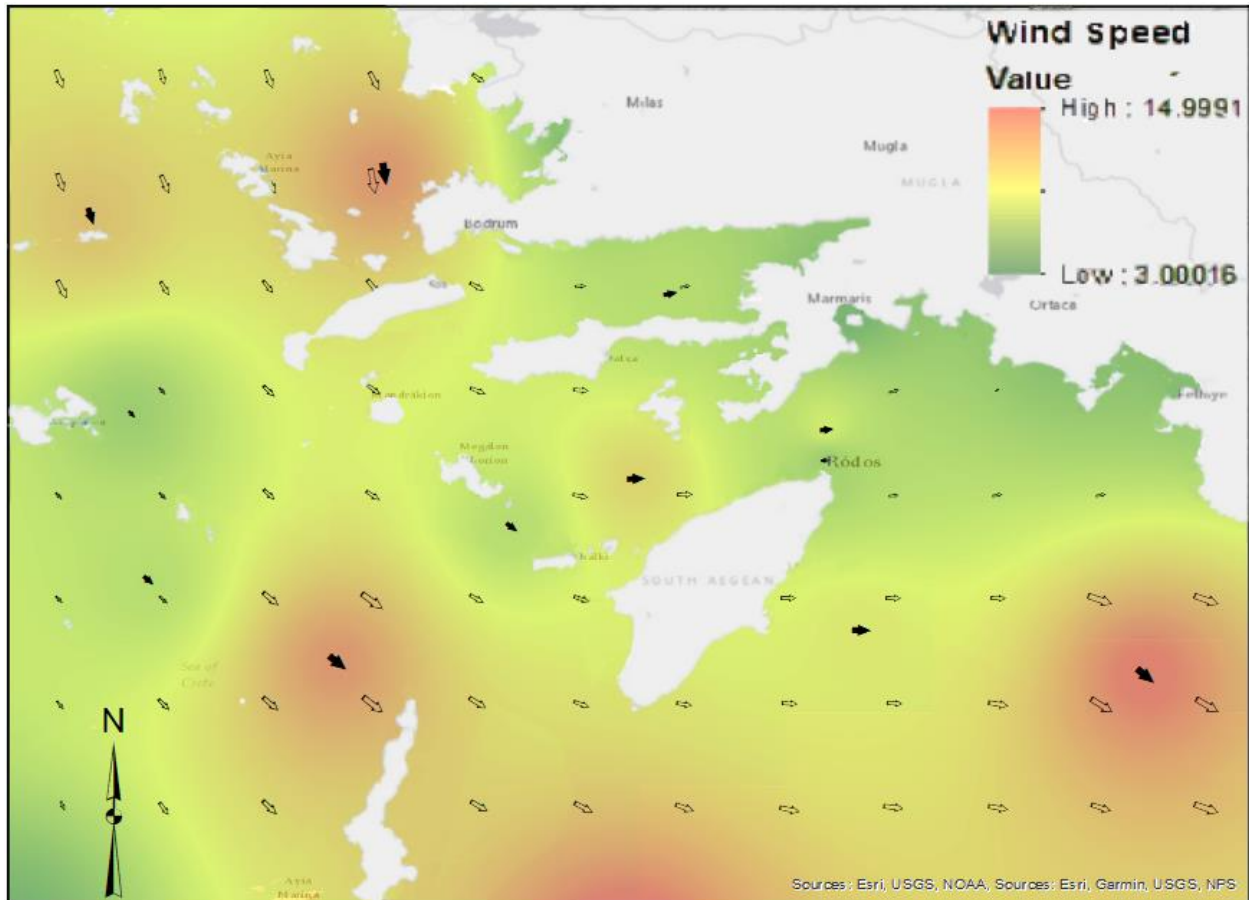


Figure 4. ArcGIS Map depicting IDW interpolations of wind speed and direction, 2020, ArcGIS, created by William Jakeman.

This conclusion about a repurposed, 5 kn fast, square-rigged, open ocean/deep-water trader is supported by Strabo, a Greek geographer born in Anatolia during the transition from Republic to Empire. Strabo in his *Geography*, Book 14 says, "...Under the Romans... the entire extirpation of the pirates, first by Servilius Isauricus... and afterwards by Pompey the Great, who burnt more than 1300 vessels of all sizes, and destroyed their haunts and retreats" (Hamilton and Falconer 2014: 22). These thirteen hundred pirate vessels all varied in size and disposition. Although Strabo mentions this incident in passing, it is nonetheless important as contemporary evidence for the lack of uniformity in the Cilician pirate fleets. The ships differed by their type of work, that is, by their functions, intended uses, applications, and so on. A mixed collection of

repurposed vessels from varying walks of life, united under the identity of Cilician piracy. Again, the purpose of attempting to identify a most likely common vessel is to use this hypothesized ship, its speeds, travel efficiency, and resultant properties as a data figure in GIS, for our predictive model.

There is still one final missing piece to this puzzle. There is an account from Cicero's *Against Verres V*, which claims that these pirates also had speedier military vessels—biremes (Clark and William Peterson 1917). Pirates using military vessels like the bireme are indeed possible. Biremes were more commonly intended for military use and naval combat with two rows or decks of oarsmen on each side of the vessel. Their lengths are estimated between 80-90ft in length, with a width, or beam, of 10-12ft (Gardiner 2004: 75). Biremes were likely used by the Phoenicians as early as the sixth century, if not earlier. In comparison to modified and repurposed trading or merchant vessels, biremes used for piratical or raiding expeditions would far outclass other vessels in achieving the same goals. They were not only faster, as was the intention of their sleek and lengthy hull, but the added rows of oarsmen would achieve faster speeds than wind speed alone. It is speculated a bireme under sail could achieve varying speeds between 6-7 knots (kn), and the addition of a crew of active oarsmen would raise the top speed to 7-8 kn (Gardiner 2004: 81). The additional oarsmen, however, decreased cargo space and acceptable crew quartering, which explains why crews of such vessels could partake in limited distanced journeys without supply ships in tow, as their overall distance is limited by the amount of food supplies stowed in the vessel's reduced cargo space.

For my purpose of hypothesizing common properties among the majority of pirate vessels, sleek galleys, biremes, or triremes are exceptions to the most likely vessel used by the average Cilician pirate. Of course, these are not the only type of vessels pirates could use, yet for

the sake of maintaining, creating, traversing, and trafficking through a maritime network of islands, using a conspicuously different vessel might have attracted unwanted attention, especially from minor maritime powers such as Rhodes. The use of repurposed everyday vessels, such as merchant ships, trade ships, fishing vessels, would help to mask the identity of pirate vessels while military ships like galleys and triremes would be more conspicuous even when repurposed.

CHAPTER 5

BRIEF ADDRESSMENT OF LIMITATIONS

There is no tangible evidence in the archaeological record for what kind of Cilician pirate vessels existed in the second and first centuries B.C. But as just argued, the most common Cilician pirate vessel most likely was a repurposed merchant, fishing, or cargo vessel. Well-preserved ancient vessels are very already limited, and they vary in their dating over multiple centuries. Speed and handling data taken from the experiments of *Kyrenia II* are problematic because the *Kyrenia II* is a cargo vessel with no discernible modifications made to its design, nor is this vessel a likely raiding vessel.

In addition, the ruins of pirate fortresses destroyed during Pompey's purge were most likely re-used and re-purposed for other buildings, such as homes, in subsequent settlements, or they have degraded so much that the only way to identify them is with in-person archaeological surveys or ground-penetrating radar. Additionally, what little historians and archaeologists have to work with concerning the history, material remains, or culture of the Cilician peoples has not been extensively discussed or written about in recent years. Minor secondary sources date to the mid-and-early twentieth century, and even as far back as 1890. The most recent archaeological work was in the 1990's and early-2000's by Nicholas Rauh in his Rough Cilician Survey Project. Extensive modern excavation, research, or surveying has not graced the region of Cilicia, and certainly not its ancient piratical past.

Another factor to consider is the limited recent research on Cilician pirate culture. Material remains are few and unfortunately reflect more on the general culture of Cilicia Pedias than of Cilicia Trachea. One main purpose of this paper is to encourage future archaeological surveys in the southern Dodecanese and Cilicia Trachea. If the Dodecanese islands and the

islands near the mainland do indeed show promise for the presence of Cilician archaeological remains—items similar to those few found in Rauh’s surveys of Rough Cilicia (Cilicia Trachea)—then a maritime lens would give insight to that aspect of Cilician pirate culture, a feature largely missing in Rauh’s survey results. This is a large hurdle to clear, and it may remain elusive.

There are no known archaeological remains of pirate strongholds within the Taurus Mountains, a problem which could be addressed especially through the use of GIS. For present purposes, however, it is the Cilician pirates’ maritime network, its possible areas of influence, and the likelihood of archaeological search areas (based on geological scarring or actual material remains) that might be identified through the use of maritime-focused GIS research.

After Pompey won the Cilician surrender, he resettled the Cilicians of Rough Cilicia to a place called Iberia. Whether this is the Iberia peninsula or the Iberian Kingdom, modern-day Georgia, is undecided and not extensively discussed in modern academia. The removal of an entire people so as to prevent them from becoming pirates again is a pragmatic decision for stabilizing the eastern Mediterranean after decades of lawless piracy, but this relocation creates a difficult situation. These people did not remain, and their place in Cilicia was filled by later peoples. Whatever evidence that could have been left was either destroyed by Pompey, removed after his campaign, or reused and replaced by later occupants.

It is to be noted that using a predictive model has inherent theoretical limitations to its applications. Caution must be taken in determining what data is included or excluded from the model’s algorithms, for the inclusion or exclusion of a string of variables may bias the model. Predictive models always have hidden biases, and therefore it is important to minimize the risk to its validity. Predictive models made by specialists working for governments or major

organizations handle larger and more complex datasets, which inflate analytical requirements and affect the feasibility of explaining the results; however, by doing so the validity of the model reaches or exceeds its full potential. I am not a specialist in predictive modeling, nor claim to be one. The predictive model presented in this paper is made with a set of data interpolations that are as simple as possible, covering hypothetical speeds in a time-distance relationship, a simplicity which may affect its full potential value. However, all data used here are rooted in catalogued data from unbiased sources, such as the Hydrographic Office (2008) or the data from the *Kyrenia II* experiments (Leidwanger 2013: pp. 3305).

Another theoretical limitation is that the idea that any evidence of piracy in the Dodecanese or Aegean is specifically Cilician. This assertion is based on contemporaneous primary sources from the period. The largest group of Mediterranean pirates in the period studied were Cilician, and this is not to say that there were no pirates of differing ethnicity. Cretan pirates, Greek pirates, and Cilician pirates sailed throughout the eastern Mediterranean, and all would have exploited the numerous islands in the Aegean as safe havens. Yet the Cilician pirates had superior organization and control over a maritime network as acknowledged by Plutarch, Cicero, and Strabo. Cretan pirates did not rule this network, though they may have taken part in it; non-Cilician pirates did not establish or control a maritime network as the Cilicians did. The probability, then, is that these ancient authors are correct, but only future archaeological discoveries can cement the point.

Theoretically, it is at best an educated guess that findings, if any, would be Cilician. If future investigations do reveal evidence of pirate infrastructure or remains within the region established by my predictive model, those findings could not be attributed as Cilician without material confirmation from archaeology. Additional archaeological surveys in either Cilicia

Trachea or the Dodecanese would need to focus on material remains which relate to pirates. The existence of such material would need to be studied in connection with archaeological finds from Cilicia. My predictive model is designed as a tool to help guide future archaeological research decisions.

CHAPTER 6

GIS AND ITS APPLICATION TOWARDS A PREDICTIVE MODEL

The use of GIS in archaeology proves most useful in site analysis, as digital mapping can reveal what lies hidden below the surface. The discovery of site disturbances, site patterns, and ground scarring assists in detailing the evolution of a site's history and growth (Conolly 2006: 258). Application of GIS in archaeology varies depending on the goal, and with each objective achieved another question may arise, which then leads to new goals. Although it may seem cyclical in nature, the process is more pyramidal in execution. It begins with speculations and hypotheses surrounding vaguely worded and obscure references pointing to a general geographic area. Originating from primary documents, such obscurities create opportunity and inspiration for the hopeful archaeologist. Hesitation and uncertainty may dissuade many from embarking on such a journey, yet others may enjoy the challenge and the opportunity to theorize and prove.

This scenario provides the bottom-most layer of the pyramidal process, upon which ascending layers are built and expanded as one's work draws nearer to an achievable end-goal. GIS helps to resolve this hesitation, this absence of activity, the missing—for lack of a better word—'boots on the ground' surveys, which GIS inherently provides solutions to. Without the need to personally venture and painstakingly search for hidden essences of humanity's past, the combination of satellite imagery and geographical/topographical charting can provide the spark of inspiration. This spark may then inspire methodic archaeological investigation (Conolly 2006: 260).

GIS matches an archaeological conscious approach to spatial analyses of civilizations over time, and GIS provides the tools to both visualize and organize data into tangible and observable information. Notable inspirations which helped motivate this paper include case

studies of oceanographic navigation influencing Spanish-Philippine maritime trade routes in the seventeenth century, analyses of Muslim raids on Christian Cypriot settlements in the Middle Ages, and Leidwanger's research on Bronze Age maritime networks. The common theme of these studies share the practice and use of GIS to better conceptualize and identify potential areas for future archaeological investigations.

This paper aims to develop a hypothesis in locating established pirate infrastructures, such as midway stations, hideouts, or strongholds, used by the Cilician pirates in their maritime network across the Aegean, that is, a predictive model in which future archaeological surveys can base their initial focus. The Dodecanese Islands have a relatively sparse history of surveys and archaeological investigations, outside Rhodes, as compared to the rest of the Mediterranean and the western Aegean. Plutarch in *Life of Pompey* provides the basic evidence that there were pirate bases throughout the Aegean. It is only the treaty and its terms of surrender between the pirates and Pompey that transferred immediate control of all Cilician pirate holdings, including those not yet conquered, directly to Pompey.

It is hoped that the finding of this paper might enable and invite future archaeological surveys to be conducted in the Dodecanese Islands to better refine and develop projects in methodically and systematically surveying island candidates in order to identify material remains pirate, and more specifically Cilician, activity. Such excavations and projects would search for and identify traces of human activity dating to the second and first centuries B.C. in and around the Dodecanese Islands. Using remote sensing applications such as LIDAR will better pinpoint and identify scarring or buried infrastructures, but first, the beginning question must be asked: where should we start?

To better grasp the angle in which GIS shall be used later in this paper, a brief discussion must be conducted of Leidwanger's *Modeling distance with time in ancient Mediterranean seafaring: a GIS application for the interpretation of maritime connectivity*. The data, figures, and analyses Leidwanger highlighted using GIS software in the Pabuç Burnu shipwreck were intended to create a preliminary model for others to follow. This model aimed to show "... how a more nuanced spatial approach can inform the human geography and socioeconomic structures of ancient maritime interaction" (Leidwanger 2013: 3304). Although the purpose of his paper leans more towards proving the usefulness of GIS in conceptualizing ancient travel, his methodology is also the key to creating a predictive model, the type my paper proposes. Leidwanger specifically attempted to enter variables ranging from wind speed, heading, and preliminary data on ship speed from sea trials of the *Kyrenia II* to generate an observable figure. This figure would assist understanding the possible changes and developments in socioeconomic trade and contact among ancient Aegean peoples.

The GIS software used for this paper's research is ArcGIS. With maps and geographic information maintained by the Environmental Systems Research Institute (ESRI), ArcGIS is used for the creation of charts and maps, with the most common purpose falling into the category of spatial data analysis. Examples and uses range from the compiling of processed geographic data, resultant analyzed map information visualized into figures and charts, and simple tasks managing and archiving geographic information within the software's database.

ArcGIS is one of the few GIS programs intended for experimenting, researching, and filing raw data into visualized information through maps and satellite imagery. The system provides an infrastructure for making maps and generating geographic information, the results of which then can be shared or presented to organizations like, NOAA, the Hydrographic Office,

state and federal governments, urban planning departments, zoning agencies, emergency response teams, and in fields ranging from environmental sciences to real estate. ArcGIS software will be used as follows in this paper's research: ArcReader to view and query maps created with the other ArcGIS products; ArcGIS Desktop, or ArcMap, to view and edit spatial data in two dimensional representations such as two-dimensional maps; and ArcCatalog to manage and manipulate tasks in relation to the inputted or received data.

By entering key data modes into ArcGIS, with a satellite map focused on the Dodecanese Islands of the Aegean Sea, we can create differing layers of conceptual travel time, put into the units of "days of travel", arcing out from a proposed epicenter to determine how far a ship could travel within a single day. The data modes inserted would consist, in much of the same way that Leidwanger did, of the mean wind heading and mean wind speed. Combined with the known speeds of a generic repurposed trade vessel, ranging from 3-6 knots with a safe average of 5 kn in favorable conditions and sailing configurations (that is, broad reach), a colored gradient map can indicate proposed vessel speeds, again much as Leidwanger did; his work is foundational for this paper.

CHAPTER 7

ANALYSIS OF GIS DATA

The Dodecanese Islands present the first area case study for likely island candidates for containing the remains or scars of Cilician pirate infrastructure. The island chain itself is comprised of fifteen major islands (although the name Dodecanese means “Twelve Islands”), the largest and most prominent being Rhodes, with roughly one hundred and fifty smaller islands scattered throughout 2,714 km² (1,048 mi²) of its geographic boundary (*Britannica Encyclopaedia* 2018). The orientation of this island chain runs from north to south on a conventional map as it is longitudinally longer than it is wide. Of these islands only twenty-six are inhabited today, most falling under control of the Greek government. Acting as symbolic boundaries, the Dodecanese are at the easternmost limit of the Sea of Crete and are the southeasternmost islands in the Aegean Sea, as seen in Figure 5. The Dodecanese is the first island chain sea-bound travelers encounter when journeying to the west from Syria, Crete, or southern Anatolia. It is appropriate, then, to consider the Dodecanese Islands as the eastern gate of the Aegean Sea, providing passage into the heart of the Aegean.

The Dodecanese, conceptually, also served as the first transit stop and place of rest that travelers originating from eastern regions like Syria or Cilicia encountered, prior to engaging with additional landmasses. A vessel, of any kind, traveling westward would first encounter Rhodes, the most famous and most recognizable name of the Dodecanese Islands. If a vessel’s destination is Samos or Lesbos in the North Aegean, when starting from Rhodes, its northbound itinerary would require the vessel to traverse through the entirety of the Dodecanese Island chain. The itinerary would require island-hopping to some degree due to the limited efficiency and nature for ships of the period with the hypothetical maximum speed of 5-6 kn at wind-bearing of

225°, darting from island-to-island inevitably sailing near most, if not all, of the fifteen primary islands.

By engaging in the practice of island-hopping, a tradition which goes back to the Neolithic and persisted into the Roman Era, there developed over time a network of known and frequented islands. In our period, a century of sailing into the Aegean through the Dodecanese,



Figure 5. ArcGIS Map focus Dodecanese Island region of the Aegean Sea, 2020, ArcGIS, created by William Jakeman.

undoubtedly would have created a network of identifiable islands accessible to those traveling from the East. These islands are natural midway points for rest and refuge for westward travelers, islands that likely have some sort of maritime infrastructure as a result of frequent

pirate traffic—such traffic, centralized around pirating, raiding, and slave trade perpetrated by the Cilician pirates.

The nature of the island chains throughout the Aegean, with islands situated in relative, close proximity to one another, provided mariners with reassurance against the possibility of losing sight of land. This is as true today, of course, as it was in antiquity because of the nature of the Aegean’s marine environment and average island proximity. Standing on the southern shore of Santorini (an island in the southernmost area of the Cyclades chain) one can see the island of Crete and its mountainous northern interior during clear weather (Figure 6).



Figure 6. Anna Shute. Photograph of Crete taken from Santorini, 2014, Photography by Santorini vacation photographer Anna Sulte.

Even during hazy or bleak weather, as long as the horizon sky is visible, the congregation of clouds frequently serves as an aid in identifying landmasses for those out at sea. This maritime practice not only is used by modern boaters and amateur sailors but also parallels the methods of Polynesian mariners as they trekked across the Pacific Ocean (Irwin and Richard 2015:422-423), a feat considered miraculous and evidence of a highly skilled people. A maritime landscape such as the Aegean, however, presents a case scenario that is not only less challenging but also the complete opposite of what Polynesian sailors endured. Aegean islands and island chains present the navigational problem of running *into* land instead of losing sight of it (refer to Figure 1). Navigation by island-hopping makes many islands, of the roughly one hundred and fifty in the Dodecanese alone, as possible resting stops and midway points situated at the gateway to the rest of the Aegean. For this paper, only the southeastern-most area of the Dodecanese will be analyzed. This would have been the first area the Cilician pirates traversed and frequented because of two reasons that will be covered next: geographic deductive reasoning and literary evidence pointing to Pharmacusa, and by extension the Dodecanese.

The target area itself is the southeastern half of the Dodecanese Island chain, with focus on the islands of Sesklio/Simi, Alimia, Makry, Agios Theodoros Nisidia, Chalki, and Tilos. Together they make six to seven appropriate candidates that fit our purpose of creating our predictive model. The reason for choosing these specific islands is deductive, primarily because of their geographic proximity to Rhodes, as it acts as a gateway not only to the rest of the Dodecanese but to the Aegean itself, for vessels coming from the East, like Cilicia must first encounter these islands. It is through deductive reasoning that I chose this region to act as the target area that our predictive model will reflect, as any and all vessels traveling from the East encounter these islands first and foremost. Prior to their brief descriptions, the outlier island Pharmacusa (covered earlier in

chapters 1 and 3) must be addressed. To recapitulate, Plutarch names this island as the feature near where Caesar was captured. "... on his voyage back, [Caesar] was captured, near the island Pharmacusa, by pirates, who already at that time controlled the sea with large armaments and countless small vessels. In the next place, [Caesar] was left with one friend and two attendants, among them [were] Cilicians" (Plutarch, *Life of Caesar* 2). It is unclear whether Plutarch insinuates that this is the island Caesar and his Cilician captors stayed on for thirty-eight days, or if it was an island *near* Pharmacusa. He is not direct in stating the exact geography, but it is clear nonetheless that the area immediate of Pharmacusa is where he was held, for Caesar promptly returned to punish the pirates with little delay between his release and return. Therefore, it must be said that Pharmacusa is an island with high likelihood for pirate remains, and should be the first island to be looked at for proving or disproving the presence of pirates and infrastructure dating to the period in question, the early first century B.C.

It is separated from the seven islands previously introduced because it lies too far north for the purposes of this paper's regional specificity and focus. This, to be excruciatingly clear, does not exclude its likelihood for being a part of a pirate network (theoretically a Cilician pirate network). It has literary proof from Plutarch (*Life of Caesar* 2) of its geographic significance to Cilician pirate activity within the Dodecanese. Its location, unfortunately, falls outside the southeastern focus of the Dodecanese in my predictive model, and thus will not be covered since only the islands of Sesklio/Simi, Alimia, Makry, Agios Theodoros Nisidia, Chalki, and Tilos fall within the predictive model.

A brief description of these islands follows, highlighting their proximity to each other and to significant features in the area. Roughly fourteen miles northwest of Rhodes are the islands of Simi and Sesklio, both inhabited, with the latter situated closest to Rhodes and its travel lanes. Of

the two islands, Sesklio shall be the focus of interest due to its southernmost proximity to travel lanes passing between it and Rhodes, as seen in Figure 7. The island's accessible exposure to these lanes is a gently curving beach and bay sheltered by two smaller islands, Artikonisi and Koutsoubi, acting as natural breakwater features. A short jetty also juts out from the beach and serves as a mooring for boats. This beach, called Sesklio Beach, and the bay it forms sit at the island's southeastern corner. For a vessel traveling westward with no intention of stopping at Rhodes, be it for time and distance efficiency or to avoid conflict, Sesklio's is the first likely island candidate for visitation by west-bound travelers.

Alimia and Makry both sit between two and four miles from the western coast of Rhodes, with Makry the closer by two miles and Alimia more distant by roughly four. Neither island is permanently inhabited, with Alimia having the presence of a church and multiple ruins at its main beach. The port city of Rhodes is roughly thirty miles to its south, as seen in Figure 8. The distance between Alimia and Makry themselves comes out to just over two miles. For a vessel sailing westward, whose intention is to bypass or avoid Rhodes, if its journey requires a southerly or southwesterly route, perhaps to Crete, Alimia and Makry are situated as the first islands it would come upon. Between these two, Alimia is the more likely candidate because of its size, distance from the island of Rhodes, quality of its bay, and its shore access. Makry, by comparison, is only a third the size of Alimia with a rougher and steeper coastline. What Alimia does not have that Makry does is a northward-facing, accessible beach or shore, which becomes negligible, however, once the quality of Alimia's bay is factored in. Sheltered by rising hills and a long coast, Alimia Bay serves as both a refuge for traveling vessels and as a tourist destination for Mediterranean yachting.

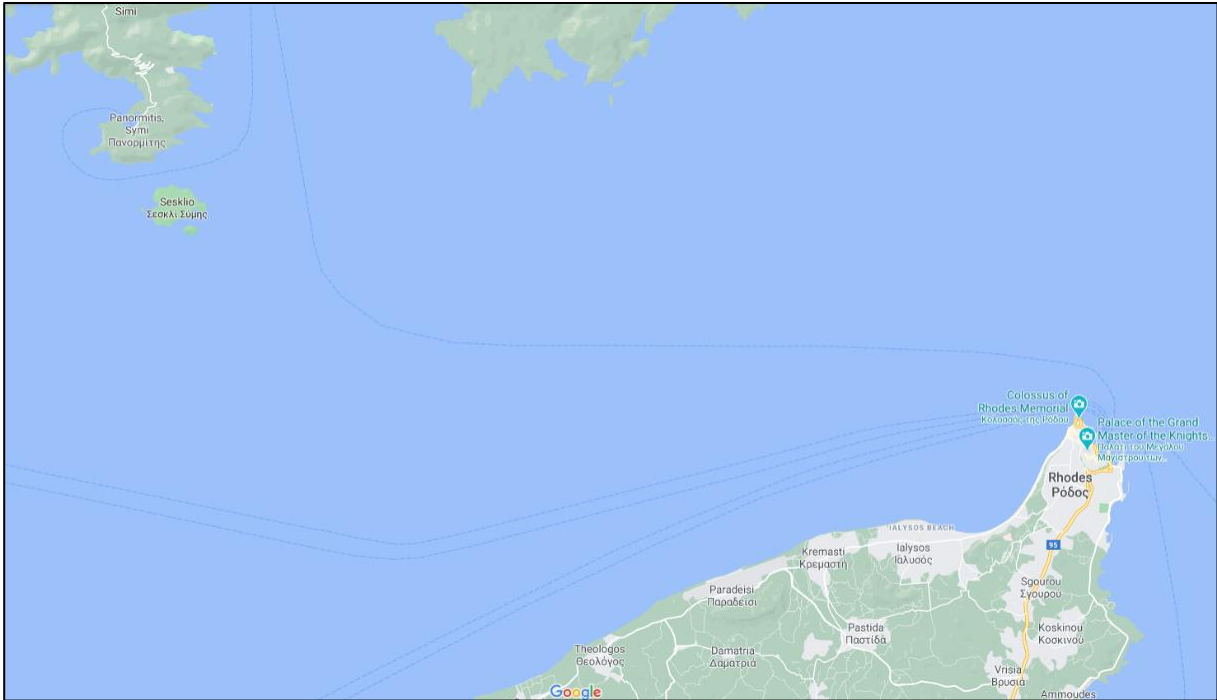


Figure 7. Map showing Rhodes and Simi sea traffic lanes/routes, 2020, Google Maps Screenshot, cropped and taken by William Jakeman.

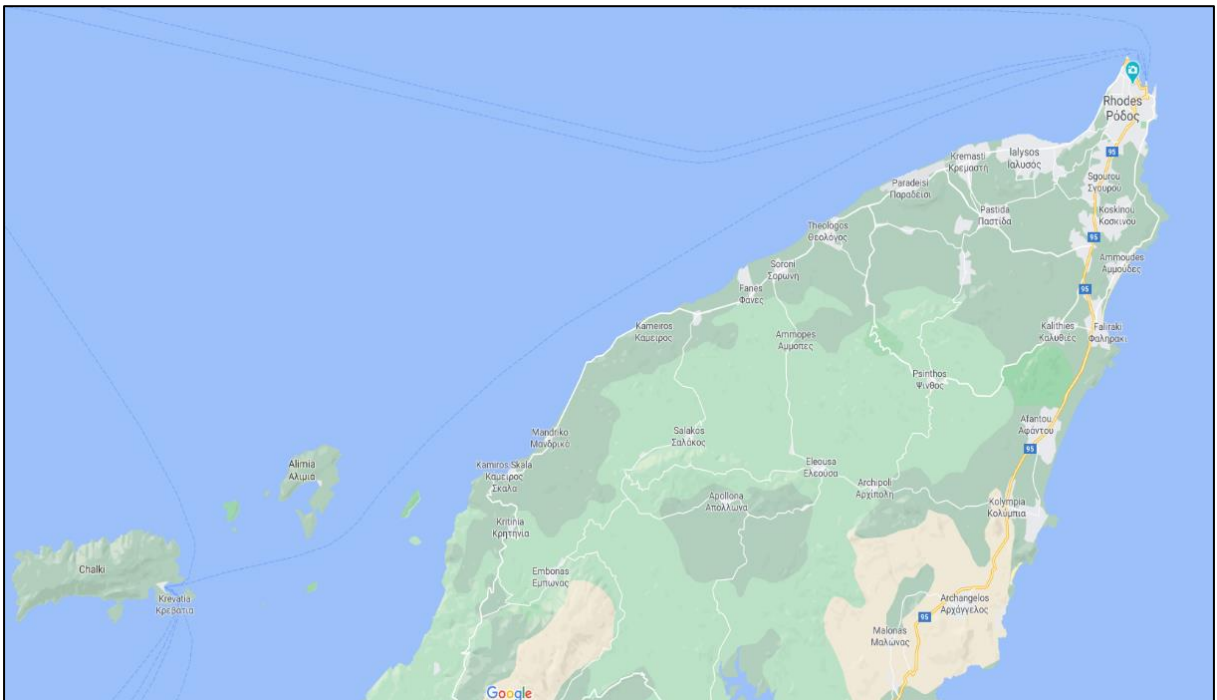


Figure 8. Map showing Rhodes and Chalki sea traffic lanes/routes, 2020, Google Maps Screenshot, cropped and taken by William Jakeman.

Roughly a mile and a half west of Alimia is Chalki, an island wider than it is long. Chalki lies roughly four miles west of Rhodes and is similarly mountainous, with the majority of Chalki's western half comprised of steep climbs, hills, and cliffs. On its eastern coast lay the port town of Halki, home today to one of the Regional Port Fund Offices of the Dodecanese and acting midway point for modern-day southwesterly ferry and travel lanes, seen in Figure 9. The coastline of Halki is soft, with three beaches and a sheltered bay protected by two large hills, one to its south and one to its northeast, and one small island, BPAXONHΣΙΣ ΝΗΣΑΚΙ or Little Rock Island, situated at the mouth of the bay. Quite fascinating is the large coastal cave entrance on the northern shore of Halki Bay, a cave which the locals call "Socrates' Cave". Even more



Figure 9. Screenshot of Halki's port and sea traffic lanes/routes, 2020, Google Maps Screenshot, cropped and taken by William Jakeman.

interesting is the presence of an unidentified site with visible structures and ruins as seen through satellite imagery in Figure 17 (to be covered later in this chapter).

The island of Agios Theodoros Nisidia geographically sits between Chalki and Alimia, each roughly the same distance between each, being half a mile. Its significance as an island candidate parallels Alimia and Chalki, and it should not be discarded or overlooked. The nature of this island at first glance may seem unusable because of its lack of a reasonably accessible shore or beach, but its unidentified structures raise questions. On the island's northwestern corner is a rocky plateau with a small sheltered cove directly to its south and a rough beach to its immediate north. The positioning of the plateau would serve a military need or foresight rather than that of mercantile or quick refuge. As apparent in Figure 10 (highlighted in red) there are structures including an abrupt rise in elevation like that of a wall encircling the eastern perimeter of the plateau. The defensive position of this site would pose many advantages. In addition, its location between Chalki and Alimia further assists the concept of defensive infrastructure, as its proximity to these islands would serve as both a hold and place of defense against any arriving foes.



Figure 10. Satellite imagery of Agios Theodoros Nisidia, 2020, Google Maps Screenshot, cropped and taken by William Jakeman.

The last and final island to be briefly described is Tilos, the northwestern most island of the candidates discussed thus far. A port of notable significance is its port town Livadia, which is a midway point for modern-day ferry and travel lanes between Chalki, Rhodes, Simi, and Nikia, as well as to the rest of the Northern Dodecanese, as seen in Figure 11. Livadia sits on Tilos' eastern coast, featuring a bay sheltered by two hills, one to its north and one to its east. For a vessel outbound, from the area around Rhodes, to the North Aegean or the rest of the Dodecanese, Tilos provides rest and safety for weary northbound travelers.

To reiterate, the predictive model of a Cilician maritime network of islands in the southeast Dodecanese is based on geographic proximity and accessibility to Cilicia, in the east and the Aegean to the west; literary evidence making the Dodecanese a preferred starting point to begin speculations and surveys. The models and figures created through ArcGIS will, when

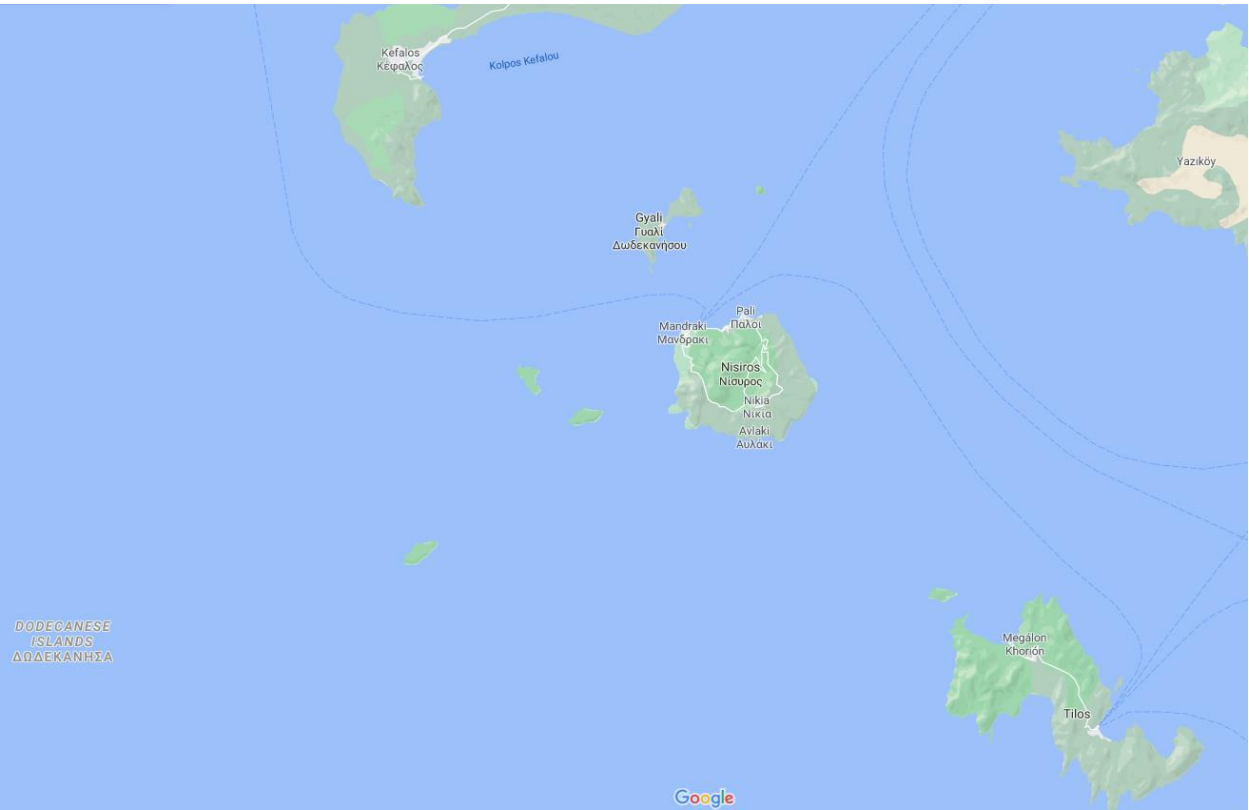


Figure 11. Map of Tilos & Nikia sea traffic lanes/routes, 2020, Google Maps Screenshot, cropped and taken by William Jakeman.

combined, form a predictive model that will likely include each of the six island candidates named above. Preliminary satellite imagery of the six islands bolsters the likelihood of at least four of the six islands being a part of a pirate maritime network. Observable unidentified structural remains on Alimia, Chalki, Agios Theodoros Nisidia, and Makry must then be briefly mentioned.

As seen in Figure 12 and Figure 13, there are unidentified structural remains also on the island of Alimia observable through satellite imagery (that which is labeled in Figure 12 is an abandoned Greek Orthodox Church). Figure 12 shows some sort of settlement or collection of ruined structures and buildings lying roughly 200 feet away from the beach. At the very center of these unidentified structures seems to be a Greek Orthodox Church. According to various amateur copyrighted pictures found on Google images taken at this site, the church is in a

reasonable, yet dilapidated, condition. But the surrounding buildings, by comparison, are in a much more noticeable state of ruin and decay. The diameter of this site is roughly 400ft laterally and 450ft longitudinally. Although it is not clear which period these unidentified structures in Figure 12 date to, it is more than likely a relatively modern settlement, perhaps of the last 100 years, that fell into decay due to unknown circumstances. Figure 13, also on Alimia Island, is on its Northeasternmost point. These unidentified ruins have some sort of structure to them, perhaps that of installation or a collection of building foundations. These ruins unfortunately do not have pictures of them that were taken in the same fashion Figure 12 had, and appear to have greater overgrowth than Figure 12. Nonetheless, the unidentified structural remains seen in Figure 13 are on a part of Alimia which has no other structural remains, as the island itself is largely uninhabited.



Figure 13. Satellite imagery of NE Alimia, 2020, Google Maps Screenshot, cropped and taken by William Jakeman.

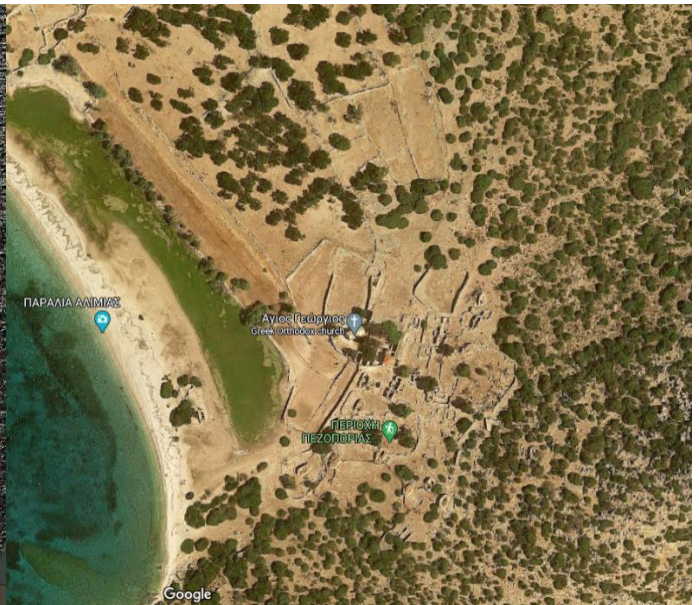


Figure 12. Satellite imagery of Alimia, 2020, Google Maps Screenshot, cropped and taken by William Jakeman.

Figures 14 and 15 focus on the island of Chalki. As seen in Figure 14, there appear to be spread out formations of structural remains. These remains cannot be identified at this time, but they are man-made, judging by the well-formed circular and linear nature of these lines which seem to indicate intentional design, perhaps for agriculture or animal husbandry. Whatever the case may be these are obvious scarring marks of previously ruined remains present on Chalki's hilly countryside. Figure 15 shows similar organization to the unidentified structures of Figure 14. Again, whether these are the scarring marks of previous agricultural or animal herding infrastructures, this is this was not ascertained. In addition, it is uncertain whether such structures are modern or not.



Figure 14. Satellite imagery of unidentified structure ruins Chalki, 2020, Google Maps Screenshot, cropped and taken by William Jakeman.

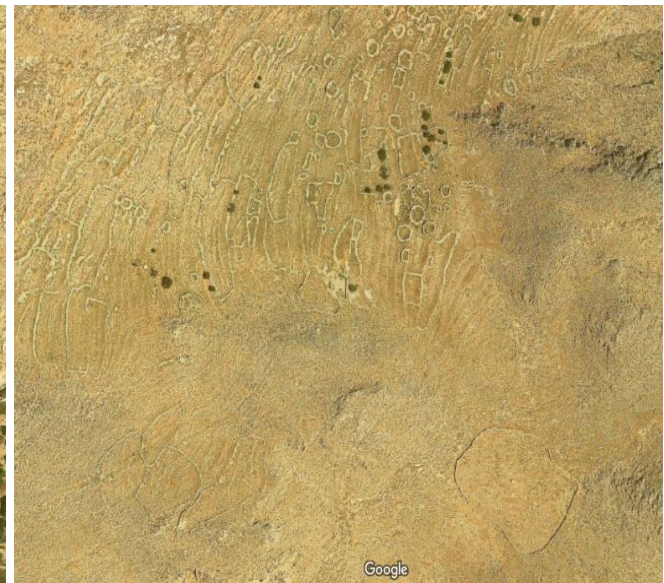


Figure 15. Satellite imagery of unidentified structure ruins Chalki, 2020, Google Maps Screenshot, cropped and taken by William Jakeman.

Figure 16 is also focused on Chalki, and shows additional unidentified structural remains closer to the coast, also obviously man-made. As one can see, the topmost part of Figure 16 shows a beach with immediate access to the Aegean waters. Interestingly enough, most of this

figure shows a number of unidentified structures in an organized fashion similar to Figure 15. On the far left, we see a long continuous linear feature (highlighted in orange) made of rocks extending southward for roughly 600 feet. At the center bottom of Figure 16 is yet another collection of unidentified structural remains, one side of which (highlighted in blue) appears to



Figure 16. Satellite imagery of unidentified structure ruins on NW Chalki, 2020, Google Maps Screenshot, cropped and taken by William Jakeman.

face towards the ocean and beach area with the other side (highlighted in yellow) housing various circles, scarring, and rectangular markings of perhaps a settlement. Even on the beach there appear to be the remains of a foundation or building, (highlighted with a red circle).

Another interesting factor concerning unidentified structures on the island of Chalki, is the presence of some sort of ruined feature near what locals call Socrates' Cave. Both it and the cave, seen in Figure 17, are on the Northern side of Halki's bay. The position of this feature overlooks the bay in its entirety, and perhaps acted as some sort of fortification or outpost in the past.



Figure 17. Satellite imagery of unidentified structure ruins and 'Socrates' Cave' near Halki, Chalki, 2020, Google Maps Screenshot, cropped and taken by William Jakeman.

Figures 18 and 19 come from the island Agios Theodoros Nisidia. Figure 18 depicts the northwesternmost point of the island, a plateau that overlooks the waters between Chalki and the Alimia. The stark difference in elevation between one part of the plateau and the other is interesting. This stark difference in elevation (highlighted by a blue circle) might be interpreted as either a cliff or an integrated wall, natural or otherwise. Even more interesting are two unidentified rectangular structures on top of the southern end of the plateau, overlooking the change in elevation. Figure 19 is a collection of large organized rubble just 600ft to the plateau's east (highlighted via a red circle in Figure 18). This collection of rubble is the only rocky ground in its immediate area that is littered with large debris, which might imply that this debris is a site of weathered ruins.

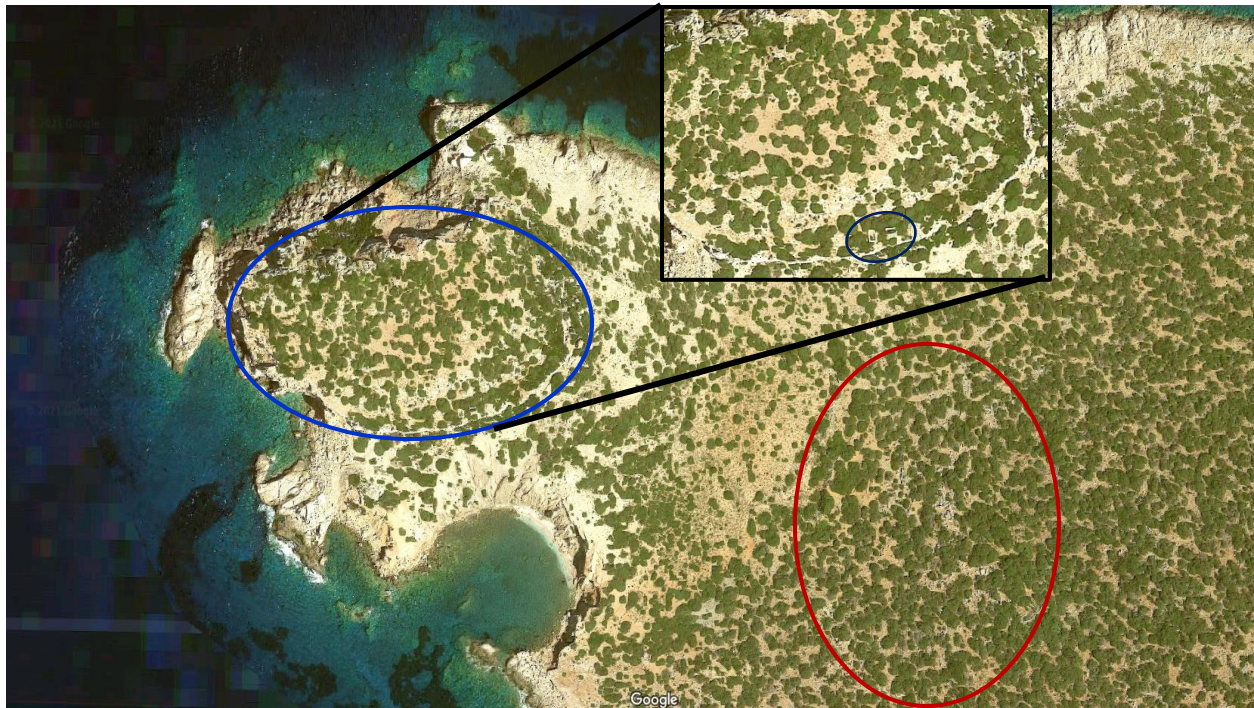


Figure 18. Satellite imagery of plateau and unidentified rubble on Agios Theodoros Nisidia, 2020, Google Maps Screenshot, cropped and taken by William Jakeman.



Figure 19. Satellite imagery of unidentified rubble on Agios Theodoros Nisidia, 2020, Google Maps Screenshot, cropped and taken by William Jakeman.

The fourth and final island to be described is Makry. Figure 20 is a singular large area of unidentified structural remains, making up the perimeter of this unidentified site. Highlighted in red, these outer linear structures create a large interior space where there is an entrance funneling towards the northeasternmost point of the island with evidence of an accessible rough beachhead, (highlighted in blue). Although these are the only structures, minimally shown as is the case, this island is uninhabited with apparent circular fishing infrastructures off its eastern coast.



Figure 20. Satellite imagery of unidentified linear structures on Makry, 2020, Google Maps Screenshot, cropped and taken by William Jakeman.

For our present purposes, the overall significance of these unidentified remains on four of the six islands is twofold. Firstly, such remains indicate the lack of modern archaeological investigation upon these islands in this part of the Dodecanese. Of the four islands, Alimia, Chalki, Agios Theodoros Nisidia, and Makry, only Chalki is significantly inhabited. As the other three are largely uninhabited with no permanently established and occupied settlements, any traffic or human presence there stems from their allure as tourist destinations. But the ruins of man-made structures indicate previous human presence on the now-uninhabited islands of Alimia, Agios Theodoros Nisidia, and Makry. Even if these remains date to the last one hundred years, or even to the Medieval Era, infrastructure of any kind may indicate the possibility that ancient peoples or mariners previously established structures and used these places for their own reasons. Nonetheless, it also shows some sort of network across multiple islands of the immediate area, thus making the method of transport between, to, or from each island to be by boat.

The following chapter combines each of the GIS figures mentioned here and created from ArcGIS. These figures are the basis of the geospatial predictive model for identifying the possible routes and islands that were once likely part of a pirate, and for my overall theory a Cilician, pirate maritime network within the Dodecanese Islands. To set the stage, one must be knowledgeable of the marine conditions of the Dodecanese Islands, modern Mediterranean travel lanes (from which we can glean common routes and vessel traffic), and the prevailing currents and winds in and around the Dodecanese Island chain.

The common routes and sea lanes in the southern half of the Dodecanese begin east of Rhodes to the south of Kaş, Turkey, and the island of Kastellorizo. This sea lane goes directly to Rhodes, branching off three ways—northward towards the city of Rhodes itself, westward to the eastern coast of the island landing at the site of Lindos, a major trading power during the sixth century B.C. (Francis and Vickers 1984), and southwestward bypassing the island and sailing straight to the island of Karpathos or Crete. This three-way split, visualized in Figure 21, lies at the very beginning of the of sea lanes which feed into the Aegean Sea.

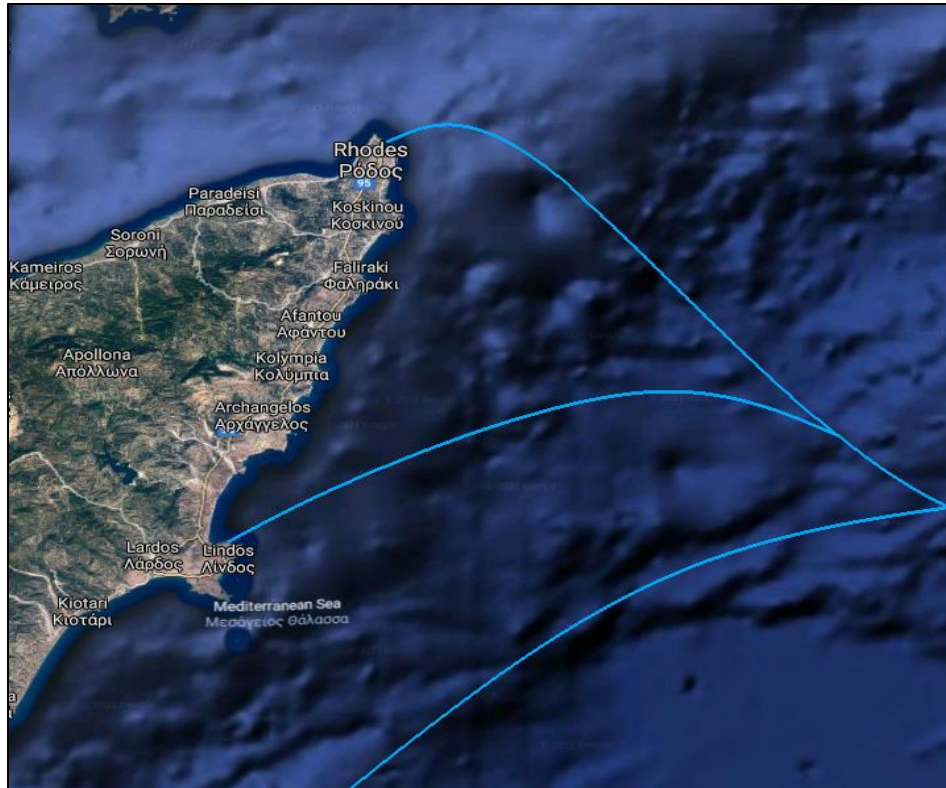


Figure 21. Map of sea lanes to Rhodes, 2020, Google Maps Screenshot, taken and edited by William Jakeman.

Circling northward near the port city of Rhodes, these sea lanes create localized traffic in and around the tip of the island. Progressing westward, the sea lanes split yet again, traveling northwest to the islands of Simi and Sesklio, directly westward to the island of Tilos, and to the southwest towards the islands of Alimia, Makry, Agios Theodoros Nisidia, and Chalki's port town Halki, all represented in Figure 22. From Chalki traveling southward, these sea routes travel to locations outside the Dodecanese such as the islands of Santorini and Melos in the Cyclades, Diafani of the island of Karpathos, Heraklion of Crete, and as far west as Piraeus, the main port of Athens, as seen in Figure 23. Traveling northward, the sea lanes seem to form into only one lane going to Tilos. As for Tilos, its port town of Livadia serves (as mentioned earlier) as a midway point between the northern and southern halves of the Dodecanese Islands. From

here, sea lanes travel northwestward to Nikia and the island of Kos and back east to Rhodes and Simi.

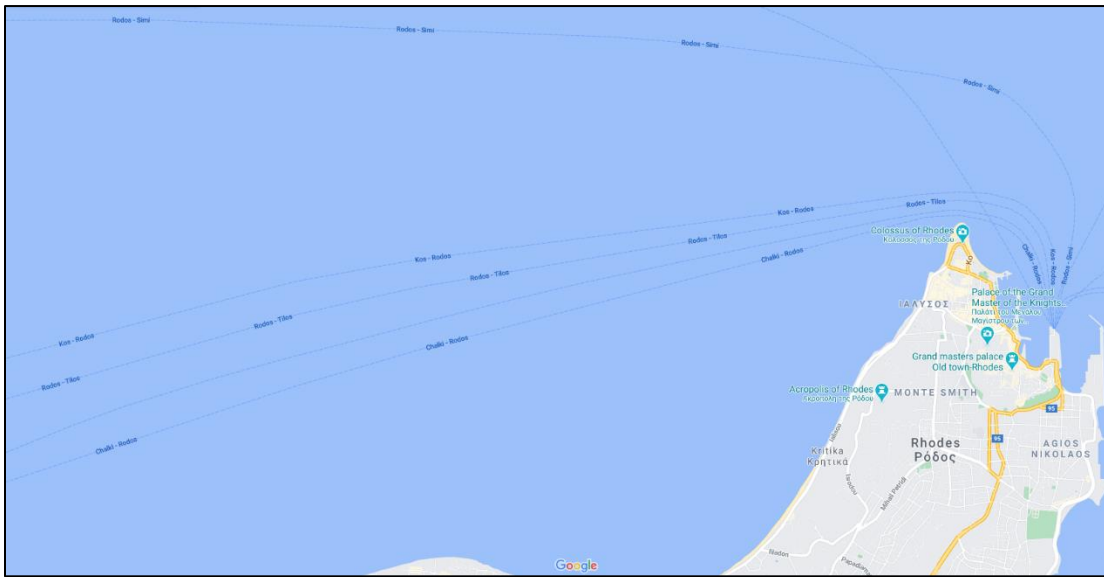


Figure 22. Map of sea traffic lanes at Rhodes, 2020, Google Maps Screenshot, cropped and taken by William Jakeman.

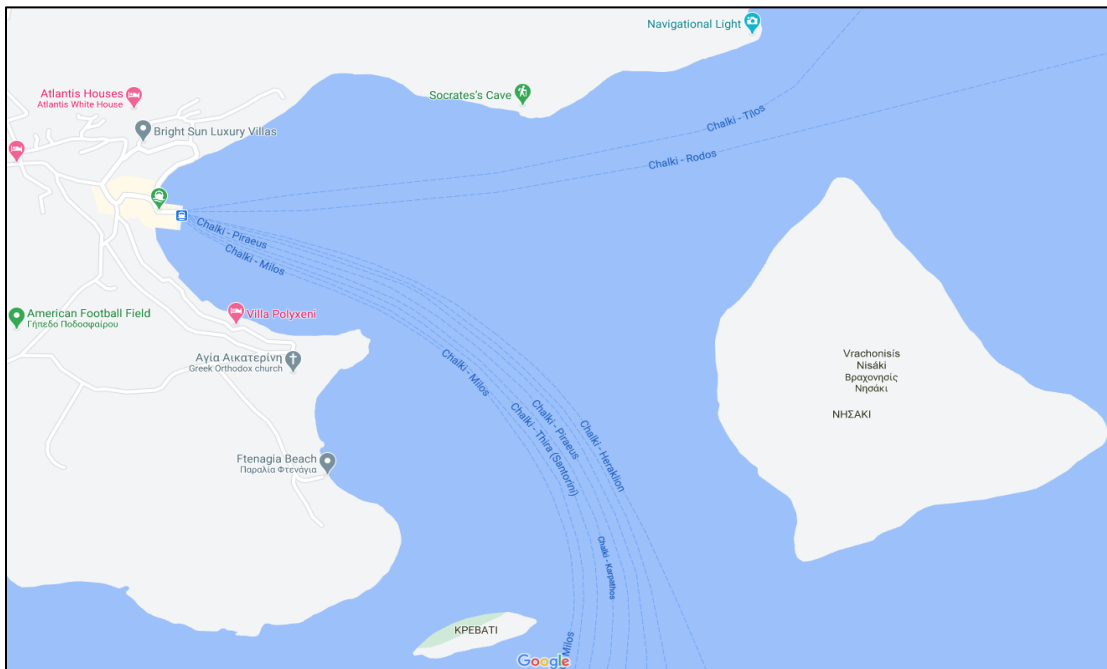


Figure 23. Map of sea traffic lanes at Chalki, 2020, Google Maps Screenshot, cropped and taken by William Jakeman.

From the existence of these routes, it can be assumed that similar travel itineraries along these lines existed during the second and first centuries B.C. However, due to the limited range of our determined average repurposed vessel of this period traveling at only 5-6 kn with restrictions on nighttime travel, the distance a vessel could travel within a day at these this speed would be less than what modern sea lanes allow. After eliminating those that extend far beyond the reasonable reach of slow first century B.C. vessels, the remaining sea lanes travel to islands in close proximity to each other. As a whole, this reduction redefines the organization of these sea lanes into a more linear “leap-frog” like arrangement.

The issue of how far a vessel could travel within a day, poses a further question: to what degree do the prevailing winds of the Southern Dodecanese affect a sailing vessel’s travel distance? This is, for the most part, answered by Leidwanger’s research discussed in the previous chapter. Through a similar process I was able to create a visual representation of both wind speed and direction in this part of the Dodecanese, using a multitude of local METARs (Meteorological Aerodrome Report), data from the Hydrographic Office pertaining to the Aegean, and “meteoblue”, an online meteorological service created by the University of Basel. The results show a mean average wind direction of 113.65° on a compass bearing indicating that the prevailing winds blow in a southeasterly direction in this part of the Aegean, and a mean average wind speed of 8.15 km/h (5 mph) or roughly 4.4 knots—visualized in Figure 4 below. In areas

seen in the figure below, wind speeds could reach as high as 15 km/h (9.3 mph) or roughly 8.1 knots, and as low as 3 km/h (1.8 mph) or 1.6 knots.

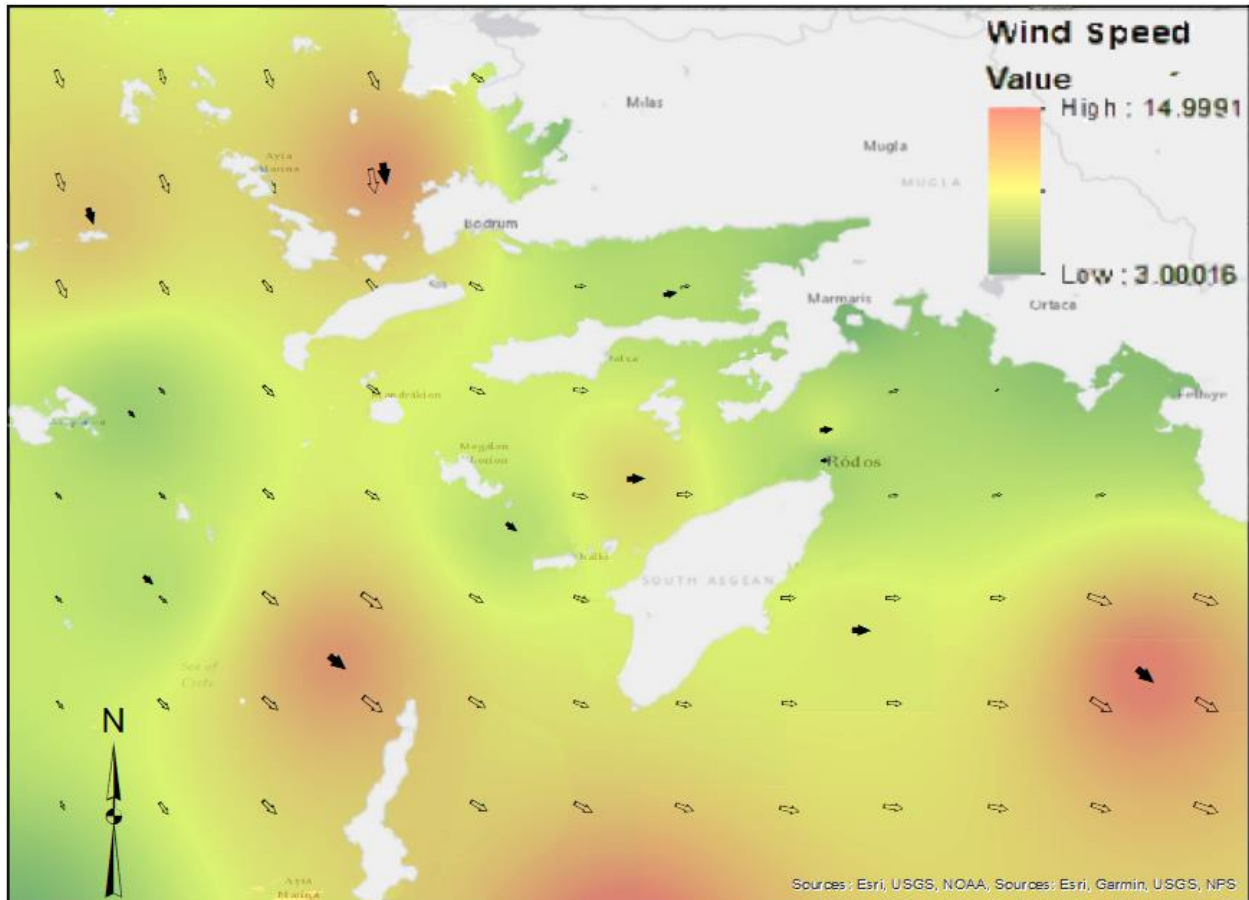


Figure 24. ArcGIS Map depicting IDW interpolations of wind speed and direction, 2020, ArcGIS, created by William Jakeman.

The process to achieve this representation first required the calculation of inverse distance weighted, or IDW, cell values within the area comprising the twenty datum points collected throughout the focused region. This interpolation of the wind speed values was then overlaid with the interpolation of wind direction, resulting in a combined layout of wind velocities throughout the southern Dodecanese, represented by the grid of transparent arrows. This layout of arrows indicating average wind direction required the mapping of a grid, or what ArcGIS refers to as a “fishnet” feature, with the Data Management tool. By inputting tables of data correlating to the datum points, shown as solid black arrows, in addition to the catalogued

wind speeds at each datum point, a resulting grid of average wind speed and direction occurred with both directional arrows and a gradient speed color scheme.

Roughly, the further in one travels throughout the Dodecanese, the average wind speed one might encounter will be less than areas southeast of Rhodes and transitioning into the open waters of the Mediterranean. The most reasonable cause for this phenomenon are the geological disruptions that islands create within a wind system. To the northern end of the map lay the extent of the Dodecanese's congregation of islands, both small and large. Beyond this point to the north is the Northern Aegean, an expanse of water not disrupted by a plethora of islands, which explains the higher wind speeds in this northern area of the Dodecanese Island region.

The last variable which has the potential of affecting a vessel's travel speed lies under the water as an unseen force. The prevailing current systems, which affect the nature of the Aegean Sea's marine environmental conditions, and for that matter the Mediterranean's, pose an intriguing visual scenario. Concerning the eastern Mediterranean as a whole, the prevailing currents roughly form a counterclockwise rotation (Soukissian 2007). Beginning in the Aegean and/or at the Island of Crete, prevailing currents wash to the south, assisted by the prevailing southern winds, and form a natural highway for trade to flow to Egypt. Even during the Bronze Age, this notion of a counterclockwise flow of trade and maritime traffic existed and is documented to some degree in ancient sources (Soukissian 2007). At the bottom of this counterclockwise route, one may continue to use the prevailing currents in assisting northward travel along the coast of Palestine and Syria, eventually crossing the shores of Cilicia and the island to its south, Cyprus. Travel westward at this point, however, became more difficult due to the more easterly prevailing winds, which changed predictably contingent on the season—an obstacle which serves to further prove the need of island-hopping, and for the case of southern

Anatolia, coastal-hopping. This area poses an increased danger for navigational safety, even today, because of Anatolia's rough coastline. The wrecks of Uluburun and Tektaş Burnu, the former dating to the Bronze Age and the latter to the fourth century B.C., both serve as good case examples for the dangers this westward passage posed to ancient mariners.

In the counterclockwise direction of the eastern Mediterranean's prevailing currents, a southerly current system sweeps throughout the Dodecanese into the open waters of the middle Mediterranean. While outside the Dodecanese Island chain, these currents are significant in assisting southerly travel, but while within reach of islands such as Rhodes, Chalki, Simi, Alimia, and Tilos, the currents are reduced to speeds as low as 0.25 km/h (0.62 mph) or 0.54 (Figure 24). Regarding ship travel within and around the Dodecanese Islands, it can be confidently stated that current strengths and speeds would not significantly affect the travel time (in days) of an average repurposed merchant vessel of the type likely used by pirates.

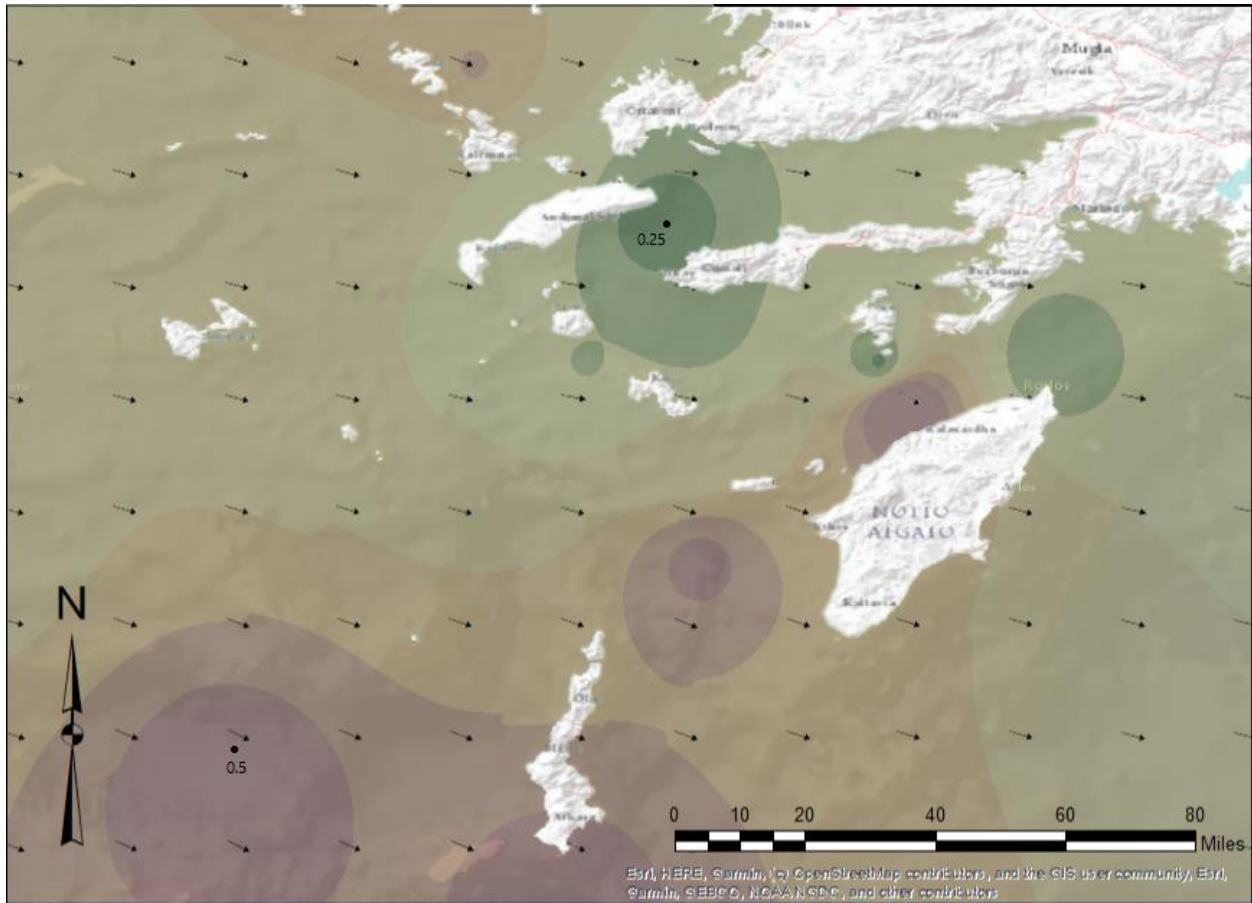


Figure 24. ArcGIS Map depicting IDW interpolations of averaged prevailing current speed and direction, 2021, ArcGIS, created by William Jakeman.

It is now appropriate to analyze the geoprocessed GIS figures calculated and formed from the previously data, such as the prevalent sea lanes, average wind speeds, prevailing wind directions, and currents of the Dodecanese Island region. Such data along with the average merchant vessel speeds taken from *Kyrenia II* sea trials together provide the final factor to aid in determining ship distance costs. Features located in port settlements such as Rhodes, Halki, and Livadia allow ArcGIS software to give referential interpolation focused on a highlighted GPS coordinate. By interpolation calculated through grid reference data management tools, Figure 26 and Figure 27 visualize ship speeds and distance costs in terms of days (a choice of measurement heavily inspired by Leidwanger’s research and reinforced by the nighttime seafaring limitations in antiquity).

It was initially difficult to translate an effective sailing schedule since a data set of such values seemed too arbitrary at first. Fortunately, a better estimate was created to assess cost values in relation to a ship's travel distance. This estimate created a timetable from 7am to 7pm, based on the seasonally adjusted time of sundown in the Aegean area. With this timetable, an established cell grid could relate values through the parameters of a 7am-to-7pm standard day (12 hours of daylight) to the path distance interpolation of a vessel traveling through a specific cell. Wind speeds and ship speeds then determined the essential "friction" a hypothetical vessel could encounter, thus affecting the time it would take to travel between and across grid cells of the area in question.

A vessel's sailing time-distance costs, measured in days, is then calculated and represented in a "graduated gradient" color layout. Cyan represents the proposed area a vessel, with similar speeds and sailing efficiencies to those of the *Kyrenia II*, could travel within a twelve hour, or 1-day, timeframe. Each consecutive color represents an additional day of travel from the point of origin required to reach and traverse each area and grid cell. A hypothetical vessel traveling an average of 5-6 kn in a broad-reach configuration across a grid cell with the friction variable of southeasterly prevailing winds blowing between 3-15 knots can hypothetically, in a single day, travel in an eastward direction a maximum distance of roughly 75 nautical miles (87mi) and roughly 29.5 nautical miles (34mi) westward with good weather conditions. This would put the average speed of our hypothetical vessel at an upper parameter of 6.25 knots at a heading of 90° East, and a lower parameter of 2.5 knots at a heading of 270° West, performing maneuvers such as gybing and tacking. This calculation alone does not yet factor in obstacles like landmasses, since such values are generalized information within an open body of water. As landmass features are factored in, truer estimates are achieved as seen in

Figure 26 and Figure 27 (to be discussed in the following pages). It is to be noted that the sea lanes and area of water between Rhodes' northwestern coast, Sesklio, and the islands of Alimia, Chalki, Agios Theodoros Nisidia, and Makry, all experience the same wind speed conditions averaging at 8.34 knots (refer to Figure 4).

This data suggests that the maximum travel speed and achievable distance of a second/first century B.C. vessel is reduced by over half in attempting westward travel against the prevailing southeasterly winds of the Dodecanese. The friction posed by the vessel's speed and heading in relation to prevailing wind speed and direction indicates the established network of islands, havens, or midway points likely to provide places of refuge and rest after entering the Dodecanese. As stated previously, it was common practice for ancient mariners to discontinue travel at nightfall because of the dangers nighttime travel posed, as well as the discomforts or lack of an adequate crew quarters. Consequently, ancient mariners slept on the beaches of Mediterranean islands and coastlines as their ship lay safely beached or anchored an accessible distance from the crew's onshore campsite.

Figure 26 portrays the data outlined and discussed above. Traveling eastward, a vessel originating from Rhodes could hypothetically travel beyond the Dodecanese and to either the Anatolian port town of Kastellorizo or to the port city of Kaş, the former only 4 miles south offshore of Kaş. A vessel on such a journey, starting at 7am and ending at 7pm of the same day, would have traversed a horizontal distance of 68nmi (79mi) at an average speed of 5.6 knots (Leidwanger 2013; Arnaud 2007). In similar conditions and timeframe, a vessel outbound in a westerly direction aiming for Simi/Sesklio faces an average wind speed of 6 knots with an average wind direction of 98° east. As sailing efficiency is reduced by over half in these

conditions, specifically by a factor of 2.5, a vessel would only traverse a total horizontal distance of 27nmi (31mi) within a twelve-hour period.

Thus far we have only discussed the resultant distance coverage on an x-axis plane. Because of the prevailing wind directions, travel on the y-axis plane is somewhat easier. Still, according to our model in Figure 26, a vessel traveling at a heading of 280° NW to the island of Sesklia originating from Rhodes, could hypothetically travel at an average speed of 2.8 kn across 24nmi (28mi) within eight hours of the twelve hour timeframe. Thus, as one of the mentioned island candidates for the construction of our predictive model, Sesklia falls under the 1-day travel area for a vessel traveling from Rhodes or its immediate neighborhood. A vessel traveling from Rhodes in a southern direction with westerly intentions must first tack and gybe against the averaged 98° East wind direction, still limiting its overall horizontal distance coverage. Journeying to the four-island group of Alimia, Chalki, Agios Theodoros Nisidia, and Makry, the average heading a vessel would take falls between 250° and 230° SW. Its speed, taking into account the average wind direction of 117° SE along the western coast of Rhodes, averages at 4.15 knots across roughly 38nmi (44mi) of open water. A vessel embarking on this itinerary would change frequently between a close-reach and beam reach sailing configuration (refer to Figure 3) in order to maintain this average speed.

These four islands are the first features a vessel would encounter at the end of the first day of its SW itinerary towards Crete. Thus, these islands would be the first stop or midway point available before the day's end. Makry is closest to the coast of southern Rhodes and yet is longitudinally as close to the southwesterly sea lanes as Alimia is. Of these two, Alimia is the better option for safe harbor because of its large, favorably located, and sheltered bay. Chalki, although the southernmost island of the four, has an established port which acts as a modern

midway point for the southern Dodecanese and gateway to the rest of the western Aegean, which alone warrants its candidacy as a potential location for a pirate maritime network.

My theory encompassing this paper's work is that this pirate network, likely used and exploited by non-Cilician pirates as well, was established, fortified, and maintained by, specifically, Cilician pirates: "... in Cilicia; here they were defeated in a battle [by Pompey]. At last they... surrendered themselves, together with the cities and islands of which they were in control; these they had fortified..." (Plutarch, *Life of Pompey* 28). Because of Agios Theodoros Nisidia's geographically advantageous location, lying between Alimia and Chalki, it would likely have been used to defend, protect, or monitor the midway points of Chalki and Alimia (see Figure 25).

Tilos does not fall into the 1-day area as depicted in Figure 26. It does, however, fall under the 1-day area when the point of origin is moved from Rhodes to Chalki's port town, Halki, as seen in Figure 27. Tilos then becomes a secondary midway point of travel accessing northern Dodecanese and the north Aegean. With the point of origin now at Chalki, for a vessel traveling west, a new 1-day area is calculated using the same data and parameters as in Figure 26. The easternmost extent a vessel originating from Cilicia could reach is Kapukargin, Turkey, northeast of Rhodes.



Figure 25. Satellite focus of Agios Theodoros Nisidia in proximity to Alimia (right) and Chalki (Left), 2020, ArcGIS, created by William Jakeman.

Other islands and landmasses become accessible within the 1-day distance costs once the point of origin is switched from Rhodes to Chalki. They are the islands of Saria, Karpathos, and Tilos. At the farthest NW extent of the 1-day area calculation lies Nikia. But only half of this island is covered by the 1-day cost of distance area which raises the question of its inclusion here. Although it does technically qualify, for the purposes of this paper, however, the target area's square-mileage must be more definitively measurable, so we shall exclude it from discussion. The numerous islands excluded here may still have pirate traces. But Alimia, Chalki, Agios Theodoros Nisidia, Makry, Simi, and Saria were chosen because of their *higher* likelihood for having evidence of an identifiable pirate maritime network. To establish a minimal list of most likely candidates, those six islands are the best candidates for our predictive model.

In Figure 27, a vessel whose itinerary lies between Chalki and Tilos encounters a lower average wind speed of 5.7 kn, as opposed to 8.34 kn in the surrounding area (refer to Figure 4). Originating from the island of Chalki and traveling at a heading of 310° NW towards Tilos, our hypothetical repurposed pirate vessel could travel only at an average speed of 2.42 kn across roughly 25nmi (29mi) of open sea because of the lower average wind speeds between the two islands, which is also an additional reason to exclude Nikia from our predictive model. The longer, slower trip in this direction would incentivize the crew to put in at Tilos for the night and reinforce the idea of island-hopping. This slower trip most likely would have taken roughly 10 hours to complete, leaving only two hours left within our 12 hour timeframe.

The distance of 19 miles between Tilos and Nikia could be accomplished within three to four hours of additional sailing time, pushing the vessel and its crew past the hour of sunset. This sailing time is feasible only because of the increased average wind speeds between Tilos and Nikia, averaging to 7.3 kn, an increase of 1.6 kn from 5.7 kn (refer to Figure 4). More than likely such feats were not impossible but were highly improbable. Tilos qualifies as a candidate because it falls under the 1-day rule for our hypothetical vessel originating from Chalki. The modern port town of Livadia also functions as a midway point between the northern and southern halves of the Dodecanese Island chain.

Saria Island is the southernmost and farthest island of our six candidates (refer to Figure 27). This island falls fairly far to the south of our other congregated island candidates, but is included for two reasons. Firstly, despite its distance of roughly 24nmi (28mi) it falls comfortably in the 1-day rule (with Chalki as the originating point). The combination of average wind direction of 131° SE, speeds of 9.22 knots, and a ship's heading at 230° SW towards Saria Island place the average speed of the vessel at 5 kn—speedier than the other itineraries

discussed. Secondly, Saria Island is the first landmass encountered in a southerly route towards Crete and is accessible to the rest of the Aegean. Our hypothetical vessel would, using this itinerary, reach most of Crete and any part of the southern Cyclades by the third day of travel by hopping from Chalki to Saria Island.

Saria Island's more southerly and far larger neighbor, Karpathos, lies deeper in Chalki's 1-day travel area and would be another excellent candidate for the proposed Cilician maritime network, but is excluded here because Karpathos would expand the predictive model beyond the scope of this paper, exactly as in the case of Nikia, and would require other adjustments and assumptions

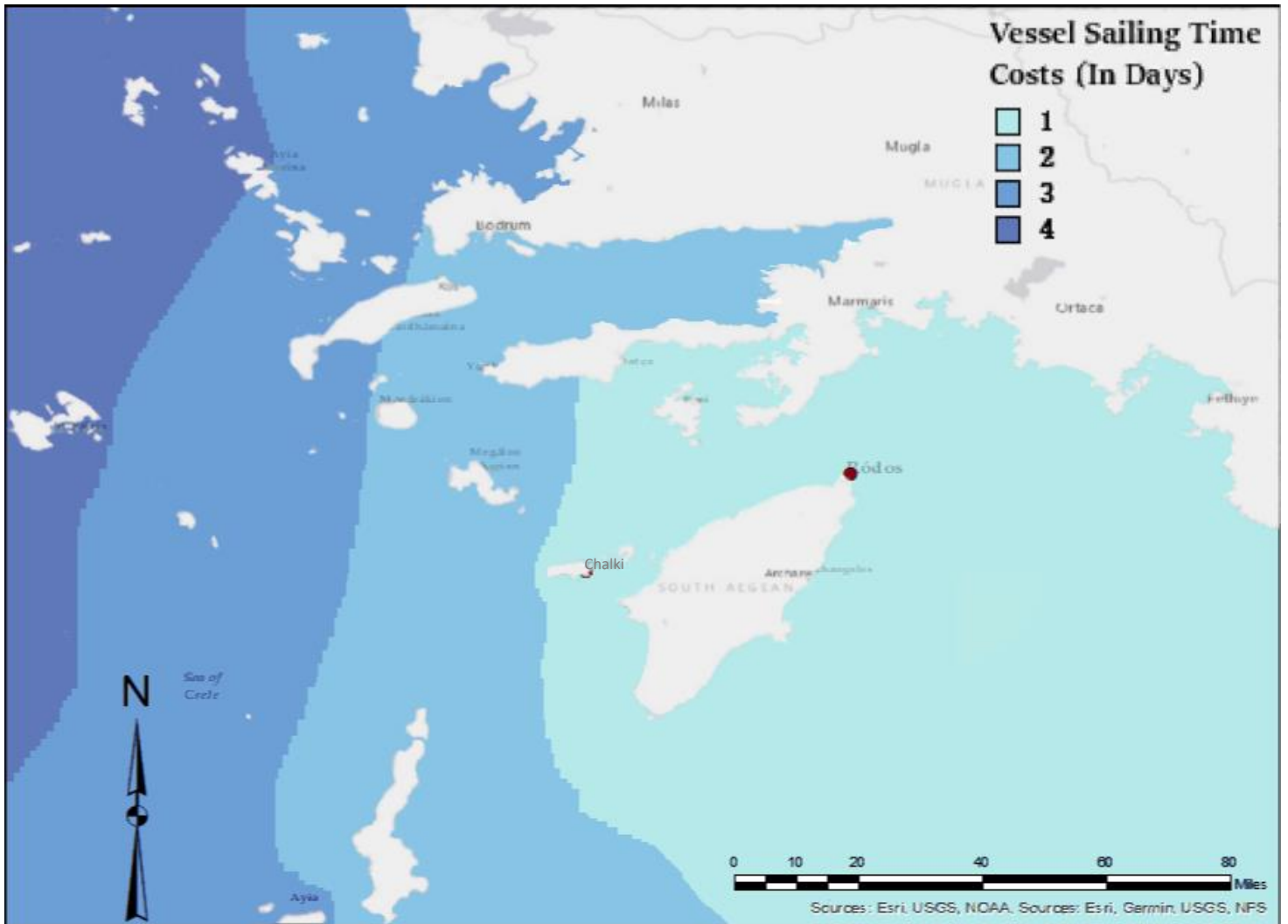


Figure 26. ArcGIS Ship-Distance-Cost map model of Dodecanese Islands, Aegean Sea, depicting travel originating from Rhodes, 2020, ArcGIS, created by William Jakeman.

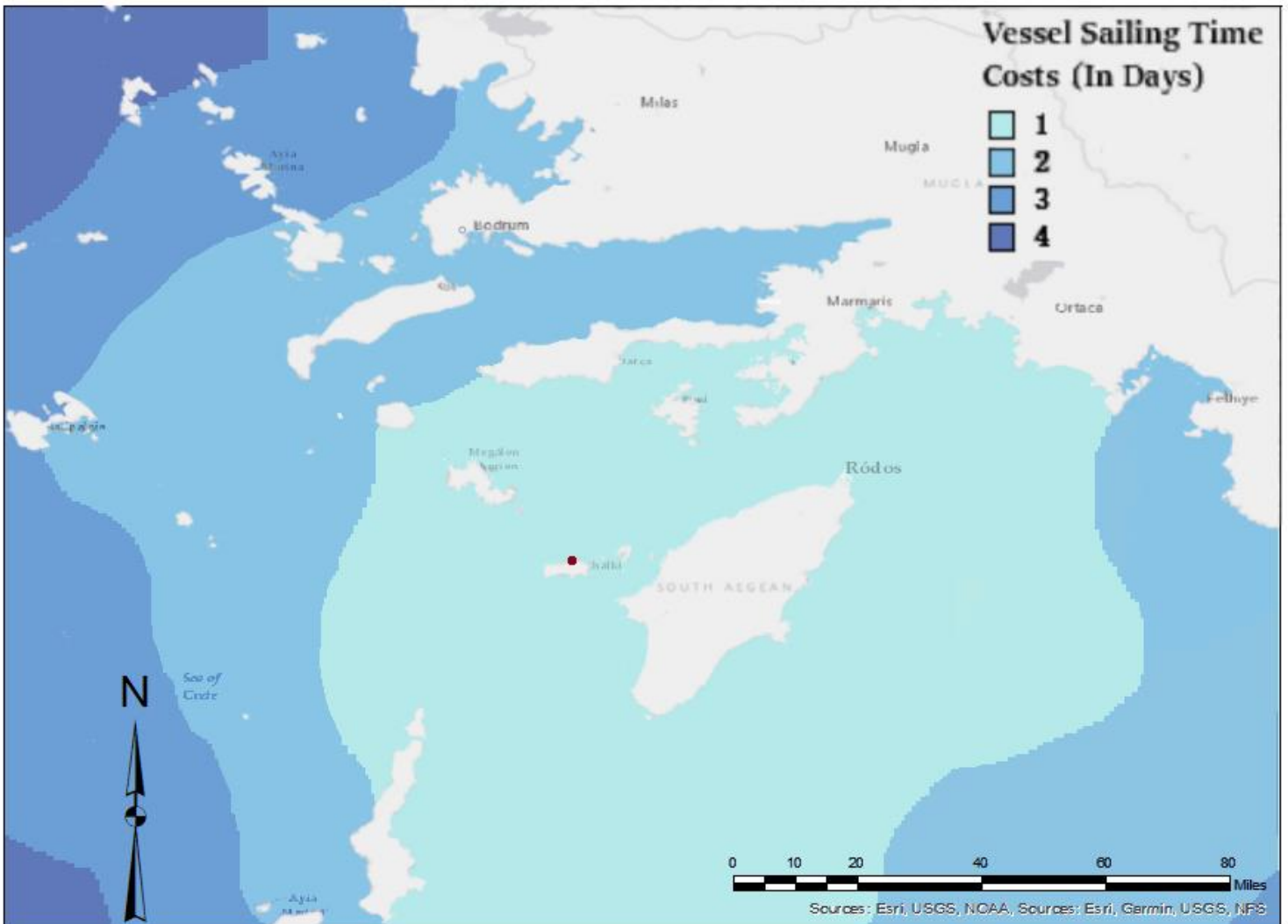


Figure 27. ArcGIS Ship-Distance-Cost map model of the Dodecanese Islands, Aegean Sea, depicting travel originating from Chalki, 2020, ArcGIS, created by William Jakeman.

CHAPTER 8

THE PREDICTIVE MODEL

Figure 4, Figure 26, and Figure 27, along with their respective data generated through ArcGIS, all indicate a general area that can be accessed and traversed by our hypothetical vessel traveling within a 12-hour (1-day) sailing period. Within this area also lay the six island candidates previously mentioned, Alimia, Chalki, Agios Theodoros Nisidia, Makry, Simi, and Saria. These islands are the most likely locations to find material evidence of a Cilician pirate network based on their geographic relation to Rhodes. GIS data figures further show that they fall within 1-day travel rule represented by the cyan-colored areas. The creation of a predictive model, discussion of the model itself, its significance, and any theoretical limitations for future investigations, is now appropriate.

As clearly shown in Figure 26, if a vessel originates from the city of Rhodes, it is comfortably able to travel and reach the islands of Simi/Sesklio, Alimia, Chalki, Makry, and Agios Theodoros Nisidia within the 1-day coverage area. If originating from Chalki or any island within a 4-mile radius of it, a vessel is able to access the islands of Tilos and Saria as well as Rhodes and Sesklio (Figure 27). It is reasonable, then, to connect all six of our islands together to conceive a maritime network that could have been developed, used, and exploited by the Cilician pirates over the course of the second and first centuries B.C.

A repurposed trade, merchant or fishing vessel used by Cilician pirates would first have reached the shores of Rhodes or the port of Rhodes itself in order to access the rest of the southern Dodecanese. By hopping along the southern coast of Anatolia in 1-day time-distance increments, a ship eventually would reach Kastellorizo and/or Kaş just east of the Dodecanese by the middle of their first day, and Rhodes by the end of their first day. From Rhodes, by roughly

following the sea lanes and trade routes, this same vessel would gain access to the five islands of Sesklio, Alimia, Chalky, Agios Theodoros Nisidia, and Makry.

Certain locations are of interest for a vessel traveling westward from Cilicia are Crete, mainland Greece, the entrance to the Black Sea, and the Cyclades. If this ship had a northwestward itinerary aiming for the North Aegean or Black Sea, Sesklio would mark the end of its first day of travel. From Sesklio, our vessel would have sailed by tacking and gybing against the southeasterly prevailing winds towards the islands of Tilos, Nikia, or Kos by its second day of travel within the Dodecanese area. On the other hand, if a vessel was heading westward to mainland Greece or the Cyclades, its first day of travel from Rhodes would bring it to Alimia and Chalky. Rather, the other two islands, Agios Theodoros Nisidia and Makry, are less likely but possible nonetheless as all four together create a compact neighborhood. These two could perhaps have been fortified and defended Alimia and Chalki, making these safe havens from prying eyes. There are numerous minor islands in and around this group of four, but their tiny size and craggy nature are navigational hazards other than practical refuges. As shown in Figure 26, our westward-bound vessel could not reach Tilos by its first day. If a vessel originated from Rhodes, the vessel's first day is limited to reaching Alimia, Chalki, or Sesklio.

For a southbound vessel aiming for Crete and originating from Rhodes, the itinerary is affected much in the same way as our westbound vessel. By the end of its first day of travel within the Dodecanese, it must reach Chalki and Alimia, as well as Agios Theodoros Nisidia and Makry, in order to jump to Saria Island and Karpathos on the second day of travel, and from there arriving at Crete would cost two more days. As represented in Figure 27, the islands now accessible when originating from Chalki are Tilos, Sesklio, and Saria Island to the far south. From Chalki our hypothetical westward vessel could choose to sail either southward toward

Saria Island and its larger neighbor Karpathos, or else northwest to Tilos with direct access to the easternmost Cyclades.

Figure 28 and Figure 29 complete the visualization of a network of access routes, destinations, and island connectivity, all of course dependent on the originating locations being Rhodes or Chalki from which the vessel traveled. Overlaying Figures 26 and 27, with modern sea lanes shown in Figures 7, 8, 11, 22, and 23, then eliminating those lanes whose destinations fall outside the 1-day area, creates a rough visual estimate that is implemented in the original data of Figures 26 and 27, creating our new Figures 28 and 29.

Figure 28 is derived from Figure 26, and Figure 29 is derived from Figure 29. In both figures, the red line indicates paths that a northbound vessel would take as affected by the average wind direction and wind speeds (Figure 4). A northbound network of islands is revealed with Simi/Sesklio on the first day, Tilos and (barely) Nikia on the second, and Kos on the third. The blue line indicates paths that a westbound vessel would take, affected by the same variables as the red line, and reveals a westbound network of islands containing Chalki, Alimia, Agios Theodoros Nisidia, Makry, and (represented by the hypothetical purple line) Sesklio. The yellow line indicates paths that a southbound vessel would take, again affected by the same variables, and reveals a southbound network of islands containing Chalki, Alimia, Agios Theodoros Nisidia, Makry, and Saria Island/Karpathos. For both Figures 28 and 29 the blue line originating from Rhodes transitions into a green line as both westward and southward paths overlay each other, creating the color green. The brown line, shown only in Figure 28, indicates paths that almost all vessels traveling westward would take from places like Cilicia, Cyprus, or Syria, through the Dodecanese. This line starts, hypothetically, from Kastellorizo/Kaş, Turkey, and is destined either for Lindos on the east coast of Rhodes or for Rhodes itself.

These findings prove useful in establishing a target area for future archaeological surveys. Additionally, this predictive model and its applications in maritime archaeology will expand our knowledge not only of maritime networks in the Aegean throughout antiquity, but also of Cilician pirate activity throughout the second and first centuries B.C. Finding material evidence of Cilician pirate activity in the Aegean Sea, and especially in the Dodecanese, would shed light on an aspect of Cilician maritime culture that is now practically non-existent within the archaeological record. Such findings would show how Cilician pirates lived, what their material culture look like, and whether such material culture differed significantly from artifacts found in their Cilician homeland (findings highlighted by Rauh's *Rough Cilicia Surveys* 1999). If there are identifiable structural remains attributable to the Cilician pirates, then such remains might also give insight as to how the pirates built their network. With this basis, future archaeological surveys might have an easier time in attributing their findings to the Cilicians.

Now it is necessary to address again the limitations of this predictive model and the data on which it is based. Firstly, this predictive model does not guarantee the presence of Cilician pirate infrastructures on the islands highlighted in this paper. The list of unidentified structural remains observable by satellite imagery shows that, although there is no guarantee that they are specifically piratical or Cilician, there are ruins on the islands highlighted in our predictive model. An in-person survey must still be conducted in the region and on the islands to prove or disprove whether the remains are either piratical or Cilician. Our predictive model does, however, present a likely case, through geoprocessed data and figures, for a hypothetical visualization of a maritime network of some kind, but of what kind and of what sort are still open to investigation.

What about the possibility of a Cilician pirate vessel not being a re-purposed trade, merchant, or fishing vessel and, instead, of it being a galley or bireme equivalent? A model using a hypothetical bireme/galley's data would bias the time-distance calculations since their speeds are higher on average than those of a cargo or merchant or fishing vessel. Other questions then arise concerning the length of one day's worth of travel. As discussed in Chapter 4, the most common vessel the Cilician pirates would have used is a re-purposed trade, merchant, or fishing vessel. Although there are accounts of Mediterranean pirates using vessels akin to the bireme, logic and literary sources represent the majority of pirate vessels as largely non-military ones, with a much smaller proportion of biremes or triremes.

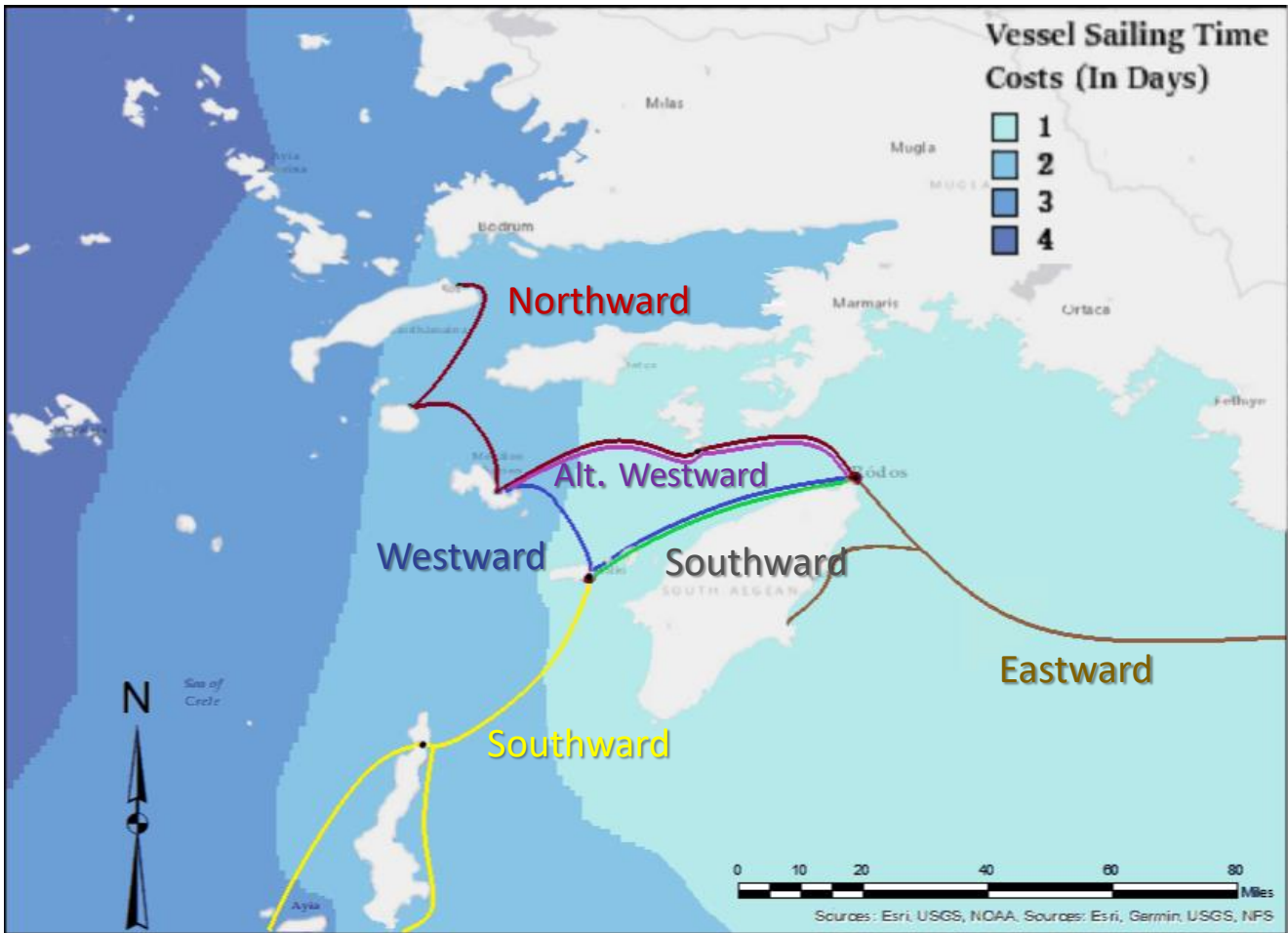


Figure 28. ArcGIS Predictive Model Itineraries of Dodecanese Islands, Aegean Sea, depicting travel originating from Rhodes, 2021, ArcGIS, created by William Jakeman.

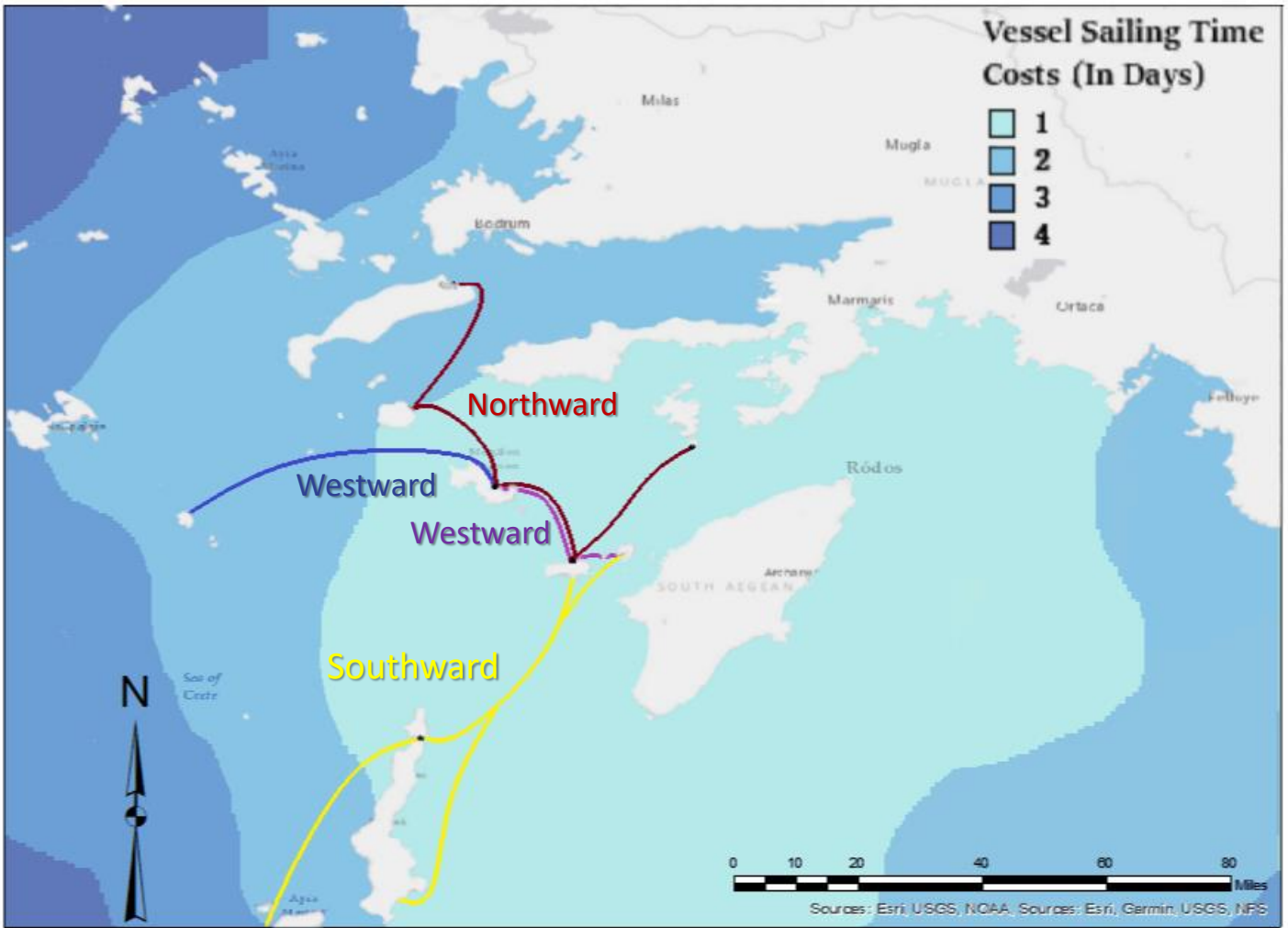


Figure 29. ArcGIS Predictive Model Itineraries of Dodecanese Islands, Aegean Sea, depicting travel originating from Chalki, 2020, ArcGIS, created by William Jakeman.

CHAPTER 9

SUMMARY AND CONCLUSION

The Cilician peoples, whose origins are mixed with the peoples of the Assyrian Empire, Neo-Hittite groups, Greek colonists, and their cultural influence, formed a powerful maritime presence which dominated from the mid-second century B.C. all the way to 67 B.C. The Cilician pirates' own actions on the entire Mediterranean ranged from simple piracy and raiding, which disrupted eastern trade lanes (some of the most significant from Egypt to Rome) to sea-borne mercenaries fighting against Rome in the Mithridatic Wars, to slave traders acting as Rome's largest dealer in slaves throughout its late Republic.

It was through sea power that the Cilician pirates gained momentum. With the removal of the Carthaginian navy from the waters of the eastern Mediterranean, there were no significant policing forces to adequately prevent or discourage pirating and raiding. Thus, those criminal activities proliferated over the course of the century. Rome's contribution to the rise of piracy, throughout the Mediterranean can be boiled down to three simple decisions. First, Rome, destabilized by social strife, did not effectively police the sea between the second century B.C. and early-first century B.C. Second, Rome lacked a substantial navy as eastern powers pushed against Rome's eastward expansion and enlisted the help of these same pirates. The third factor making up Rome's contribution to the rise of piracy is its one failed attempt to quell it.

In 102 BC Marcus Antonius Orator, ordered by Sulla, sailed with an expeditionary force to Cilicia and engaged in a land-based campaign against the homes of the pirates. He besieged their forts in the Taurus Mountains and killed those who were deemed to be their associates and those who were linked to the pirates themselves. What he did not do, however, was blockade the coast of Cilicia Trachea which would have prevented the largely successful retreat and escape of

the Cilician peoples. Their retreat took them along the same routes used by the pirates, and ended up in the northeastern sector of Crete, unbeknownst to Orator. Rome had now failed to eliminate the Cilicians from the Mediterranean, within the next decade these same Cilicians returned to their homeland and rebuilt their homes. These Cilicians actively engaged in mercenary work against Roman interests. This continued until 67 BC, a time when the Cilicians were wealthy and powerful and, as pirate warlords, led large fleets comprised of mainly Cilicians, likely Cretans and other Greeks in the mix.

In 67 B.C. Pompey, authorized by the Senate, began his maritime campaign to purge the entire Mediterranean of its infectious piracy, a danger that increasingly threatened Roman citizens and colonies in Italy. Sweeping from Corsica and Sardinia, Pompey sailed eastward in and around the shores of Greece, Crete, the Aegean, and finally to Cilicia itself. In less than a year, Pompey managed to eradicate virtually all piracy from the Mediterranean and decisively end Cilician pirate superiority in the eastern Mediterranean.

The use of GIS begins to reveal possible networks used by pirates and, as my theory suggests, by Cilician pirates. Island-hopping, common throughout the Aegean, dates back to the Neolithic and Bronze Ages, and is the most likely method by which the average Cilician pirate vessel would have traveled through the islands. Variables included the season of travel as well as the time of day. In an area scattered with navigational hazards such as rocky outcroppings, islands of all sizes, or jagged coastlines, nighttime navigation was impractical, which forced most crews to find suitable beach or safe harbors to spend the night. The average pirate vessel was most likely a repurposed trade or fishing vessel. Such vessels based on data from the sea trials of the *Kyrenia II* had a top speed that ranged between 5 and 6 kn in a broad reach configuration but only between 1.5 and 2 kn when traveling upwind.

Consequently, these speeds limited the range our ship could travel in any set time. By including these data sets with average conditions and the prevailing wind direction and likely speed throughout the southern Dodecanese, we can create a model which illustrates the distance such a ship could travel within a 12-hour, or 1-day, sailing period. Originating either from Rhodes or the island of Chalki and its surrounding neighborhood, a vessel could travel as far west as 27nmi (31mi) and as far east as 68nmi (79mi) within a 12-hour/1-day period from 7am to 7pm. Within this 1-day range are the islands of Chalki, Alimia, Tilos, Makry, Agios Theodoros Nisidia, and Sesklia. These six islands present the best possibility for finding (Cilician) maritime infrastructure, as they are geographically the most likely midway points, places of refuge, and safe havens for mariners traveling through this gateway region of the Aegean Sea.

The resulting data-driven predictive model clearly illustrates a hypothetical maritime network frequented by mariners in westward travels during the second and first centuries B.C. Possible westward and southwesterly itineraries share similar difficulties, obstacles, and sailing costs in terms of days as indicated by the predictive model. Thus, because of this predictive model it can be stated that in two of the three cardinal directions by which to enter the Dodecanese region, a mariner first encounters the islands of Chalki, Alimia, Agios Theodoros Nisidia, and Makry, which demonstrates the likely importance such islands have as assets in the construction and maintenance of a pirate maritime network.

In conclusion, this thesis has been structured to illustrate necessary steps in creating a predictive model for locating the maritime network of the Cilician pirates. As such, it is a proposal for future archaeological work to be undertaken, and there are two levels of theorizing. On the first level, for present purposes, I accept Plutarch's identification of the pirates in question as being Cilician. He is the best informed ancient source in his biographies of Pompey,

Crassus, and Caesar, and only future archaeological discoveries might help to pin down the Cilician identification (or not). On the second level, I have tried to identify the most logical area where pirates from Cilicia, or the East more generally, would most likely have to go first in entering the Aegean Sea (the Dodecanese Island chain), and then where they might have to put ashore at night or hole up for various lengths of time. A number of islands are likely candidates for future archaeological investigation, and there are two main network routes: starting from Rhodes city or the coast of the island, a northbound network, of Simi/Sesklio, Tilos, possibly Nikia, and Kos; a westbound network containing Chalki, Alimia, Agios Theodoros Nisidia, Makry, and Saria/Karpathos). Much of the argumentation in this thesis justifies and explains the complicated, interconnected variables and the considerations necessary to understand and generate the predictive model, in order to use and show the benefit of GIS software for future archaeological research on the Cilician pirates.

REFERENCES

Arnaud, Pascal

2007 Diocletian's prices edict: the prices of seaborne transport and the average duration of maritime travel. *Journal of Roman Archaeology*, 20:321-336.

Bent, J. Theodore.

1890 Explorations in Cilicia Trachea. *Proceedings of the Royal Geographical Society and Monthly Record of Geography*, no. 8. The Royal Geographical Society. 12:445-463.

Britannica, T. Editors of Encyclopaedia.

2018 Dodecanese. *Encyclopedia Britannica*, <https://www.britannica.com/place/Dodecanese>.

Broodbank, Cyprian

2013 "Minding the Gap": Thinking About Change in Early Cycladic Island Societies from a Comparative Perspective. *American Journal of Archaeology*, 4:535-543.

Broodbank, Cyprian

2013 *The Making of the Middle Sea: A History of the Mediterranean from the Beginning to the Emergence of the Classical World*, Oxford University Press, New York.

Casson, Lionel.

1995 *Ships and Seamanship in the Ancient World*, Johns Hopkins University Press, Baltimore Maryland.

Chisholm, Hugh,

1911 Cilicia. *Encyclopædia Britannica*, Cambridge University Press, Cambridge, U.K. 6:365-366.

Cicero, Marcus T.

1917 The Speech on the Punishments. *The Fifth Book of the Second Pleading in the Prosecution against Verres*, Albert Clark and William Peterson, translators. Perseus Digital Library.

<<http://www.perseus.tufts.edu/hopper/text?doc=Cic.+Ver.+2.5&fromdoc=Perseus%3Atext%3A1999.02.0018>>. Accessed 20 August 2020.

Conolly, James, and Mark Lake

2006 *Geographical Information Systems in Archaeology*, Cambridge University Press, Cambridge, U.K.

De Souza, Philip

2002 *Piracy in the Graeco-Roman World*, Cambridge University Press, Cambridge, U.K.

De Souza, Philip

2008 *Rome's Contribution to the Development of Piracy*, *Memoirs of the American Academy in Rome*. 6:71-96.

Farr, Helen

2010 Measurement in navigation: conceiving distance and time in the Neolithic. *The Archaeology of Measurement: Comprehending Heaven, Earth and Time in Ancient Societies*, Cambridge University Press, Cambridge, U.K. pp. 19-26.

Francis, E.D., and Michael Vickers.

1984 Amasis and Lindos. *Bulletin of the Institute of Classical Studies*, 31:119-130.

Gardiner, Robert

2004 *The Age of the Galley: Mediterranean Oared Vessels since Pre-Classical Times*, Chrysalis, London.

Gates, Charles

2015 Kinet Höyük (Classical Issos): A Harbor Town in Southeast Cilicia during the Persian and Hellenistic Periods. *Journal of Eastern Mediterranean Archaeology & Heritage Studies*, 2:81-104.

Gjerstad, Einar.

1934 Cilician Studies. *Revue Archéologique*, Presses Universitaires de France. 3:155-203.

Gomme, Arnold W.

1925 Ancient Piracy. *The Classical Review*, University Press of Liverpool. 5(6):127-128.

Grayson, A.K.

1991 Assyria: Sennacherib and Essarhaddon (704-669). *The Cambridge Ancient History, Volume III Part II*, Cambridge University Press, Cambridge, U.K., 2:103-141.

Hamilton, H.C., and Falconer, W.

2014 Book XIV, *The Geography of Strabo Volume I*, George and Sons (1904), translator.

Hydrographic Office

2008 Admiralty Sailing Directions: Mediterranean Pilot, *Coasts of Libya, Egypt, Israel, Lebanon and Syria, South Coasts of Greek Islands from Kríti to Ródos and Turkey with the Island of Cyprus*, United Kingdom Hydrographic Office.

Irwin, Geoffrey and Richard G.J. Flay

2015 Pacific Colonization and Canoe Performance: Experiments in the Science of Sailing. *The Journal of the Polynesian Society*, 4:419-443.

Katz, Hayah.

2008 The Ship from Uluburun and the Ship from Tyre: An International Trade Network in the Ancient Near East, *Zeitschrift des Deutschen Palästina-Vereins*. 2:128-142.

Leidwanger, Justin

2013 Modeling distance with time in ancient Mediterranean seafaring: a GIS application for the interpretation of maritime connectivity. *Journal of Archaeological Science*, 40:3302-3308.

Mark, Samuel E.

1991 Odyssey 5.234-53 and Homeric Ship Construction: A Reappraisal, *American Journal of Archaeology*, 3:441-45.

McGovern, Patrick E., and Gretchen R. Hall.

2016 Charting a Future Course for Organic Residue Analysis in Archaeology, *Journal of Archaeological Method and Theory*, 2:592-622.

Miller, Chantel E. and Miller, Naomi F.

2018 The Archaeobotany of Grape and Wine in Hittite Anatolia, *Die Welt des Orients* 48(2):209-224.

Morton, J.

2017 *The Role of the Physical Environment in Ancient Greek Seafaring*, Brill, Leiden.

Murray, W.M.

1987 Do modern winds equal ancient winds? *Mediterranean Historical Review*, 2.2:139-167.

Palmer, C.

2009 Windward sailing capabilities of ancient vessels. *International Journal of Nautical Archaeology*, 38(2):314-330.

Plutarch, Lucius M.

1916 The Life of Crassus. *Plutarch The Parallel Lives*, Section 10. Digital Loeb Classical Library. University of Chicago.

<http://penelope.uchicago.edu/Thayer/E/Roman/Texts/Plutarch/Lives/Pompey*.html>.

Accessed August 20 2020.

Plutarch, Lucius M.

1917 The Life of Pompey. *Plutarch The Parallel Lives*, Section 24, 25, 28. Digital Loeb Classical Library. University of Chicago.

<http://penelope.uchicago.edu/Thayer/E/Roman/Texts/Plutarch/Lives/Pompey*.html>.

Accessed August 21 2020.

Plutarch, Lucius M.

1919 The Life of Caesar. *Plutarch The Parallel Lives*, Section 2. Digital Loeb Classical Library. University of Chicago.

<http://penelope.uchicago.edu/Thayer/E/Roman/Texts/Plutarch/Lives/Pompey*.html>.

Accessed August 27 2020.

Rauh, Nicholas K.

1999 Rough Cilicia Regional Archaeological Survey Project. *Near Eastern Archaeology*, The University of Chicago Press. 62(1):54-55.

Sayce, A. H.

1910 The Cilician Cities of Anchiale and Illubri. *Journal of the Royal Asiatic Society of Great Britain and Ireland*, Cambridge University Press, Cambridge, U.K. 42(4):1339-1343

Schmitz, Philip C.

2009 Archaic Greek Names in a Neo-Assyrian Cuneiform Tablet from Tarsus. *Journal of Cuneiform Studies* 61, pp. 127-131. The University of Chicago Press.

Semple, Ellen Churchill.

1916 Pirate Coasts of the Mediterranean Sea. *Geographical Review*, American Geographical Society. 2:134-151.

Seton-Williams, M. V.

1954 Cilician Survey. *Anatolian Studies*, British Institute at Ankara. 4:121-174.

Sherwin-White, A. N.

1976 Rome, Pamphylia and Cilicia, 133-70 B.C. *The Journal of Roman Studies*, Society for the Promotion of Roman Studies. 66:1-14.

Smith, William

1856 Dictionary of Greek and Roman Geography, Edited by William Smith, LL.D. *Notes and Queries* s2-II, London Press, London, U.K. 31:120–133.

Soukissian, T., Hatzinaki, et. al.

2007 Wind and Wave Atlas of the Hellenic Seas. Hellenic Centre for Marine Research, Anavyssos.

Steffy, J. Richard.

1985 The Kyrenia Ship: An Interim Report on Its Hull Construction. *American Journal of Archaeology*, 89(1):71-101.

Steffy, J. Richard.

1994 *Wooden Ship Building and the Interpretation of Shipwrecks*, Texas A&M University Press.

Steinby, Christa

2014 *Rome Versus Carthage: The War at Sea*. Pen and Sword Military.

Westerdahl, C.

1995 Traditional zones of transport geography in relation to ship types. *Shipshape. Essays for Ole Crumlin-Pedersen*, Viking Ship Museum, Roskilde. pp. 213-230.

Whitewright, J.

2011 The potential performance of ancient Mediterranean sailing rigs, *International Journal of Nautical Archaeology*. 40:2-17.

