Within the Roanoke region of North Carolina, the Roanoke River has served as a natural route for trade and settlement. Despite being known by the Tuscaroras as Moratoc, or "river of death," this river was at the core of economic activity and expansion. Accordingly, human activity has created a rich historical and archaeological record tied to the river.

Within this study, Adam Friedman studies anthropological trends regarding human behavior, economics, and archaeological signatures both above and below the waterline of the Roanoke in the pursuit of the themes of legitimation, risk, industrial locational convenience, and legal and illicit forms of commerce sharing a cultural landscape.

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The Legal Choice in a Cultural Landscape: An Explanatory Model of the Roanoke River, North Carolina

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PROGRAM IN MARITIME STUDIES
MARITIME HISTORY
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By

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DEDICATION

I dedicate this work to my wife, Michelle, and parents, Stephen and Meredith.

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CHAPTER 1
INTRODUCTION

Throughout known history, the Roanoke River has served as a useful body of water to multiple social groups. Before Europeans came to the region, represented by the Ralph Lane expedition in 1586, Tuscaroras established settlements along the river. Steadily increasing numbers of colonists eventually displaced the Tuscaroras, a process that was largely completed by the Tuscarora War fought between 1711 and 1712 (Ready 2005:35-37). Cultural change continued along the Roanoke as population grew during the Colonial Era, supported the independence of the new United States, fought a Civil War, and recovered from global economic tribulations.

Due to its long history and strategic importance, the Roanoke River and surrounding region accumulated a complex archaeological record. Much of the cultural material discovered along the river is indicative of human behaviors and decision-making processes that led to their deposition. In an effort to fully realize the interpretative capability of these residues of continued cultural change, this study will follow an explicit research design, a requirement guiding all maritime archaeologists to investigate sites in an interdisciplinary manner and "initiate research formulated to answer broad questions of human behavior" (Murphy 1983:89).

Murphy (1983:89) wrote that archaeologists, in addition to developing explicit research designs, should utilize anthropology by perceiving shipwrecks as databases. At its core, this study will not only embrace the particularistic need of individual site investigation but will move beyond the examination of single cultural loci by compiling them into a database. As a result, the Albemarle Sound Cultural Landscape Database (ASCLD) and Roanoke River Terrestrial Sites Database (RRTSD) will both be databases of databases: collections of archaeological data including that derived from shipwrecks.

The construction of the ASCLD and RRTSD will permit the application of statistical analyses and provide the archaeological test to the historical trends already known regarding the United States, state of North Carolina, and Roanoke Region. In addition, the information contained in each database will be made into a geographic information system, or geodatabase, that will reveal spatial relationships between archaeological sites, zones of industrial activity, and human behavior. The combined strategies of statistical and spatial analysis will provide general and broad as well as spatial and specific interpretations of processes shaping the cultural landscape of the Roanoke River.

An early version of the ASCLD, known as the Roanoke River Database (RRD), was already conceived and established by Richards and Price in creating Price's thesis, *Conflict and Commerce:*

Maritime Archaeological Site Distribution as Cultural Change on the Roanoke River, North Carolina (2006). Since the successful conclusion of Price's work, additional fieldwork and historical research deepened the interpretative capabilities of the RRD and expanded its coverage to other North Carolina river systems that drain to the Albemarle Sound, prompting the name change to ASCLD. Though the ASCLD covers multiple river systems, much of its expansion came from additional fieldwork conducted in the Roanoke over two years, which greatly increased the body of underwater archaeological information contained in the database. The ASCLD, however, lacked terrestrial archaeological data, the information required for observing changes in a cultural landscape on land and over time. This lack prompted investigation of multiple terrestrial sites along the Roanoke and created the Roanoke River Terrestrial Sites Database (RRTSD) (Appendix A). Though the information in each database is limited to the Roanoke River Region, its use in investigating the themes of this study is not restricted and will require examination of the landscape at large. Enlargement of the ASCLD and introduction of the RRTSD should ensure the effective investigation of the study's themes. In this respect, the capabilities required of these databases reflect the design of this study: to investigate the themes of social structure, risk, legality, central place, and transportation, as discussed below. The geographical boundaries imposed by the Roanoke region are necessary, serving only as a location on which to base the study, a hallmark of recent trends within explicit "thematic" and comparative studies within maritime archaeology (Richards 2006).

Research Questions

This study will attempt to discern the roles of legality and changing infrastructure, in tandem with resource location and geographic convenience, in the patterning of maritime commercial activities. To understand legality, this research will thematically investigate the effects of transportation, infrastructure, transportation technology, political forces, industrial legality, resource location, and geographical convenience on the cultural landscape. Investigating these themes will involve analyzing changes in the cultural landscape of the Roanoke River Region over time by asking several questions:

- How did emergent transportation technologies and different transportation forms affect maritime economic activity and traffic?
- How have physical and economic forces influenced the location and patterning of industries, population centers, and, therefore, transportation networks?

- What trends can be observed via a diachronic study of the dynamic between regional and domestic economies?
- How has the location of resources, combined with accessibility to the river, caused certain geographic areas to be chosen for industrial exploitation? Is there a difference in the location of industrial activities of legal versus illegal endeavors?

Use of a geographic information system (GIS) will integrate all information gathered in an attempt to reach the objectives of this study. Through this software, historical maps and other historical research will be layered with remote-sensing data, itself a bilayer of georeferenced sonar images and magnetometer data. Unification of the historical and archaeological records will draw primarily upon vessel enrollments, custom house statistics, regional tax structures, magnetic anomalies on the river bottom, and sonar image returns.

Format

The layout of this report reflects the research design, findings, and analyses of this work. Following this chapter, Chapter Two details the theoretical framework that provided the foundation for the research design. Due to the complexity of themes and research questions, multiple theories were necessary to guide the collection of historical and archaeological data and arrange information into forms that permitted higher level analyses. In addition, different themes required different theories. Cultural landscapes theory defined the landscape as an interaction between human behavior and the physical landscape (Hoskins 1955; Sauer 1963; Mulvaney 1989; Ebert 1992; Westerdahl 1992; Jasiński 1993; von Droste 1995; Stuart 1997; Duncan 2000; McErlean 2002; Parker 2002; Flatman 2003). The interaction of human behavior, risk, and risk management came from Giddens (1984), Crook (1999), Souza (1999), and Duncan (2000). Ideas concerning the roles of transportation infrastructure were derived from Taylor (1951), Christaller (1966), Peterson (1968), Moore (1970), Clark (1981), Parsons (1986), Hunter (1993), and Richards (2003). Theories of deliberate discard of vessels were provided by Murphy (1983), Babits and Kjorness (1995), Moore (1995), and Richards (2002, 2006).

Chapter Three explains the methodology used in pursuit of the work. This includes historical and archaeological research, remote-sensing data collection and processing, and modes of data analysis. Methodological limitations are also discussed.

Chapter Four provides historical context for analyses conducted in Chapters Five and Six. The history of colonial North Carolina provides information on the early, forest-oriented industries

and shipping trends of the Roanoke Region. Followed by the turn of the nineteenth century, extension and change is seen within these trends regarding North Carolina shipping and land-based transportation infrastructure.

Chapter Five statistically examines the historical trends outlined in Chapter Four. Broad interpretations reveal the interconnectedness of the national economy to that of Eastern North Carolina and the Roanoke Region. Examination of the Roanoke vessel assemblage reveals perturbations caused by economic cycles and physiologic factors of the river. Ultimately, bifurcation of the Roanoke vessel assemblage into abandoned and wrecked components will produce diachronic analyses that will provide general and broad explanations of change within the Roanoke River's cultural landscape.

Chapter Six discusses results derived from GIS-based geospatial analyses. A method of using multiple synchronic projections of the landscape to form a diachronic interpretation, an attempt to narrow the date range of unknown vessel use-lives, is detailed. Integration of terrestrial data allows zonation of the landscape by industrial activities and, similar to the diachronic method, serves to suggest the function of unknown vessels.

Statistical analyses contained in Chapter Five merge archaeological and historical data to discover patterns and trends. Geospatial analysis in Chapter Six places data into geographical context, revealing locations of activity and, as a result, human behavior. Both Chapters Five and Six are necessary to adequately investigate themes discussed in Chapter Seven. This final chapter merges the interpretations reached in Chapters Five and Six to create an explanatory model of the Roanoke River's cultural landscape.

Limitations

As was the case with Price (2006), historical research could not find documented vessel losses in the Roanoke River before 1831 despite the known importance of Halifax during the colonial era (Lefler 1973: 280). In addition, it is probable that during the many dredging operations conducted by the United States Army Corps of Engineers both before and after the turn of the twentieth century many undocumented discarded vessels were removed before archaeological recording could occur. The vessel assemblage, like the cultural landscape, is created by the artifice of humanity and, therefore, its destruction is also artificial, decreasing but not eliminating its interpretative capability.

Further decreasing the effectiveness of statistical and geospatial analyses is the dearth of information regarding certain vessels that compose the archaeological record of the river. Many watercraft are known only by their location, sonar image, and/or magnetic anomalies. Ground-

truthing is essential to attaining basic dimensions of submerged hulls and, aside from local informants, is the method most likely to identify unknown vessels.

Terrestrial investigations, conducted during remote sensing float surveys and multiple additional days in the field, provide comprehensive coverage of archaeological land sites between Williamston and Plymouth. This data has been invaluable in the course of geospatial analysis. More data concerning moonshining sites, however, is required to strengthen assertions regarding the interaction of legal and illegal behaviors in the landscape, as well as the factor of land convenience in deciding the locations of these activities.

Despite limitations on the study, the quantity and quality of the data is sufficient to support the pursuit of a comparative study. The work of Price (2006) used much of the same information but employed the data to determine relationships between human behavior and vessel loss during times of war and peace. This study attempts to reconstruct the cultural landscape of the Roanoke based on the locations and permutations of industrial activity, legal and illegal, and the interactions between commerce, the vessel assemblage, and human behavior. Development of an explanatory model based on a riparian environment requires utilization of multiple theories to guide data collection and analysis, which are detailed in the following chapter.

CHAPTER 2:
THEORY

Human activity has touched and shaped the Roanoke River. Action and behavior left material culture on land and underwater, making this region suitable for study as a cultural landscape. Historical and archaeological data enables the formation of an explanatory model that describes social change, use, and development of the Roanoke River region while suggesting sociological paradigms of land use in reference to legal and illegal activities. This chapter will discuss the theoretical framework of this study.

Before engaging in higher level analyses, this study drew data from previous site-specific studies and recent fieldwork. Among the previously studied sites were Fort Branch, the Rhodes site, and the Broad Creek blockade (Bright 1979, 1981a, 1981b; Burke 1982; Lawrence 2002a, 2002b). Site-specific data in the Albemarle Sound Cultural Landscape Database (ASCLD) and Roanoke River Terrestrial Sites Database (RRTSD) created a foundation that permitted the use of diverse and broad theoretical sets.

This chapter will first concentrate on cultural landscapes. Cultural Landscapes Theory, Structuration Theory, and theories of Risk and Risk Management provide definitions of the landscape and its interaction with human behavior and action. The role of population centers as loci of importance within the cultural landscape will form the second part of the chapter. Central Place Theory describes cities as centers of activity and production, which establishes them as transportation hubs. As such, transportation infrastructure has the ability to modify the landscape, which will be discussed in the third part of this chapter. This will include theories describing infrastructure development and competition between forms of transportation technology. Finally, theories explaining the intentional discard of vessels will be compared to explanations of shipwrecks and societal responses to wrecking events. Describing these sets of discourse will provide an example of the comparative approaches used in later chapters to outline differences between abandoned and wrecked vessel assemblages of the Roanoke River.

Cultural Landscapes

An early study involving the investigation of a region-wide landscape came from Hoskins (1955), though his investigation of the English landscape was predominantly geographic. It was not until the work of Sauer (1963) that anthropology was merged with geography to examine sociological trends over and in the landscape, an area where "the works of man express themselves" (Sauer 1963:

333). Extending the concept of a cultural landscape to a maritime context first came in the work of Westerdahl. Though Westerdahl initially focused only on material culture in the first theoretical formation of a maritime cultural landscape, he extended his opinions of important aspects of the cultural landscape to include activities occurring within the study area associated with cognition, culture, and society (Westerdahl 1994: 266; Duncan 2000: 21). As a result, Westerdahl (1992: 5-6) asserted that "the maritime cultural landscape signifies human utilization (economy) of maritime space by boat, settlement, fishing, hunting, shipping, and its attendant subcultures, such as pilotage, lighthouse and seamark maintenance." Aspects of the landscape are to be studied via shipwrecks, maritime and terrestrial artifacts and structures, and traditions of usage in the form of informal local knowledge, natural topography, and toponymic investigation of local names (Westerdahl 1994; Duncan 2000: 22). The combined information held in the ASCLD and RRTSD, which includes knowledge from local informants, satisfies the listed areas of cultural landscape investigation.

In a thesis written in 2000, Brad Duncan offered a thorough discussion of cultural landscape theory. The cultural landscape, he explained, was the product of interaction between human cultural activity and the physical environment, which shapes a cognitive consciousness and the use of an area (Duncan 2000: 10). Use of an area is shaped by not only the culture engaging in an activity but also by physical factors of the environment as well. As a result, studies of cultural landscapes must be interdisciplinary, drawing from multiple academic fields to properly understand the landscape under investigation. For this reason, the hydrology of the Roanoke as a patterning force in the landscape, discussed in the Chapter 4, must be considered alongside cultural forces, such as economics and resource extraction (Mulvaney 1989: 2; Stuart 1997: 23).

The strategies for using scientific versus sociological theories to explain the interdisciplinary patterning forces at work in the Roanoke landscape must necessarily be different. Whereas the natural sciences use only one theory of a process until it is supplanted by another explanation better able to unite observations and predict future events, archaeology uses multiple social theories that describe various subtleties of human nature. For this reason, theories by Giddens (1984), Duncan (2000), and others must be considered as they relate to cultural patterning forces in the landscape.

Cultural landscapes are shaped in part by human behavior, making Structuration Theory a useful tool for understanding behavior as a patterning force (Westerdahl 1992; Jasiński 1993; Parker 2000; McErlean 2002; Flatman 2003). Structuration Theory is explanatory of the roles of society, the individual (Agent), and human action (Agency). At the center of Structuration Theory is the tenet that the agents actively understand and alter the rules, or structure, of the social system through agency. The structure of society reflects these actions, which is simultaneously reinforced,

transmuted, and evolving. Agents constantly use introspection, as well as extrospection, to rationalize their actions as being in compliance with societal structures: signification, domination, and legitimation. Unintended consequences of agency always occur and the structure of society changes as a result (Giddens 1984: 5).

Social systems have three partitions of composition: structure, modality, and interaction. Structure may limit or enable certain actions. Therefore, limiting aspects of structure are considered "rules" and enabling features are "resources." Two subcategories define resources: allocative and authoritative (Giddens 1984: 16-25, 33). As defined by Giddens (1984: 33), "allocative resources refer to capabilities – or, more accurately, to forms of transformative capacity – generating command over objects, goods or material phenomena. Authoritative resources refer to types of transformative capacity generating command over persons or actors." The "Duality of Structure" asserts that Agency cannot be separated from structure because structure must exist to guide the formation of Agency, and Agency, as the instantiation of structure, exists as the physical manifestation of this aspect of the social system (Giddens 1984: 25-28). As such, rules and resources of structure must be translated into Agency, which is achieved via modalities of structure. Language, for example, is a mode that provides meaning of the structure to Agents, allowing Agents to act, or produce Agency. The last step, the production of Agency, is interaction (Giddens 1984: 28-29).

In the last example, one type of structure, that of signification, was converted via the mode of language and symbols to communicate the constitutional meaning and normative sanctions of society. Signification is only one type of structure. The societal structure of domination of people or areas is converted into Agency of societal Agents via the modality of facility, or allocative and authoritative resources that permit wielding power and control. Legitimation produces standards, laws, moral codes, and the ability to change these quantities, by the modality of the social norm (Giddens 1984: 29, 165).

Essentially, as this theory will be applied to the Roanoke, society provides agents with a value system, encouragement to engage in valuable activities, and a regulatory system with which to control those activities. Agency will be investigated via industrial efforts, such as logging and manufacturing. Structuration Theory will also explain society's attempts to regulate agency via a legal system, such as making moonshining unlawful. Other theories related to differing perceptions of the landscape by various individuals, and attempts by society to manage risk, better explain illegal action along the Roanoke.

Different social groups and individuals perceive a landscape in varying ways in terms of usefulness, which can result in multiple overlapping cultural landscapes within a particular area at a particular time (Gosden and Head 1994). This describes the concept of a cognitive landscape, whereby social and individual perceptions of the utility of an area shape the conformation of the residual archaeological record. This is particularly important in landscapes that spatially support multiple forms of industrial activities simultaneously or even diachronically. Single locations used for multiple purposes will have an archaeological record reflecting the cognitive perceptions of the social group or groups that used the area.

With specific locations capable of hosting various activities based on an individual's perception of a location's utility, the eventual use of a location within the landscape is dependent on the intention of an individual and the willingness of the individual to defy, or conform with, the rules of society. These rules, also known as legislation, are typically society's attempt to mitigate risk, a negative consequence of an action (Fox 1999). Citing Crook (1999), society manages risk in two ways: "ordered risk management" and "neo-liberal risk management." When implementing ordered risk management, a society bans and suspends the freedom of individuals to engage in activities that expose them to risks surrounding a given hazard. Neo-liberal risk management provides information and awareness of the risk of a hazard but does not prohibit risk-inviting activities (Duncan 2000: 28-29). These methods of risk management integrate into Structuration Theory via the domination and legitimation structures of society. Risk management infers the ability of society to shape agency via laws in regards to specific situations. Crook's description of risk management does not fully explain individual choice. Understanding the decision to defy society, violate ordered risk management, and accept the potential consequences of deviating from societal legislation requires additional input from the work of Souza (1998).

Souza (1998) explored the behavior of antiquated sailing merchant vessels competing against steamships and the risks that sailing crews accepted to delay the obsolescence of their watercraft. To succeed, sailing crews occasionally stepped outside the risk-mitigating rules of society by sailing too close to the Dry Tortugas islands off of Florida in barely seaworthy vessels. Though their actions were not unlawful, these sailing crews ignored neo-liberal risk management by cutting costs at the expense of safety. The Dry Tortugas case studies aid in explaining the tension between economic necessity and potentially lethal consequences, an explanation that can be applied to explaining risk inherent in illegal activity.

Central Places

The industrial and commercial activities that influence the conformation of the cultural landscape concentrate within population centers. Christaller's Central Place Theory describes the role of population centers, or central places, within the landscape. A central place produces goods and offers services consumed in the surrounding region. The size of the region over which a place has influence is a function of the importance of the central place. The importance of a central place and the size of the accompanying region are not static; they are subject to dynamic forces that can alter the place-region relationship (Christaller 1966:101-104).

Of the forces described by Christaller, those of traffic and transportation are of particular interest. As centers of industry, cities must serve as hubs of transportation both for the accumulation of raw materials and the dispersal of goods and services. As such, Central Place Theory describes the direct relationship between the importance of a central place and the growth of transportation infrastructure within the adjoining region (Christaller 1966:104-107).

The ideas of Ebert (1992: 10-11), which state that regional cultures form part of wider networks, is miscible with Central Place Theory. The creation of networks within the landscape establishes historic travel routes as key to understanding a cultural landscape. Historic travel routes were defined at the World Heritage Committee meeting held at Madrid in 1994 as a specific and dynamic type of cultural landscape encompassing overland and maritime routes. In addition, routes and their constituent parts (arrival and departure points, places for lodging) fell under the influence of political events as well as environmental determinants (von Droste 1995: 437, 439). Investigation of transportation infrastructure within a landscape requires consideration of competition between different modes of transportation, especially between land and water-based travel.

Transportation

Understanding the effects of technological change on transportation infrastructure of and between population centers requires input from other theoretical works. The historical work of Taylor (1951) on patterns of transportation infrastructure use, development, and changes in antebellum America between 1815 and 1860 revealed the competitive nature between land and water transportation. Land transport did not begin to supplant water transportation until development of more efficient steam engines. When rail lines were constructed roughly parallel to the courses of rivers or coastlines, railroads were able to out-compete coasting steam and sail lines, eventually leading to their obsolescence (Taylor 1951: 102). Typically, railroads were considered deleterious to

waterborne modes of transportation (Clark 1981; Parsons 1986). When sufficient rail line mileage exists within a region to cause the downfall of riparian trades, watercraft abandonment activity rises, indicative of declining waterborne modes of transportation (Richards 2003: 274).

Considerations of competition between land and water-based transportation systems focus on the rise of not only the rail engine but the automobile as well. Both operated at the expense of maritime and riparian trade. Moore (1970) stated that the gasoline engine was influential in bringing about the downfall of waterborne travel, and Hunter (1993) asserted that the quality of the transportation medium, water or road, was decisive in deciding the outcome of land or water transportation dominance. As stated by Richards (2003), the combined effects clarified by Clark (1981), Parsons (1986), Moore (1970), and Hunter (1993) proved effective in explaining changes in transportation within Australian and American landscapes, such as government attempts to control riparian traffic on the River Murray or the decline of the Tasmanian barge trade; their contribution to the investigation of those same forces in the Roanoke River will be only partially applicable. Multiple differences exist between these seascapes and the Roanoke because all regions hold unique qualities. These patterns must be tested against the archaeological and historical evidence gathered from the Roanoke River cultural landscape. Therefore, these theories only guide investigation of the nature of transportation technological change on the Roanoke.

Comparative Research

The vessel assemblage of the Roanoke is a dichotomy between abandoned and wrecked vessels. Both of these sub-assemblages result from different behaviors. Abandoned vessels are different from shipwrecks because their deposition into the archaeological record does not result from wrecking events (Richards 2002: 379). Abandoned vessel assemblages, whether in the form of isolated discard sites or accumulated into graveyards, are manifestations of human behavior (Richards 2002; Richards and Staniforth 2006).

Discarded vessels present unique problems during the compilation of a comparative work. Unlike shipwrecks, which are dramatic events that receive the attention of the public, ship disposal is often clandestine and proceeds without historical documentation (Babits and Kjorness 1995; Moore 1995:3; Richards and Staniforth 2006:84). Conversely, shipwrecks usually occur in high-traffic areas, such as river channels and sea lanes, necessitating their removal due the hazards they pose to navigation (Murphy 1983). As such, shipwrecks are historically documented but are not present in the archaeological record.

Vessels abandoned in rural and urban environments, unlike shipwrecks, are typically discarded in low-traffic areas, such as secondary and tertiary streams, and areas close to the locations of operating businesses (Babits and Kjorness 1995; Richards and Staniforth 2006). Intentionally discarded vessels can, therefore, inform on the locations of industrial activities and vice versa. In the Roanoke, shipwrecks are typically absent from the archaeological record and their documented wreck locations will provide similar information on dominant trade routes and central places. Comparative approaches, as exemplified by considerations of abandoned and wrecked vessels, have the ability to reveal human behaviors and landscape attributes not immediately evident from historical and archaeological data.

Conclusion

Investigation of the themes of this study requires multiple modes of thought to form a theoretical foundation for a research methodology. The broad span of theory incorporated into the research design reflects the varied goals of this work. Particularism, site-specific investigations of "shipwrecks as databases," as asserted by Murphy (1983), and material culture both above and below the waterline, as proposed by Westerdahl (1994) produces, essentially, a database of databases, or the RRTSD and ASCLD. These databases, holding specific knowledge on multiple sites throughout the Roanoke River landscape, permit higher level analyses guided by diverse and ambiguous theories, such as Central Place Theory, Structuration Theory, and theories of risk and behavior.

Though the priority is to construct explanatory models of technological effects on transportation, and the inter-relatedness of social behavior and the evolving cultural landscape, this study attempts to make theoretical contributions in regard to the connection of the convenience of geographic land use and its role in harboring legal and illegal industrial agency. Any explanatory model will be specific to the Roanoke River region but because the study involves consideration of themes, the models maintain a potential for application to other regions within the State of North Carolina, the United States, and internationally. The theories selected to guide research, data processing, analysis, and interpretation shaped the methodology of the study, which is presented in the next chapter.

CHAPTER 3:
METHODOLOGY

The methodology of this study is divided into three distinct phases: historical research, archaeological fieldwork, and data analysis. Historical research investigated information sources that yielded details on individual vessels and explained trends observed in the landscape. Archaeological fieldwork detected cultural resources above and below the Roanoke River's waterline via remote-sensing, ground-truthing, and terrestrial site investigation. Data analysis and interpretation collected, merged, and processed historical and archaeological information into forms suitable for producing various statistical and geospatial analyses. This chapter discusses these individual units, explains the combination of historical and archaeological data, and discloses methodological problems.

Historical Research

The historical research utilized multiple libraries and archives (outlined below), incorporated oral history from residents of Plymouth, NC, and included information compiled by Price (2006: 45-144). Primarily, the purpose was to contextualize terrestrial and underwater archaeological sites, placing them within the cultural landscape of the Roanoke River. Historical information, therefore, had to be specific for individual vessels, such as vessel enrolment forms, or general, typically as statistical data. These complementary forms of information provided different perspectives on the particular sites within the Roanoke River Region as well as the greater landscape of which they were part.

The Treasurer's and Comptroller's Papers, record group 13.48, North Carolina State Archives, contained shipping records for all North Carolina colonial ports including Port Roanoke, which served the Roanoke River area. The records found under the subheadings of "Ports" and "Port Roanoke" provided raw data on export and import cargoes coming through Port Roanoke from 1703 to well after the American Revolution. Transcribed information related to exported goods was compiled into a database and analyzed. Though significant gaps exist across certain years, the data is sufficiently contiguous to reveal colonial era patterns of industrial production and maritime trade along the Roanoke River.

In addition, the archives maintain a complete microfilm collection of land and timber deeds arranged by county and extending from 1779 to the present. The Roanoke River serves as a boundary for five North Carolina counties: Washington, Bertie, Martin, Halifax, and Northampton. Investigation of the land and timber deeds of these five counties could theoretically disclose patterns

of land use and timbering. It was found, however, that each county has gargantuan numbers of deeds. For this reason, only those deeds using the Roanoke River as a boundary were considered applicable to the study.

After deciding that significant deeds were bounded by the river or some tertiary waterway, individual deeds were visually scanned for those pertaining to particular townships (county subdivisions) lying along the river. This method presented an imposing task. The search could only be restricted by reviewing all deeds filed by particular companies known to have logged along the river as recorded in the deed index. Due to the expensive nature of this research strategy in time and resources, it was abandoned for other, more productive, avenues of research.

Joyner Library maintains an excellent maritime history collection, including the *Annual List of Merchant Vessels of the United States* from 1868 to the present. The merchant vessels lists yielded information on multiple vessels operating within the Roanoke River portion of the ASCLD, expanding the database and providing new leads for further research. The usefulness of the merchant vessels lists significantly increased after the 1890s when additional information was routinely recorded, such as build location and the cause of vessel loss or abandonment. Lists compiled in the 1950s, for example, featured an index of vessel owners and managers that also included all the vessels they operated. In the case of Atlas Plywood Corporation, a company known to have owned vessels that operated along the Roanoke River, two previously undocumented tugboats were found to have belonged to Atlas: *Solicitor* and *Immigrant*. They were dismantled in 1952 and 1957, respectively (United States Treasury Department 1952, 1957). It is suspected that these are the identities of two tugs present in the Roanoke River and included in the ASCLD under the labels of "Unknown Tug 2" and "Unknown Tug 3."

The merchant vessels lists provide limited information so consulting historic newspapers was necessary to retrieve additional details on vessels listed in the ASCLD. Newspaper research began by using an electronic database offered by Joyner Library, "America's Historical Newspapers, 1690-1922 including Early American Newspapers Series 1-3." All entries across the entire database containing the phrase "Roanoke River" were investigated. This method yielded references to previously unknown vessels lost in the Roanoke River. The *Sun* of Baltimore, Maryland, and the *Richmond Enquirer* of Richmond, Virginia, were excellent sources though references to wrecks came from as far abroad as *The Jeffersonian Republican* of New Orleans, Louisiana. These references, typically brief due to the non-local nature of the reported vessel loss, provided a date and a vessel name for future research.

Joyner Library's North Carolina Collection is a repository for many North Carolina newspapers. These newspapers cover a span from 1751 to the present and fill over 10,000 microfilm rolls. Despite the large amount of data contained within this collection, numerous gaps exist in specific newspapers over particular years. In addition, newspapers operated for finite lengths of time at certain localities. Therefore, the newspaper collections chosen to investigate had to cover the date of a known wrecking event and be in or near the Roanoke River region. Examples of such papers are the *North-Carolina Journal*, *Roanoke Advocate, and Halifax Minerva*, all of Halifax, NC, as well as the *Democratic Banner* of Williamston, NC. Other papers, such as the *Tarboro' Southerner* of Tarboro, NC, and *The Old North State* of Elizabeth City, NC, also provided much detailed information despite the fact that Tarboro is on the Tar River and Elizabeth City is on the Pasquotank River. These local papers frequently provided detailed maritime disaster accounts, such as the three paragraph description of the capsizing of the schooner *Empire* on 30 January 1851 (*The Old North State* 1851).

Multiple other sources provided information on specific vessel entries in the ASCLD, such as *Lightships of the United States Government*, the *Timothy Hunter Papers* (collection number 748) of the East Carolina Manuscript Collection, the *Connecticut Ship Database* of the Mystic Seaport Museum, the *New-York Marine Register* from 1857 to 1858, *American Lloyd's Register of American and Foreign Shipping* from 1859 to 1883, *Record of American and Foreign Shipping* from 1871 to 1900, and *Official Records of the Confederate and Union Navies*. These sources typically provided data specific to vessel attributes, traced some vessels back to their built locations in Connecticut or New York, or provided details in addition to the merchant vessels lists that fleshed out the use life of a vessel, such as insurance ratings provided by *American Lloyd's*.

Remote Sensing

The Program in Maritime Studies at East Carolina University conducted a comprehensive side scan sonar and magnetometer survey from the mouth of the Roanoke (18S 347109.67E 3978925.88N WGS84) to above Hamilton, NC, (18S 301457.07E 3980642.84N WGS84) during the months of July and August 2006. Further side scan sonar and magnetometer surveying occurred in October 2006 and served as a field opportunity for the course HIST 5005 *(Selected Topics) Deep Water & Advanced Survey Methods for Maritime Archaeology* taught during the Fall 2006 semester at ECU. The Program in Maritime Studies and the Department of Geological Sciences acquired multibeam sonar data at four locations: two on the Roanoke River and two in the Albemarle Sound. A NOAA Ocean Exploration Grant awarded to Lawrence Babits, Nathan Richards, Frank Cantelas (Maritime

Studies), and J.P. Walsh (Geological Sciences), with the goal of surveying the Roanoke and Perquimans Rivers to discover cultural resources, provided the funding. The work considerably enlarged upon previous sonar and magnetometer surveys of the Roanoke that covered the river between Plymouth and Jamesville, NC, and alleviated some of the archaeological bias by extending into the middle and upper reaches of the Roanoke.

The surveys utilized a Marine Sonics Technology Sea Scan 600 kHz side scan sonar tow fish unit with an integrated GPS. This sonar system has a range of beam swath widths, from 5 to 500 meters. At 5 meters, acoustic data is at high resolution but minimum bottom coverage. The opposite is true for a beam swath of 500 meters. Therefore, a 20 to 50 meter swath width was used to create high resolution data with adequate bottom coverage extending from the main channel to the river bank. As a result, a simple survey strategy of towing the sonar fish up one side of the river and back down the other was successfully pursued. A 10 meter beam width was used in tertiary streams, such as creeks and other small waterways, which produced data at a higher resolution.

Data obtained by the towfish was transferred to a ruggedized *Windows*-based computer running Marine Sonic's *SeaScanPC* data collection software. *SeaScanPC* integrated GPS and sonar data into files known as a Marine Sonics TIFFs, or .MSTs. These .MST files were copied and moved to other computers for processing and analysis.

In conjunction with the side scan sonar unit, a Geometrics G882 cesium magnetometer passively detected variations in the Earth's magnetic field throughout the survey. Magnetic field strength is measured in gammas, and one gamma is equivalent to one nanotesla (nT), or $1X10^{-9}$ T. The towfish was deployed behind the vessel with a bidirectional cable that connected it to a computer separate from the side scan sonar system. Care was taken to distance the fish from the survey boat due to the sensitivity of the magnetometer to ferrous material. *Hypack Max 4.3a Gold*, installed on the receiving computer, acquired the incoming information from the magnetometer. After concluding each field surveying session, collected magnetometer data required processing through *Hypack Max 4.3a Gold*.

A multibeam sonar survey was conducted 9 to 12 November 2006 with a RESON SeaBat 8101 system. The multibeam survey covered four locations: the Plymouth waterfront, the location of the Broad Creek blockade, a rectangular area of the Albemarle Sound, and another in Bachelor Bay, by the mouth of the Roanoke River. Many submerged vessels were detected by the Plymouth waterfront and Broad Creek blockade areas, including the USS *Southfield*, a Federal gunboat sunk during the Civil War, and some vessels intentionally sunk in the creation of the Broad Creek blockade.

The RESON SeaBat 8101 operated at a frequency of 240 kHz and had an unmodified swath size of 150°. At maximum, the swath width of the 101 beams, at a spacing of 1.5°, was 300 meters. Multiple hardware components fleshed out the multibeam system: a multibeam data processor, a GPS positioning system, a gyroscopic compass, and a standard personal computer. The data processor accepted acoustic data from the multibeam sonar head and was connected via a LAN to a personal computer. The TSS MAHRS (Meridian Attitude and Heading Reference System) navigation system featured a motion sensor and gyrocompass, and utilized specialized algorithms to account for vessel heave, roll, and pitch (TSS International 2005:1). The capabilities of the MAHRS system when combined with a Trimble *Ag*GPS 332 differential GPS antenna and receiver provided the necessary motion information for correction of multibeam acoustic data.

Remote Sensing Data Processing

Processing side scan sonar data occurred with the program *SonarWiz.MAP* by Chesapeake Technology, Inc. The program imports the .MST files accumulated by *SeaScanPC* software and creates a single mosaic. The mosaic is created by incorporating GPS data acquired during survey and merging the data with the .MST files. This georectifies the files and permits *SonarWiz.MAP* to stitch them together into a mosaicked image. Once the mosaic is created, individual sonar files can be edited by trimming and removing sonar bottom tracking from the image. Features of interest can be labeled as targets and contacts. Two thousand nine hundred and fifty-four converted .MST files were edited and analyzed for submerged cultural resources. After identifying contacts across all sonar files, *SonarWiz.MAP* compiled the contacts into a list which was used to create survey reports. The contacts were exported in the form of ESRI shapefiles for integration into the ASCLD and ASCII files for the visualization program *Fledermaus*.

Magnetometer data processing began and ended within *Hypack Max 4.3a Gold*. Data acquired by the magnetometer and inputted into *Hypack* filled individual .RAW files. As the file suffix implies, this data was raw and unedited. These .RAW files contained artifacts, aberrations in the acoustic data caused by electronic noise and other error sources, and, therefore, required editing. Editing occurred under the single beam editor tool, a subprogram known as SBMAX. Within the displays of the single beam editor, false gamma spikes were deleted.

Once edited, .RAW files became .EDT, or edited data files. When the .EDT files were obtained, multiple directions were possible. The .EDT could have been sorted, converted into .XYZ files, and used in the creation of TIN (triangulated irregular network) models or visual outputs via Golden Software's *Surfer* program. Neither of these possibilities provided the geographical

precision required. TIN models and *Surfer* outputs created color contoured magnetic topographies with magnetometer data, not pinpoints of dipoles and monopoles. In addition, diurnal variation caused background magnetic field strength to vary by thousands of gamma over a single day. Operating with a strategy of surveying up one side of the river from morning until midday, and then down the other from midday to evening, this variation made it impossible to compare multiple measurements of magnetic hotspots in commensurate locations.

Though not available to the study during fieldwork, a magnetometer base station measuring diurnal variation in one position would have overcome these difficulties. Magnetometer data collected by the base station could be subtracted from data obtained from a second magnetometer; the one used during survey. This process would remove background magnetic readings and compensate for diurnal variation. In addition, a gradiometer would achieve the same results without the need of a base station.

To overcome the problem of diurnal variation, the magnetic background was removed from consideration entirely by manually recording magnetic dipoles and monopoles, within the .EDT files, that were at least 5 nTesla from crest to trough. Within the single beam editor tool, it is possible to obtain all of the necessary information for each GPS-defined geographical point: northing, easting, and gamma. This allowed the data processor to scan the visual output given by the single beam editor for dipoles and monopoles, which were deviations, in this context, from the background magnetic field affected by diurnal variation. The detection of a deviation required different processing steps depending on if it was a dipole or monopole.

Due to the geometry of a monopole, the approximate central geographical location in UTM was best determined by averaging the easting and northing coordinates of two points flanking the monopole on the baseline. In addition, since these two flanking points often maintained slightly different gamma values (seen as different depths in the terms of *Hypack*), an average of their gamma values produced an average gamma value for the baseline at the locations occupied by the monopole anomaly. The gamma value of the maximum point forming the monopole could then be found and compared to the average gamma value of the baseline. These calculations produced the geographic center and strength of the monopole.

A Microsoft *Excel* spreadsheet facilitated the data collection and manipulation required by this methodology. The spreadsheet contained the column headers of "Date," "Primary Northing," "Secondary Northing," "Primary Easting," "Secondary Easting," "Average Northing," "Average Easting," "Primary Gamma," "Secondary Gamma," "Average Baseline Gamma," "Crest/Trough Gamma," and "Monopole Gamma." The geometry of a dipole magnetic anomaly made it easier to

determine the geographic center location and gamma strength. The strength of a dipole was determined by the vertical difference between crest and trough. Therefore, all that was required to acquire the dipole's absolute gamma strength was to take the absolute value of the difference between the maximum points forming the dipole. In addition, UTM coordinates for the two maximum points could be averaged to determine the geographical central location of the anomaly. Therefore, instead of a "Crest/Trough Gamma" and "Monopole Gamma" column, there was only the "Dipole Gamma" on the dipole spreadsheet. Within a workbook, data pertaining to monopole and dipole anomalies were separated from each other via tabbed worksheets. Once data extraction had been completed for a data set, the Excel workbook could be saved as a comma-delimited file with a .csv file extension. As such, the file could be imported into other programs, such as ArcGIS.

A magnetometer that has a single sensor that passively reads the strength of the magnetic field around it; a multibeam sonar system has multiple beams, each of which ensonifies, reads, and produces data. *HypackMax 4.3a Gold* required a program extension known as *Hysweep* to handle the acquisition of data from the 101 beams of the Reson SeaBat 8101. *Hysweep* added a multibeam editor tool, known as MBMAX, which was similar to the single beam editor tool. MBMAX read .HSX raw data files produced at the time of multibeam operation and created .HS2 files. During this process, the GPS-defined navigation data could be read and corrected if necessary.

The software program *Caris* combined the multibeam sonar data into a single, continuous base surface; a two-dimensional visual representation of the information contained within the .HSX files. The presence of GPS data in the .HSX files allowed *Caris* to overlay the resulting surface onto a georectified map. Editing occurred within one of two editor tools: swath or subset editor. The swath editor enabled noise and artifact removal from individual survey lines. This tool was effective when errors in only one survey line affected the quality of the overall surface. Typically, noise and artifacts were systemic and random in distribution. For this reason, the subset editor proved faster and more effective. The subset editor opened a geographic square or rectangular block, as defined by the user, of the surface. The block spanned a portion of each survey line composing that part of the base surface. Once editing ended within a block, the block was shifted along the surface until all the data were examined and cleaned.

After completing editing, finished BASE surfaces in *Caris* were gridded and reprocessed as DTM files, or digitized terrain models, via the *Fledermaus* programs *AvgGrid* and *DMagic*. *DMagic* prepared the DTMs for use by *Fledermaus*, which produced a three-dimensional output of the multibeam sonar data and permitted virtual navigation, or "flying," of the surface. The *Fledermaus*

three-dimensional output confirmed the presence of multiple targets identified via side scan sonar and magnetometer and offered a unique method for their examination.

Groundtruthing

Groundtruthing was not a dominant method in this study due to the decision to focus upon remote-sensing and terrestrial investigation. Despite this decision, sonar Contact 0083 was directly investigated. A field investigation was performed by the North Carolina Underwater Archaeology Branch after a copy of the sonar image was shared with them.

The acoustic image of Contact 0083 featured a prominent bow and hatches present in a preserved deck. Located just downriver from Williamston, NC, at coordinates 18S 316752.3991E 3970122.21N WGS84, the target could have been the remains of the screw steamer *Commerce* which burned and sank at Williamston in 1883 (Certificate of Enrolment *Commerce* 1880). Investigation of the contact revealed no propeller shaft. In addition, a flat transom, seemingly suitable for pushing, and a single bollard at both the stern and bow, perhaps for daisychaining, suggest the vessel was a barge. As a result, Contact 0083 was entered as Unknown Vessel 6 into the ASCLD.

Terrestrial Investigations

With the help of Russell Lee, a retiree who has lived around the Roanoke River for decades, land investigations revealed many traces of industrial and commercial activity along the river that would not have otherwise been known via other archaeological techniques (Appendix B). Mr. Lee provided waterborne transportation to sites from Jamesville to downstream of Plymouth, NC. Mr. Lee's knowledge of site locations governed terrestrial investigations: a non-systematic survey. Forms carried into the field featured fields for the date, name of informant, name of investigator, location name of the site (as given by Mr. Lee), the UTM coordinates of the location, the datum used, a photolog, and space for description. A hand-held GPS unit and digital camera were taken during investigations, as well as scale bars for photographic purposes. The sites were typically at the water-land interface, in a remote location, or both.

In conjunction with terrestrial surveys, visual surveys occurred during remote-sensing surveys. While moving along the river collecting sonar and magnetometer data, the crew observed the passing shoreline looking for traces of material culture. When a noteworthy object was spotted, such as a canal or piece of old machinery, the location was marked and briefly described in a HYPACK target list and recorded by hand in field journals. By this method, the river banks and

first few feet of forest were included in the site-specific and more detailed terrestrial investigations with informant Russell Lee.

Analysis

At the termination of historical and archaeological data collection, all information was added to various databases prior to incorporation into GIS. Historical information specific to existing entries, as well as new sites discovered via sonar and magnetometer, was added to the ASCLD. Terrestrial information required a new database because it could not be included in the ASCLD, a collection of vessels lost along the river. Just as the ASCLD is vessel-specific, the RRTSD is site-specific and contains information collected during field excursions with Russell Lee, and visual surveys conducted during remote-surveys.

Data contained within the ASCLD and RRTSD was analyzed via the construction of tables and graphs in Microsoft *Excel*. *Excel* permitted comparison of collected historical and archaeological data to external forms of data, such as the historical adjusted GDP of the United States. ESRI *ARCView GIS* integrated the spatial characteristics of maps obtained online from the Library of Congress and the North Carolina Department of Transportation. Library of Congress maps were georectified, and the locations of cities, the course of the river, and traces of roads and railroads were vectorized. Multiple maps of the Roanoke river region through time provided a layered view of physical change in the landscape.

CHAPTER 4:
CULTURAL DISPLACEMENT, ECONOMICS, AND TECHNOLOGICAL INNOVATION: A HISTORY OF THE ROANOKE

This chapter will discuss the commercial and industrial history of the Roanoke River region through colonial and federal North Carolina. North Carolina's colonial era developed an economy distinct from Great Britain that focused on forest products as naval stores. This chapter will investigate the maturation of the North Carolina economy in the 19th and 20th centuries, the development of industrial activities, and the interactions of various modes of transportation. Quantitative data in the form of export and railroad data support the patterns observed in the following pages.

Europeans first came to the Roanoke River in the Spring of 1586, when Ralph Lane sailed westerly from Fort Raleigh. During his exploration of the Albemarle Sound, Lane successfully ventured to the furthest navigable reaches of the Roanoke: the falls at modern day Weldon (Rogers 1947:1). By 1682, European exploration and settlement had developed enough to justify a dedicated port, that of Port Roanoke (*Treasurer and Comptroller Papers,* Record Group 13.43). During the 18th Century, extensive trade was conducted between the Roanoke River and the Caribbean. North Carolina lumber products and naval stores were exchanged for sugar products, such as rum and molasses. An extensive fishing industry existed as well, catching rockfish, herring, and shad (State Board of Agriculture 1896:142; Price 2006:46-47).

Colonial Era

The development of early industries everywhere within the North Carolina colony, was inhibited by various artificial and natural factors (Ekirch 1978). The geology that forms North Carolina's distinctive regions, the Appalachian Mountains, Piedmont, Coastal Plain, and Outer Banks, affected human movement into the colony. Crews attempting to navigate through one of the many inlets breaching the Outer Banks discovered the danger of such a passage. So dangerous were the islands that the first map of the region, Theodor De Bry's "The Arrival of the Englishmen in Virginia, 1584," featured a shipwreck in every inlet then known (Ready 2005: 9). To provide further perspective, De Bry drew his map two years before Ralph Lane explored the Roanoke River in 1586, the first European exploration of this extensive river system (Rogers 1947).

The chain of Outer Banks islands protected the sounds, bays, and river mouths that characterize mainland North Carolina. Vessels that drew twelve to fifteen feet of water and made it

safely through an inlet could navigate the extensive inland waterways behind the protective banks. Many North Carolina rivers empty into the sounds, which unite them in a contiguous navigable water system. Despite the hazards of crossing though the inlets, the Outer Banks protected and produced an environment conducive to inland maritime trade (State Board of Agriculture 1896: 128-129).

Aside from the natural barriers to settlement and growth in colonial Carolina, legislation by Parliament hindered economic development. After the English Civil War ended in 1651, the English Commonwealth passed the Navigation Act of 1651. This act, considered by Adam Smith to be the result of lobbying merchants, required that only English vessels carried English goods (Farnell 1964: 439-441). Passage of the act preceded the colonial charter of Carolina and ensured the dependence of Carolina's economy on England's before the colony even existed. The strength of English shipping, as measured by its shipbuilding industry and merchant marine fleet, therefore determined the health of Carolina's economy. Carolina was born into a mercantilist system.

Additional navigation acts were created before Carolina was chartered. The Navigation Act of 1660 and the Staple Act, or Act for the Encouragement of Trade, of 1663 required imports and exports exchanged between England and the colonies to travel through English ports for taxation purposes. The acts taxed certain enumerated goods from the colonies, such as tobacco and sugar, before transshipment to foreign ports (McGovney 1904: 725; Sawers 1992: 262-263). Consequently, these acts, in tandem with the Navigation Act of 1651, taxed colonial exports, gave English shipping a monopoly by freeing it from foreign competition, and delayed colonial shipments to foreign ports because of English transshipment, which allowed inspection and taxation of the exports. Furthermore, the navigation acts hindered the trade balance of the entire British Empire (Smith 1843: 125-126):

> The act of navigation is not favourable to foreign commerce or to the growth of that opulence which can arise from it….[The number of f]oreigners…[,] hindered from coming to sell…[,] coming without a cargo [due to prohibitions within the acts]…[will] diminish [as a body of] buyers[. We would] buy foreign goods dearer…[and] sell our own cheaper than if there was a more perfect freedom of trade.

Lassiez-Faire economics, evident from the above quote, however, would not exist before 1776, the publishing year of Smith's *Wealth of Nations*. Since it was not known that, in the words of Adam Smith, "no regulation of commerce can increase the quantity of industry in any society beyond what its capital can maintain…[but] only divert a part of it into a direction in which it might not otherwise

have gone," the progress of Carolina's colonial economy until 1775 abided by the tenets and truncations of a mercantilist economy (Smith 1843: 108).

Though entrenched in mercantilism, Carolina's colonial government quickly realized the potential profitability of naval stores. In fact, some plantations were producing naval stores but to no positive economic effect. Carolina drafted a petition on 19 May 1704 to London for government support. The petition stated that "there is great plenty of Timber for building of Ships, and also to produce Pitch, Tarr & Rozin, and a Soil capable to afford hempe" (Saunders 1886: 598). In addition, the petition pointed out the danger of depending entirely on the "Northern Crownes," such as Norway, Sweden, and Denmark, for these militarily strategic resources (Saunders 1886: 598). Competition from these countries was overwhelming the nascent naval stores production of Carolina (Saunders 1886: 599).

A lack of interest in Carolina by planters, proprietors, and traders, combined with burdensome high freight rates, further complicated the development of this economy (Saunders 1886: 598). The petition makes the following request (Saunders 1886: 599):

> Unless these Comodities from the North [Baltic States] can be Charged with a great Custome, and those from the Plantations be eased from all Custome: or her Majesty be graciously pleased to cause these goods to be brought freight free to the Planters or owners, or to give to them some recompense at a Certain rate [per] Tunn for what they may bring, as may equalize the Charge of freight.
> The Naval Stores from the North will always hinder their being brought from the Plantations, as Comodities in the way of Trade, which only can cause a large importation of them for the use of our Navigation in General, hinder the Exportation of our Coyne to the North and prevent the inconveniencies that may happen, by our dependence upon these Crownes.

The production of Carolina naval stores would prevent the hemorrhaging of English specie, ensure prosperity for the colony, and create an exclusive economy within the British Empire for producing naval stores. Facilitating development of a naval stores industry, a militarily strategic resource in a world dominated by navies of wooden vessels, would be of vital interest to a global nation-state.

Legislation requested by the petition came via the Naval Stores Bounty Act of 1705, which provided a £4 per ton bounty on tar and pitch and £3 per ton bounty on turpentine and rosin (Price 1984: 81). By 1 August 1716, the Lords Proprietors proclaimed "[the] erecti[on of] a Port at Bath Town…the most proper place within the said Province for ships to take in Masts, Pitch, Tar Turpentine and other Naval Stores for the use of his Majesty's Fleet" (Saunders 1886: 237). The existence and wording of the proclamation indicates that by 1716, North Carolina not only had a naval stores industry but one that was experiencing growth, necessitating an increase in

infrastructure in the form of Port Bath. The phrase "for the use of his Majesty's Fleet" suggests the development of a military interest. As crews already considered Bath the most convenient location for obtaining stores infers that North Carolina had begun supplying matériel to the Royal Navy and British merchant marine.

A letter from Governor Gabriel Johnston to the Board of Trade dated 12 December 1734 provided continuing evidence of North Carolina's burgeoning naval store economy. Johnston wrote that "there is more pitch and tarr made in the two Carolinas than in all the other Provinces on the Continent and rather more in this than in South Carolina." (Johnston 1734: 5). The letter, however, was a response to one sent by the Board of Trade and reported a dangerous situation facing North Carolina planters in London markets: prices for barrels of pitch, typically £1000 per barrel, scarcely were yielding 20 shillings profit for the producers. For tar, the prices were lower still (Johnston 1734: 5).

Johnston informed the Lords of Trade that these profits would be economically prohibitive to North Carolina producers at current market rates. Additional legislation from Britain was necessary to maintain a naval stores economy. Johnston consequently requested the reinstatement of a previous bounty level of 10 shillings be awarded for each barrel produced that would supplement any earned profits. This bounty would raise London prices to a reasonable level and enable ship masters to buy quality naval stores produced within the empire (Johnston 1734: 6). The development of a mature, militarily significant economy in North Carolina was not complete but comparison of the concerns mentioned in Johnston's 1734 letter with those of the colonial government in 1704 reveals a crucial difference: the bounty requested in 1734 was £1 less at £3 per barrel of tar instead of £4 in 1704. London legislative aid, while still required, was quantitatively less in 1734 than in 1704, a sign that North Carolina was becoming more self-sufficient and that trade from civilian and naval vessels was supporting the economy.

Between 1755 and 1764, Arthur Dobbs served as governor of North Carolina and his various writings to the Board of Trade provided insight into the continued maturation of the naval stores economy through the French and Indian War. After receiving a copy of the circular sent to all royal governors by King George III ordering them to augment their militias with local conscripts, Dobbs wrote a lengthy letter to the Board of Trade. Though the letter was mostly concerned with military expenditures and fortifications on the western frontier and coast, Dobbs found space to insert a request to improve trade: "I hope your Lordships will take into your consideration…[to petition the House of] Commons to repeal so much of the Acts of navigation or other restraining Acts with proper restrictions so as to inlarge the Trade of the Colonies so far as it shall appear to be

beneficial to the Trade of Britain." (Dobbs 1755: 330-333). Dobbs sent a similar request in his letter of 15 March 1756 when he described a potentially advantageous trade route between North Carolina, Spain, and Portugal. The route would allow North Carolinians to import badly needed salt and wine. In return, North Carolina naval stores and lumber, available at lower prices than Baltic stores, would drive the trade (Dobbs 1756: 574).

Dobbs persisted on this theme through subsequent letters, re-asserting his desire to open trade to Spain and Portugal in letters dated 14 January 1764 and 29 March 1764, and written to Secretary Lord Halifax and the Board of Trade, respectively (Dobbs 1764a: 1022; Dobbs 1764b: 1030-1031). In the 29 March 1764 letter, a lack of patience was noticeable in the tone of his letter. Dobbs moved beyond his usual comments that open trade would balance Britain's foreign trade and bring specie to the colony, and he discussed the obsolescence of the Navigation Acts (Dobbs 1764b: 1033):

> [The Navigation Acts were] framed at a time with the united Provinces were almost masters of all the Trade of Europe, and the Indies, when the British Trade was scarce out of it's infancy, and it's Colonies but few and weak, as to wealth and numbers, and the Dutch the chief carriers of goods to all the surrounding Countries[.]

Despite this well-worded argument concerning the bygone supremacy of the Dutch, which continued for another paragraph and a half, the only response received by Dobbs from either party was a letter dated 12 May 1764 from Halifax that sidestepped the main issues. Only two short paragraphs long, the letter from Halifax merely accepted Dobbs' retirement (Halifax 1764: 1045). The longevity of Dobbs' petitions to open trade and ease the navigation acts in his letters between 1755 and 1764 suggested that the Board of Trade and Secretary Lord Halifax made no attempts to act on his suggestions. Halifax's response to Dobbs in 1764 was familiar, even comical to an extent, in its similarity to modern day messaging techniques. The empty response coming at the end of nine years of prodding indicated that suggestions to supply foreign countries and, therefore, foreign navies, with naval stores were not popular and, subsequently, ignored.

Stepping backward momentarily, Dobbs' letter of 30 May 1757 to the Board of Trade and its response contrasted sharply against the apparent neglect that Dobbs suffered from London in 1764. Amid the military conscriptions occurring within the colony in connection with the French and Indian War, Dobbs mentioned raising two companies of one hundred men each, which required support in the amount of £5300. He then explained that to supply these funds, he intended to buy naval stores on behalf of the colony and sell them in Charlestown, South Carolina. South Carolina,

however, imposed an importation duty against North Carolina, preventing Dobbs from raising the necessary funds. To this, Dobbs stated that the "[duty was] very impolitic in them" and asked for help in overriding it (Saunders 1886: 761-762). The Board of Trade, in a letter dated 9 November 1757, responded (Saunders 1886: 786):

> The Duty which you mention to have been laid in South Carolina upon Naval Stores imported from the Northward must in its consequence destruct the Commerce of His Majesty's subjects in North Carolina and have an improper effect thereupon and therefore we shall lose no time in enquiring into this matter and taking such measures as shall appear to us to be proper.

Unlike Dobbs' suggestions to open the naval stores trade to foreign markets, Dobbs received instantaneous feedback, by 18th century standards, on an issue impacting the production of naval stores and raising of military units. The problem invited London's immediate attention to the strategic implications of this wartime problem. Aside from the relatively small consequences of the duty in preventing the support of two small companies, the larger consequences were far more severe. Inter-colonial duties on stores inhibited North Carolina from supplying matériel to other ports and drydocks, facilities necessary for supporting Royal Navy operations around the empire. In addition, duties harmed a naval stores industry nurtured for over half a century. Britain could not permit such a breach to occur in their wartime economic and supply strategy, which explained the prompt action by the Lords of Trade.

The trends outlined via correspondence between various colonial governors, the Board of Trade, and Secretary Lord Halifax are supported by data derived from the *Treasurer's and Comptrollers Papers, 1682-1887* for Port Roanoke. The data quantitatively demarcated the birth of a naval stores industry within Carolina. Though the first document of this record set was dated 1682, records of vessel clearances, and vessels carrying exports specifically, began in 1703. In addition, Port Roanoke was only one of five North Carolina ports: Port Bath, Beaufort, Brunswick, Currituck, and Roanoke (Merrens 1964: 88). Due to its early creation and usefulness to the Albemarle region, Port Roanoke experienced longevity unmatched by any other throughout the colonial period. Exportation figures from this port, therefore, were not only descriptive of the Roanoke River region but also served as a legitimate sample of data concerning exports across the entire colony. In regards to the latter, no sampling strategy was entirely free of errors. It was known that colonial ports dealt with the products of their constituent regions. The Port of Wilmington, for example, superseded other colonial ports in the amount of forest products and naval stores shipped from its docks (Merrens 1964: 151). Despite regional trade differences, statistics derived from Port Roanoke describe the

maritime economy of the Roanoke cultural landscape and place it in the larger context of colonial North Carolina.

The *Papers* represent the years 1703 and 1704 fairly well with five and six clearances recorded, respectively. Only two clearances report exporting naval stores: fifteen barrels of pitch and five barrels of tar for a departure on 3 February 1703 as well as six barrels of pitch on a vessel departing 2 August 1704 (*Treasurer and Comptroller Papers, 1682-1887*). Only two of the eleven vessels leaving Port Roanoke between 1703 and 1704 carried naval stores and, of those two vessels, the amount was modest. The presence of any naval stores, however, is more important than their quantity or frequency of exportation. Assertions made in the 19 May 1704 petition and the Port Roanoke export statistics agree: Carolina was capable of supplying naval stores but without protectionist legislation and trade inducements, production would remain low and Britain would remain dependent on the Baltic States.

The Port Roanoke export records offer little definitive and comprehensive evidence of a trend of positive growth of the naval stores industry between 1704 and 1753. Records after 1704 are sparse and fragmentary until 1754, a year for which four records of vessels carrying exports survived: a comparatively adequate representation. In addition, only one record of an exporting vessel exists for each of the years 1710, 1726, 1728, 1730, 1731, and 1739, and none indicate exportation of naval stores. The quantitative historical record for Port Roanoke between 1704 and 1754 is, therefore, either unreliable or indicative of a long-term economic slump. Regardless of which explanation is correct, an information gap exists during these years. Despite the gap, an adequate analysis comparing 1703/1704 to the 1750s and 1760s is possible. The following graphs represent years that experienced at least five ship clearances.

Figure 4.1 compares the amount of naval stores produced in 1703 to other comparable exports of that year. Comparable, in this sense, means any product expressed in units of "barrels," "bushels," "hogsheads," and "pounds." The graph omits forest products due to the difficulty of comparing "barrels" to units such as "number of shingles," "board feet of lumber," and "number of barrel staves." In 1703, agricultural products clearly dominated the portion of the North Carolina economy handled by Port Roanoke.

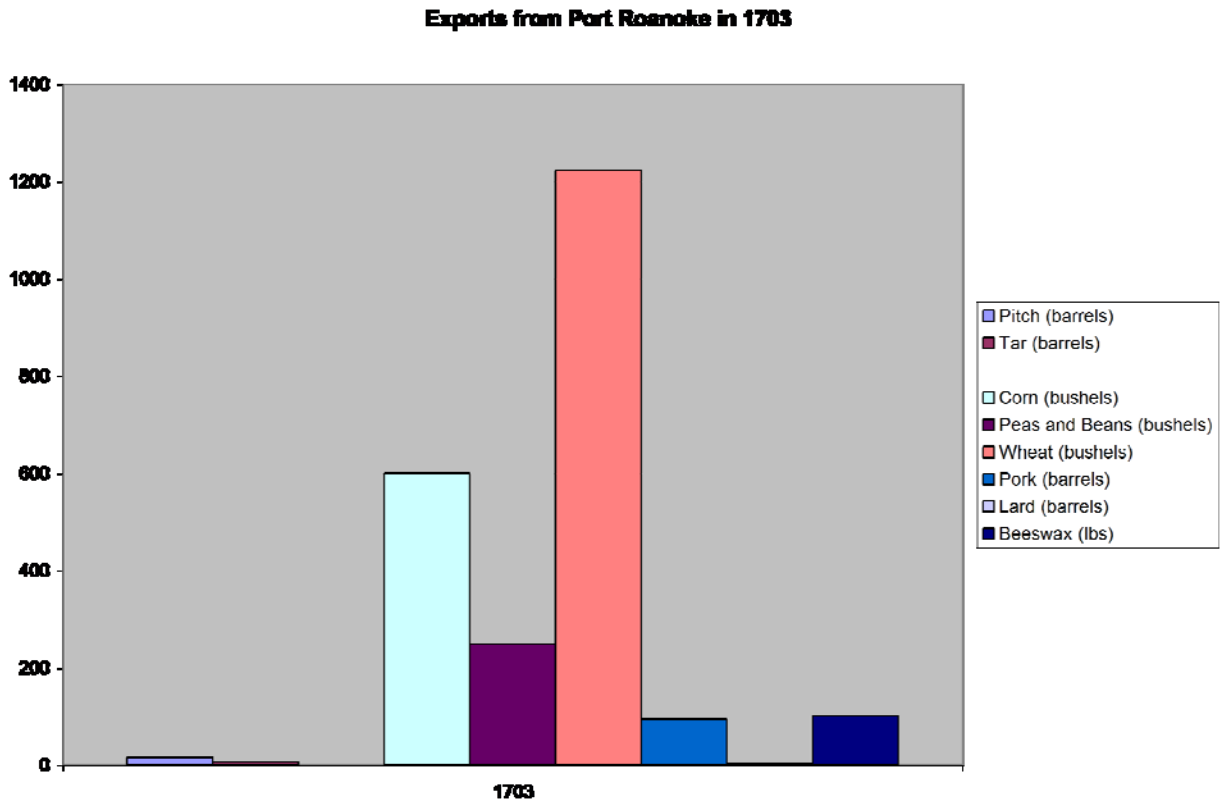

FIGURE 4.1. Exports from Port Roanoke in 1703 (Treasurer and Comptroller Papers; graph by author 2007).

In comparison to 1703, export ratios at Port Roanoke for the year 1755 (Figure 4.2) changed drastically to favor naval stores. Tar alone dwarfed exports of corn, traditionally a major export from this region. Cotton, rice, and tobacco showed on the docks but not in any significant amounts. Corn exports in 1756, however, reached over 2,500 bushels and reassert their old dominance in the trade of Port Roanoke (Figure 4.3). Though this trend continued in 1758, corn production entirely disappeared in 1761 (Figures 4.4 and 4.5). Corn exports reappeared the following year, however, at 600 bushels. Therefore, this data does not infer that corn is no longer important in 1761 but instead suggests a high variability of production.

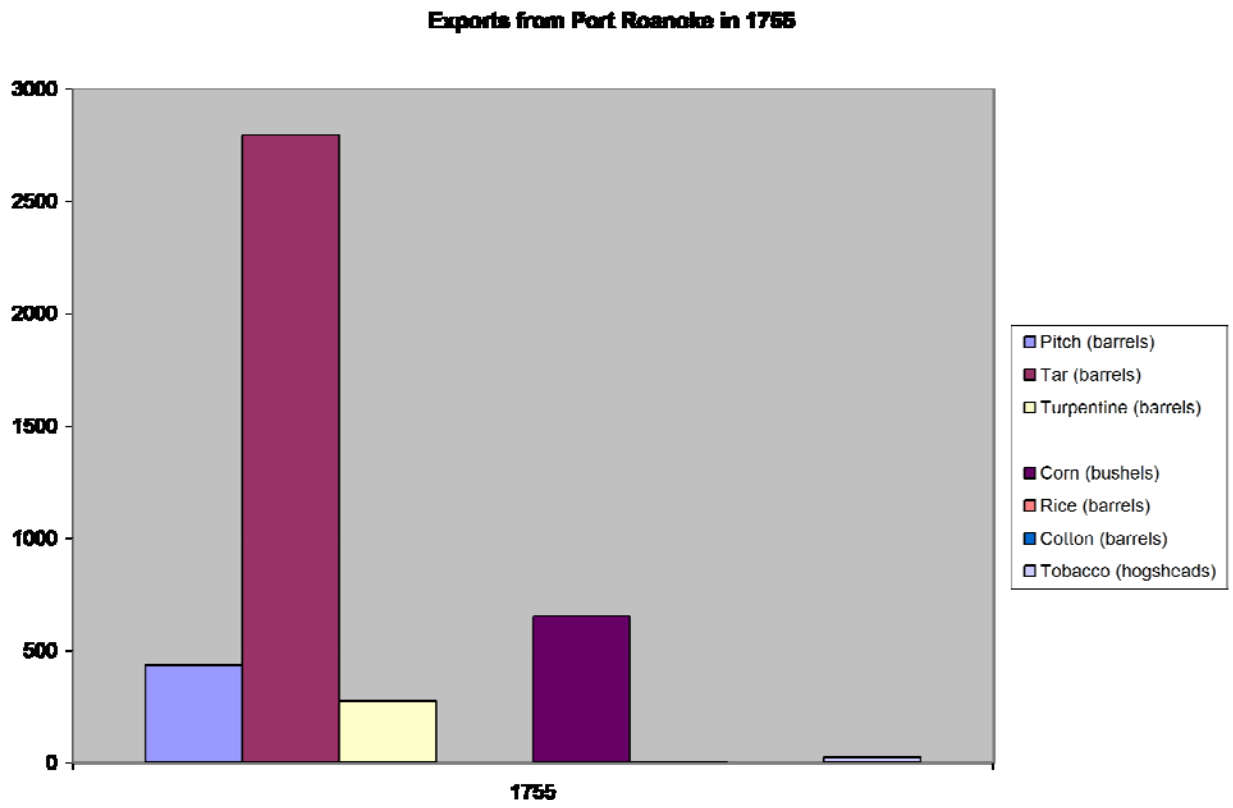

FIGURE 4.2. Exports from Port Roanoke in 1755 (*Treasurer and Comptroller Papers*; graph by author 2007).

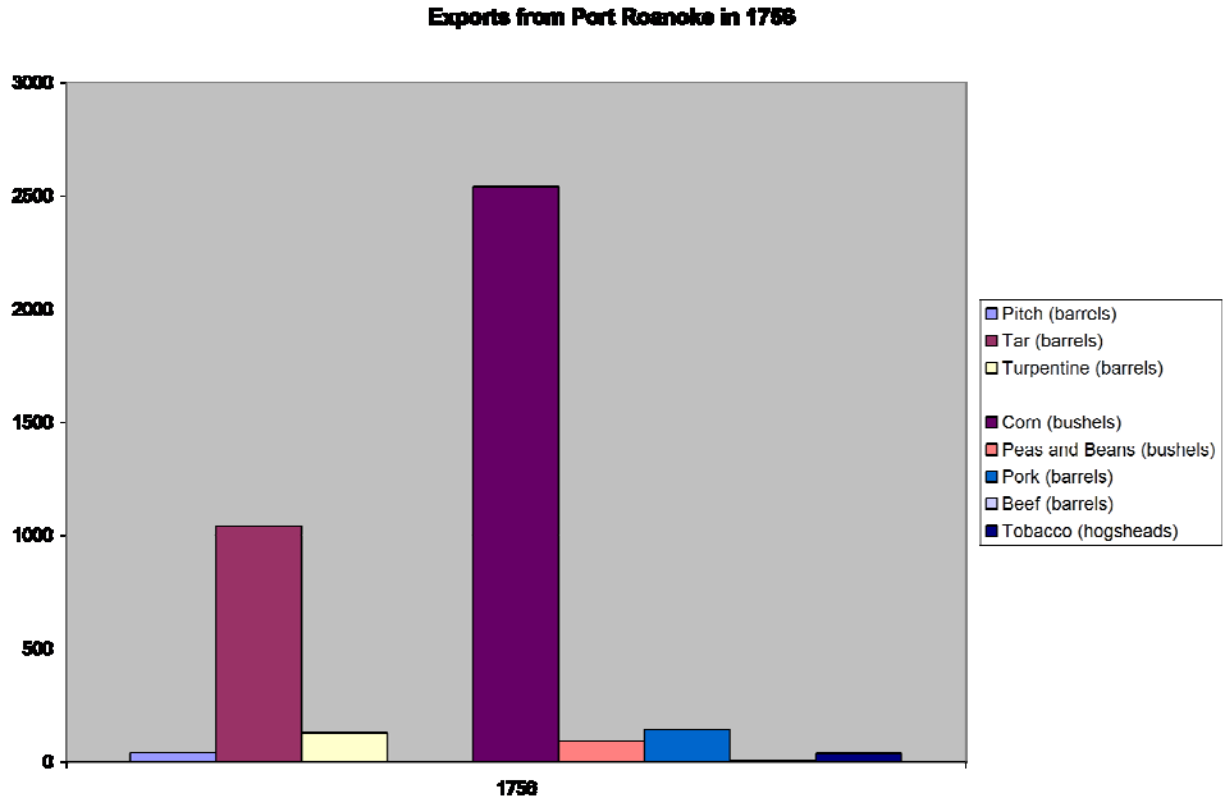

FIGURE 4.3. Exports from Port Roanoke in 1756 (*Treasurer and Comptroller Papers*; graph by author 2007).

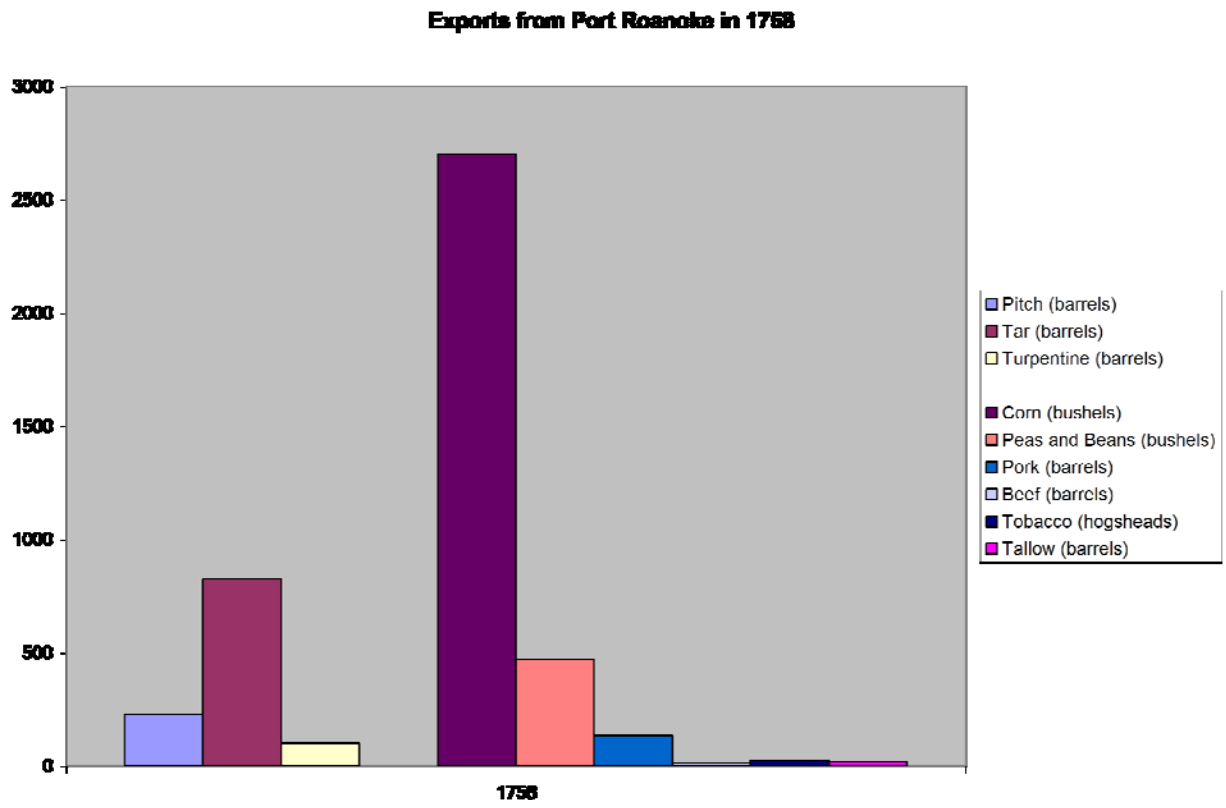

FIGURE 4.4. Exports from Port Roanoke in 1758 (*Treasurer and Comptroller Papers*; graph by author 2007).

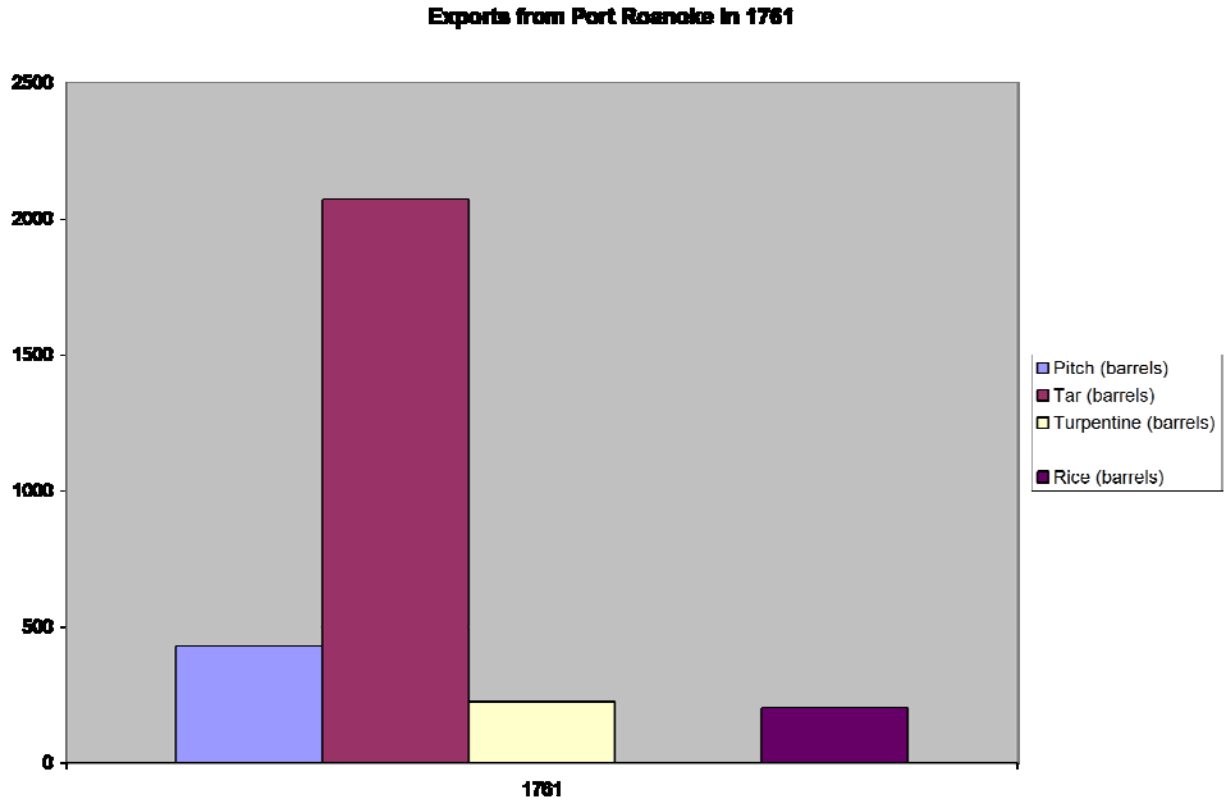

FIGURE 4.5. Exports from Port Roanoke in 1761 (*Treasurer and Comptroller Papers*; graph by author 2007).

Between 1755 and 1761, naval stores experienced some variability as well, but not nearly as much as corn. In 1755, 1756, 1758, and 1761, tar swung from 2800, 1100, 800, and 2100 barrels, respectively. Corn exports varied between 600, 2600, 2700, and 0 bushels during those same years. Tar appeared more stable and, though it may have fluctuated between certain years, it was a consistent and significant portion of total Port Roanoke exports, which was not the case with corn. In addition, except in 1756, turpentine production was always half that of pitch. The continuance of this pattern, as well as consistently high levels of tar exports, indicated stability in naval stores production, which, by the 1750s and 1760s, formed the core of the North Carolina economy and evened out years of agricultural dearth.

Despite variability in some North Carolina exports from year to year, shipping from Port Roanoke gradually increased, as proven by the positive slope of the linear regression line in figure 4.6, a graph of export-laden vessel clearances by year. The fit of the line is less than optimal with an R^2 value of 0.1392 but data points offer a simple explanation. Two periods well-represented by the data flank a drought of clearances, or lack of surviving records, for the years 1705 to 1753. Comparing only the years 1703 and 1704 to the years between 1754 and 1762 would produce the same trend. Trade at Port Roanoke, and likely everywhere in North Carolina, increased during the colonial era. In addition, almost every vessel composing the cluster of clearances between 1754 and 1761 carried naval stores. Only three out of eighty-two vessels, or 3.7 percent, clearing Port Roanoke during these years carried no naval stores.

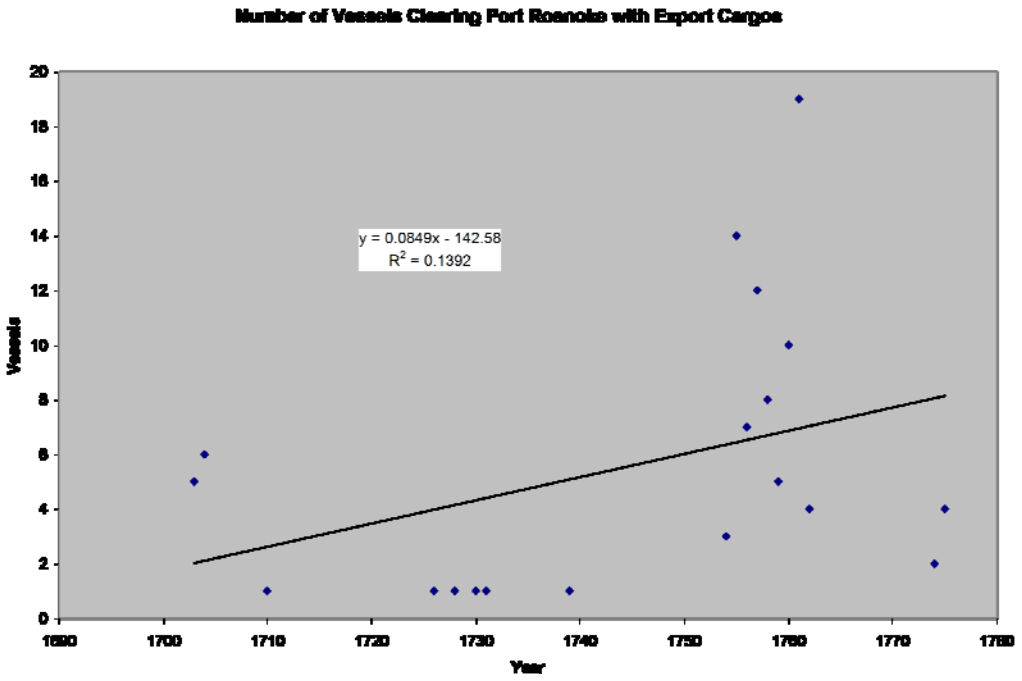

FIGURE 4.6. Number of vessels clearing Port Roanoke with Export Cargos (*Treasurer and Comptroller Papers*; graph by author 2007).

By the end of the colonial era, North Carolina maintained a military economy based on maritime transportation. The documented activities of Port Roanoke provided a glimpse of the settlement and industrial activities that occurred along the Roanoke and the recursive relationship between transportation and the culture that moved along the river, subtlety but constantly changing the cultural landscape of the region. The transition to statehood in the early Federal period brought further change to the economy of North Carolina and, in turn, the Roanoke River.

Statehood

The transition to statehood in the federal government of the United States of America at the end of the 18th century occurred alongside transportation technology changes in the form of steam-driven modes of transportation that impacted the Roanoke River and the state of North Carolina. The Dismal Swamp Canal, constructed after authorized by the North Carolina state legislature in 1790, connected the Pasquotank River, and the whole of Albemarle Sound, to the Chesapeake Bay. After the development of steam engine technology in 1807, multiple steam lines traveled back and forth from Norfolk, VA, to Elizabeth City, NC, as well as multiple population centers along the Roanoke, such as Plymouth, Williamston, and Halifax, to name a few (State Board of Agriculture 1896, 130-131). Since 1830, steamers plying this route entered the historical record: the sternwheel steamer *Lady of the Lake*, for example, frequently appeared in the Elizabeth City newspaper the *Roanoke Advocate* between 13 May 1830 and 24 March 1831.

The combined force of steam technology and the construction of the Dismal Swamp Canal led to remarkable increases in exportation from the Roanoke and Albemarle Sound regions:

> *Dismal Swamp Canal*.-Among the items of North Carolina produce that passed through this outlet to the Norfolk market, in the year ending 30th Sept. last, we find upward of a million bushels of Corn, thirty-one millions of Shingles, more than seven millions of Staves, 6532 bales of Cotton, 43,864 bbls. of Fish, 166,000 lbs. of Bacon, 112,668 bushels of Wheat, Peas, Potatoes, and Flaxseed, 29529 bbls. Naval Stores, &c. &c. The goods forwarded from Norfolk by the Canal bear a proportion to this large receipt of produce (*The Tarboro' Press* 1846:1).

This account from 1846 revealed a boom in inland maritime shipping and production since the colonial decades already considered.

Land routes in antebellum America, on the other hand, were typically "common roads," which only extended far enough to connect a community to a river for transshipment. Farming

communities, more concerned with building structures and putting land under cultivation, perceived little need for more roads. Attempts to improve existing roads were considered unnecessary because snow and ice transformed routes into slick surfaces for sleds in the North, and rain made them into mud tracts for mud boats in the South (Taylor 1951: 15-17).

The neglect that Americans had for terrestrial modes of transportation in the form of common roads began to change with the first significant use of a steam engine on land. After Robert Fulton mounted a steam engine on a vessel launched and used on the Hudson River in 1807, steamships dominated transportation by the 1830s, proving faster and able to adhere to a schedule, which increased reliability and decreased prices (Taylor 1951: 56-73). By the 1830s, the steam engine was installed in a land-based vehicle, the rail engine, and steamships began to slip from their primary position. Taylor cites a statistic that in 1840, all of Europe had 1818 miles of railroad to the 3000 miles laid in the United States. The need for cheap, flexible, and fast overland transportation into the interior, the lack of hindering political boundaries, and the cheapness of land and, therefore, the consequential ease of obtaining railroad easements allowed railroads to be an extremely commercially-viable technology in America as compared to Europe (Taylor 1951: 74-75). Railroads were capable of accessing interior regions away from navigable rivers, usually operated year round despite weather conditions, and were flexible enough to allow spurs off main lines. These advantages overcame the turnpike, canal, and steamline (Taylor 1951: 102-103).

By 1840, six years prior to the above newspaper account, three railroads existed in North Carolina: the Fayetteville and Salisbury, built in 1833; the Raleigh and Gaston, built in 1836; and the Wilmington and Weldon, built in 1840 (State Board of Agriculture, 1896, 213). These three railroads covered two hundred forty seven miles and cost $3,163,000 to construct (MacGregor 1843: 701). As a result of their introduction, these railroads competed with a pre-existing North Carolina merchant marine. Between 1803 and 1842, multiple swings occurred in registered tonnage within the state. Despite these swings, tonnage remained statistically constant, inferring that alongside the volatility of tonnage, there was a lack of positive growth as well (Figure 4.7). Moreover, the value of foreign and domestic North Carolina exports suffered considerably over the same time frame (Figure 4.8). Clearly, these first railroads faced a maritime competitor that had been steadily weakening over four decades.

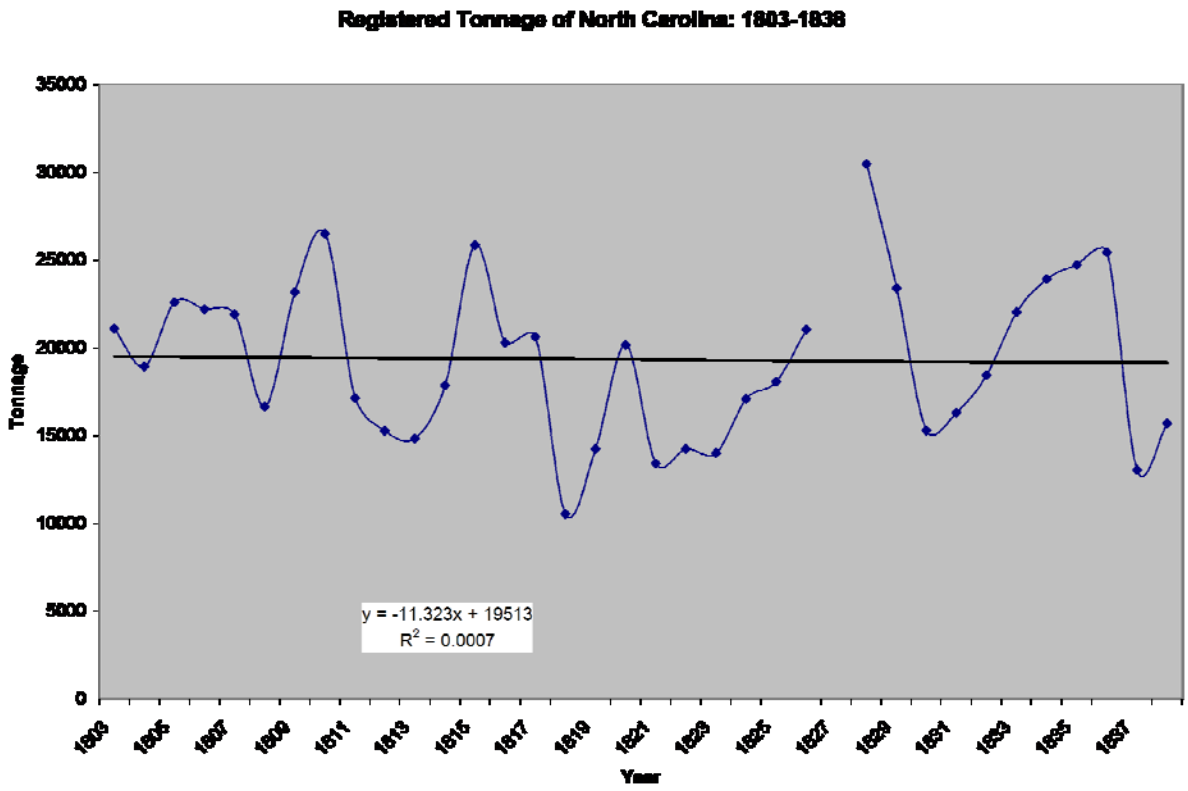

FIGURE 4.7. Registered tonnage of North Carolina, 1803-1838 (MacGregor 1846; graph by author 2007).

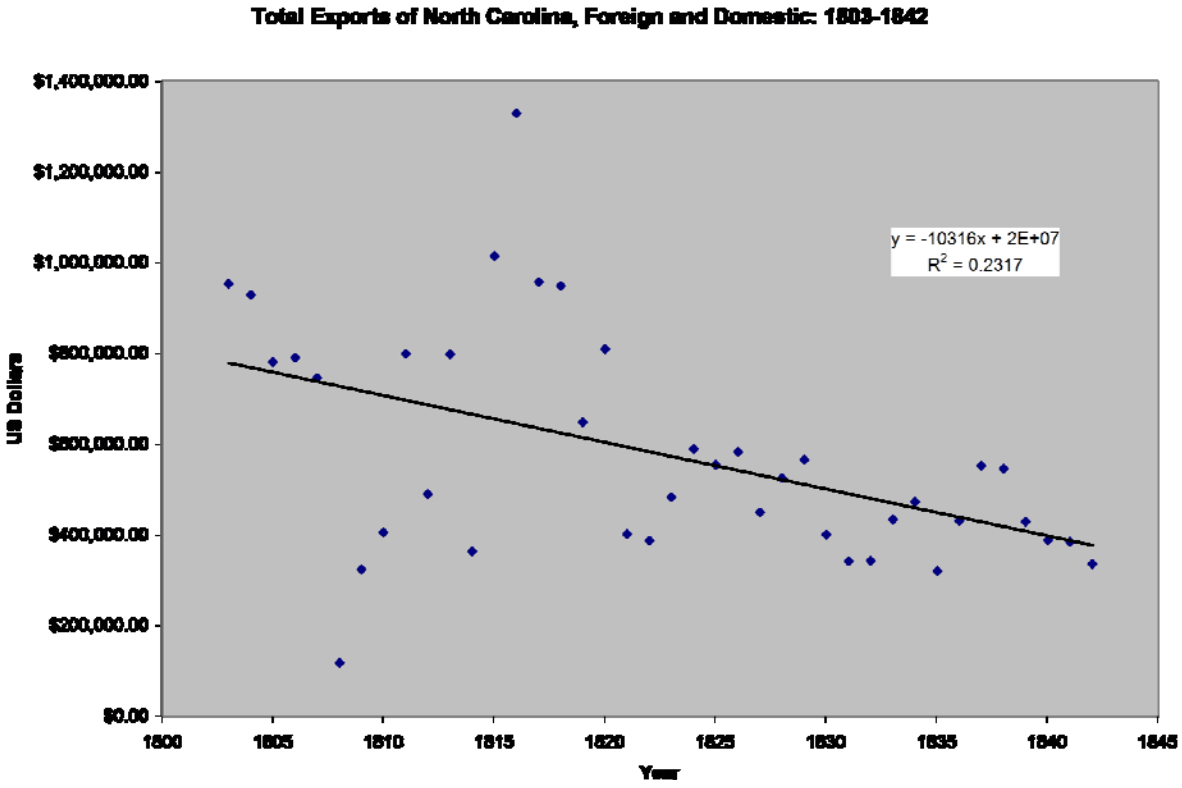

FIGURE 4.8. Total exports of North Carolina, Foreign and Domestic, 1803-1842 (MacGregor 1846; graph by author 2007).

In antebellum North Carolina, railroad construction continued unabated. In 1856, the North Carolina railroad, running from Goldsboro to Charlotte, was completed and covered two hundred twenty-three miles, nearly doubling the amount of laid track within the state. War prevented further construction (State Board of Agriculture 1896, 213-214). North Carolina railroads did not recover until well after Reconstruction when, between 1886 and 1890, the value of all railroad property jumped 800% from $1,710,914 to $13,674,106, respectively (Annual Report of the Auditor 1886; 1890). Over the next three decades, railroads experienced exponential growth. Though statistics for ferry, steamboat, and canal property were more limited in the *Annual Reports of the Auditor of the State of North Carolina*, data covering the years 1891 to 1902 was comparable to railroad valuations over the same dates. Maritime forms of transportation suffer during the exponential growth of the railroads or, at the very least, stagnate (Figure 4.9).

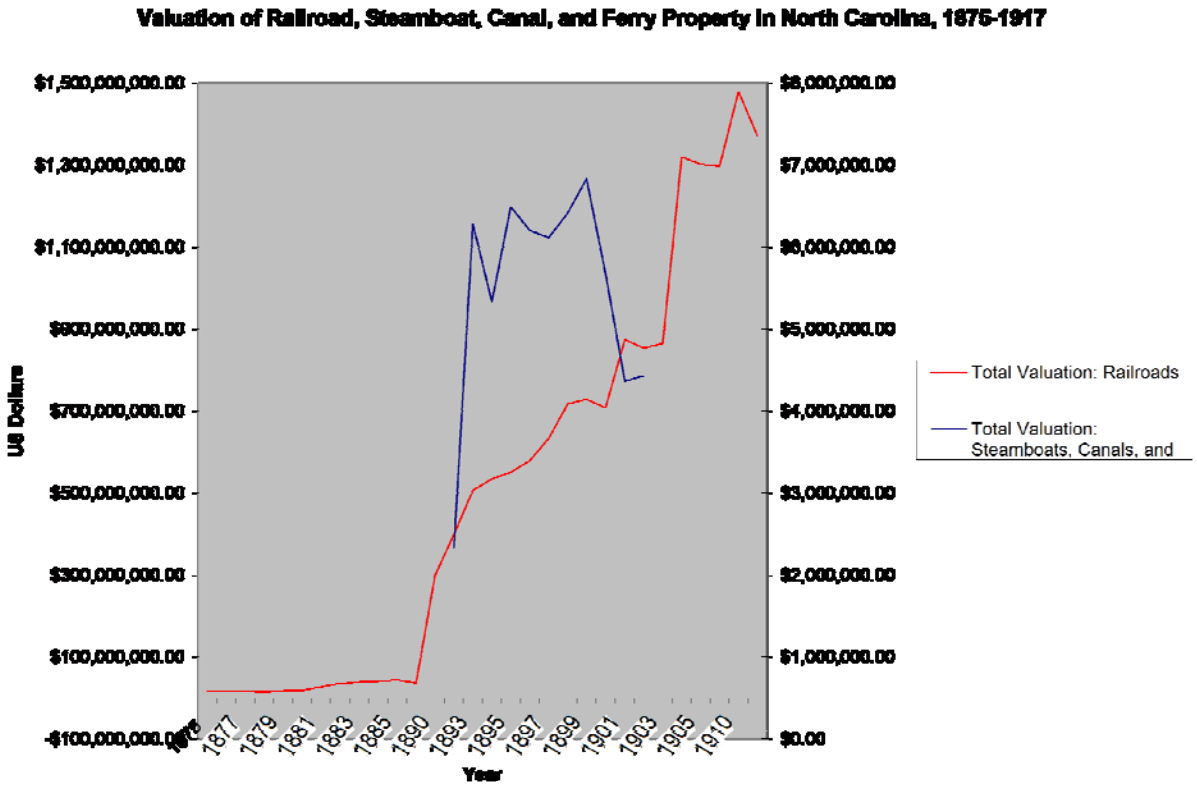

FIGURE 4.9. Valuation of railroad, steamboat, canal, and ferry property in North Carolina, 1875-1917 (*Annual Report of the Auditor of the State of North Carolina*; graph by author 2007).

Despite the state-wide downward trend in waterborne travel, steam vessels persisted on the Roanoke River. The vessels listed in Table 4.1 spanned the period of stagnation and decline indicated in Figure 4.9. Maritime steam co-existed with rail that served the landscape at multiple locations along the river, such as Plymouth, Williamston, and Weldon. An organic grafting of

maritime steam and rail made it unnecessary for rail lines to parallel the banks of the Roanoke; instead, rail met the river at specific points, which shaped the evolving landscape.

Vessel Name	Year Sank in Roanoke	Cargo
Vesta	1879	Unknown
Rotary	1882	Cotton
Commerce	1883	Cotton
City of Long Branch	1892	Unknown
Ranger	1896	Shingles
Hamilton	1917	Guano and lime
Mayflower	1920	Passengers

TABLE 4.1. Vessels losses and cargos between 1879 and 1896 (Albemarle Sound Cultural Landscape Database; table by author 2007).

Possible explanations for a mutual relationship between rail and maritime steam reside with the hydrology, geography, and natural history of the Roanoke River. The Roanoke is an alluvial river, meaning that the river channel is not constrained by bedrock but by alluvium, or river deposits. Confined only by the sediments deposited by the course of the channel and not by harder rock substrate, the Roanoke has a wide floodplain. Within the floodplain, the most common biome is the riparian swamp forest, with stands composed mostly of inundated Tupelo and Cypress (Hoyt and Landbein 1955:13; The Nature Conservancy 2005:1, 6).

The swampy, low-lying floodplain experienced multiple great floods with eight occurring between 1877 and 1940. Floods were frequent events before the construction of dams along the river in 1950. The lower Roanoke has few high terraces, places above the floodplain, that border the dominant course of the river. These high terraces, typically composed of rock or some erosion-resistant substrate, divert the channel of the river until another area of hard rock is encountered. The result is a meandering river (Rogers 1947:1; Hoyt and Landbein 1955:13-16, 426). In addition, settlements along the Roanoke fit a settlement pattern corresponding to terraces. Halifax, Hamilton, Williamston, and Jamesville are all located at river bends; the locations of rare river heights. Heights demarcate the extents of swamps as well, except in the case of Plymouth, which does not sit at a bend but remains outside the reaches of inundated areas.

Natural limits imposed by the river on settlement locations meant that little development occurred along the banks. Instead, cypress, tupelo, and sweetgum dominated the banks including back areas extending to the terraces of the floodplain. Cypress, especially, was a commercially-important wood for producing lumber, shingles, barrel staves, railroad ties, fencing, water pipes, and finished interiors (Ashe 1915: 123).

Shortly after the Civil War, exploitation of the cypress along the Roanoke began in earnest. John L. Roper, who had served in the Albemarle region during the war as a Union captain, returned to the area and, in 1866, founded the Roper-Baird Lumber Company with the Baird family. The Baird family, represented by David Baird, had established a lumber mill at Northwest Landing on the Chesapeake-Albemarle Canal in southeastern Virginia. From this location, Roper-Baird expanded operations south into the Albemarle Sound region, including the Roanoke, and established a shingle and lumber mill at Roper, NC, about five miles east of Plymouth. Other lumber companies appeared after the war as well, such as Richmond Cedar Works, which operated primarily in the cypress tracts of the Great Dismal Swamp (Hanlon 1970:154-155, 205, 227).

Gaining access to timber stands in the swamps of the Roanoke required waterborne transportation. Cutting cypress and floating the logs downriver could be done on those trees lining the river banks but penetrating the back areas of the swamps required other methods. Bull-hunching, an ancient method of logging inundated areas, involved felling two trees and laying their trunks spaced and parallel on the swamp bottom. The top surfaces of the logs, above the water, would enable other cut logs to be placed on top of them perpendicularly and rolled out of the swamp. As lumber operations penetrated the swamp, additional logs would be placed on the swamp bottom to lengthen what was essentially a log road. Logging cypress by this method, lumbermen had two options: split shingles and laths out of the lumber immediately after felling, or create lumber rafts with iron dogs (cleats driven into the ends of multiple logs to fasten them together) and float them by water to a mill (Hanlon 1970; Harry Thompson, pers. comm. 2007).

Rail technology gradually supplanted the difficult bull-hunching technique. As with bull-hunching, logs would be placed on the swamp bottom. These logs, however, would create a road similar to a plank road and would permit laying light rails on top. The rails could support small engines with cars and other lumber-related steam-driven equipment, such as winches. Georgia-Pacific and Union Camp, both lumber companies, were known to use this technique in the "Big Swash," a swamp area near Hamilton on the Bertie County side of the Roanoke. These companies used a skidder mechanism driven by a donkey engine on the rail car, by which a winch mounted on a boom dragged logs onto the car. The rail engine could then haul the logs to the river for

waterborne transshipment or, later, to trucks on nearby highways (Harry Thompson, pers. comm. 2007; Russell Lee, pers. comm. 2007). Stacks of light rails and even one of the small rail engines, identified by Russell Lee as the *Train of Plymouth*, survive at locations along the Roanoke where they were abandoned.

By 1897, much of the cypress had been exploited but scattered individual trees remained along the Roanoke (Ashe 1897:123; 1915: 174). Over the next forty years, timber exploitation gradually turned to tupelo and sweetgum that grew up in areas left vacant by cypress harvesting. Typically considered "junk trees," these species proved suitable for pulp production. The Weyerhauser pulp mill at Plymouth, originally built in the 1940s and still in operation, treated the pulp for cardboard and paper products. Though large-scale commercial logging by Georgia-Pacific occurred until 1980, the Roanoke lumber industry could not support a system of maritime transportation as it had done in the nineteenth century. Presently, logging operations are having difficulty competing against cheap South America eucalyptus. A new crop of eucalyptus may be harvested every eight years, whereas sweetgum and tupelo may only be cut every eighteen years (Harry Thompson, pers. comm. 2007). As a result, Weyerhauser, the current owner of the Plymouth pulp mill, is considering the sale of the plant (Rogers 1947:1; Harry Thompson, pers. comm. 2007).

The Effect of Industrial Decline: Moonshining

The decline of viable industry on the Roanoke meant the rise of illicit activities, such as moonshining. Moonshining is a form of commerce that is difficult to research due to a lack of records. The only record of illegal distilleries, for this study, came by word of mouth. Distilling has likely occurred along the Roanoke as long as people of European descent have lived in the landscape, but, in more recent history, moonshining held appeal when people experienced hard times, especially during the Great Depression of the 1930s. On the Roanoke, moonshiners were typically lumbermen attempting to supplement insufficient earnings with the sale of untaxed liquor. Lumbermen had an advantage because they often worked in remote locations (Russell Lee, pers. comm. 2007; Harry Thompson, pers. comm. 2007). Remoteness, seclusion, and river access were three necessities for any moonshine operation.

People tend to base population centers and industrial activities at convenient locations. Along the Roanoke, this translates to areas of higher ground on the river bank. For this reason, the Weyerhauser pulp mill is located in Plymouth, a location outside the swamps bordering most of the river. Timber harvesting, however, is not affected by convenience; an industry must gather a

resource wherever it may reside. Therefore, lumbermen are required to penetrate and work in areas that would typically be considered inconvenient to others. The forces of legal commercial operations occurring in convenient locations exposed lumbermen to areas well-suited for unlawful industry, such as moonshining. For this reason, it was not uncommon for a lumberman to also be a bootlegger (Russell Lee, pers. comm. 2007). Archaeological evidence supports this assertion because both investigated distillery sites were on land once logged or owned by a lumber company.

Conclusion

In the course of European development along the Roanoke River, the industrial focus has been on forest products: naval stores in the 18th and 19th centuries, increasing lumber production in the 19th century and into the 20th, and, finally, a shift to pulp and paper production in the present, an industry now under foreign pressure. Moonshine, possibly produced in every century considered here, enjoyed a close connection with the extraction of forest products, especially during hard times. In every century, the industrial activities and economy of the Roanoke have been a reflection of events within the state, the nation, and the international community.

For most of the era considered, riparian transportation handled most of the transshipment concerns of the forest-based industries of the river. The introduction of rail to the region altered transportation patterns but not in generally accepted ways. Studies of the Mississippi River have concluded that rail lines constructed roughly parallel to the course of the river, roughly North-South, directly competed with, and eventually destroyed, steam lines (Peterson 1968:463). The rails of the Norfolk-Southern Railway and Atlantic Coast Line typically intersected the Roanoke at cities, creating rail heads at those locations. Due to the limited development potential of most land immediately beside the Roanoke, these cities represented the only developable land and, therefore, the only locations to which products could be delivered. As a result, vessels were still needed to transfer forest products from the remote sites of their extraction to transshipment areas.

Presently, with pulp production under assault from South America, few exports leave the Roanoke. Most riparian activity is conducted by avocational fishermen and hunters. With much of the riverside forest swamps owned and managed by the Roanoke River National Wildlife Refuge, the river is returning to a natural state.

The historical trends leading up to the present conformation of the Roanoke River landscape will be statistically analyzed in the following chapter. Chapter Five will provide a statistical archaeological test to the trends outlined in this chapter. Incorporation of historical data with

archaeological evidence from the Roanoke region will provide broad interpretations of social behavior shaping the Roanoke River cultural landscape over time.

CHAPTER 5:
TIME AND PURPOSE, VESSELS AND RAILROADS: A STATISTICAL ANALYSIS

Multiple archaeological and anthropological authors, such as Gould, Lenihan, and Murphy (1983), Duncan (2000), Veth (2006) and Richards (2006) assert the need to move past particularist investigations to higher level, comparative studies. To study the Roanoke River vessel assemblage as part of a comparative work while creating an explanatory model of the cultural landscape by considering multiple themes, several statistical analyses and tests were performed. The analyses pursued in this chapter provide broad explanations of the nature of the Roanoke River cultural landscape.

This chapter combines statistical analyses to examine the Roanoke River as a closed system: the interpretation that vessels interacting with the river tended to remain. To determine if the Roanoke was a closed system, multiple analyses will be conducted. First, the domestic and state economies will be linked with the river system to explain potential causes leading to intentional discard of endemic vessels. Second, examination of watercraft longevity will reveal that vessels along the Roanoke became specialized for use within the river system or between river systems. Third, vessel dimension analysis will reveal significant differences between abandoned and wrecked vessels, most notably in draft. Lastly, combining these analyses will produce a broad interpretation that explains the causes of intentional discard, the trend towards vessel specialization, and the dominant presence of watercraft specialized for shallow water operations.

In addition, these analyses will illuminate additional changes within the Roanoke's cultural landscape. The rise of central places as centers of industry will be associated with the installation of new forms of transportation infrastructure. The effects of infrastructure development and increases in the importance of central places along the Roanoke will be reflected in the river's material culture. Overall, analyses will describe the industrial decline and nature of maritime commerce along the Roanoke as demonstrated by archaeological evidence.

Economic Crosslinkages at the Domestic, State, and Riverine Levels

The ship has been described as a cultural component of a larger, parent culture: a vessel is not only for cargo and passengers but also a container for behavioral patterns specific to operating the ship, completing a mission, and simply surviving away from land (Murphy 1983: 67). Considering non-wartime watercraft, commercial vessels strive to complete missions driven by economics. Trading vessels attempt to sell goods at a higher price at their destinations than where they bought them. As

such, vessels are economic instruments and physical representations of economic cycles and forces within the parent culture. Investigation of the Roanoke River vessel assemblage, as well as terrestrial archaeological residues, provides insight into the effects of national economic cycles on the Roanoke and the North Carolina forest products industry.

As discussed in previous chapters, the forest products industry has traditionally been a dominant form of commerce along the Roanoke River. For this reason, the economic history of eastern North Carolina forest products was merged with that of the United States, as well as known shipwrecks of the Roanoke River vessel assemblage (Figure 5.1). Values of lumber production were known for specific years: 1840, 1893, and 1929. Lumber production for these years was comparable once adjusted for gross domestic product (GDP) and inflation to year 2006 dollars. In the case of 1929, figures were available for lumber production in millions of board feet as well as an associated dollar valuation. Once properly adjusted, a dollar value per board foot of lumber in 1929 was determined. For year 1950, only the amount of lumber production per board foot was known. With the 1929 values known and adjusted to year 2006 dollars, this valuation was applicable to the lumber production statistics of 1950. Therefore, the value of Eastern North Carolina lumber production is observable across four points from 1840 to 1950.

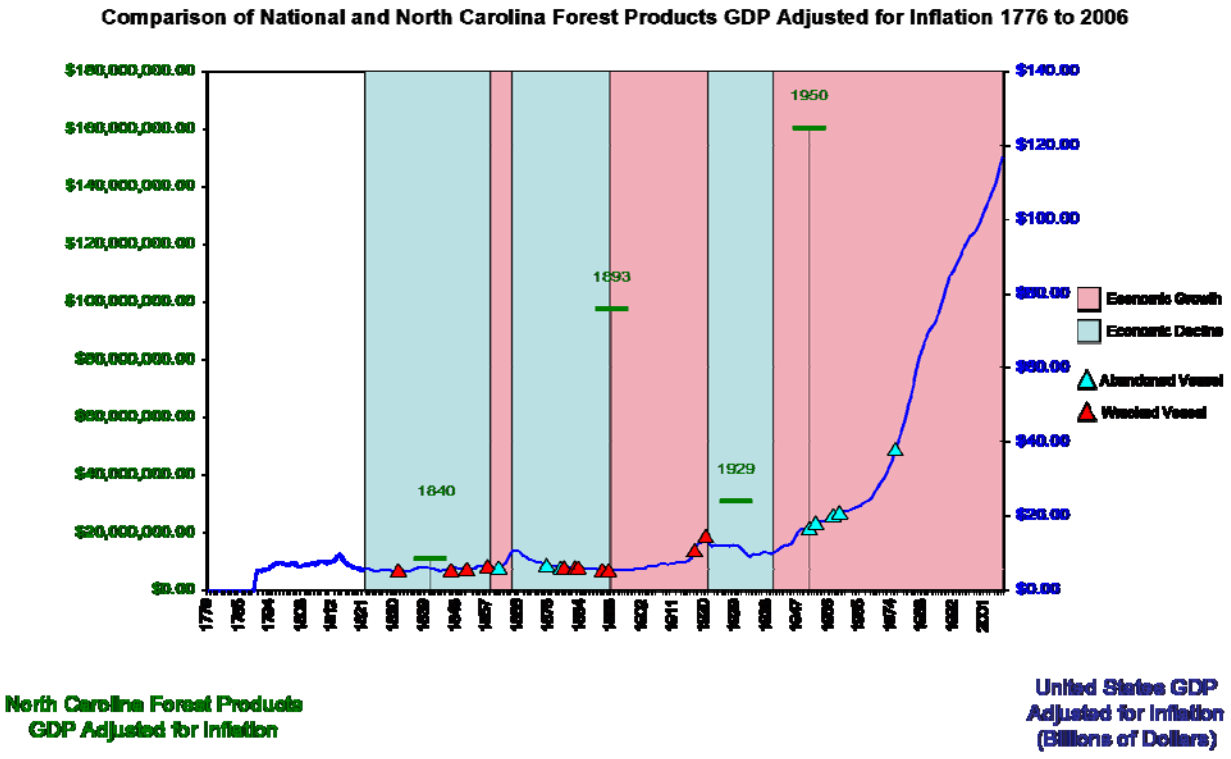

FIGURE 5.1. Comparison of National and North Carolina Forest Products GDP Adjusted for Inflation 1776 to 2006 (MacGregor 1846; Ashe 1894; Mathewson 1929; Knight and McClure 1966; Johnston and Williamson 2005).

Immediately observable in Figure 5.1 is that wrecking events occurred on the Roanoke fairly regularly despite periods of economic growth or decline until the 1920s. In comparison, the three abandoned vessel events prior to the 20th century are oddities. *Unknown Scow 1* and *2* were abandoned in 1860, and their true identities, owners, and reasons for discard are unknown. This is the case with *Unknown Tug 1* as well, discarded and then removed in 1874 (Humphreys 1875). Barges *Currituck* and *Emma* are oddities compared to other discarded vessels considered in this study. Their classification as abandoned came after their combined disappearance from the *Merchant Vessels of the United States*. A thorough search concluded that these barges had not simply been renamed or changed owners (US Treasury Department 1878:363, 373). Their disappearance in 1878 came at the end of the post-Civil War recession, an American analogue to the observation that, in Australia, economic transition from wartime to peace results in higher rates of discard (Richards 2006: 89).

Antebellum wrecking events of the 19th century, as compared to post-Civil War shipwrecks, were likely due to technological rather than behavioral and economic causes. The steamer *North Carolina*, for example, had operated for only two years when it burned in 1831 (*Roanoke Advocate* 1831). *Pioneer*, exploded 1846, and *Liberty*, burned 1857, shared *North Carolina*'s fate and sank from the risks inherent in using high pressure steam engine technology (*The Tarboro' Press* 1846; *The Jeffersonian Republican* 1846; *Tri-Weekly Commercial* 1857). Only *Lady of the Lake* avoided fire, having been blown ashore (Angley 1995). This pattern supports the assertion of MacGregor Laird, a leading British steam engineer of the 1830s. Laird, upon being questioned about his conservative tendency to use a maximum of 10 PSI in his steam engines, stated that though American vessels utilized pressures as high as 30 PSI, they "kill[ed] a thousand people every year" (Headrick 1981: 29).

Vessels lost during the post-Civil War recession, as compared to antebellum sinkings, were the result of similar causes but different circumstances. As with *North Carolina*, *Pioneer*, and *Liberty*, the vessels *Vesta*, *Rotary*, *Commerce*, and *City of Long Branch*, were lost by fire. *Commerce* burned in a city-wide fire that started within Williamston and eventually consumed the docks to which *Commerce* was tied. The vessel *Rotary* serves as a suitable case study of the behavioral processes affecting this group of vessels. *Rotary*, built 1859, appeared in *American Lloyd's*, receiving the rating of "A2" in 1861 and a designation of "fair" in terms of fire protection. As an A2 vessel, it was in the third class, suitable only for the transport of dry goods, or perishable cargoes over short distances (Blunt 1861:556-557). A floating potential tinderbox, *Rotary* would have been a risk to anyone operating the vessel.

The rating system provided by *American Lloyd's* is an example of society's attempt to limit risky behaviors. Vessels rated A1+, A1, and A1- by *American Lloyd's* were considered first rate. The designations of A1.5 and A1.5- labeled a vessel as second rate, A2 and A2- as third rate, A2.5 and A2.5- as fourth rate, and A3 and A3- as fifth rate. According to the definitions of risk provided by Crook (1999), this rating system of A1 to A3 would be an example of neo-liberal risk management because they were suggestions of acceptable risk levels in shipping vessels. Vessels falling below the rating system of *American Lloyd's* were considered susceptible to sea damage and unseaworthy. Instead of society passing legislation to prevent individuals from shipping cargo on vessels rated below fifth class, capitalism's requirement to profit under the most risk-free conditions essentially exiled these ships from the trade routes. In the case of *Rotary*, neo-liberal risk management did not deter the owners, the Roanoke, Norfolk and Baltimore Steamboat Company, from operating the vessel, a behavioral pattern similar to observations by Souza (1998; Certificate of Enrollment: *Rotary* 1880). Souza found that obsolete sailing vessels persisted in a shipping industry dominated by more efficient and safer steam watercraft because sailing crews engaged in cost-cutting behavior that oftentimes increased the risk of their voyages. Though operating *Rotary* during Reconstruction-era North Carolina represented a significantly different set of conditions, the behavior and decision-making process were similar; economically unfavorable conditions led Roanoke ship owners to purchase cheaper vessels and accept associated risks to keep costs down and remain competitive.

Though an inherently risky vessel, *Rotary* would have been inexpensive to procure to offset risk. At the time of *Rotary*'s operation on the Roanoke, North Carolina was in the midst of Reconstruction. The recession caused by post-war Federal policies sank into depression with the Panic of 1873 (Wright 1949: 703-705). Since the structure of society is shaped by historical and economic trends, Reconstruction and the Panic of 1873 altered social structures within the cultural landscape of the Roanoke River (Cohen 1987: 288, 296). Unlike the antebellum period where steam vessels burned due to their being on the cutting edge of infant steam technology, post-war Roanoke society temporarily favored less than ideal vessels due to the exigencies of an impoverished regional market.

Reversal of this trend of inadequate vessels serving the maritime economy of the Roanoke occurred around 1893. Prior to 1893, *Rotary* and *Commerce*, sinking in 1882 and 1883, respectively, were both carrying cotton when lost (Angley 1995; Certificate of Enrolment *Commerce* 1880). Though North Carolina's cotton production nearly tripled between 1869 and 1889, the resurrection was primarily due to the counties of Mecklenburg, Wake, Richmond, Robeson, Johnston, Edgecombe, Pitt, Wayne, Wilson, Anson, Cleveland, and Union (State Board of Agriculture 1896:

158-159). Not one of these counties borders the Roanoke. It seems, therefore, that cotton production along the river, and the cotton-dependent shipping industry, struggled. Between 1840 and 1893, however, the adjusted GDP of North Carolina forest products grew 923%. In turn, the replacement of cotton by logging had a beneficial effect on Roanoke vessels. After the loss of *City of Long Branch* in 1892, another wreck did not occur until 1917 when *Hamilton* sank while laden with lime, guano, and passengers, cargoes unrelated to logging (Army Corps of Engineers 1893:1450; *The Charlotte Observer* 1917).

The idea that the Roanoke forest products industry was ascendant in the 1880s and 1890s gains support from terrestrial investigation of a logging site located at the coordinates 18S 0334376E 3969410N WGS84. This site featured a vertical steam boiler close to a wheeled scotch boiler (Figure 5.2). The boiler assembly is similar to one used for logging in Charlotte (Figure 5.3) and a donkey engine recovered from Issaquah National Forest in the State of Washington (Figure 5.4). A date plate installed on the boiler read "PAT' JAN.6 1880," providing a *terminus a quo* for this site (Figure 5.5). A few yards away from the steam engine assembly was a "hit-and-miss" one cylinder gasoline engine (Figure 5.6). Invented in the 1890s, this engine type was used for many agricultural applications (Figure 5.7). Their most wide-spread usage was in the 1910s. They became less widely used in the 1930s when more efficient gasoline engines became available (Wendle 1983).

FIGURE 5.2. Suspected logging steam engines (photo by author 2007).

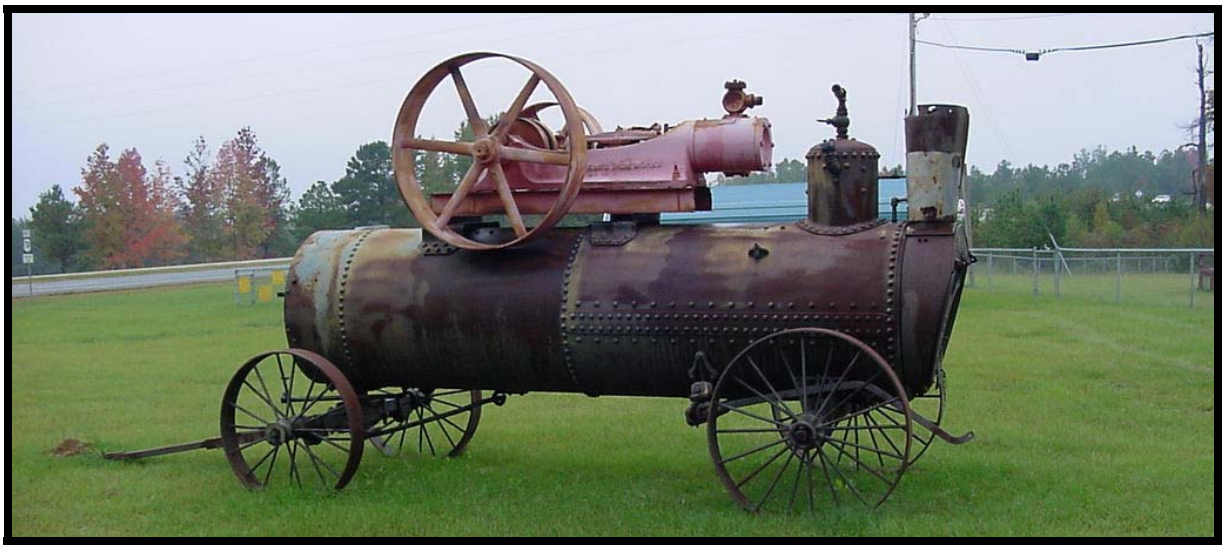

FIGURE 5.3. Logging steam engine (McGraw 2007).

FIGURE 5.4. Logging donkey engine (University of Washington Libraries, Special Collections, IND0209).

FIGURE 5.5. Patent plate on suspected logging steam engine (photo by author 2007).

FIGURE 5.6. Hit-and-miss gasoline engine nearby suspected logging steam engine (photo by author 2007).

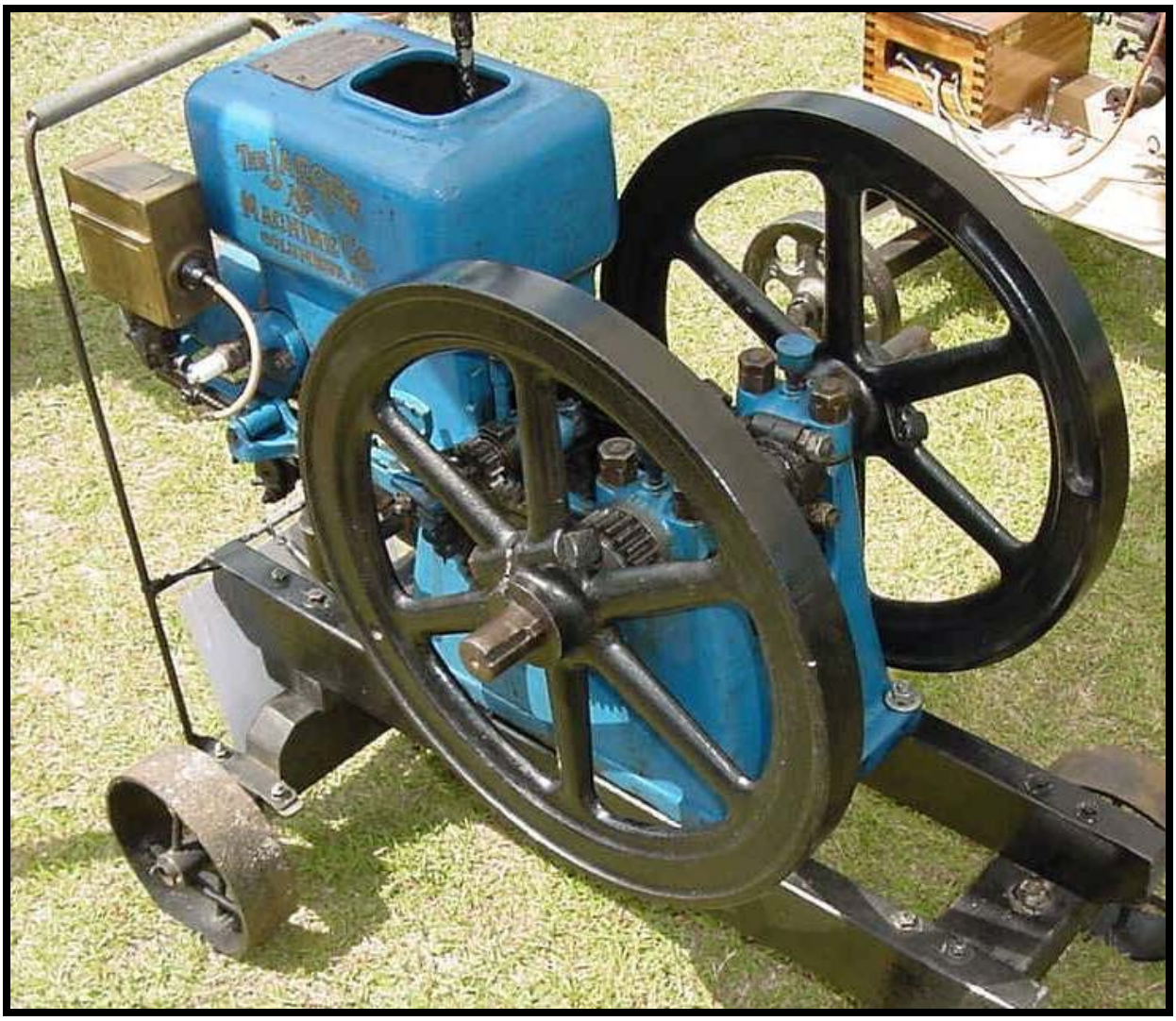

FIGURE 5.7. Re-conditioned hit-and-miss engine (McGraw 2007).

Similar vestiges of steam technology were found at other sites along the Roanoke as well, such as a steam boiler at 18S 0324511E 3968120 NAD83, a logging railroad engine known as the *Train of Plymouth* at 18S 0324093E 3973730N NAD83, and a boiler component at 18S 0334298E 3969212N WGS84 (Figures 5.8, 5.9, and 5.10). The similarity of the abandoned equipment across these sites suggests that these logging operations occurred at similar times. Based on these findings, the archaeological record clearly represents an industrial dominance of logging along the Roanoke at the end of the 19th and beginning of the 20th centuries.

FIGURE 5.8. Suspected steam-powered logging equipment (photo by author 2007).

FIGURE 5.9. Suspected *Train of Plymouth* logging railroad steam engine (photo by author 2007).

FIGURE 5.10. Boiler segment found near suspected logging steam engine (photo by author 2007).

On land, there is a lack of abandoned logging equipment post-dating 1930, the "hit-and-miss" engine being the most recent cultural residue. This observation corresponds with the Great Depression that occurred relatively early in fiscal year 1929. Beginning with the crash of the New York stock market, the subsequent cessation of foreign loans made by the United States dragged several foreign economies into depression (Wright 1949: 778). Seemingly in reflection of this global economic catastrophe, the adjusted GDP of Eastern North Carolina timber production in 1929 represented only 31% of adjusted GDP timber production for 1893 and likely led to abandoning the logging equipment still present today.

The forty-two unknown vessels assumed to have been intentionally discarded due to their discovery in secondary and tertiary tributaries of the Roanoke, are probably also linked to the crash of 1929. Supporting this link is the fact that the last Army Corps of Engineers dredging operation on the Roanoke River occurred in 1913 (United States Army Corps of Engineers 1913: 1915). Dredging would have removed any discarded vessels predating the 1920s, resulting in an abandoned vessel assemblage composed primarily of vessels post-dating the 1920s.

In the 1950s, six vessels were abandoned along the Roanoke: *Solicitor* and *Fort Branch Barge* in 1952, *Immigrant* in 1957, *Susan Preston MacPhie* and *Rodney Philips MacPhie, Jr.* in 1959, and *Southern Kraft No. 3* in 1975 (US Treasury Department 1952; 1957; US Department of Commerce 1959; US Department of Transportation 1974). The behaviors surrounding these abandoned vessels are different from those considered thus far because they were intentionally discarded during prosperous times. At this time, prosperity resulting from World War Two had ended the Great Depression but, unlike other post-war eras' recessions, the 1950s were an extension of the wartime prosperity that occurred during World War Two. Accompanying the post-war boom was a rise in housing construction and home ownership (Brown 1994: 293). Supplying lumber to meet American housing demands fell to the forest products industry. As a result, 1950 has the highest lumber productivity for eastern North Carolina (Figure 5.1). In other words, this is a curious time to discard vessels. It is possible that the prosperity of the 1950s made it unnecessary for Atlas Plywood Corporation, owner of *Solicitor*, *Fort Branch Barge*, *Immigrant*, *Susan Preston MacPhie*, and *Rodney Philips MacPhie, Jr.*, to accept risks associated with operating aging, technologically obsolete vessels beyond their use-lives. In economically favorable conditions, obtaining additional vessels would not theoretically be difficult. The ease of obtaining additional vessels would, conversely, make it difficult to sell older craft and necessitate their disposal. By the time Atlas Plywood withdrew from

Plymouth, NC at the end of the 1950s, they chose to discard their vessels in various locations away from the main channel.

The examples of Atlas Plywood, abandoned logging equipment, and the loss of vessels along the river from 1831 to the present demonstrates that the archaeological record of the Roanoke was affected by national and state-wide economic events, such as the decline of cotton and rise of lumber during Reconstruction. Through these cultural residues, the behaviors and values of agents within Roanoke society are visible: embracing new steam technology, attempting to recover from war and depressions, and enjoying economic prosperity. The structure of Roanoke society was not only reactionary to economic events as portrayed thus far but also proactive in terms of implementing new technologies. Infrastructure, in the form of railroads and automobiles, changed the cultural landscape of the Roanoke, giving rise to new central places and enlarging others.

Vessel Longevity: The Effects of Economic Growth and Infrastructure Development

The economy of the Roanoke River is a microcosm of the economies of North Carolina and the United States. As stated previously, human behaviors interacting with economic factors created the vessels and determined their cargoes. The archaeological information embodied by watercraft offers insight into the culture that created them (Murphy 1983: 66-67; Hume 1969: 189-190). As a result, the Roanoke River vessel assemblage is simultaneously part of the cultural landscape and a reflection of economic influences shaping the region.

Figure 5.11 shows the number of vessels with known loss dates lost along the Roanoke per year. With fourteen vessel losses occurring in 1864 alone, the devastating impact of the Civil War is clearly evident. Years without war experience a fairly uniform rate of wrecking events, as demonstrated by Figure 5.12. At most, only two vessels were lost during any peacetime year. This chart visually represents the time span separating wrecking events. For example, one wreck occurred in 1831 and another in 1846. Between these two dates, fifteen years passed. Therefore, the value fifteen was plotted for the date 1846, the number of years that had passed since the last documented wrecking event. The plotted linear regression line features a fairly flat and positive slope of 0.0545, and the data set maintains an average year span between wrecking events of 6.9 years. The regression line equation, $y=0.0545x-96.746$, predicts an interim wrecking span of 3.86 years in 1846 but 10.89 years in 1975. As time passed from 1831 to the present, shipwrecks became less frequent.

FIGURE 5.11. Number of known vessels lost on Roanoke River by year; N=50 (*Albemarle Sound Cultural Landscape Database*; graph by author 2007).

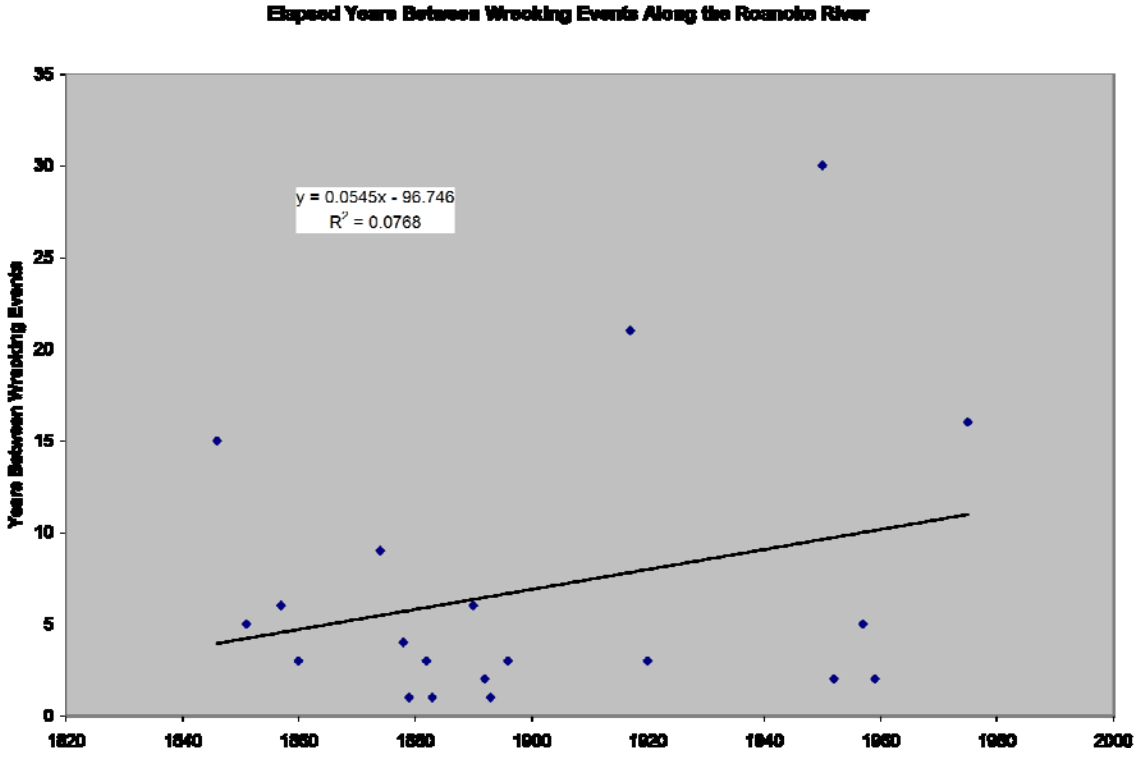

FIGURE 5.12. Elapsed years between wrecking events along the Roanoke River (*Albemarle Sound Cultural Landscape Database*; graph by author 2007).

Assertions derived from Figure 5.13, when paired with those of Figure 5.12, form the second half of a statistical description of vessel longevity within the Roanoke River vessel assemblage. Figure 5.13 revisits an analysis performed by Price (2006) but with the addition of seven vessels newly added to the ASCLD. Incorporation of these seven vessels was due to additional historical research that discovered new vessel losses, as well as more descriptive information about vessels already in the ASCLD, such as build and loss years. This re-analysis of vessel use-lives confirms and strengthens the findings of Price (2006), who found an increasing trend in the lifespans of Roanoke vessels.

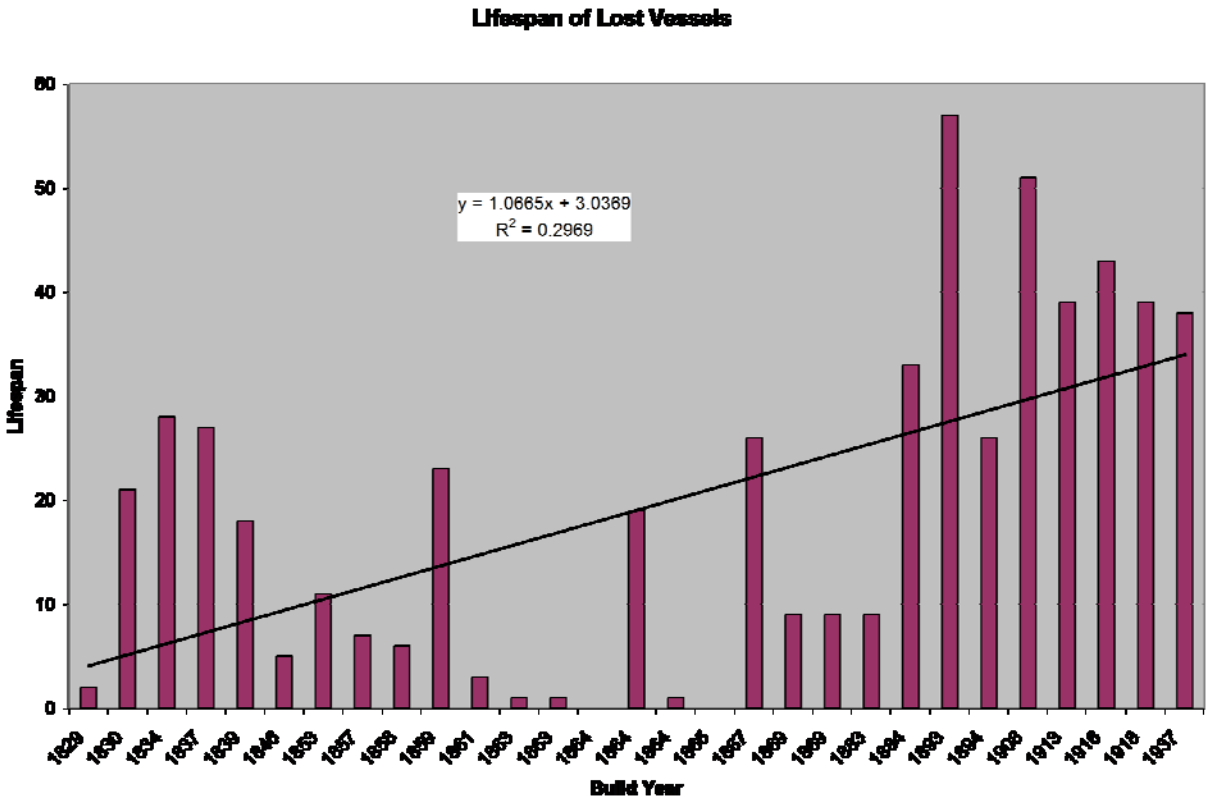

FIGURE 5.13. Lifespan of lost vessels; N=29 (*Albemarle Sound Cultural Landscape Database*; graph by author 2007).

Lengthening vessel use-lives and decreasing shipwreck frequencies are indicative of larger trends occurring within the vessel assemblage and cultural landscape. These trends involve central places as defined by Christaller (1966): places that existed before the introduction of railroads but were transformed by steam rail technology into efficient centers of resource collection, manufacturing, and export. Improvements in transportation technology increased the influence that Roanoke cities wielded over increasingly enlarging dependent regions.

Rail improvements first came to the Roanoke at Weldon in 1840. Prior to this, North Carolina experienced over forty years of highly-variable but stagnant levels of registered shipping tonnages and decreasing exports (Figures 4.7 and 4.8). After the construction of the Wilmington and Weldon line, no significant increase in railroad property occurred until 1886 when railroad valuations increased over 800%, likely attributable to the construction of the Albemarle and Pantego line (Figure 5.14). The Panic of 1893, however, had a similar effect on North Carolina railroads as it did on Roanoke River watercraft. As observed in Figure 5.1, no shipwrecks occurred after 1892, which might be explained by a decrease in shipping. With fewer vessels operating due to adverse economic conditions, wrecks occurred less frequently. An alternative explanation, however, could be that railroad infrastructure was sufficient for the Roanoke economy, which meshes with the interpretation made earlier that the decreasing shipwreck frequency was due to using better vessels. Regardless, the fact that railroad valuations (Figure 5.14) leveled, stabilized, and did not decrease suggests a direct and mutual relationship between watercraft and railroads at this time.

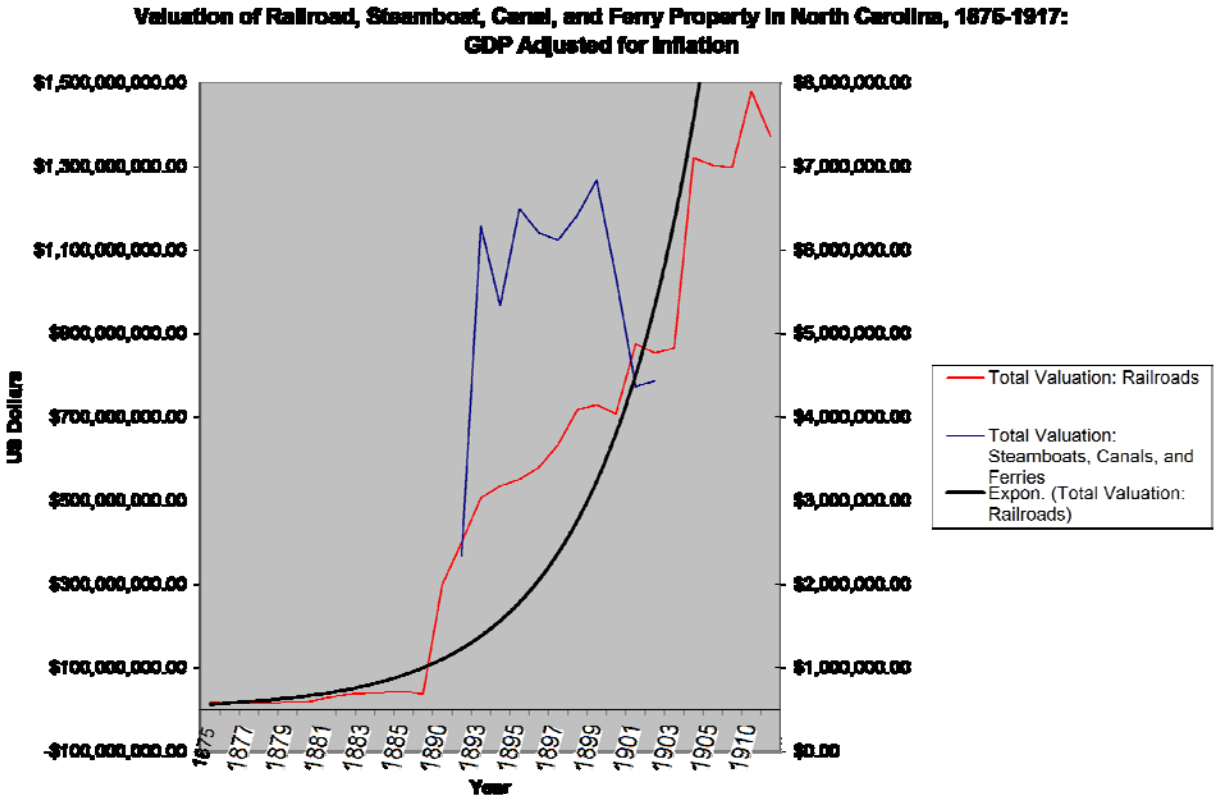

FIGURE 5.14. Valuation of railroad, steamboat, canal, and ferry property in North Carolina, 1875-1917; GDP adjusted for inflation (North Carolina State Auditor; graph by author 2007).

Mutualism between water and rail would end at the turn of the 20th century. Waterborne valuations returned after the Panic of 1893 but stagnated until 1899, after which they declined 35%. This reduction apparently prompted the North Carolina State Auditor to cease reporting steamboat, canal, and ferry valuations in 1902. Conversely, railroad valuations showed a positive growth over this same period (Figure 5.14), as demonstrated by the close fit of the exponential regression line with an R-squared value of 0.89. At the beginning of the 20th century, the mutualism between waterborne transportation and railroads along the Roanoke suddenly ended, as indicated by a cessation of reported waterborne valuations, demonstrating the domination of rail engine technology.

Like the absence of reported waterborne property valuations after 1902, the State Auditor discontinued reporting rail property valuations after 1917. By 1940, most of the report was given over to reporting automobile and highway valuations, in addition to road building expenditures. The 1940 report listed highway valuations at $5,331,748 and new highway expenditures at $28,946,907, which represented 24% of the state budget. By 1950, expenditures had increased to $144,180,453.77 (North Carolina State Auditor 1940, 1950).

It is apparent that both North Carolina waterborne and railroad properties responded similarly to national economic events. The collected data supports the assertion that a mutualistic relationship existed between waterborne and railroad transportation until the Panic of 1893, after which railroads supplanted watercraft as the dominant form of transport infrastructure. This trend, occurring from 1893 to after 1900, conforms to the patterns observed by Taylor (1951), Peterson (1968), Clark (1981), and Parsons (1986) that new forms of transportation are typically parasitic, siphoning traffic from pre-existing forms of infrastructure. As a result, a flow of succession proceeds along the Roanoke from waterborne to rail to truck, with a temporary mutualism between water and rail between 1840 and 1893.

Despite the effects succession had on the individual types of transportation technology, continual technological and infrastructural improvement corresponded to a growing influence that population centers wielded over areas of the Roanoke. More remote areas became accessible to resource exploitation via the same technologies that transformed Roanoke central places into hubs of transportation. The rail engine, adapted to the requirements of the logging industry, permitted harvesting swamp forest in progressively more shallow conditions farther away from the main river banks (Figure 5.9). This required specialization in the construction of vessels intended to meet logging's evolving needs.

Specialization would have made vessels safer and reduced the risks associated with exploiting remote resources, thereby completing a positive feedback loop of specialization and logging. Craft intended for shallow waters and swamps would not leave the river system and only transport raw materials to transportation hubs (central places) along the Roanoke where rail lines or vessels specialized for inter-riparian and trans-oceanic trade would carry them to other destinations. Generalist vessels capable of operating in both shallow and deep water, and well-suited for neither, were no longer necessary. Technology, as a result, depressed the need for neo-liberal risk management associated with remote swamp logging (Crook 1999).

The desire of society to gain resources, as described by the domination structure (Giddens 1984), in an era of reduced risk and increasing safety due to specialized vessels, led to a fundamental change in the nature of the Roanoke River. Differentiation of the vessel assemblage into vessels built for use within the river and others designed for long-distance inter-riparian transport led to the Roanoke being more closed than open; vessels reached the end of their use-lives via deposition in the river. Comparison of vessel dimensions, between abandoned and shipwrecked craft, offers interpretations that the Roanoke was, in fact, a vessel vacuum.

The Roanoke as a Closed System

The first section of this chapter described linkages between the economy of the United States, the state of North Carolina, and the Roanoke River. In the second section, the effect of increasing importance of central places along the Roanoke and developing transportation infrastructure on the vessel assemblage was investigated. Continuing from analyses concerning vessel longevity, this section describes the economic decline of the Roanoke River by using additional archaeological evidence to establish that the Roanoke was a closed system.

Comparison of national and Roanoke gross tonnage reveals both wartime and peacetime correlations (Figure 5.15). This chart demonstrates that the construction of vessels forming the Roanoke assemblage occurred during national shipbuilding booms. Vessels built around 1840, 1885, after 1893, and between 1908 and 1918 reflected market corrections from the Panics of 1837, 1873, 1893, 1907 to 1914, respectively. Richards (2006:89) explains that "the use life of a ship is a representation of the health of the trade in which it was engaged." Increased rates of intentional discard would, therefore, be greatest during periods of economic recession and depression. This trend, combined with the risk-taking behaviors of vessel operators staying in business during economic downturns, exacerbated the effect of depressions on maritime commerce. The link between increased rates of intentional discard and wrecking events ensured the occurrence of

shipbuilding booms during market recovery years, replenishing the tonnage available to waterborne trade after periods of economic recession and depression. These statistics and observations, however, do not indicate if the Roanoke is a vacuum for vessels, the assertion that more vessels enter and become wrecked or discarded, rather than transfer to home ports outside the region. Analysis of the abandoned vessel portion of the Roanoke assemblage supplies the archaeological test to determine the nature of the Roanoke as a vessel vacuum.

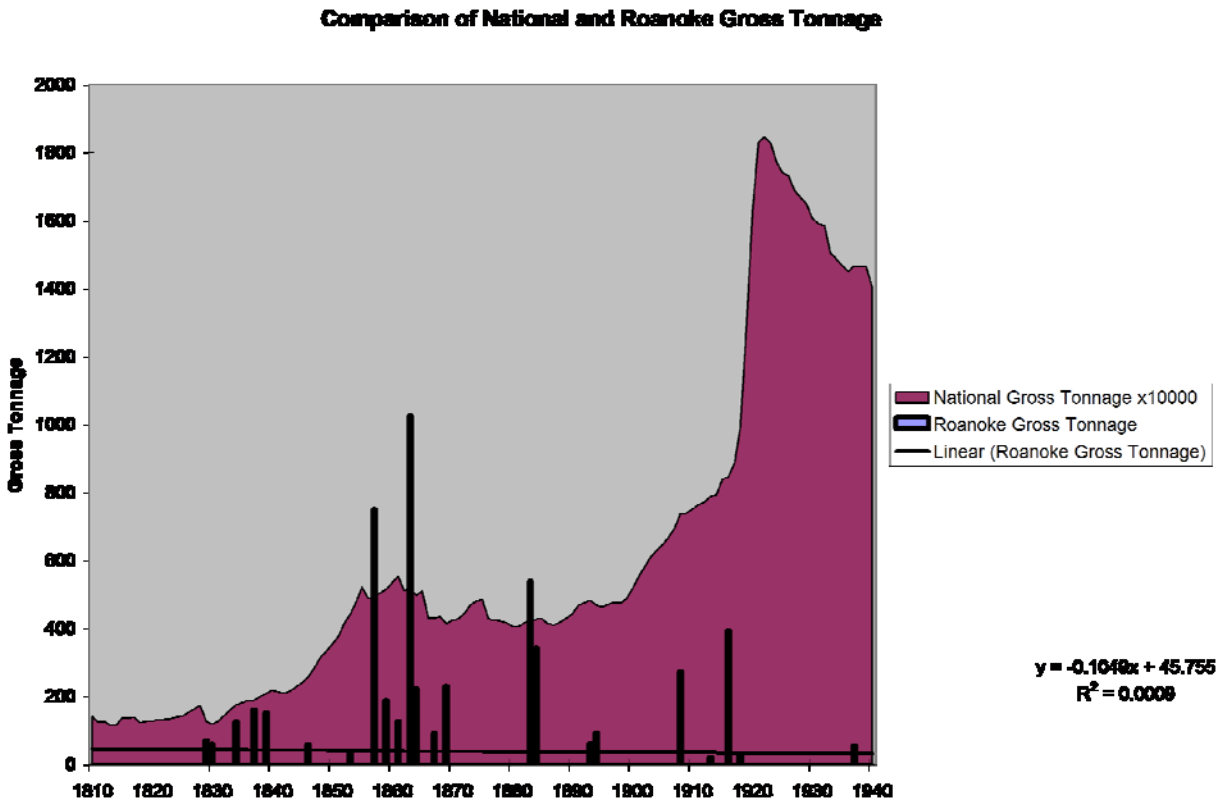

FIGURE 5.15. Comparison of National and Roanoke Gross Tonnage (*Albemarle Sound Cultural Landscape Database*; Cain 2006; graph by author).

Unlike shipwrecks, abandoned vessels are typically quietly discarded, their disappearance from use going unnoticed by the general public or governing authorities (Moore 1995: 3; Richards 2006: 84). Shipwrecks, on the other hand, usually occur in high-traffic areas and are removed from the archaeological record because they present a hazard to navigation (Murphy 1983: 66). Vessels intentionally discarded are disposed of away from heavily used areas and, therefore, persist in the archaeological record (Richards 2006: 84). The observation of Shomette and Eshelman (1998:332), that abandoned vessels formed the largest portion of the vessel assemblage on the Patuxent River, was applied to the Roanoke. Vessels without known circumstances of loss that were discovered in secondary and tertiary tributaries were considered deliberately discarded. Two pie charts were

constructed: one showing a differentiated "unknown" circumstance of loss category and the other merging the unknown category with the abandoned classification (Figures 5.16 and 5.17). In both cases, abandoned vessels formed the majority of the assemblage.

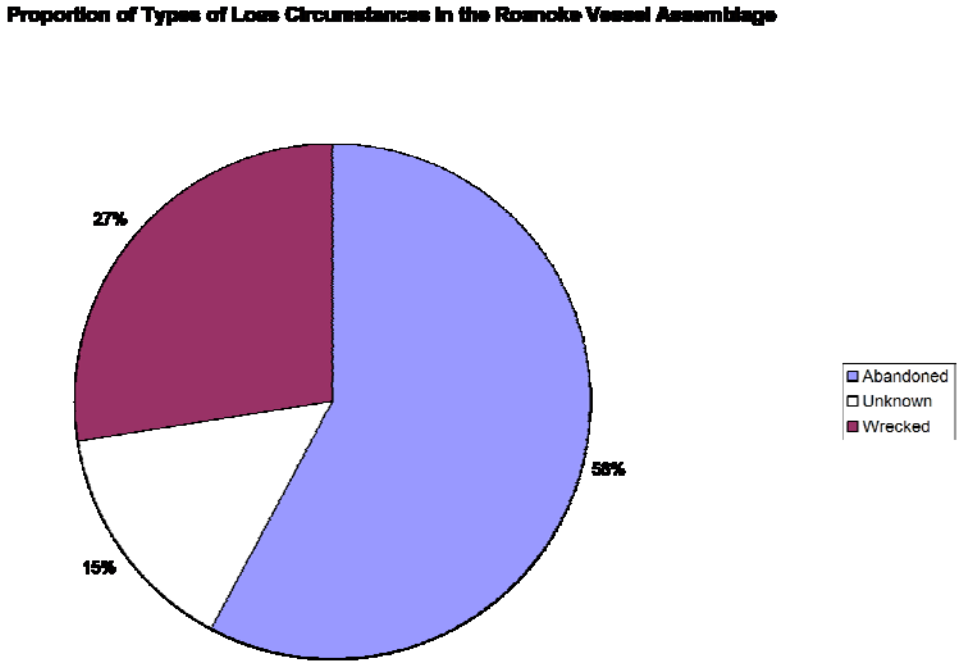

FIGURE 5.16. Proportion of types of loss circumstances in the Roanoke vessel assemblage (*Albemarle Sound Cultural Landscape Database*; graph by author 2007).

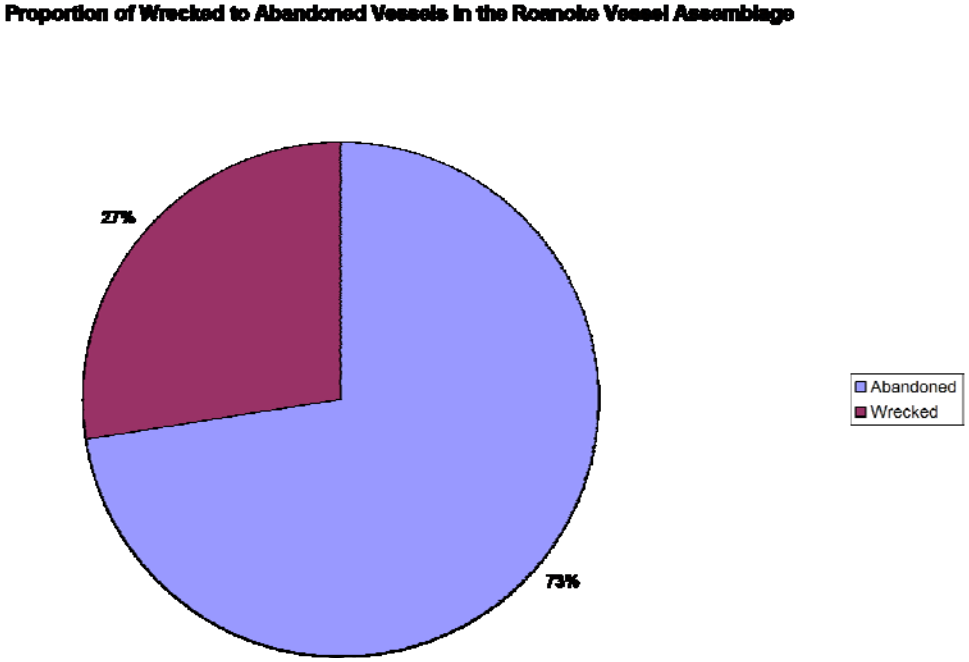

FIGURE 5.17. Proportion of wrecked to abandoned vessels in the Roanoke vessel assemblage (*Albemarle Sound Cultural Landscape Database*; graph by author 2007).

To test the hypothesis that the Roanoke was a vessel vacuum, the Roanoke River vessel assemblage was partitioned by manner of loss, abandoned or wrecked, to reveal significant differences in terms of vessel dimensions. Significant differences would indicate if vessels specialized for particular purposes preferentially composed ships' graveyards along the Roanoke. The two subsets, abandoned and wrecked, contained an N number of 42 and 20, respectively (Table 5.1). Thirty-three were excluded from this analysis due to the lack of any hull dimension data. As a group, the forty-two abandoned vessels had a median length of 69.2 feet with wide variability in individual vessels, shorter and longer, as represented by the high standard deviation of 43.99. The determined value for standard deviation made it difficult to identify any trends or patterns concerning lengths of abandoned vessels over time. The smaller wrecked vessel subset was similar in this case; wrecked vessels had a median length of 94.3 feet with a standard deviation of 52.73. When examining plots of vessel lengths over time for either subset, the trendlines were nearly horizontal and fit the data only minimally with R-squared values of 0.0046 and 0.0309. The only trend evident in these subsets inferred no significant change of vessel lengths, which is suspect due to the high variability (standard deviation) of vessel lengths. These data were inconclusive in determining if the physiological limitations of the Roanoke had an effect on vessel lengths.

	Abandoned Vessels; N=42			**Wrecked Vessels; N=20**		
	Median	Average	Standard Deviation	Median	Average	Standard Deviation
Length	69.2	68.1	44.0	94.3	113.4	52.7
Breadth	20.9	22.0	13.6	22.2	23.9	6.7
Depth	5.8	6.4	3.0	7.1	7.6	1.9

TABLE 5.1. Statistical analyses of abandoned and wrecked vessel dimensions (*Albemarle Sound Cultural Landscape Database*; table by author 2007).

Examination of vessel breadths revealed little difference between abandoned and wrecked vessels. Abandoned vessels had a median breadth of 20.9 feet, standard deviation of 13.58, and wrecked vessels had a median of 22.2 feet and standard deviation of 6.69. The standard deviation and median for abandoned vessels should be lower, however; the inclusion of two sites, *Unknown Anomaly 5* and *11*, could be incorporating two debris fields into the dataset and, consequently, introducing two exaggerated length and breadth measurements. Omission of these sites would decrease the median to 18.3 feet with a much lower standard deviation of 9.63. The low variability

of these numbers inferred a connection to the dimensions of the Dismal Swamp Canal and Albemarle and Chesapeake Canal through time, shown in Table 5.2. Correlation of Roanoke vessel breadths to canal widths indicated that the widths of the Dismal Swamp Canal and Albemarle and Chesapeake Canal governed vessel breadths along the Roanoke (Price 2006). Confirmation of Price's findings was expected due to the work of Kenderdine (1994) and Westerdahl (1992), who found that canal infrastructure and dredging operations limited vessel dimensions operating along waterways.

Canal	Year	Width	Depth
Dismal Swamp	1805	6	2.08
	1823	12.5	4.5
	1829	15.6	7
	1877	17.5	7
	1899	40	9
Albemarle and Chesapeake	1859	40	7

TABLE 5.2. Widths and depths of Dismal Swamp Canal, and Albemarle and Chesapeake Canal, by year (Brown 1970; table by author 2007).

The slight difference in vessel breadths between abandoned and wrecked vessels takes on additional meaning when paired with depth data. Abandoned vessels, as a group, had significantly shallower drafts than wrecked vessels, indicated by a median depth of 5.84 feet as compared to 7.05 feet for wrecks. Shallower drafts allowed more freedom of movement in wide, inundated floodplains: a characteristic of the Roanoke. Industries relying on operations in the floodplain lowlands would rely on this characteristic to allow workboats and small barges to penetrate remote areas, such as cypress and sweetgum stands suitable for logging. Wrecked vessels, typically maritime or inter-riparian transports, had deeper drafts for stability in high-traffic and deep water sealanes, channels, and ports. Canal infrastructure was not the only force limiting vessel dimensions. Vessel function, related in part to the manner of vessel loss, mandated structural differences between watercraft intended to leave the river system and those that perpetually remained.

An examination of propulsion types between abandoned and wrecked Roanoke vessels is also germane. Figures 5.18 and 5.19 show the distribution of propulsion types for abandoned and wrecked vessels. As explained by Price (2006), the large percentage of sailing vessels amongst abandoned vessels are likely attributable to a shift in technology to steam power propulsion and an

economic impetus to dispose of older sailing craft via intentional discard. The percentages of sailing vessels, 56% of abandoned vessels and 14% of wrecked vessels, equal sixteen abandoned sail and three wrecked, respectively. It is clear that far more sailing vessels reached the conclusion of their use-lives by discard than by catastrophic event in the course of normal operating life.

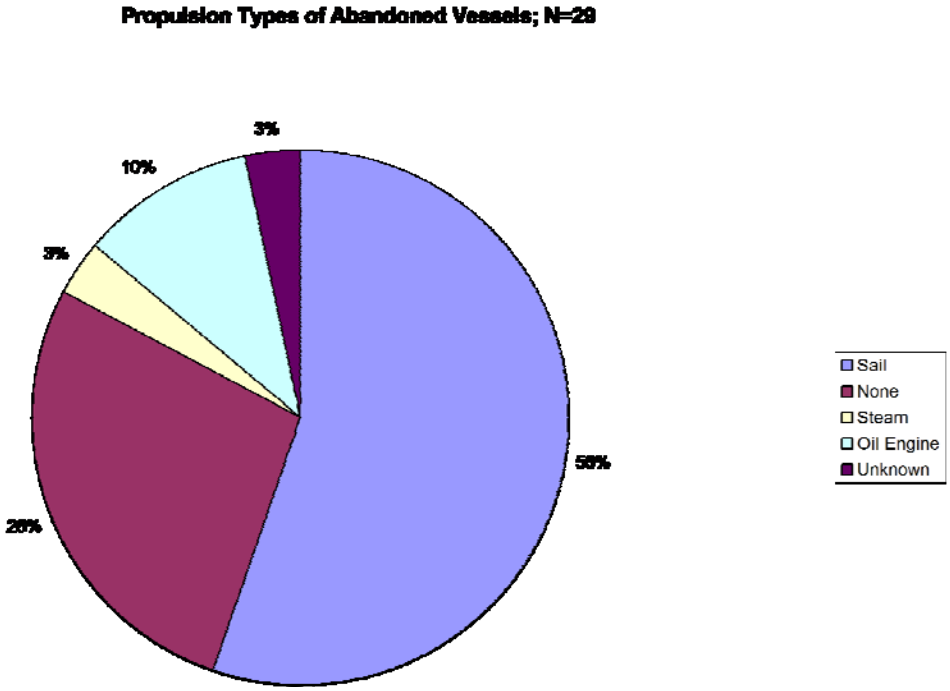

FIGURE 5.18. Propulsion types of abandoned vessels; N=29 (*Albemarle Sound Cultural Landscape Database*; graph by author 2007).

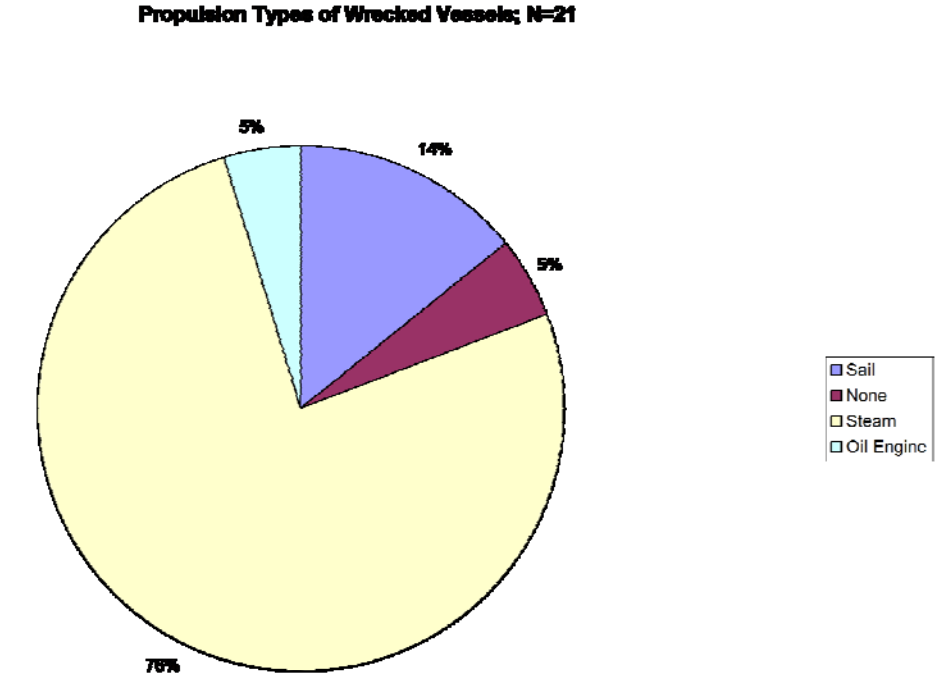

FIGURE 5.19. Propulsion types of wrecked vessels; N=21 (*Albemarle Sound Cultural Landscape Database*; graph by author 2007).

Of greater interest is the finding that more vessels without any mode of propulsion were abandoned than wrecked. These vessels, probably intended, or later adapted for reuse, as barges, formed 28% of abandoned vessels (eight examples) and 5% of wrecked vessels (one example). History provides examples of long distance barges daisy-chained together and pulled by a towboat, in the Great Lakes and on the Ohio and Mississippi Rivers (Rodgers 2003:3-4, 13; Rodgers and Green 2003: 20-21). This was observed on *Unknown Vessel 6*, which featured a bollard forward and aft, seemingly built for daisy-chain towing. This method of transshipment was common among Roanoke companies producing finished forest products in the 1950s. Lumber was brought to mills via railroads and, once processed, loaded onto boats for transshipment to the Chesapeake and Philadelphia (Harry Thompson pers. comm., 2007). Atlas Plywood operated five vessels in the 1950s: *Susan Preston MacPhie*, *Rodney Philips MacPhie, Jr.*, *Lookout*, *Immigrant*, and *Fort Branch Barge*. *Susan Preston MacPhie* was steam powered with a draft of 9.5 feet. *Rodney Philips MacPhie, Jr.* had no propulsion and a draft of 10.4 feet. *Lookout* and *Immigrant* were tugboats and *Fort Branch Barge*, as its temporary label infers, was a barge. All five vessels were intentionally discarded along the Roanoke and appear to have been a group of watercraft suited to towing barges over long distances.

From the above analyses, it is clear that there was almost no difference in average vessel length and breadth between abandoned and wrecked watercraft. The shallower drafts of abandoned vessels, their tendency to lack means of propulsion, and their greater number were significant factors differentiating abandoned and wrecked vessels. Supplementing these statistics is a tangible example. A surplus World War Two LCVP landing craft was found abandoned on the river banks (Figure 5.20). This vessel, used by a logger named Jack Williams, was outfitted with a winch. The winch pulled logs into the LCVP for transshipment (Harry Thompson pers. comm., 2006). In this case, a wartime vessel was adaptively reused to operate during peacetime; a process simple to understand considering that an LCVP typically had a capacity of 8100 pounds, enabling it to land platoons of thirty-six men or a jeep and twelve men (US Navy Department 1944). The example of the LCVP, in conjunction with statistical analyses outlining significant differences between vessels composing the abandoned and wrecked vessel assemblages, supports the interpretation that the Roanoke River was a closed system.

FIGURE 5.20. LCVP found abandoned along the Roanoke River (Photo by author 2006).

Conclusion

In large part, the global and domestic trends concerning economics, history, and transportation were already well understood prior to the work contained in this chapter. Every cultural landscape, however, is unique, as are the effects of broad global and domestic trends on shaping cultural landscapes. In addition, individual regions can contain multiple cultural landscapes depending on the perceptions of social groups utilizing the particular region (Gosden and Head 1994). Therefore, although economic and historical trends were already understood, their effects and formative influence on the Roanoke River cultural landscape was not.

The Roanoke's cultural material, both on land and submerged, is the physical manifestation of human behaviors and society that changed the cultural landscape. This material provides an archaeological test to the trends affecting all levels of humanity, global, domestic, and regional, as they apply to the river system. Analysis of the Roanoke River archaeological record confirmed previous assertions of the Roanoke vessel assemblage and offered new interpretations. Through the use of statistics, vessel length was found not to be physiologically constrained by canal infrastructure related to the Roanoke River system. Partitioning the vessel assemblage into subsets of abandoned and wrecked led to assertions that draft and modes of propulsion were keys in describing the Roanoke River as a closed system.

Broad statistical analysis disclosed abstract trends within the cultural landscape of the Roanoke. These investigations, however, do not put these trends, or the archaeological record, into a spatial context. In the subsequent chapter, archaeological data will be analyzed geographically in an attempt to describe zones of industrial activity and give spatial context to where human behaviors occurred. In addition, spatial analyses will attempt new techniques to supplement the diachronic strength of statistical analyses and discern the function and operation dates of unknown vessels present in the archaeological record.

CHAPTER 6:
PURPOSE AND PLACE, TOWARDS A SPATIAL PORTRAIT OF THE ROANOKE: A GEOSPATIAL ANALYSIS

The previous chapter provided statistical analyses linking the Roanoke to wider economic and historical trends, described the effect of transportation technology and infrastructure on the river landscape, and presented interpretations regarding the nature of the river as an archaeological vacuum for vessels. This chapter builds on the abstract statistical observations and answers questions related to the spatial patterning of human behavior, industrial activity, and centers of importance along the Roanoke. By concentrating on the geographical locations of cultural material, spatial analyses will lead to a better understanding of the patterning influences that economic determinants have on industrial endeavors. Ultimately, these analyses will examine the patterning of legal and illegal industries.

In the course of this chapter, multiple geospatial analyses will be discussed: diachronic analysis, the use of GIS to aid in determining unknown vessel use-lives, zonation of the landscape via terrestrial site investigation to reveal spatial patterns, comparison of moonshine distilleries to legal industries, and the elucidation of unknown vessel function via terrestrial zonation. Each spatial analysis draws data from the ASCLD, RRTSD, and remote sensing surveys. Consequently, the investigations are geographically limited to the Roanoke River and adjoining areas, which imbues a more regional and less general character to observations and assertions discussed in the previous chapter.

Diachronic Analysis

An extension of the previous chapter's statistical analyses, diachronic analysis used GIS to chart locations of vessel losses decade by decade along the Roanoke River. This was done by creating multiple maps in ArcGIS covering ten year spans, except in the case of vessels lost by warfare between 1861 and 1865. Vessels lost during the Civil War were affected by significantly different forces than those under primary consideration by this study and, therefore, were grouped into a separate projection. Lost vessel groupings were as follows: 1831 to 1840, 1851 to 1860, 1861 to 1865, 1871 to 1880, 1881 to 1890, 1911 to 1920, 1950 to 1959, and 1975. The existence of data controlled the partition of date groups. Therefore, dates and decades that did not have a recorded vessel loss were not included.

Logically, the ideal vessels used in a diachronic analysis have definite identities, loss dates, and known loss locations. Of the ninety-five vessels representing the Roanoke River portion of the ASCLD, fifty-two (55%) had known loss years. Five of these fifty-two vessels had no known loss location. These five, *Pioneer, Currituck, Emma, J.T. Murdock,* and *Norwood*, were discovered in historical references that gave loss dates but omitted their locations. Without locations, these vessels were omitted from spatial analysis and used only in statistical analyses.

Only one vessel with a known loss date and location existed in the dataset for 1831 to 1840: *North Carolina*, lost 1831 on the route between Norfolk, Elizabeth City, and the Roanoke (Figure 6.1). A dataset of one makes any analysis difficult but the loss, vessel build, and loss location remain informative when paired with Central Place Theory and trends in transportation technology. Railroads had not yet come to Plymouth and the closest line, between Wilmington and Weldon, was approximately one hundred eleven miles upstream in 1840. Built in 1830, twenty-two years after Fulton's first steam vessel, *North Carolina* was on the cutting edge of transportation technology. The transshipment duties of *North Carolina* extended to Halifax and Weldon, making Plymouth the "depot for the produce of Warren, Nash, Franklin, Granville and several other counties" (*Roanoke Advocate* 1830). The loss of *North Carolina* close to Plymouth confirmed the importance of this early transportation hub as a central place.

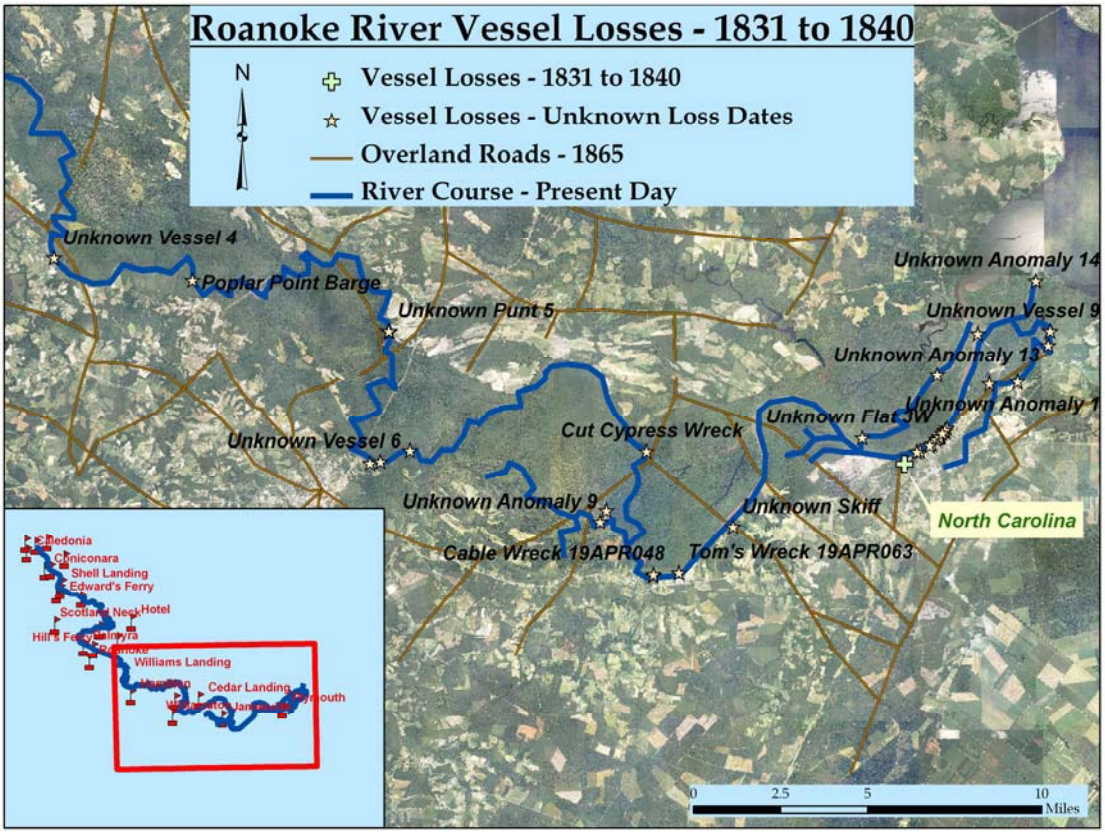

FIGURE 6.1. Roanoke River Vessel Losses – 1831 to 1840 (projection by author 2007).

After completing ten roundtrips between the Roanoke and Norfolk, VA, *North Carolina* was lost to fire after only one year of use and was not abandoned. The loss of this vessel cannot be attributed to influences of other modes of transportation. The vessel, worth $9000 in 1831, was not insured (*Roanoke Advocate* 1831). Not insuring *North Carolina* was a refusal by the Virginia and North Carolina Transportation Company to limit risk, a questionable behavior in this situation. The novelty of steam technology at this time also meant that it was dangerous, especially when Americans were utilizing steam at high pressures (Headrick 1981: 29). At the time of *North Carolina*'s operation, however, the Virginia and North Carolina Transportation Company enjoyed an almost total shipping monopoly through the Dismal Swamp Canal. In 1829, the Company operated eight vessels, *Staunton, Dan, Roanoke, Chowan, Meherrin, Elizabeth, Nottoway,* and *Pasquotank*. Only two vessels operating through the canal, *Independence* and *Experiment*, were owned by private individuals (Lotven and Horn 2003: 4; *Richmond Enquirer* 1829). Such economically-favorable conditions apparently allowed the Company to ignore neo-liberal risk management strategies, such as insuring their vessels.

Similar analyses apply to the years 1851 to 1860 (Figure 6.2). The schooner *Empire* capsized at the mouth of the Roanoke in 1851 but continued vessel enrolments from Elizabeth City through 1853 indicate that it was righted, put back into use, and eventually transferred to another port on 28 February 1853 (Certificate of Enrolment *Empire* 1851). The steamship *Liberty* was lost in 1857 at Plymouth. The loss of *Liberty* further confirms the importance of Plymouth as a central place and allows application of the ideas of von Droste (1995: 437-439), who stated that trade routes and their associated transshipment points are cultural landscapes in their own right. Since a geographic region is capable of having multiple overlapping landscapes (Gosden and Head 1994), Plymouth existed as a cultural hub, serving as a nexus between a cultural landscape upriver dominated by terrestrial industrial activities and another downriver, linking the river to the rest of the nation and world via shipping routes. In this way, the Roanoke landscape appears shaped by distinct cognitive perceptions: use of the lands along the Roanoke by regional, endemic tradesmen, and the extraction of regional products and resources by shipping crews.

The loss of vessels during the Civil War represented circumstances of loss not yet considered in the course of this work (Figure 6.3). Though this study is primarily concerned with peacetime themes of industrial vessel loss, land use, and legality, locations of lost vessels intentionally sunk in the main channel indicates that other places besides Plymouth were important in the 1860s. Multiple blockades, set up in 1862 and 1864 between Plymouth and Jamesville by Confederates and Federals alike, reveal that throughout the war, Plymouth was a vital center as it was in the 1830s: a

place worthy of occupation by the Union. These blockades, studied by Lawrence (2002a, 2002b), and imaged by multibeam sonar (Figure 6.4), indicate the importance of upriver stretches of the Roanoke, particularly Weldon, the Roanoke hub of the Wilmington and Weldon rail line and an objective of Union naval strategy (Frankle 1900:93).

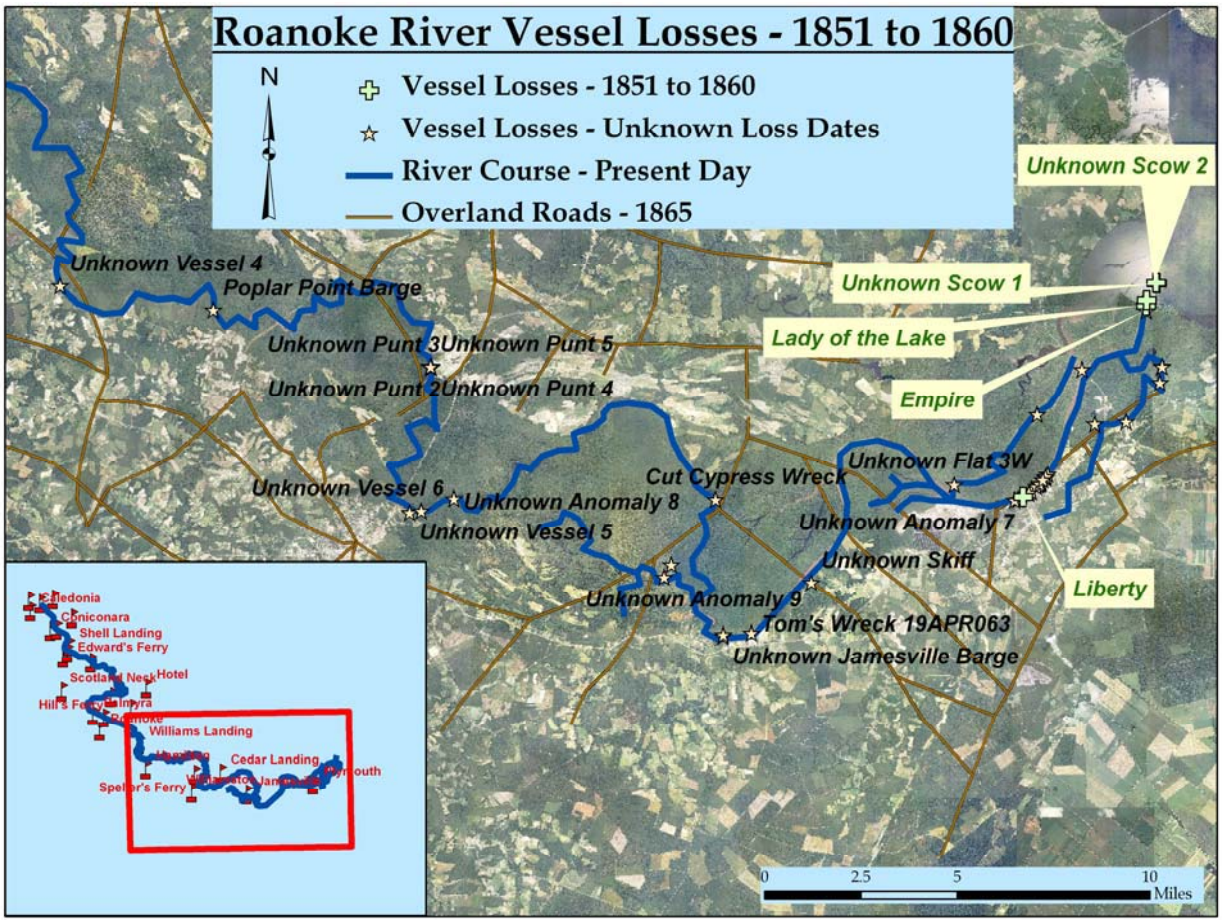

FIGURE 6.2. Roanoke River Vessel Losses – 1851 to 1860 (projection by author 2007).

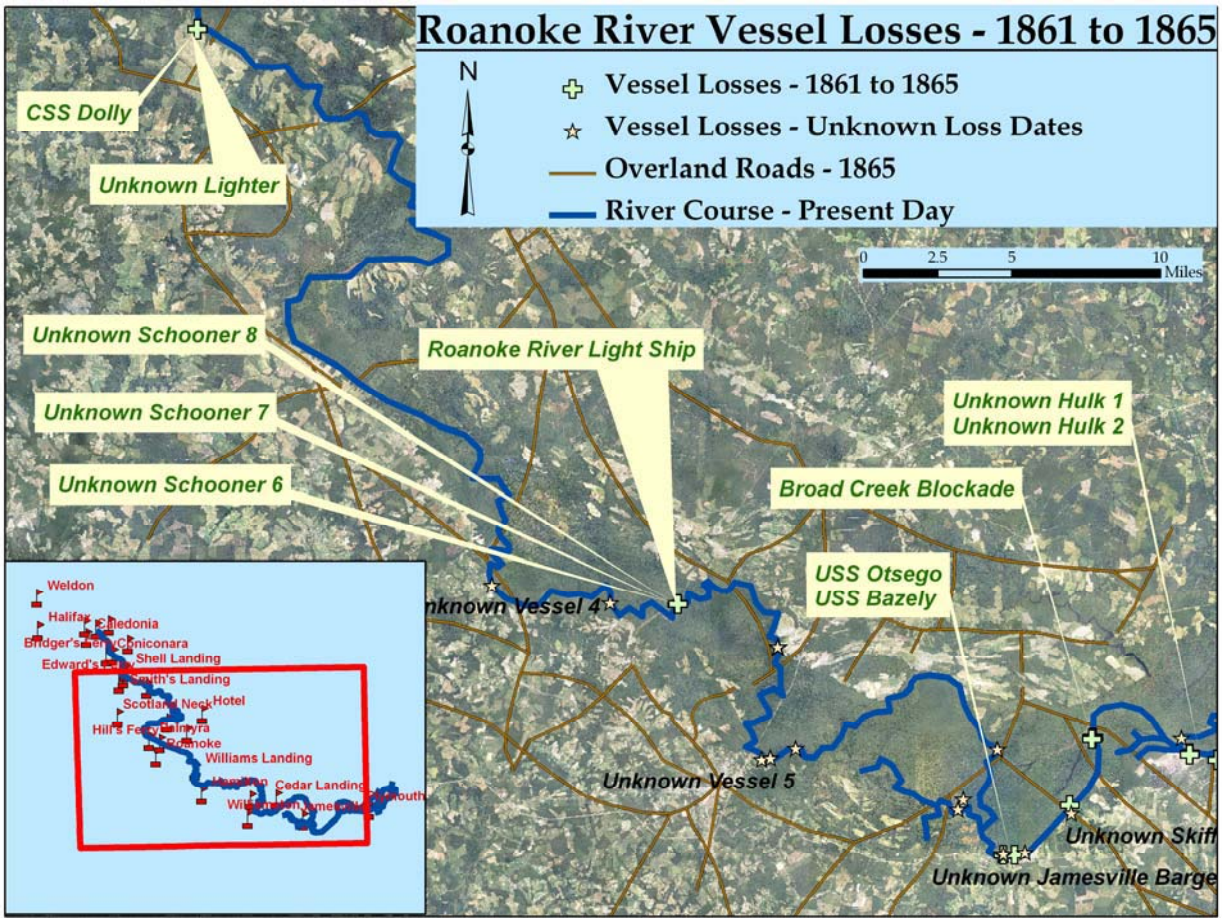

FIGURE 6.3. Roanoke River Vessel Losses – 1861 to 1865 (projection by author 2007).

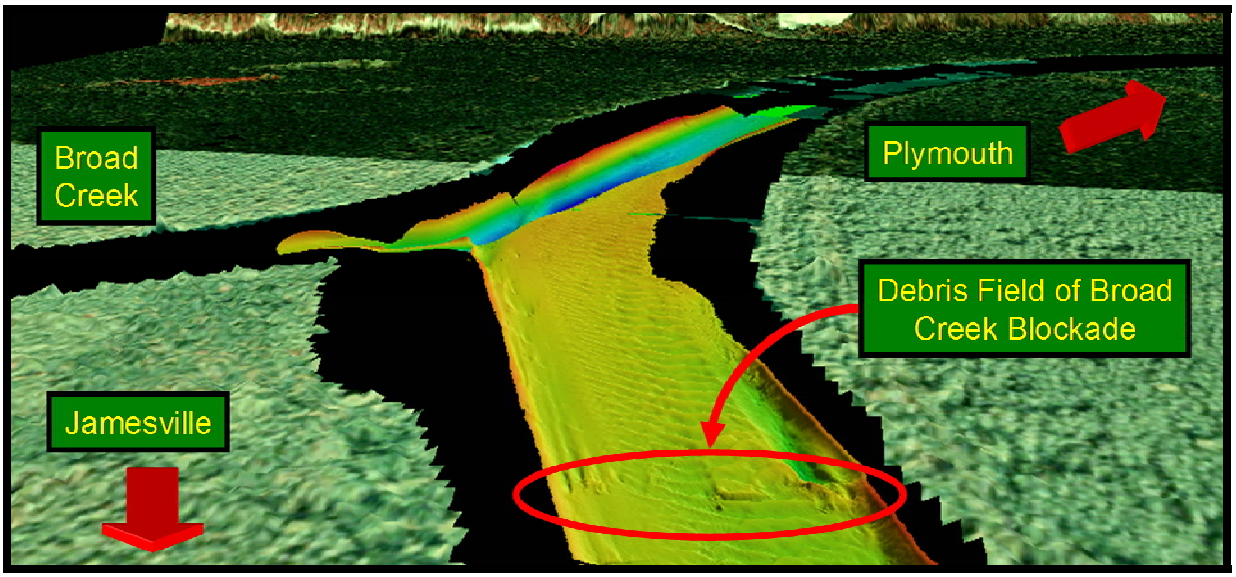

FIGURE 6.4. Multibeam tile of Broad Creek Blockade, Broad Creek, Roanoke River (image by author 2007).

After the Civil War (Figure 6.5), rail lines servicing the Roanoke at Weldon were well-established having operated over the last three decades. Railroads had not connected to any part of

the lower Roanoke below Weldon. The loss of the steamship *Vesta* near Norfleet's Landing between Palmyra and Caledonia indicates that industry along the Roanoke still depended on the riparian transshipment capabilities of steam vessels to move people, mail, and industrial goods, especially after a post-war dearth of shipping due to intentional wartime sinkings. The loss of *Vesta*, by snagging and sinking, occurred roughly halfway between Plymouth and Weldon and it is likely that *Vesta* was going to, or coming from, a location upriver, such as the railhead of the Wilmington and Weldon (*The Sun* 1879). If this is true, then between 1871 and 1880 there existed an organic linkage of waterborne and land-based modes of transportation between the centers of Weldon and Plymouth. In addition, the 1874 Report of the Chief of Engineers stated that a tugboat accidentally sank and was raised (Humphreys 1875:64). The report failed to mention where the tugboat went down but the presence of a tug infers that facilities along the Roanoke supported long-range waterborne transshipment and barges.

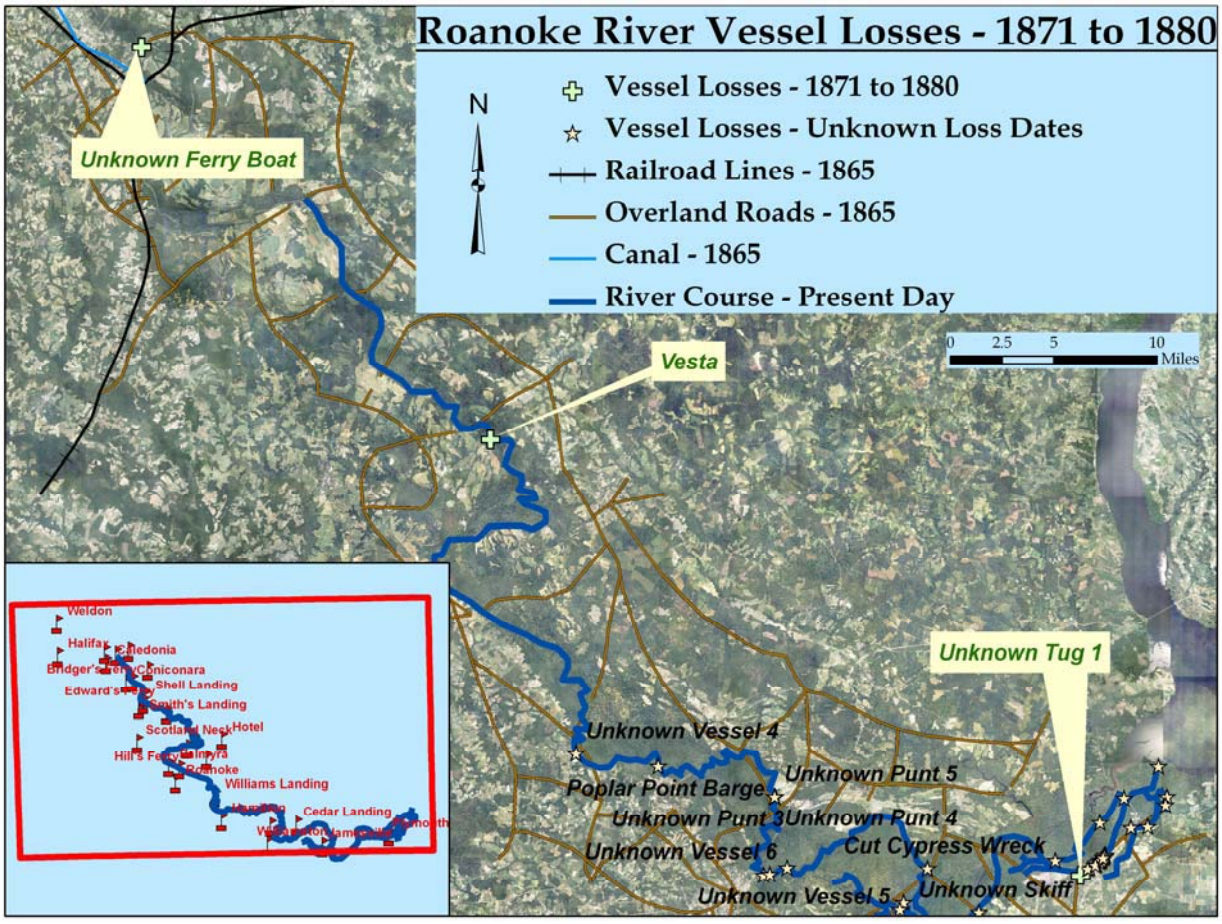

FIGURE 6.5. Roanoke River Vessel Losses – 1871 to 1880 (projection by author 2007).

An 1887 map details the course of the Albemarle and Pantego Railroad connecting to Williamston, NC (Figure 6.6). Williamston, a significant inland port well before the railroad arrived: the steamer *Commerce* burned at the docks in 1883, taking most of the business district with it. The presence of much cultural material in the vicinity of the Reconstruction Era Williamston docks, such as mooring cables and the site of *Unknown Vessel 6,* discussed previously, provides additional evidence that the establishment of a railhead at this location secured the importance of Williamston as a transshipment hub despite changes in transportation technology (Figure 6.7).

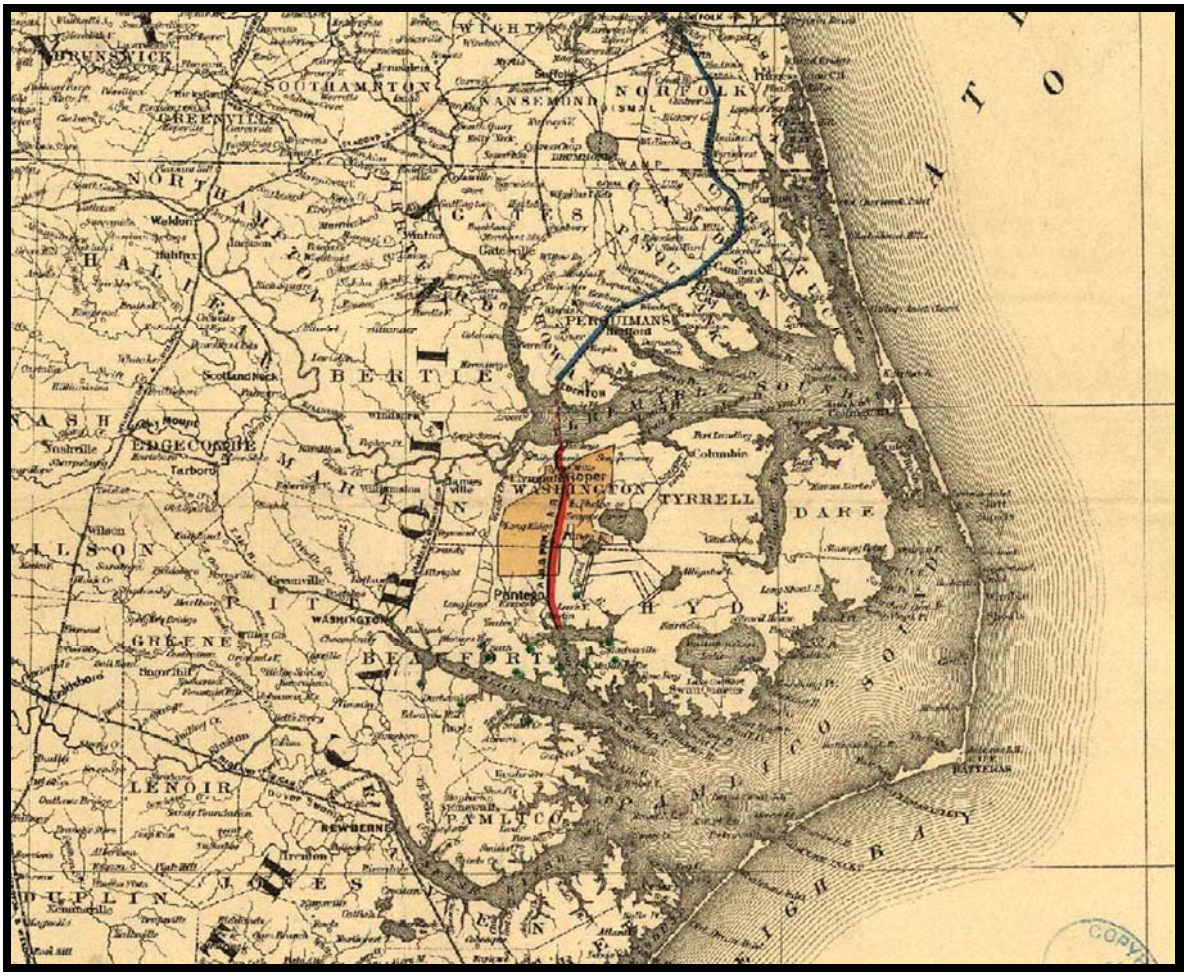

FIGURE 6.6. Albemarle & Pantego Railroad, 1887 (G.W. Colton and C.B. Colton & Co. 1887).

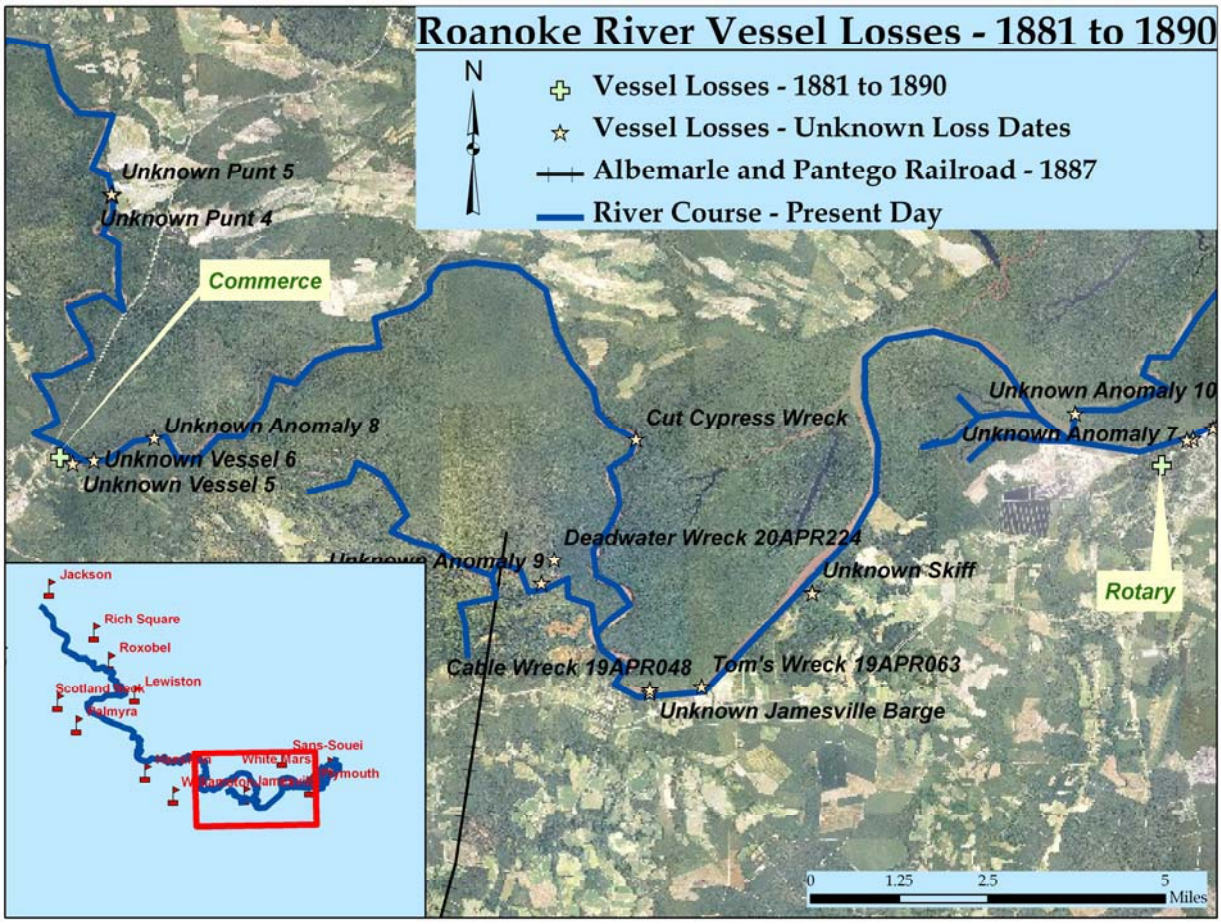

FIGURE 6.7. Roanoke River Vessel Losses – 1881 to 1890 (projection by author 2007)

Ordinarily, as per Taylor (1951), Peterson (1968), Clark (1981), and Parsons (1986), it would be expected that the presence of railheads at two strategic points on the Roanoke, Weldon and Williamston, would have potentially interfered with riparian transportation. If this were the case, the mal-effects of railroad competition were not immediately felt. In 1890, three years after establishment of the Albemarle and Pantego railhead, a 29 July article in *The Sun* reported the sinking of two barges, *Norwood* and *J.T. Murdock*, bound for Philadelphia during a freshet while loading railroad ties at Willoughby's Landing and Honnicock Landing, respectively. Though the location of neither landing is known, the loss of the barges testifies to the persistence of a waterborne transportation network along the Roanoke. In addition, the 1917 loss of the steamer *Hamilton*, while plying the Hamilton to Edenton route, demonstrated that waterborne transportation outside of the river was similarly persistent. Though railroads gradually became more parasitic over time, as argued in the previous chapter, they were not wholly deleterious even in the early 20th century.

Vessels lost in the 1950s complete the description of competition between different modes of transportation and a shift of importance away from the river mouth (Figure 6.8). These vessels

comprised the largest data assemblage for any decade considered and were largely deposited by intentional discard. Tugboats *Solicitor* (formerly *Unknown Tug 3)* and *Immigrant* (formerly *Unknown Tug 2*) were both reported abandoned and broken up in the *Merchant Vessels of the United States* for the years 1952 and 1957, respectively (United States Treasury Department 1952; 1957). In addition, *Susan Preston MacPhie* and *Rodney Philips MacPhie, Jr.* were discarded in 1959. They remain in a ships' graveyard within a mile downriver of the Plymouth waterfront. Moreover, the tentatively named *Fort Branch Barge*, named for its proximity to Fort Branch, was abandoned in 1952 (Bright, Lawrence, and Wilde-Ramsing 1982). Each of these vessels were owned and operated by Atlas Plywood Corporation, whose Plymouth branch was not listed as operator or owner of vessels after 1959 (United States Treasury Department 1959). The intentional discard of these vessels demonstrates that the industrial cultural landscape of the Roanoke was in significant transition during this decade: river industries were declining and becoming unable to support riparian transportation. The abandonment of *Southern Kraft No. 3* in 1975 provides further evidence of this trend (United State Department of Transportation 1974). Abandoned by the Plymouth Towing Company (Figure 6.9), this is the most recent vessel in the Roanoke portion of the ASCLD and likely represents the decline to present industrial activity levels of pulpwood production.

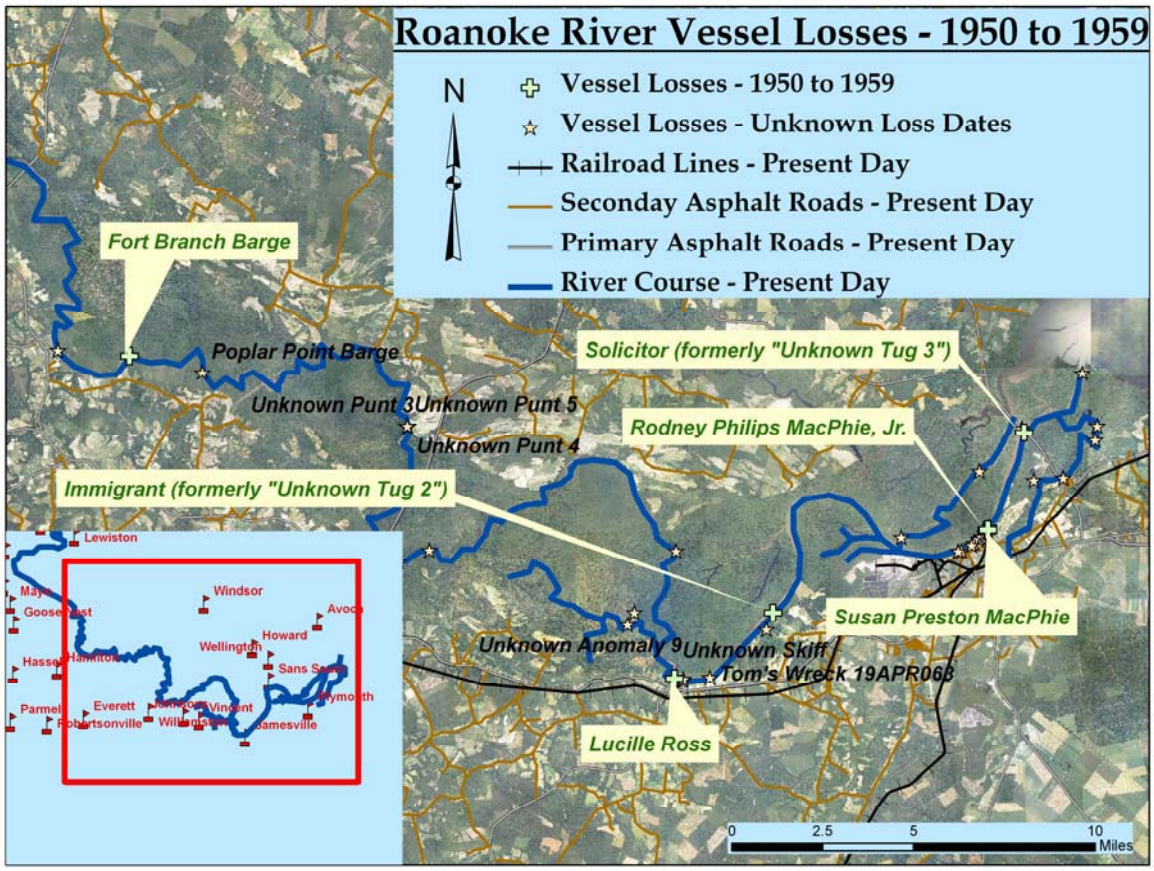

FIGURE 6.8. Roanoke River Vessel Losses – 1950 to 1959 (projection by author 2007).

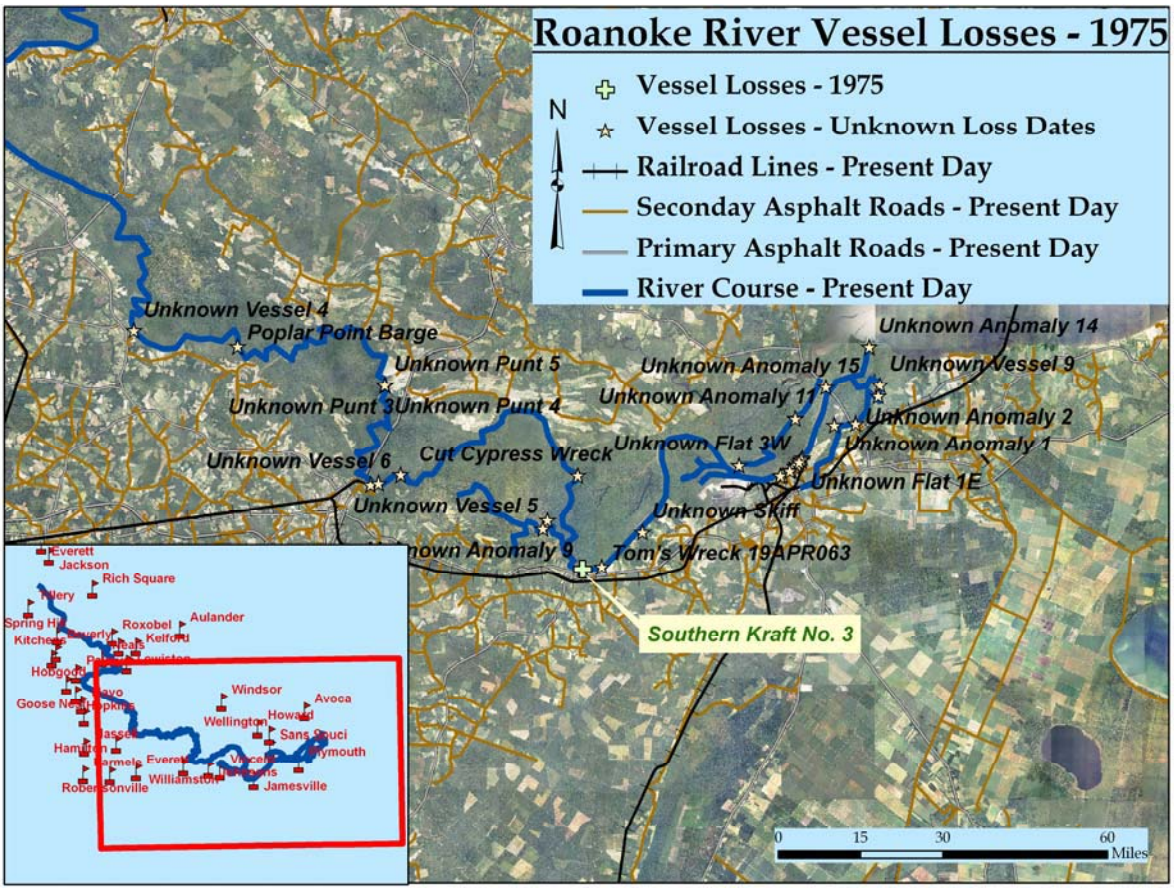

FIGURE 6.9. Roanoke River Vessel Losses – 1975 (projection by author 2007).

By stretching the analytical abilities of GIS to supplement diachronic statistical investigations of the Roanoke River, diachronic spatial analysis revealed trends outlining the evolution of central place importance. Plymouth dominated as a port in the 1830s. Weldon, with its railhead, was the military objective of the Union during the Roanoke Campaign of the Civil War. Williamston acquired ascendancy as a port and rail hub at the end of Reconstruction. This analytical technique showed the rise and fall of Roanoke central places, the eventual infrastructural dominance of the railroads, and the end of most waterborne commerce by the 1950s. Beginning at the river mouth, industrial importance gradually moved up the Roanoke, guided by the proximity that railroads provided to other centers, such as Norfolk, Wilmington, and Raleigh.

Determination of Unknown Vessel Use-lives

The method of diachronic spatial analysis was applied to forty-three vessels in the ASCLD whose archaeological locations were known but whose loss years, manners of loss, and identities were unknown. The forty-three vessel locations were plotted on charts of the Roanoke alongside vessels whose locations, loss dates, and identities were known: the vessels examined in the previous section

of this chapter. By observing associations between known and unknown vessels, this technique was able to suggest and narrow date ranges of unknown vessels.

Past alterations of the underwater archaeological record posed theoretical limitations on this strategy. Between 1871 and 1874, the Army Corps of Engineers cleared the river of many obstructions, counting forty-seven "bad snags," with some in Devil's Gut, a tertiary branch of the river. Engineers returned between 1882 and 1890, and they removed an unknown barge at Jamesville in 1913. In addition, vessels were removed individually by other parties shortly after wrecking. The article referring to the sinking of *Vesta* stated that the Baker Wrecking Company sent a crew to raise the vessel (*The Sun* 1879).

Despite clearing operations by the Army Corps of Engineers and private individuals, residues of navigation-obstructing vessels were still present in the main channel of the Roanoke, such as the Broad Creek Blockade, and the USS *Southfield* at Plymouth (Figure 6.10). These sites are fragmented, having been cleared sufficiently to be of no danger to passing traffic. The inability to find the locations of later known vessels was due to their high-profile identity. Unlike the tendency of deliberately-discarded vessels to be abandoned in waterways peripheral to areas of high shipping activity, as described by Richards (2006:90), catastrophic wrecking events usually occurred in heavy traffic areas, such as wharves or in the main channel (Murphy 1983: 66). Wrecks are dramatic events that sometimes receive documentation by those witnessing the occurrence, at times becoming preserved in the historical record. As a navigation hazard, they are typically removed and subsequently lost to the archaeological record. Therefore, the documentation of vessel loss in the cultural landscape of the Roanoke River is bifurcated. As research has shown, the historical record of the Roanoke included high profile vessels lost by wrecking that were removed from the river. Modest vessels quietly discarded in low-traffic and relatively unimportant waterways were not removed, thereby instantiating the archaeological record.

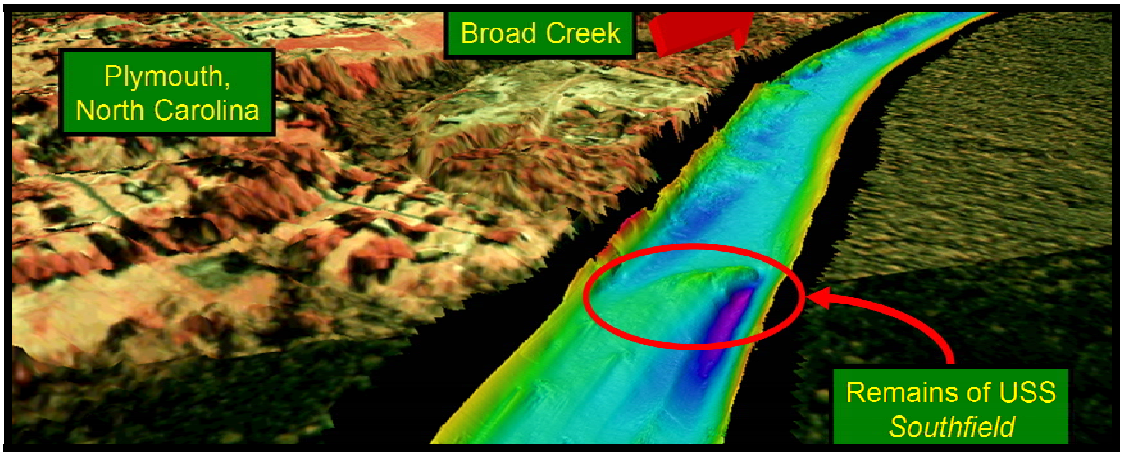

FIGURE 6.10. Multibeam tile of Plymouth waterfront, USS *Southfield*, Roanoke River (image by author 2007).

With multiple modifications occurring to the vessel assemblage of the Roanoke, it was unlikely that any spatial patterns of site clusters would persist to the present. Patterns did exist, however, and the occurrence of past dredging operations was an interpretative aid, not a hindrance. Knowing when dredging occurred provided a *terminus ad quem* for the possible use lives of unknown vessels. Unlike high profile wrecked vessels, individual vessel clearing behavior was not a significant threat to intentionally discarded vessels. Dredging, the all-inclusive clearing of waterways, impacted and disrupted abandoned vessel assemblages. As a result, it is likely that vessels detected via remote sensing techniques were deliberately discarded during the twentieth century.

GIS projection of the unknown vessels still present in the archaeological record revealed seven vessel clusters (Figure 6.11). From the river mouth moving upstream, these clusters occurred in the river delta area (Conaby Creek, Eastmost River, Middle River, and the Thoroughfare), the Plymouth abandonment area, Jamesville, Devil's Gut, the old port of Williamston, Speller's Ferry, and Hamilton. Two clusters were within one or multiple tertiary streams: the river delta and Devil's Gut. In line with observations made by Richards (2006:90), that abandoned vessels tend to accumulate adjacent to ports, four abandoned vessel clusters occurred near Roanoke wharf areas: Plymouth, Jamesville, Williamston, and Hamilton. The seventh cluster, located at the old site of Speller's Ferry, contained four punts. It is probable that when Speller's Ferry was no longer economically necessary, the punts and the ferry were abandoned.

Certain abandoned vessels, about which some additional information is available, contributed to the determination of date ranges for these clusters. Vessels abandoned in the environs of Plymouth correlated with plywood and veneer manufacturing begun in 1912 at the New Wilts Veneer Company and its aliases (Plymouth Box and Panel Company, Atlas Plywood, Georgia-Pacific) (Tidewater Atlantic 1990: 12-13). This historical data, along with removal of the tentatively named *Unknown Jamesville Barge* by the Army Corps of Engineers in 1912, supplied a maximum age to vessels in the vicinities of Jamesville and Plymouth. Further narrowing the age of underwater site clusters, and the elucidation of the function of these abandoned vessels, required incorporating data from terrestrial site investigations, as well as histories of industrial activities along the river.

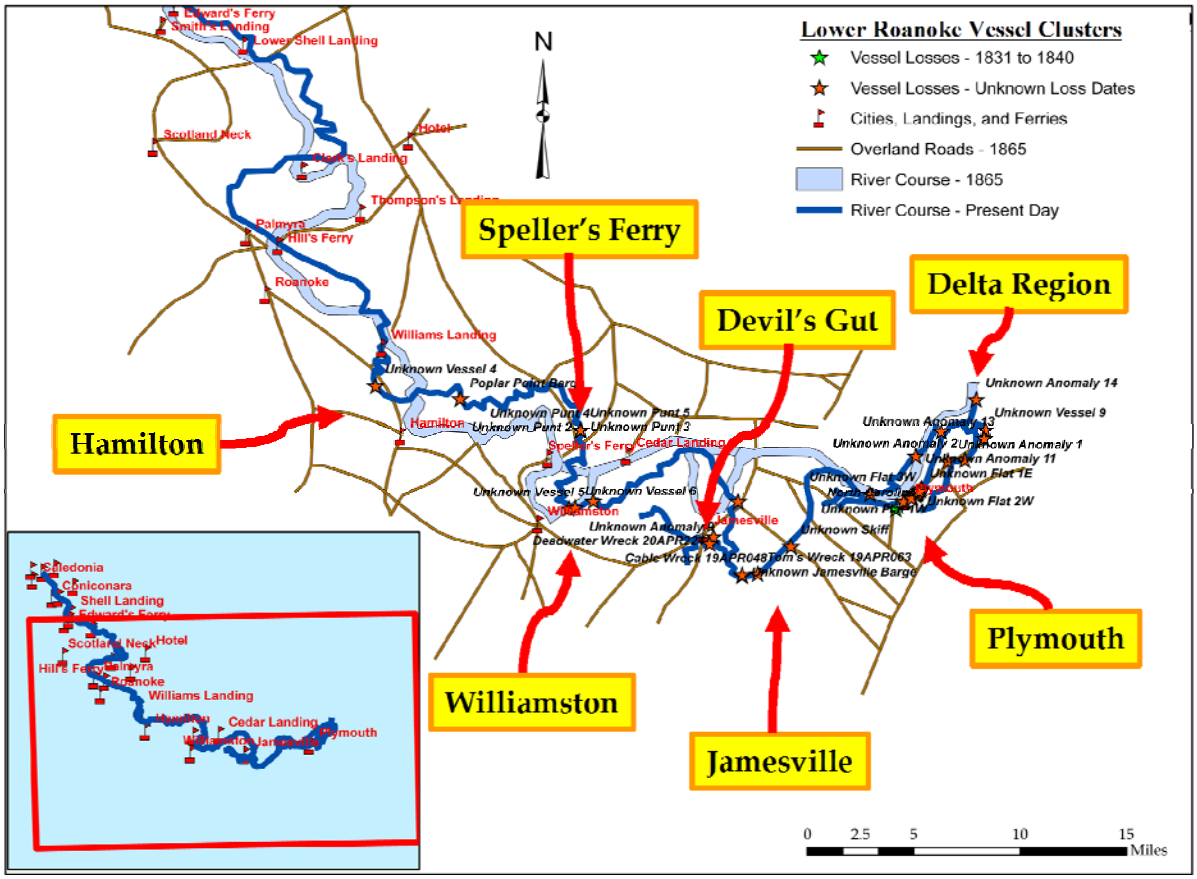

FIGURE 6.11. Lower Roanoke Vessel Clusters (projection by author 2007).

Zonation of the Landscape via Terrestrial Site Investigation

Applying the various definitions of landscapes given by the World Heritage Committee, the Roanoke is an organically evolved landscape containing both relic and continuing components (World Heritage Convention, 1995: 432). Moving beyond methods and levels of analysis that serve to narrow potential date ranges and functions of unknown watercraft, investigation of the landscape revealed information pertaining to human actions that produced its current conformation (Hoskins 1955). Classification of terrestrial sites according to their function, and spatially plotting this data in GIS, provided the means with which to analyze human action, past and present, and demarcate zones of industrial use and activity within the landscape.

The thirty-six terrestrial sites of known function were grouped into five categories: logging-related, fishery-related, farming-related, industrial landings, and illicit moonshine distilleries (Figure 6.12). Plotted in a pie chart, the dominant category is self-evident: the logging-related group, representing over nineteen sites, contains over half (53%) of all sites of known function (Figure 6.13). It is clear from this statistic alone that logging has been the dominant industrial activity since at least the 1880s.

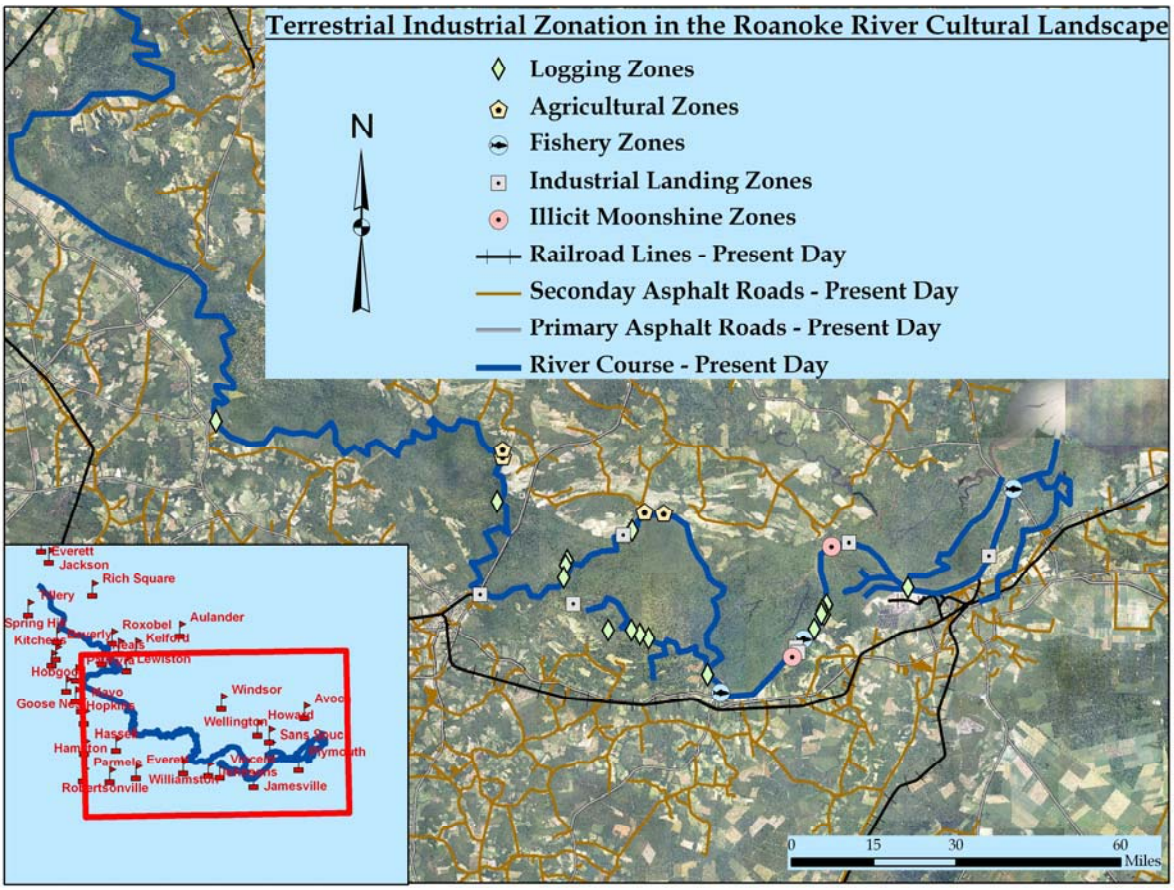

FIGURE 6.12. Terrestrial Industrial Zonation in the Roanoke River Cultural Landscape (projection by author 2007).

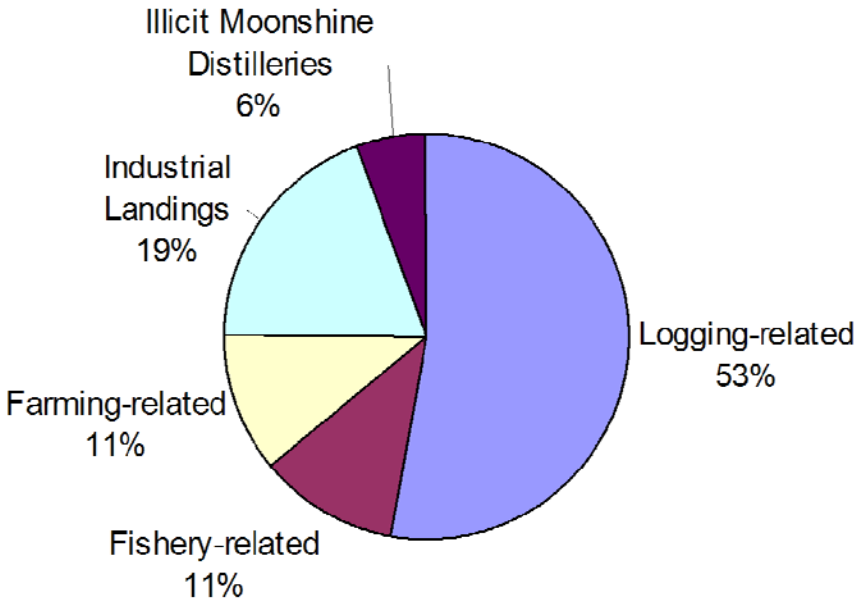

FIGURE 6.13. Number of terrestrial sites per function category; N=36 (*Roanoke River Terrestrial Sites Database*; graph by author 2007).

Logging-related sites were most commonly located between industrial landings. Concentrations of logging sites sat between the Sans Souci Ferry and Jamesville, Jamesville and Barber Landing at the western terminus of Devil's Gut, and between Jordan Landing and Williamston. Individual outliers also fit this pattern: the presence of light rail irons at Hamilton and Speller's Ferry, and the existence of the Weyerhauser Pulp Mill since the 1940s. The spatial patterning of logging sites indicated a differentiation between locations suitable for human settlement and those suitable for resource extraction. As discussed previously, hydrology heavily influenced settlement. If situated on topographically higher land, industrial landings would not have lowland swamp forests nearby. When forests were close to landings, such as on the bank opposite Speller's Ferry and Jordan Landing, logging sites would, in turn, be proximal to industrial sites.

Areas suitable for swamp logging were not normally close to developed areas. For this reason, Devil's Gut was a locus of logging activity (Figure 6.14). Approximately eight miles wide, the area between the gut and the main channel of the Roanoke to the north encompassed a wide floodplain that was almost always submerged. This attribute extended along the length of the river between Williamston and Jordan Landing, and also described the stretch of river between Sans Souci and Jamesville.

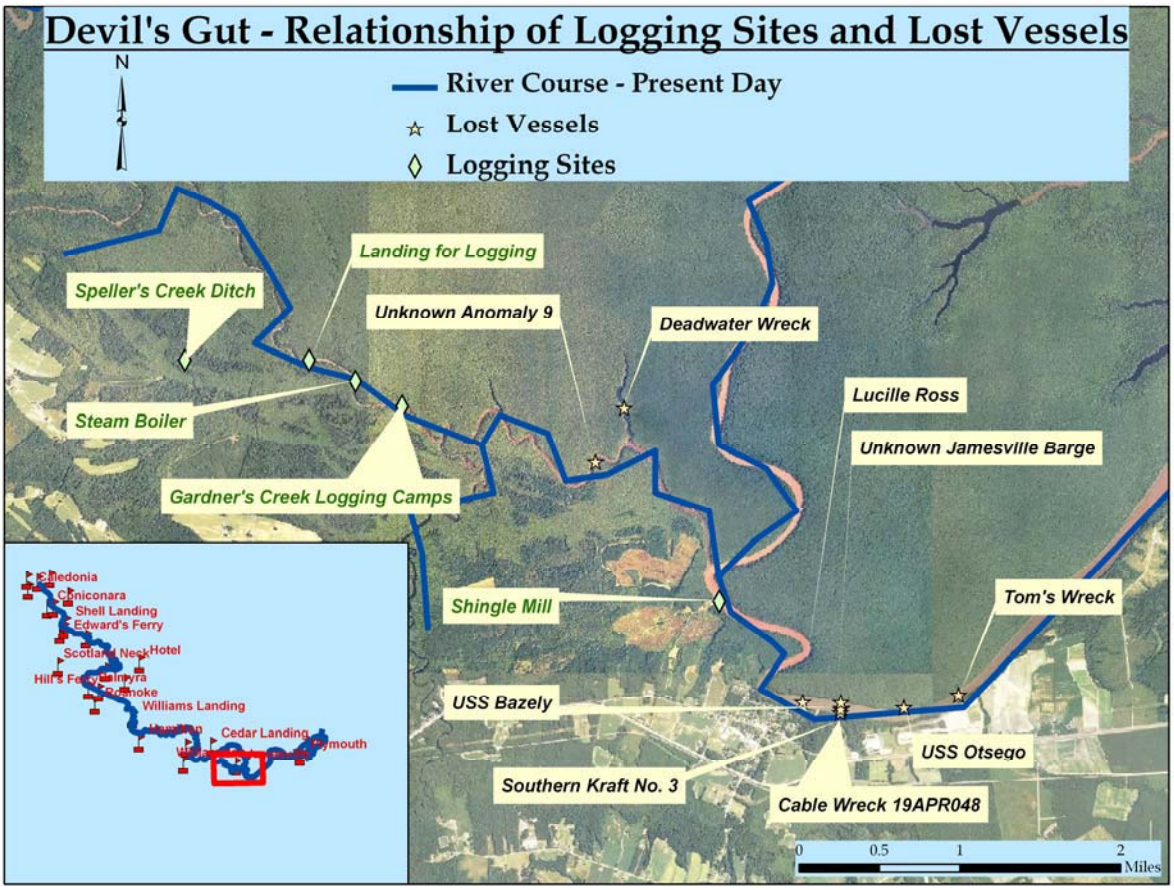

FIGURE 6.14. Devil's Gut – Relationship of Logging Sites and Lost Vessels (projection by author 2007).

Site dating came from both artifact analysis in the field and knowledge of local informants. A piece of logging-related, steam-powered equipment located between Jamesville and Sans Souci featured a date plate that read "PAT' JAN. 6 1880." At the very least, this only provides a *terminus a quo* for this single site but the technology appeared similar to machinery located elsewhere, such as the *Train of Plymouth*. Swamp forests, however, were logged, and logged again repeatedly, whenever a stand of trees returned to an economically-favorable size and density (Hanlon 1970). The Jordan Farm, for example, was logged in the 1950s and again during 1969 and 1970 (Russell Lee pers. comm., 2007). Some individuals still living in the Roanoke River region trace their ancestors to riparian logging before the Civil War, demonstrating a tradition of timber harvesting in the same forests time and again (Harry Thompson pers. comm., 2007).

Re-cutting previously logged tracts, and the occurrence of antebellum logging, suggests that logging-related sites included in the RRTSD covered a broader chronological span than the archaeological record indicates. Persistent physical remains, such as iron rails and machinery, did not appear until approximately 1880, as assumed by the *terminus a quo* derived from the 1880 donkey engine patent plate. Signatures of bull-hunching, the primary mode of logging prior to steam-driven logging practices, would not have survived long after the actual logging event.

Unlike logging, fisheries appeared to be non-specific in their land-use tendencies, sitting non-preferentially on low-lying or developable land (Figures 6.15 and 6.16). The surviving structures at Flemings Fishery, for example, are located directly across the river from the Jamesville waterfront but become inundated when the river is high (Figure 6.17). In another case, Gray's Fishery is located strategically between Jamesville and Sans Souci, a ferry that remains in operation. The old location of the Kittyhawk Fishery, where the Weyerhauser Pulp Mill now stands, was the only fishery located on higher ground.

Logically, zones suitable for fish processing are adjacent to rivers but this industrial activity appeared not to require any particular type of land. Similar to logging, where trees were felled in remote locations and brought to a mill or a landing for manufacturing and transshipment, fisheries acted as places of resource concentration and processing in the form of catch collection and cleaning. For this reason, as long as a riverside location was suitable for building a structure, vessels could dock, nets could be dragged back to shore, and a fishery could operate. A fishery, however, needed proximity to developed areas to participate in local markets. Therefore, fisheries were unlike the timber industry where centers of timber collection and milling were only found on convenient and developable land. Fisheries operated on lower quality land close to developed areas and within reach of local markets.

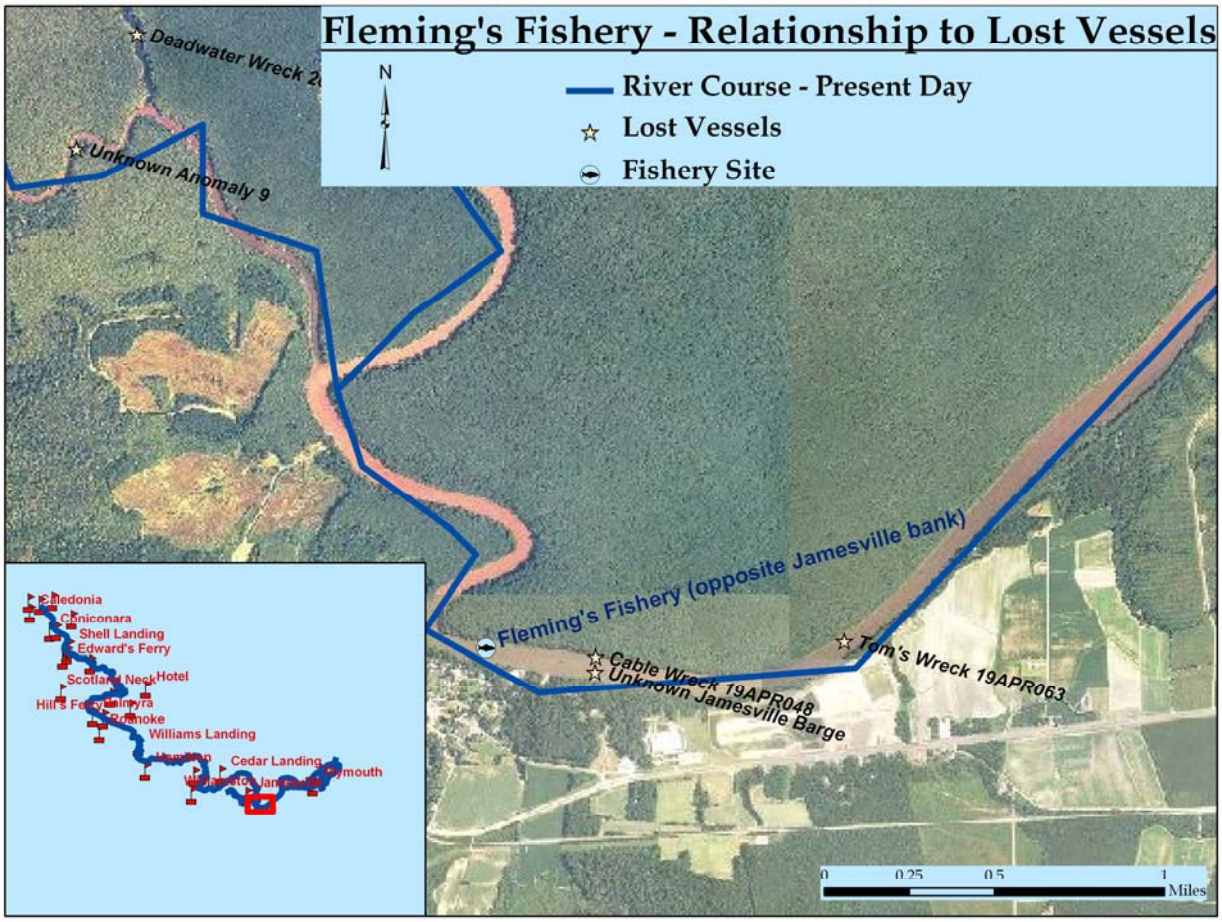

FIGURE 6.15. Fleming's Fishery – Relation to Lost Vessels (projection by author 2007).

FIGURE 6.16. Fleming's Fishery, as seen inundated (photo by author 2007).

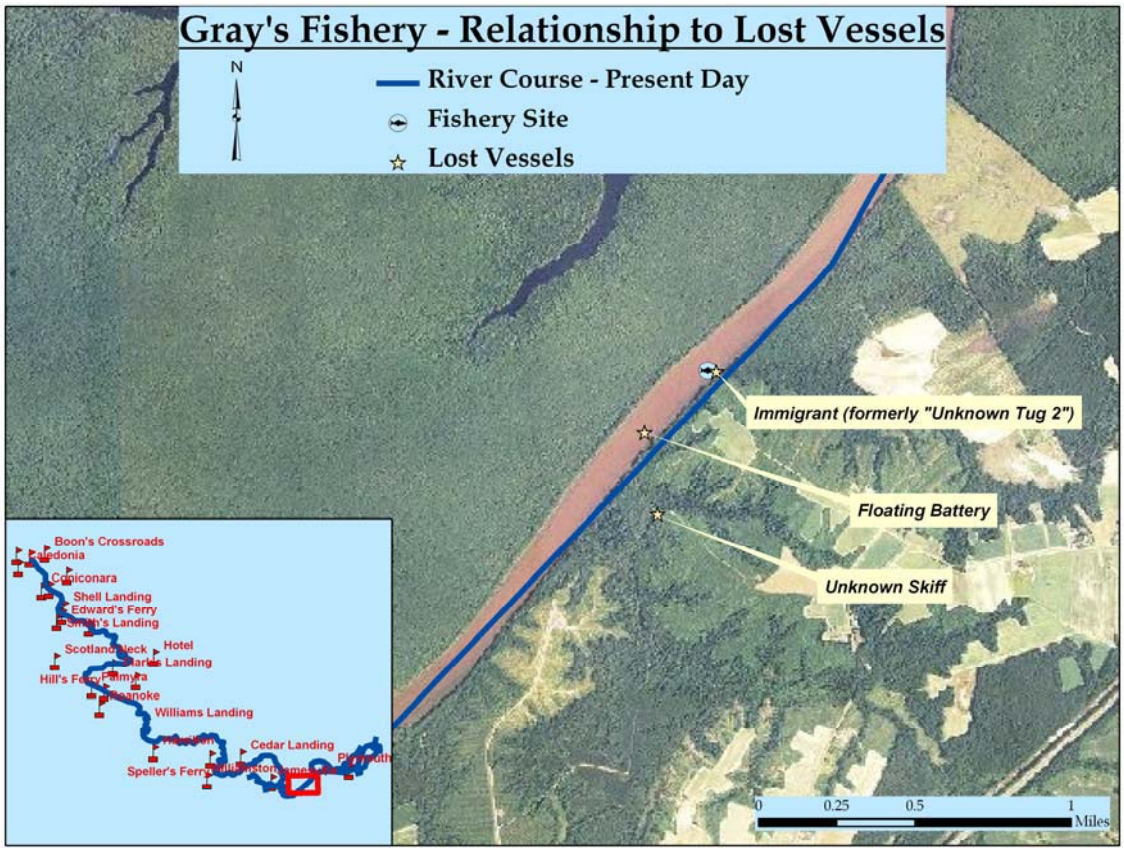

FIGURE 6.17. Gray's Fishery – Relation to Lost Vessels (projection by author 2007).

Most agricultural crops, except for rice, do not grow well in inundated areas. For this reason, farms did not tend to border on the Roanoke except if bluffs allowed. The Grey Farm, for example, is situated between Plymouth and Jamesville with fields extending only as far as the river heights and not down onto the lower floodplain. Other agricultural sites used today are located by Jordan Landing and Speller's Ferry (Figure 6.18). These are river bends and, though adjacent to the river, have high banks. As a result of the agricultural requirement of topographically-high land, zones supporting farming are more exclusive than those for fisheries and do not include any low-lying areas.

Zones describing the location of logging, fisheries, agriculture, and industrial landings form a spectrum of suitable locales. Fisheries sit at one end due to their non-specificity of low-lying or headland areas. Agriculture requires the river as a water source but cannot tolerate floodplain locations. Between fisheries and agriculture, in terms of usable land, is logging. Loggers must fell trees, whether or not the forests stand on convenient or inconvenient land. In addition, lumber does not immediately decay, unlike fish, which permits lumber to be transported from remote locations to developed areas convenient for processing, marketing, and shipping.

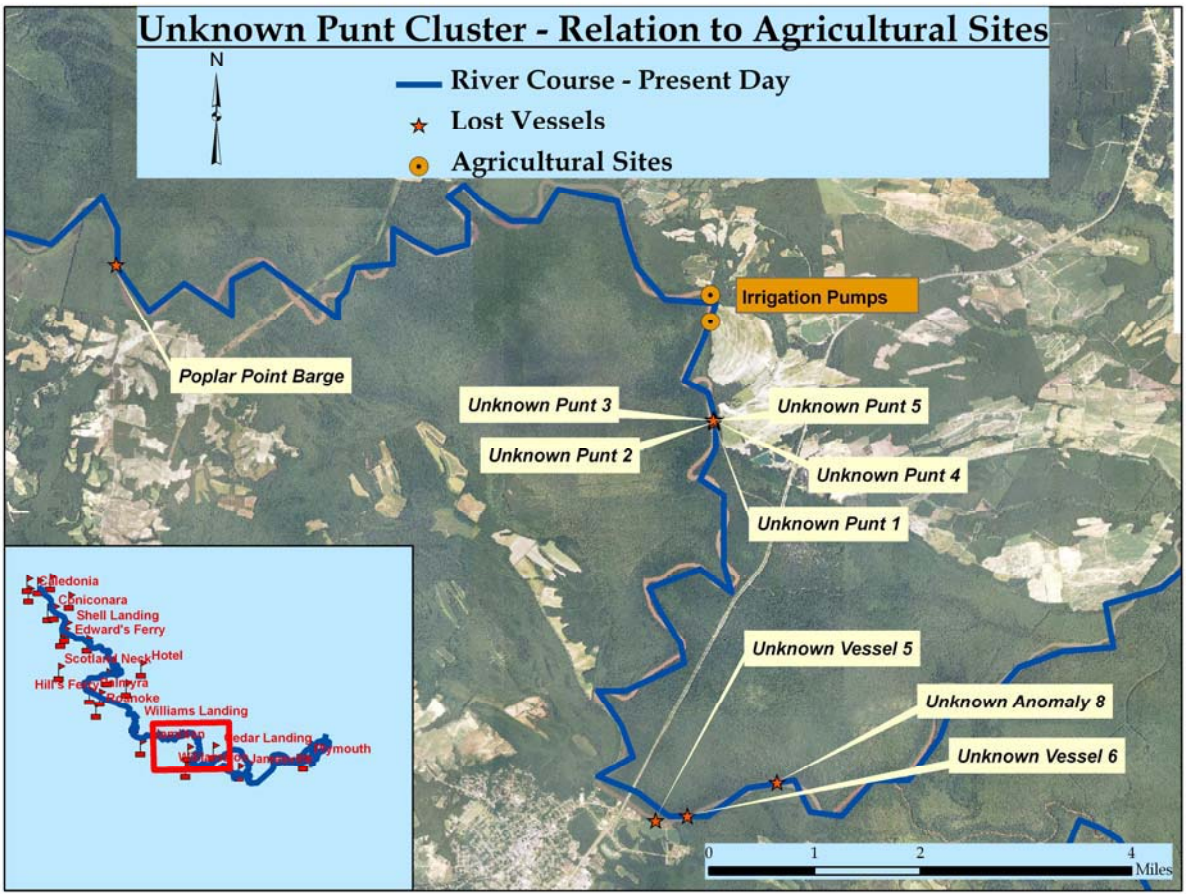

FIGURE 6.18. Unknown Punt Cluster – Relation to Farming Sites (projection by author 2007).

Zonation of industrial activities reveals modes of behavior and risk assessment. Location choices by agents engaging in logging, fishing, and agricultural are made within the structures of society. Each industrial endeavor necessary to society is legal, as explained by the domination and legitimation structures, but not free from risk (Giddens 1984: 29, 165). Risk, in reference to these activities, exists in the methods by which logging, fishing, and farming are pursued. Flooding poses a risk to farmers, compelling them to place farms adjacent to the floodplain rather than adjacent to the river. With fisheries, as long as fishery structures can survive a flood, fishing contains little risk regarding river processes. Logging requires timber harvesting in swamp areas, but milling does not. Owners of lumber mills share the risk of farmers; floods can destroy factories as well as inundate crops.

Without bans on the placement of farms, fisheries, or mills, zonation has patterned the landscape in line with neo-liberal risk management as described by Crook (1999). Foreseeing that a flood might occur prompted agents to place farms and mills on lands not prone to inundation yet convenient for riparian transshipment. The combined factors of industrial legality, neo-liberal risk

management, and the existence of low-risk convenient venues on the river yielded the conformation of the Roanoke cultural landscape.

Zonation of Illicit Moonshine Distilleries and Comparison to Legal Industries

Both known moonshine sites are within logging-related zones: by the *Train of Plymouth* across from Jordan Landing, and off Rose's Creek on land owned by Georgia-Pacific (Figure 6.19). By word of mouth, it is generally known that loggers at times engaged in moonshine production (Russell Lee pers. comm., 2007). Aside from individuals abandoning vessels in tertiary streams and hunters prowling the backwoods areas, loggers were the only people entering and using remote, lowland swamp forests. Their trade depended on operating in these inconvenient locations, exposing them to venues of infrequent visitation and scant judicial oversight. Their experience provided two essential elements for locating an illicit distillery: no visitors and no authorities.

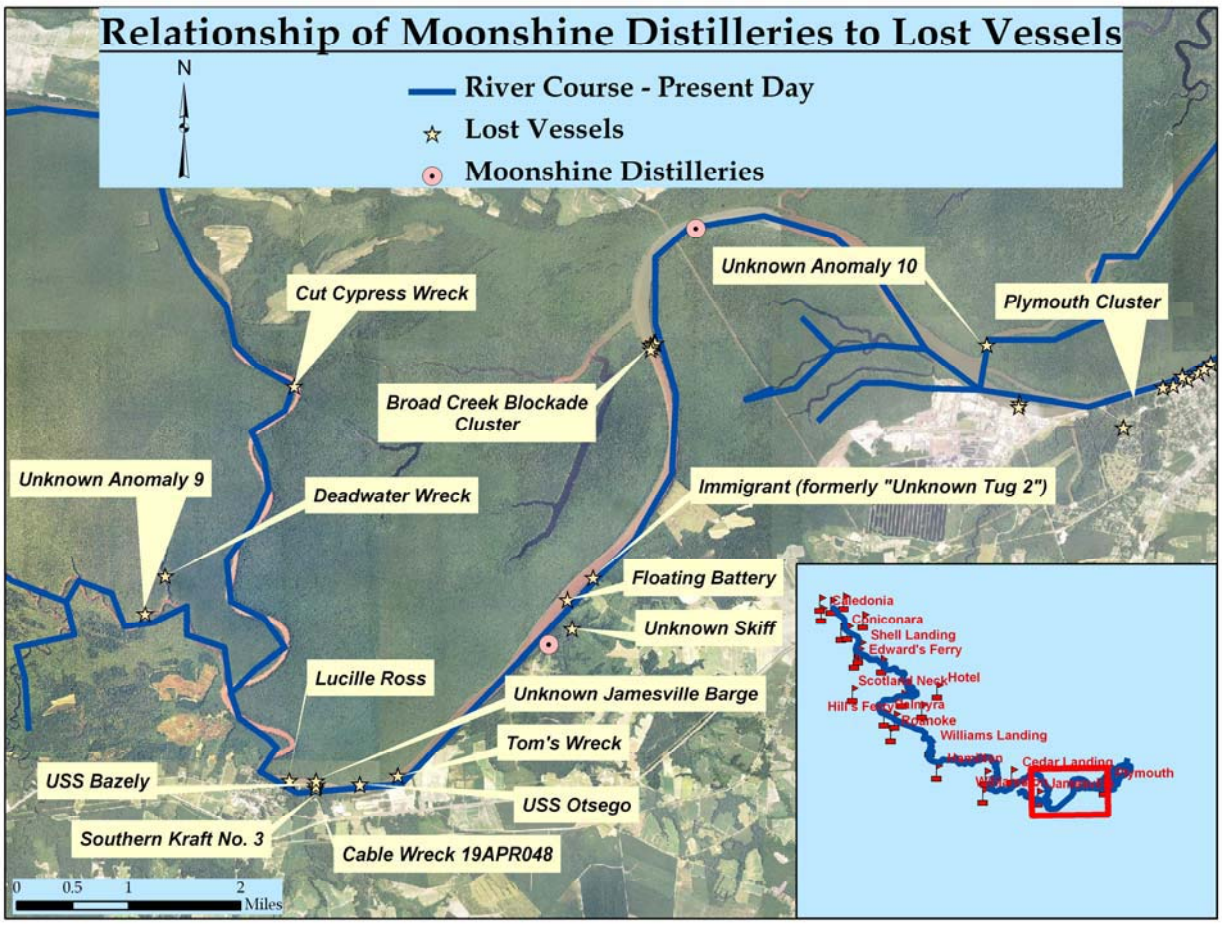

FIGURE 6.19. Relationship of Moonshine Distilleries to Lost Vessels (projection by author 2007).

The moonshine site locations within logging zones demonstrate the varying perceptions that different groups had of Roanoke swamp forests. The archaeological record reflects the many facets of the cognitive landscape defining the patterning of moonshine distilleries (Gosden and Head 1994; Duncan 2004). The close proximity of the *Train of Plymouth* to one still, and the situation of another moonshine operation on Georgia-Pacific land, shows that the Roanoke hosted overlapping cultural landscapes. The overlap was not typical, however, because it was affected by the legitimation, rather than domination, structure of society. Individual areas supported cultural landscapes defined both by legal and illegal activities: a result of individuals alledgedly acting both as loggers and moonshiners. Acting both within and outside the laws of society, these agents, in terms of Structuration, had multiple perceptions of the utility of Roanoke swamp forests.

Though situated in remote locations, moonshine distilleries were not inaccessible. Being difficult to reach discouraged chance discovery by wandering individuals or government agents, but distillery sites still required access to minor waterways to bring raw materials in and carry finished alcohol out to market. In this way, moonshining was not different from the legal trades occurring around it. The health dangers associated with uncontrolled alcohol production, however, made it dangerous to consume. The effects of society's attempt to nullify or limit these dangers via ordered risk management and the dialectic of control were observed at the Rose's Creek moonshine distillery site: a debris field of dynamited 55 gallon drums and shredded rubber hoses (Figure 6.20). The risk that came with the possibility of completely losing the financial investment represented by the still and the danger of marketing the product meant that profits could be had: an encouragement to some to accept the risks associated with defying society's laws.

FIGURE 6.20. Moonshine Distillery Debris Field (photo by author 2007).

Profits from moonshine involved exportation to, and sale in, developed areas, which required careful choosing on where to situate a distillery. The most economically favorable locations for illicit distilling were those considered by legal industries as inconvenient places for production and yet were close enough to a landing or city to minimize transshipment time and risk of detection en route. The proximity of one site to Jordan Landing, and another to Grey's Fishery and Jamesville, supports this interpretation. Land inconvenient for the purposes of legal industry was convenient and risk-minimizing for illicit trades.

The production of moonshine, and the decision of some individuals to construct distilleries, can be explained in large part by current understandings of cultural landscapes, societal structuration, and risk, but not entirely. Moonshine distilling was typically conducted by single agents maintaining multiple perceptions of a single location. A lumberjack, for example, could simultaneously be a moonshiner: an agent perceiving a stand of swamp forest suitable for logging and alcohol production. This is not to say that single locations could not support multiple industries. Single locations could serve multiple purposes but a location typically hosted one industrial activity at a time and experienced a succession of resource collection activities. In this way, an area would be cleared of trees by loggers, then cultivated by farmers, and then, if the fields were left fallow too long, logged again in a continuing cycle. This was known to have occurred on the Gray Farm (Russel Lee pers. comm., 2007). None of these legal activities, however, occurred simultaneously on the same tract of land. The infrequent nature of logging, on one hand, established a tract as meant for harvesting and provided a legitimate front to illicit activities occurring out of sight from the river. As a result, single agents produced a mercurial complex of cognitive landscapes and a cultural landscape of diverse function through time.

Determination of Unknown Vessel Function via Terrestrial Zonation

Thus far, zonation of the Roanoke River landscape has eased the investigation of spatial relationships between industrial sites and central places. Terrestrial zonation permitted the investigation of human behaviors on land, as well as the associated cognitive landscape that explained the patterning of industrial activities and places. Forty-three vessels of the ASCLD, however, remain unknown in terms of function. This section observes possible associations between unknown vessel clusters and the terrestrial component of the cultural landscape to suggest functions for these derelict craft.

Unknown vessels in the environs of Williamston gained context from material culture remains located on the Bertie County river bank (Figure 6.21). At multiple points corresponding to

underwater vessel locations, there were cut mooring lines about one to two inches diameter tied to trees. It is likely that these lines once prevented now sunken vessels from floating downstream, intended to temporarily keep unnecessary watercraft out of the way but in a state that would allow them to be easily reactivated as carriers once economic conditions improved (Wilde-Ramsing 1986).

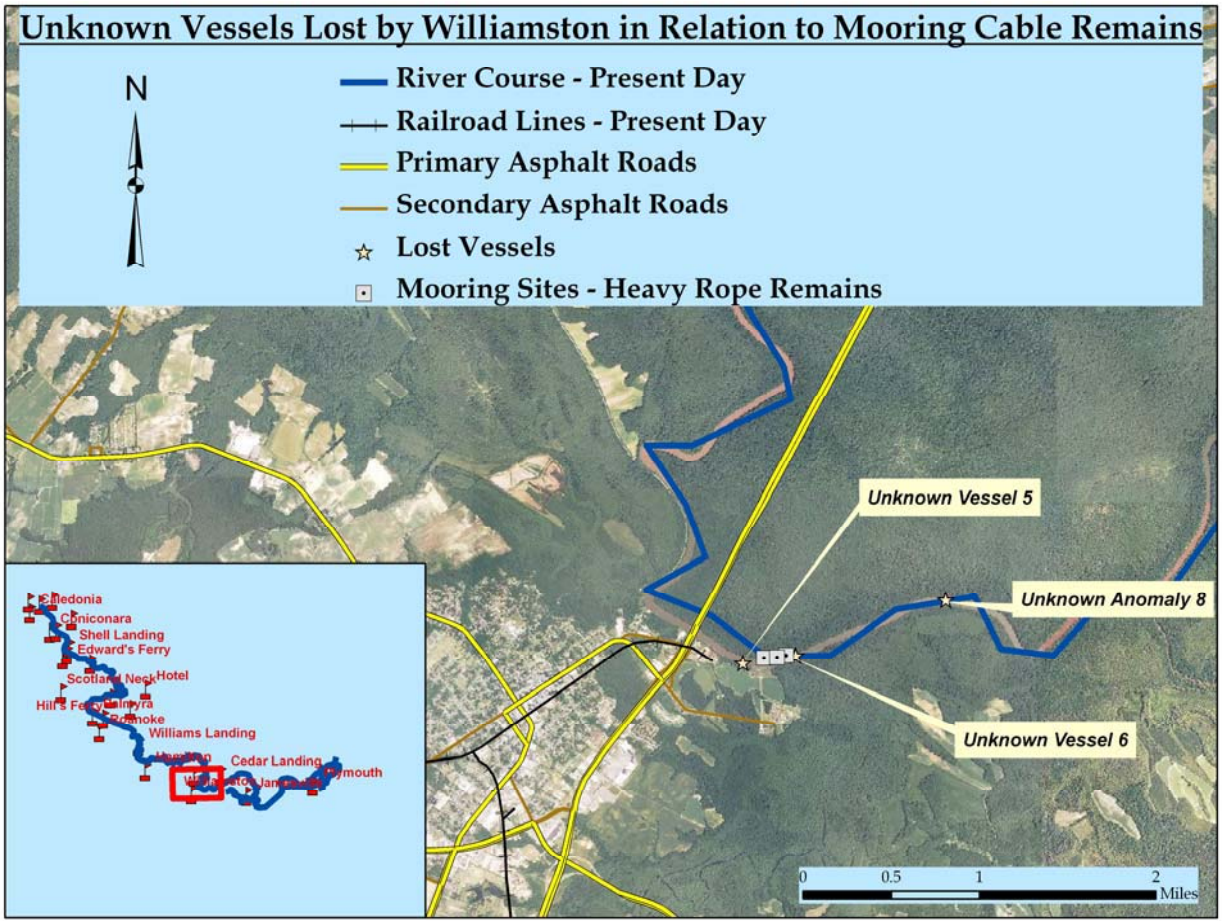

FIGURE 6.21. Unknown Lost Vessels by Williamston in Relation to Mooring Cable Remains (projection by author 2007).

Ground-truthing of *Unknown Vessel 6*, part of the Williamston cluster, confirmed the unintended nature of its loss. The vessel, originally thought to be the steamer *Commerce* that burned at the Williamston docks in 1883, had structural features more in common with a barge. In excellent condition, the top deck was intact with a single bollard fore and aft, as well as a vertical transom, suggesting that it was intended to be towed via daisy-chaining. Of greater interest was the orientation of the vessel to the bank. The stern is about four feet from the bank in twenty feet of water. The bow juts out into the channel and points downstream, forming an approximate angle of thirty degrees with the bank. With the barge's forward section in the channel and an approximate side of hull of four to five feet, the vessel would pose a potential navigation hazard to deeper draft

vessels. A dredging operation would not miss *Unknown Vessel 6*. Hence, it is likely that this vessel was lost sometime after the 1912 dredging.

The processes acting on *Unknown Vessel 6* appeared similar to those of Eagles Island, Wilmington, NC. In the case of the steam tugboat *Argonauta*, the owner, Stone Towing Line, moored the vessel at a vacant dock in 1931. This was during the Great Depression and the corresponding slump in maritime commerce that made *Argonauta* unnecessary. The Stone brothers, who operated the Stone Towing Line, intended this to be the temporary storage of a useful vessel without an economy in which to work. The economy did not improve quickly enough and, by the time maritime commerce within Wilmington improved, *Argonauta* was in disrepair, obsolete, and consequently abandoned (Wilde-Ramsing 1986).

Farther upriver from Williamston, five unknown punts were found at Speller's Ferry (Figure 6.22) (Lawrence 1990: 2). The spatial connection between the punts and the ferry is clear but other relationships exist between the vessel cluster, farming, logging operations, and asphalt road infrastructure. Currently, there is an active farm one mile upriver from the old Speller's Ferry site. In addition, rail iron sits on the bank about a mile downstream. The swampland around the ferry site was logged by Union Camp and Georgia-Pacific. Logging operations, as described in Chapter Four, utilized light rails and railroad engines to aid timber harvesting operations.

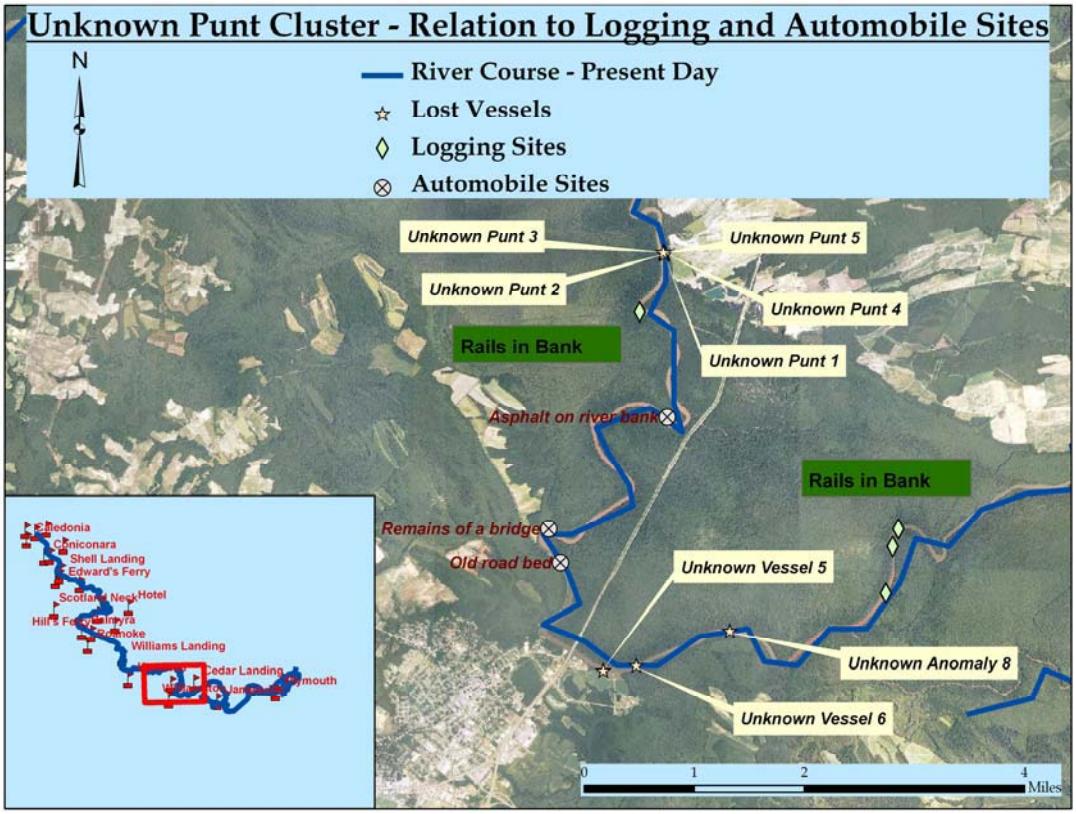

FIGURE 6.22. Unknown Punt Cluster – Relation to Logging and Automobile Sites (projection by author 2007).

Located between arable and swamp land, Speller's Ferry apparently was a transshipment location. The remains of an abandoned asphalt road bed extending from Williamston towards the location of the rail irons suggests that automobile technology in the form of trucking usurped the necessity of the ferry, making it a possible victim of transportation technological succession. Instead of logs being carried to the river on light rails and moved to landings by boat, direct interaction between the light rail and asphalt road would increase logging efficiency by cutting out river-based transportation. The punts, no longer needed as workboats, were abandoned.

The areas of Devil's Gut and Jamesville supported a variety of industrial activities in relation to vessel clusters on these segments of the Roanoke River (Figure 6.12). Multiple logging-related sites, discussed previously, sat on Devil's Gut. These sites, combined with the remains of a shingle mill midway between the gut and Jamesville, clearly demarcated this section of the river as important for timber. A previously ground-truthed vessel, *Deadwater Wreck 20APR224*, and a sonar contact, *Unknown Anomaly 9*, sit within the gut. *Unknown Anomaly 9*, not a confirmed wreck, resembles a broken up vessel scatter area, possibly the result of the Army Corps of Engineers 1874 dredging operation.

Logging operations in Devil's Gut were connected with Jordan Landing to the north and west via a temporary rail line through the swamp (Russell Lee pers. comm., 2007) (Figure 6.23). The abandoned remains of a rail engine, the *Train of Plymouth*, and a flat car are present at the line's Jordan Landing terminus. This linkage may explain the relative dearth of vessels located in the stretch of river between Jamesville and Jordan Landing. Moreover, this explains the vessel deposition pattern between the gut and Jamesville. No rail lines connected logging locations in Devil's Gut to Jamesville, necessitating waterborne transshipment. In addition, seven extant flats associated with plywood and veneer businesses were lost both upriver and downriver from Plymouth. It is, therefore, possible that some vessels in the gut, as well as a flat in Conaby Creek, are these seven flats.

While it is likely that some unknown abandoned vessels at Jamesville were involved in the lumber trade, they may also have been operated by Fleming's Fishery located on the bank opposite the Jamesville waterfront. The Great Depression hit fisheries hard along the Roanoke, and Fleming's was likely no exception (Russell Lee pers. comm., 2007). In 1972, Dr. and Mrs. S. W. Fleming sold the land around the fishery buildings to Georgia-Pacific (Figure 6.24). It is therefore possible that *Cable Wreck 19APR048*, *Tom's Wreck 19APR063*, and *Unknown Skiff* were associated with Fleming's Fishery.

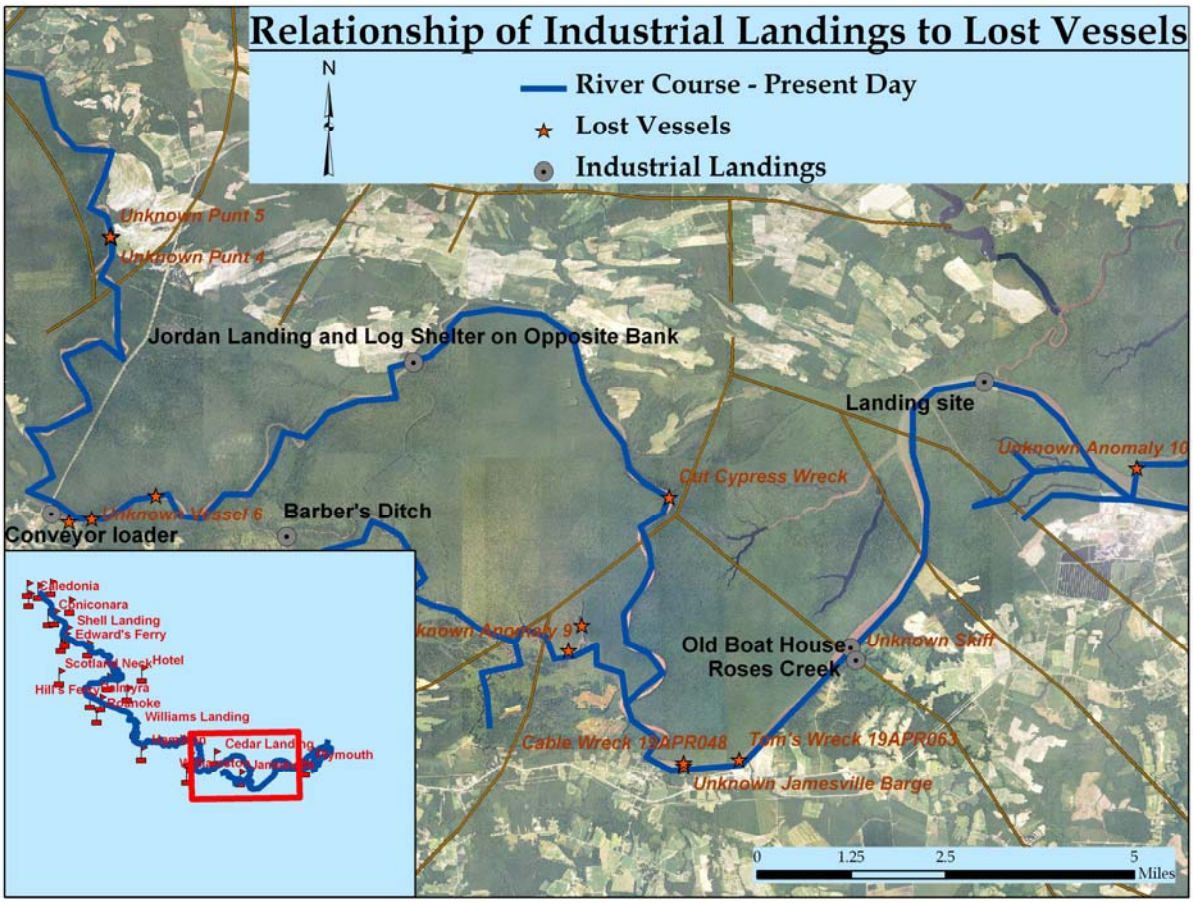

FIGURE 6.23. Relationship of Industrial Landings to Lost Vessels (projection by author 2007).

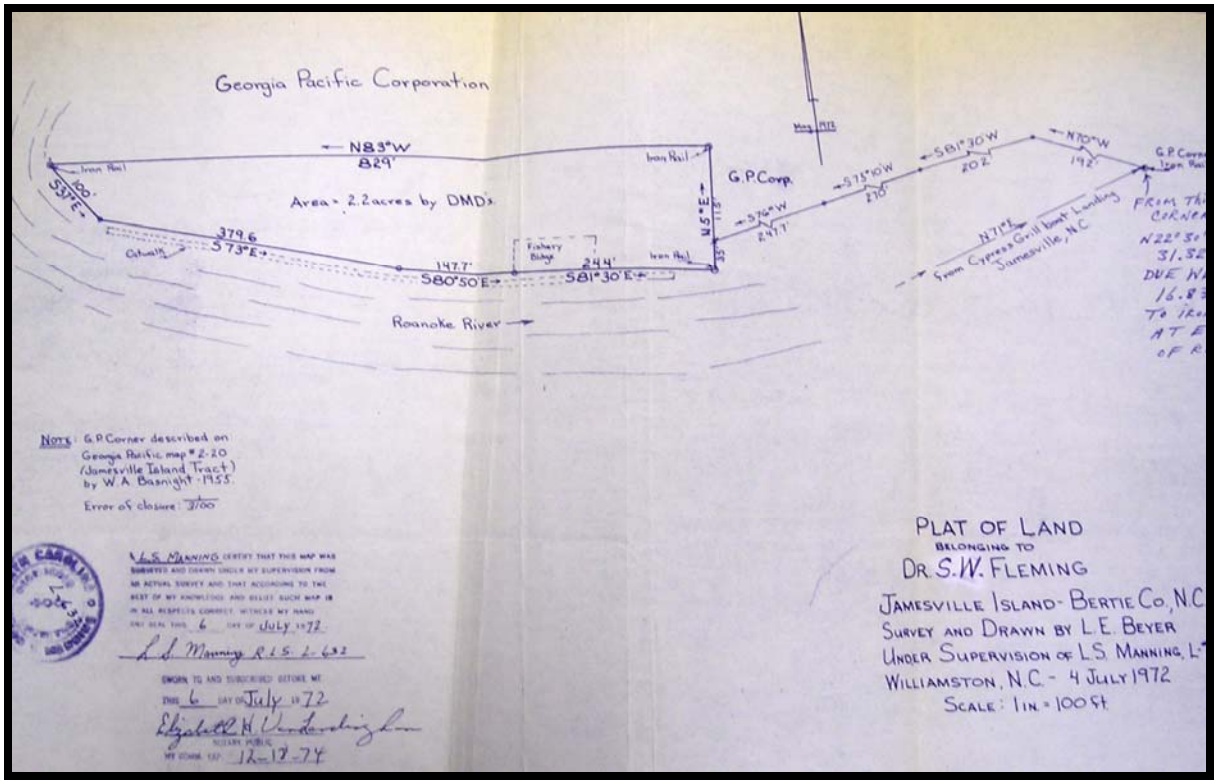

FIGURE 6.24. Survey Map of Fleming Property (Beyer 1972).

The vessel assemblages of Hamilton, Plymouth, and the river delta in which Plymouth sits relate to the landscape primarily in their association with central places: the operation of port activities. Though logging occurred on Huff Island as late as 1980 by Georgia-Pacific (Harry Thompson pers. comm., 2007), indicating that there was still need for Roanoke port facilities, activity had greatly slackened at Plymouth by this time. The declining volume of trade at Plymouth, therefore, was not considered a principal factor influencing the discard of vessels in the area. Aside from Conaby Creek, the constituent waterways of the delta region provided alternative routes to the Albemarle Sound and connected the Roanoke to the Cashie River, and, therefore, Windsor, the Bertie County seat. With the Middle and Eastmost Rivers serving as corridors leading out of the Roanoke River region, vessels lost on these waterways would have been engaged in inter-riparian commerce. The Thoroughfare, a link between the Roanoke and Cashie halfway between Plymouth and Jamesville, carried ferry traffic, such as *Mayflower*, between Windsor and Plymouth (Russell Lee pers. comm., 2007). Conaby Creek, however, did not facilitate traffic along the Roanoke because it does not connect to any other body of water. As a branch of the Roanoke near the river mouth that meanders to no important location, Conaby Creek was a low-traffic area suitable discarding watercraft. Four unknown vessels, submerged but close to the banks, were found in the creek.

Price (2006) utilized the ideas of Shomette (1982), Richards (2002), and Kenderdine (1994) to explain the abandoned vessel assemblage around Plymouth. The location of the assemblage at the periphery of Plymouth as a commercial area agrees with Shomette, as well as Richards who stated that "the function of maritime commerce is directly related to the creation of watercraft abandonment areas" (Richards 2002: 231). In addition, expansion of the Roanoke survey area to include additional tertiary streams confirmed observations that vessels abandoned along the Pamlico and Pungo Rivers accumulated on "smaller waterways and headwaters of larger creeks" (Babits and Kjorness 1995: 77-78; Babits et al. 1995: 104). The concentration of vessels found in Conaby Creek and Devil's Gut offsets the dominance of the Plymouth abandonment area.

Possible connections between Plymouth businesses and abandoned vessels in the Plymouth abandonment area, Devil's Gut, and Conaby Creek, indicate a complex set of behavior. In accordance with Kenderdine, who observed a connection between intentional discard and trade development and decline, the failing business of Atlas Plywood led to the abandonment of *Rodney Philips MacPhie, Jr.* and *Susan Preston MacPhie* at Plymouth in the 1950s. Businesses involved in the production of plywood and veneer were logging-related. Areas suitable for timber extraction along the Roanoke were typically accessible only by secondary and tertiary streams and were, therefore, low traffic routes. Knowledge of areas convenient for intentional vessel discard was a byproduct of

these companies' normal business practices. As a result, logging-related businesses had multiple possible abandonment sites that spread out abandoned vessels and did not strain the holding capabilities of the Plymouth abandonment area.

Conclusion

In the course of this chapter, multiple techniques were employed through the use of *ArcGIS* software to increase the interpretative power of general statistical analyses of the previous chapter and, in turn, deepen them spatially by studying the geographical relationships between archaeological sites along the Roanoke River. Five analytical techniques were used in the course of this chapter: diachronic analysis, determination of unknown vessel use-lives, landscape zonation via terrestrial site investigation, zonation of illicit moonshine distilleries and comparison to legal industries, and determination of unknown vessel function via terrestrial zonation. These methods produced interpretations that aided in answering the questions set forth at the beginning of this study.

By investigating vessel loss locations decade by decade, spatial analyses revealed vessel depositional patterns that represented the rise of Plymouth in the first half of the 19th century. When infrastructural improvements in the form of railroads came to Weldon, central place importance shifted upstream to the fall line of the Roanoke. Despite the shift of importance away from the mouth of the river, the influence of Plymouth did not diminish. It became a nexus between two cultural landscapes: an upriver landscape of terrestrial industrial endeavors, and a downriver seascape based on maritime shipping. Study of the seascape, from the antebellum period to the present, revealed changing attitudes concerning the novelty of steam technology, the willingness of ship operators to accept risk in regards to insurance, and the effects of transportation technological succession on port facilities.

Concentrating on the upriver portion of the Roanoke River cultural landscape produced a maximum age for vessels intentionally discarded in secondary and tertiary areas of the river. This resulted from the inability to adequately link abandoned vessels to shipwrecks. Whereas shipwrecks are typically removed from sea lanes shortly after deposition, abandoned vessels were not because they were out of sight and out of mind (Murphy 1983; Richards 2006). Therefore, unless cleared by dredging operations, abandoned vessels persisted in the landscape. The last comprehensive dredging, occurring in the mid-1920s, would have cleared most of these vessels, effectively establishing a new abandoned vessel assemblage post-dating 1916.

Plotting the locations of investigated terrestrial sites and labeling them according to their industrial purpose revealed spatial patterns among and between types of industrial activities, legal

and illicit. Zonation of the landscape by industry showed that different industries preferred different areas of the Roanoke River, with some better able to handle the risk of inundation than others. The patterning of farms, fisheries, and logging operations revealed multiple cognitive landscapes and associated human behaviors that limited risks in the attempt to collect and manufacture resources of value to society.

The combination of methods revealing the spatial relationships of terrestrial activities and vessel loss locations effectively joined the terrestrial and underwater archaeological records of the Roanoke. Observations of vessels discovered in side areas of the river justified their consideration as intentionally discarded. Their locations in these secondary and tertiary arms of the Roanoke also put them in proximity to various endemic industries that operated in these locations. Linking abandoned vessels to logging operations and riparian fisheries supplemented assertions made in the previous chapter regarding the nature of the Roanoke as a closed system. Not only were more vessels found abandoned than were shipwrecked but these intentionally discarded watercraft served legal and illicit industries that depended on extracting resources from within the river system.

CHAPTER 7:
AN EXPLANATORY MODEL OF THE ROANOKE RIVER

The development of an explanatory model of the Roanoke River cultural landscape has proven to be a complex task that necessitated an interdisciplinary and comparative approach to the analysis of archaeological and historical data in an attempt to answer the questions posed by the research design described in Chapter One. The methods used to investigate the themes of social structure, risk, legality, central place, and transportation embraced both site-specific and comparative approaches in order to utilize the strengths of both archaeological strategies to accumulate, process, analyze, and interpret the cultural material of the Roanoke River. Guided by theories of structuration, risk, and central places, among others, this study elucidated multiple reciprocal links between agent and agency, risk and risk management, infrastructure and influence, and the cumulative forces shaping the Roanoke River cultural landscape.

This work was guided by the questions put forth in Chapter One. These questions served as tools for the investigation of the themes at work on the Roanoke River. As such, each chapter contains elements of the answers to those questions. Below, these answers are integrated to produce an explanatory model of the Roanoke River cultural landscape.

The Influence of Structure

The Roanoke River, like any cultural landscape, is an arena of human activity. This is an extension of human nature in that "to be a human being is to be a purposive agent, who both has reasons for his or her activities and is able, if asked, to elaborate discursively upon those reasons (including lying about them)" (Giddens 1984:3). Sentient activity, and the self-aware agency of others, forms society, meaning that just as individuals are cognizant of their motives, so to is an individual aware of another's. This produces a system of interaction, or "dialectic of control," defining the relationship between an autonomous agent and the collective of society (Giddens 1984:14-16). As a dialectic or reciprocal relationship, the interaction between agent and society simultaneously maintains a collective value system that provides motive for certain types of agency, in turn reinforcing the value system.

The effects of the dialectic of control were evident in the patterning of industrial activity along the Roanoke. Of the three structures of society, signification, domination, and legitimation, the values that society placed on resources located in the region stemmed from the domination social structure; the desire to accumulate allocative and authoritative resources in order to transform

material objects and exercise control over individuals (Giddens 1984:33). Industrial activities occurred because of the domination structure and society communicated the value of these forms of commerce to individuals through signification; in this case, operating under a capitalist system, signification came via the dollar, an expression of the power gained via the accumulation of resources and manufacture of goods. As a result, the Roanoke River was used for a variety of industrial purposes, such as agriculture, fishing, and logging.

Each desire of society invoked an industry, and each industry used land in a different way, resulting in a landscape patterned by the need to extract allocative and authoritative resources. The archaeological material left behind in these areas is the residue of these activities and the instantiation of a cultural landscape. As a result, the interaction between agent and collective propagated systems of human behavior that transformed the physical landscape of the Roanoke into a human landscape.

The Role of the Central Place

The existence of a cultural landscape requires central places, locations described as producers of goods and services for a surrounding region. Industries formed to satisfy demands for resources situate in central places because they also serve as hubs of transportation (Christaller 1966). Cities, therefore, are resource collection points, centers of manufacturing, and ports of entry and departure. Central places are the physical connection between society and the landscape.

Throughout the course of this work, the roles of central places within the cultural landscape of the Roanoke were visible. The river supported multiple ports: Plymouth, Jamesville, Williamston, Hamilton, Halifax, and Weldon. Industrial activities utilized available modes of transportation to extract resources and move them to these places. Accumulations of archaeological material demonstrate this persistent trend through history in the form of a ships' graveyard by Plymouth, multiple logging sites in the environs of Jamesville, mooring cables and *Unknown Vessel 6* at the old port of Williamston, and more abandoned vessels by Hamilton. The deposition of archaeological material close to central places as well as resource extraction points delineated historic travel routes: individual cultural landscapes according to von Droste (1995). These travel routes, however, were not static. Changes in transportation affected Roanoke central places and the locations of industrial activities.

The Effect of Transportation

The combined work of Taylor (1951), Peterson (1968), Clark (1981), and Parsons (1986) illustrates a trend that railroads, upon introduction to a maritime landscape, act parasitically towards waterborne modes of transportation. An archaeological manifestation of this trend in a landscape comes as increased numbers of abandoned vessels; watercraft intentionally abandoned after a sufficient amount of rail line was laid, allowing railroads to out-compete the maritime shipping industry (Richards 2003:274).

Water-based forms of transportation did not immediately decline after the introduction of railroads to the Roanoke River region. Shipwrecks continued to occur, an indicator of continuing waterborne transshipment, and vessels were discarded as late as 1975, well after the introduction of the Wilmington and Weldon rail line in 1840, and the Albemarle and Pantego rail line in 1887 at Williamston. Instead, it appears that central place importance shifted upriver towards Williamston and Weldon, locations where railroads and waterborne shipping routes were becoming organically joined.

An observation regarding the distribution of wrecked and abandoned watercraft along the river, however, suggests an alternative interpretation. More vessels were found intentionally-discarded in the environs of Plymouth and the river delta area than in upriver stretches of the Roanoke. Initially, it seems that the assertion of Kenderdine (1994), that derelict vessels accumulated at the mouth of the Murray River because it was the last stop on the final voyages of watercraft intended for discard, would explain this observation on the Roanoke. Vessels found in these areas of the Roanoke appear to have greatly post-dated the introduction of railroads, such as the Atlas Plywood vessels abandoned in the 1950s. In addition, railroads serving the Roanoke were not constructed parallel to the river but, rather, only met it at points. In this case, the observations of Peterson (1968), that rail lines running north-south beside the Mississippi River undermined the pre-existing steamboat lines, do not apply. Plymouth remained an influential central place, specializing as a hub of maritime shipping and the Roanoke's connection to other regions via shipping routes. Weldon, conversely, was situated at the furthest point upriver traditionally reachable by water and grew in importance by differentially specializing as a hub of terrestrial forms of transportation.

The Influence of Risk

Whereas society created a landscape patterned by human behavior, risk governed where agents chose to situate their industrial operations. Zonation of the landscape demonstrated land-use preferences of the logging, fishing, and farming industries in regards to flood toleration. Some areas were more convenient than others for situating a particular industrial endeavor. Elevated areas close to central places were ideal locations for farms due to their proximity to markets and protection from inundation. Fisheries tended to accumulate at easy access points along the river but close to markets as well. Urban development followed the tendencies of farms to locate at river bends on higher land not as susceptible to flooding. As such, much of the remaining wide floodplain of the Roanoke was lowland swamp forest, which was essentially useless to anyone except loggers. Loggers operated where they found their resource, and their resource came in the form of trees growing in one to two feet of water.

Needless to say, these swamp forests were not suitable for other industries. Aside from the obvious economic difficulties involved in trying to establish a farm or build a structure in an inundated area, the regularity with which the river levels rise and fall poses a risk to anyone attempting to permanently modify these forests. These risks affected loggers as well. Logging cabins are no longer present in the landscape, having been reclaimed by the lowland forests. In fact, multiple modern hunting cabins were observed during terrestrial investigations that were approximately ten to twenty years old and almost entirely consumed by the river. The difficulties posed by the Roanoke prevented loggers from penetrating into the interior of these forests.

The incorporation of rail and steam made bull-hunching obsolete and eased the risks and logistics involved in extracting lumber far from the main channel of the Roanoke. Laying light rails and operating small versions of steam railroad engines hastened the swamp logging operation and made it more efficient. Developing transportation technology decreased the risk of flooding during a logging operation, which translated into greater yields and penetration of the remote areas of lowland forest.

Significant differences between abandoned and shipwrecked vessels similarly reflect responses to risk. The tendency of intentionally-discarded watercraft, as a whole, to have shallower drafts indicated that these vessels were specialized for swamp and lowland forest operations. By constructing vessels with a shallower draft, ship architects made them less prone to snagging, running aground, and generally getting stuck, making them more efficient and safer. In other words, less of a risk to operate in inundated locations.

Consequently, analysis of vessel drafts revealed a wider trend within the maritime commerce of the Roanoke. Vessel specialization made watercraft safer and more efficient in response to risk, differentiating the vessel assemblage of the Roanoke into vessels that were intended for use within the river and eventually discarded, and vessels intended for use outside of the river that were either discarded or wrecked. Based on historical information, it is known that wrecked vessels were employed on inter-riparian trade routes, such as *North Carolina* and *Commerce*, for example. Though it is possible that deep water vessels serving the Roanoke could have ended their use-lives in other locations or could have been abandoned alongside local watercraft, the higher number of abandoned to wrecked vessels combined with a statistically significant difference in draft suggests that most Roanoke watercraft were discarded or lost within the river system.

The Legal Choice

It is apparent from archaeological evidence that agents and agency were guided by cognition of risk from physical sources, such as the Roanoke, but they also confronted forms of risk posed by society's laws. Only neo-liberal risk management, a concept described by Crook (1999), seemed to control and not ban the pursuit of certain resources. This led to the differential patterns of land use by industries discussed above. Roanoke society, however, did embrace ordered risk management strategies by specifically banning the production of moonshine. Individuals, aware of the dialectic of control between them and the collective, could choose to follow the laws of society or accept the risk of defying them.

The existence of moonshine distilleries along the Roanoke indicates that individuals chose to violate the controlling legitimation structure of society. This demonstrates that the Roanoke hosted multiple cultural landscapes not just from varying perceptions of the utility of parcels of land but also in terms of legality. River locales suitable for legal industries were also perceived as suitable for moonshining. The overlap of legal and illegal cognitive landscapes created a cultural landscape defined by economic signification, risk, and legislation.

Suggestions for Future Research

The themes investigated in the course of this study, social structure, risk, legality, central place, and transportation, all influenced facets of the complex cultural landscape of the Roanoke River. Through the execution of a comparative study, the effects of these themes were seen through the cultural material investigated across multiple archaeological sites. Though this work constructed an

explanatory model of the Roanoke River cultural landscape, more research is necessary to overcome the limitations inherent in this study.

The problems mentioned by Price in the execution of his 2006 thesis regarding the difficulty in finding historical references to vessels lost before *North Carolina* in 1831 persisted in this study. Aside from the *Merchant Steam Vessels of the United States 1790-1868*, also known as the *Lytle-Holdcamper List*, no extensive vessel list was found before 1858 (Mitchell 1975). Newspaper searches combined with the investigation of certificates of registration and enrolment issued for merchant vessels at Edenton, Elizabeth City, and Plymouth were typically the only options available for discerning historical aspects of antebellum vessels.

It seems unlikely that no wrecking events occurred in the Roanoke River prior to 1831. In an attempt to find vessels lost before this date, the oldest newspaper printed at Halifax, NC, the *North Carolina Journal*, was searched. The North Carolina Collection holds the paper across two microfilm rolls, covering the years between 1792 and 1810. Despite the date range, many issues are missing but enough remain to maintain an adequate sample. No vessel losses were found in these issues. The newspapers *Free Press*, 1824 to 1830, and *Halifax Compiler*, beginning 1818, should be similarly investigated.

Due to siltation processes obscuring features on the bottom of the Roanoke River and archaeological filtering processes, certain sonar contacts proved difficult to identify as a lost vessel (Muckelroy, 1978). These sites require groundtruthing to assess their significance. This study, focusing on the overall landscape of the river, chose to invest more in remote-sensing than diving, resulting in many potential sites being omitted from the ASCLD that await closer investigation at a future date. Omitted sites were those with chaotic sonar returns that nonetheless aberrated from returns obtained from background river bottom. The number of excluded contacts, however, was far less than the number included: only seven out of forty potential sonar contacts were not included in the ASCLD. Despite the lack of groundtruthing, the high quality of sonar data collected during survey excursions allowed more inclusion, rather than exclusion, of potential sonar contacts. The thirty-three new sonar contacts added to the database should be groundtruthed to ensure their assigned identities as wrecks.

In addition, much of the Roanoke River remains to be surveyed. Remote sensing surveys have scanned between the river mouth and Hamilton, including several secondary and tertiary streams. The river from Hamilton to Weldon, however, remains unstudied. This area includes Halifax, a North Carolina colonial capital, which might hold colonial and early Federal

archaeological information awaiting incorporation into the explanatory model of the Roanoke River cultural landscape.

Locating and documenting moonshine sites stood as the only limitation in the terrestrial aspect of the archaeological research. Illicit distilleries were in remote locations along the river, requiring an overland hike, usually over swampy land after venturing by boat from a distant public access landing. Foreknowledge of a sight was a requirement since these sites were not visible from the river bank. In addition, moonshiners did not maintain records of their illegal activities, thereby making any attempt to determine site locations via the historical record a near-futile endeavor. Despite the difficulties, one moonshine site was investigated directly and the location of another was learned from Russell Lee, but additional oral histories should be taken to ascertain the positions of additional distilleries.

The ability of this study to create an explanatory model of the Roanoke demonstrates the interpretative power of this region. Much of the rich and diverse archaeological record of the Roanoke River remains to be investigated, analyzed, and discussed. As such, the river continues to hold great potential for future archaeological investigations and comparative studies.

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APPENDIX A:
ROANOKE RIVER TERRESTRIAL SITES DATABASE (RRTSD) DATA GLOSSARY

The Roanoke River Terrestrial Sites Database served as a warehouse of collected terrestrial archaeological data; essentially the terrestrial equivalent of the Albemarle Sound Cultural Landscape Database (ASCLD). Data accumulated via direct site investigations (Appendix B) and visual searches during remote sensing surveys (Appendix C) were combined in the RRTSD. Consequently, this database archaeologically covers much of the lower Roanoke River (Figure A.1). The purpose of this appendix is to acquaint researchers with the setup and data types handled by the RRTSD.

Location

The name of the site, local and/or official, is kept here, not coordinates.

Zone

This actually combines zone and band in the universal transverse mercator (UTM) coordinate sytem. Along the Roanoke, 18S was always entered.

Easting and Northing

These fields hold the UTM coordinates of the site under investigation.

Datum

Two datums were used during field investigations: NAD83 and WGS84. WGS84 was preferred and it is recommended that a project routinely use one datum to avoid confusion.

Date of Investigation

This field kept track of when the site was visited. This was considered important due to the possibility of changing environmental conditions between site visits and facing future site visits. If river levels are lower than they were when these sites were investigated, for example, then the changing site formation forces can be observed.

Investigator and Informant

These fields keep track of who was investigating and who, locally, provided the information. In this way, the investigator can be contacted for questions and informants knowledgeable of certain sites can be contacted.

Description

This field contains large amounts of text that describes the site during the visit, records oral history of the site as provided by the informant, and generally permits note taking.

Photos

A photolog, kept on a separate tab when in "form view" in Microsoft *Access*, lists photos taken at individual sites. A notes field included in the photolog tab permits the storage of pertinent information related to specific images.

Use

The use field is a drop-down menu of twelve choices: Automobile Transportation, Cemetery, Farm, Ferry, Fishery, Landing: Industrial, Landing: Recreational, Landing: Unknown, Logging-related, Moonshine Distillery, Unknown, and Waterway. This field categorized sites by their function, a necessity when zoning a landscape according to specific actions related to industry and transshipment.

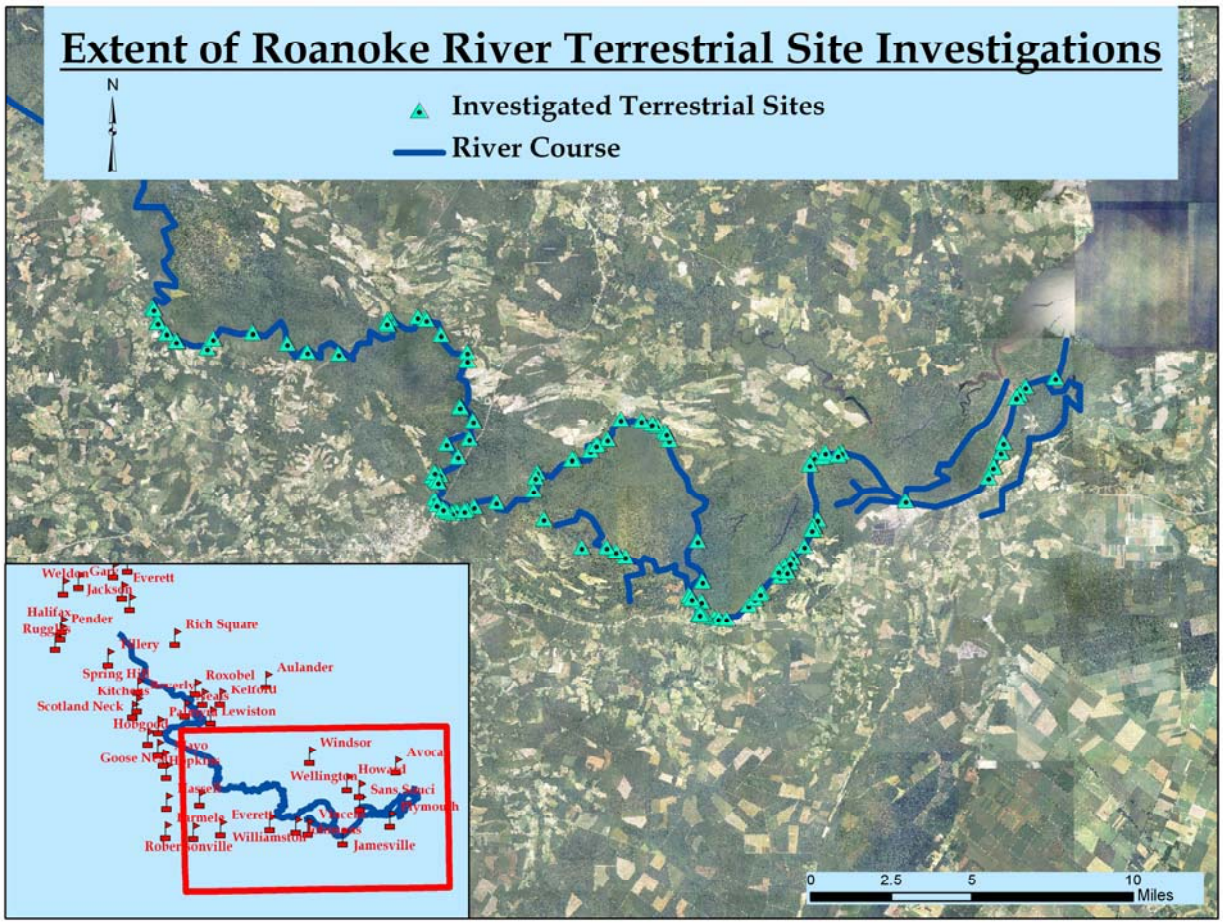

FIGURE A.1. Extent of Roanoke River Terrestrial Site Investigations (projection by author 2007).

APPENDIX B:

Roanoke River Terrestrial Site Investigations

Site: Fleming's Fishery (opposite Jamesville bank)

Date: 25 January 2007

Informant: Russell Lee

Coordinates: Location Omitted

Function Classification: Fishery

Description: Fishery structures that have fallen into disrepair. The fishery has not been in operation since the 1960s. During this visit, the walkway that connected the building to the fishing structures along bank was submerged by high water. There was a wooden incline, about 45 degrees, facing down into the river in front of the structure for dragging up fishing nets. See photos ADFRR0001 (Figure 6.16) and ADFRR0002.

Site: Shingle Mill

Date: 25 January 2007

Informant: Russell Lee

Coordinates: Location Omitted

Function Classification: Logging-related

Description: The shingle mill operated around 1900 and probably featured three or four structures. Only the foundations remain because the rest of the structures were probably metal and sold for scrap. Field between foundation remains in these photos was likely the lumber yard. See photos ADFRR0003, ADFRR0004 (Figure B.1).

FIGURE B.1. Shingle mill (photo by author 2007).

Site: Logging Camps – Gardner's Creek

Date: 25 January 2007

Informant: Russell Lee

Coordinates: Location Omitted

Function Classification: Logging-related

Description: The camps, since gone from view, were connected by rail across the gut and up to Jordan Landing.

Site: Landing for logging

Date: 25 January 2007

Informant: Russell Lee

Coordinates: Location Omitted

Function Classification: Logging-related

Description: This landing was serviced by a railroad that went to the Barber Islands located off of US Highway 17. The landing sits on land known as the Smithwick Tract.

Site: Steam Boiler

Date: 25 January 2007

Informant: Russell Lee

Coordinates: Location Omitted

Function Classification: Logging-related

Description: This piece of logging equipment dates anywhere between 1880 and 1950. It appears to have a winch and wheels that would permit its use on a railroad. See photos ADFRR0005 (Figure 5.8), ADFRR0006 (Figure B.2).

FIGURE B.2. Steam boiler with railroad wheels (photo by author 2007).

Site: Speller's Creek Ditch

Date: 25 January 2007

Informant: Russell Lee

Coordinates: Location Omitted

Function Classification: Logging-related

Description: Georgia-Pacific dug this ditch for logging purposes in 1968/1969 with the intention of gaining access to lumber stands. It was not used. See photo ADFRR0007 (Figure B.3).

FIGURE B.3. Speller's Creek Ditch (photo by author 2007).

Site: Barber's Ditch

Date: 25 January 2007

Informant: Russell Lee

Coordinates: Location Omitted

Function Classification: Landing: Industrial

Description: A landing was located down the ditch between 1900-1970 that was used for logging, hunting, and fishing. According to an informant, the Barber Island people were more rural, "redneck," and impoverished. They produced moonshine, were defensive, xenophobic, and "crude." Most people fear being shot if they set foot into the Barber Islands area. See photos ADFRR0008, ADFRR0009 (Figure B.4).

FIGURE B.4. Barber's Ditch (photo by author 2007).

Site: Jordan Landing and Log Shelter on Opposite Bank

Date: 25 January 2007

Informant: Russell Lee

Coordinates: Location Omitted

Function Classification: Landing: Industrial

Description: This landing possibly operated since circa 1900. A railroad connecting to Gardner's Creek once came to the river on the opposite bank. See photos ADFRR0010, ADFRR0011, ADFRR0012 (Figure B.5).

FIGURE B.5. Jordan Landing (photo by author 2007).

Site: *Train of Plymouth*

Date: 25 January 2007

Informant: Russell Lee

Coordinates: Location Omitted

Function Classification: Logging-related

Description: The site contains the remains of a logging rail engine with flat car (for hauling logs) still attached. Logs are still present on the flat car. There is more equipment in the woods that is not visible from this location. Part of the track that this engine used ran just up from Gardner Creek, by Spellers Creek, to Jordan Landing. See photos ADFRR0013 (Figure 5.9), ADFRR0014 (Figure B.6), ADFRR0015.

FIGURE B.6. Flat car with logs connected to *Train of Plymouth* (photo by author 2007).

Site: Weyerhauser Pulp Mill

Date: 8 March 2007

Informant: Russell Lee

Coordinates: Location Omitted

Function Classification: Logging-related

Description: There used to be two fisheries here: Hampton Fishery and Kittyhawk Fishery (operated 1800s-1900), both owned by the same man. Herrings were processed at Hampton Fishery. After field investigation, informant found a windlass and canning pots. Slades Creek Fishery was located where a pulp mill now stands. The Kittyhawk Fishery was across the river on the island. The Hampton Fishery owned both of these other fisheries. Pete Hampton is a descendent of the owning family and is currently 91 years old.

Site: Landing Site

Date: 8 March 2007

Informant: Russell Lee

Coordinates: Location Omitted

Function Classification: Landing: Industrial

Description: Pilings can be seen.

Site: Ferry Road

Date: 8 March 2007

Informant: Russell Lee

Coordinates: Location Omitted

Function Classification: Ferry

Description: This is an old road associated with a ferry that operated in the 1930s. The road replaced another ferry that operated farther upriver during the 1860s.

Site: Land owned by Georgia-Pacific

Date: 8 March 2007

Informant: Russell Lee

Coordinates: Location Omitted

Function Classification: Logging-related

Description: This area was owned by Georgia-Pacific. Weyerhauser gained a right-of-way to dig a canal through the tract but never did so. The canal was intended to flush the mill ponds of the pulp mill.

Site: Fagan Tract

Date: 8 March 2007

Informant: Russell Lee

Coordinates: Location Omitted

Function Classification: Logging-related

Description: Logged three to four years ago by a party unknown. Land was and is owned by the Fagan Family.

Site: Jordan Farm

Date: 8 March 2007

Informant: Russell Lee

Coordinates: Location Omitted

Function Classification: Logging-related

Description: Jordan Farm was logged in the 1950s. When it was logged again in 1969/1970, it was the last time that a rail engine was used to take logs away from the river.

Site: Old Ferry

Date: 8 March 2007

Informant: Russell Lee

Coordinates: Location Omitted

Function Classification: Ferry

Description: This ferry operated around the 1860s and allowed transportation to Windsor. A landing was located on the Gray Farm. A corduroy road likely served the ferry. An old tugboat is located nearby (possibly a notation error on the part of the investigator).

Site: Moonshine Still about 40 to 50 Yards from the river bank

Date: 8 March 2007

Informant: Russell Lee

Coordinates: Location Omitted

Function Classification: Moonshine Distillery

Description: The site is not visible from the river and temporarily inaccessible due to high river conditions. Across the river, on the downriver side of the powerlines, there has been recent clear-cut logging.

Site: Gray Family Graveyard

Date: 8 March 2007

Informant: Russell Lee

Coordinates: Location Omitted

Function Classification: Cemetery

Description: Gravestones belonging to the Gray Family. See photos ADFRR0116, ADFRR0117, ADFRR0118, ADFRR0119 (Figure B.7).

FIGURE B.7. Gray Family gravestones (photo by author 2007).

Site: Rose's Creek/Bob's Landing

Date: 8 March 2007

Informant: Russell Lee

Coordinates: Location Omitted

Function Classification: Landing: Industrial

Description: According to courthouse records uncovered by informant, this landing was once called Bob's Landing. A man named Gurkin owned the adjoining 20 acres with a right of way and had a power line put in, which has since been cut from the grid since no lives in the area anymore. See ADFRR0120 (Figure B.8).

FIGURE B.8. Bob's Landing, represented by pilings (photo by author 2007).

Site: Area Adjoining Bob's Landing

Date: 8 March 2007

Informant: Russell Lee

Coordinates: Location Omitted

Function Classification: Residence

Description: This site is Gurkin's cabin, which was occupied in the 1950s and 1960s. The land was sold for approximately $10,000 to Parish, an Edenton resident. Gurkin used to keep apiaries here. The trees in front of the cabin grew within the last ten years. See photos ADFRR0121 (Figure B.9), ADFRR0122, ADFRR0123 (Figure B.10), ADFRR0124, ADFRR0125 (Figure B.11), ADFRR0126, ADFRR0127.

FIGURE B.9. Gurkin's cabin (photo by author 2007).

FIGURE B.10. Gurkin's garage (photo by author 2007).

FIGURE B.11. Small abandoned skiff at Bob's Landing (photo by author 2007).

Site: Moonshine Still off Rose's Creek

Date: 8 March 2007

Informant: Russell Lee

Coordinates: Location Omitted

Function Classification: Moonshine Distillery

Description: The site was dynamited. Weyerhauser owned the land and sold it in September 2006, according to informant. See photos ADFRR0128, ADFRR0129 (Figure B.12), ADFRR0130 (Figure B.13), ADFRR0131, ADFRR0132 (Figure B.14), ADFRR0133, ADFRR0134, ADFRR0135, ADFRR0136 (Figure 6.20).

FIGURE B.12. A 55-gallon drum shredded by dynamite (photo by author 2007).

FIGURE B.13. Unknown pipe and shredded rubber hose (photo by author 2007).

FIGURE B.14. Dispersal of destroyed 55-gallon drums along hillside above creek (photo by author 2007).

Site: Hit-and-Miss Gasoline Engine/Moveable Donkey Engine/Vertical Boiler

Date: 8 March 2007

Informant: Russell Lee

Coordinates: Location Omitted

Function Classification: Logging-related

Description: Site was apparently of some importance. It seems that the equipment supported a logging operation. Pilings are present off the bank where the site is located, inferring that this was once a landing as well. A creek or canal cuts perpendicularly into the bank and alongside the location of the hit-and-miss gasoline engine/moveable donkey engine/vertical boiler. See photos ADFRR0137 (Figure 5.6), ADFRR0138 (Figure 5.2), ADFRR0139 (Figure 5.3), ADFRR0140 (Figure B.15), ADFRR0141, ADFRR0142 (Figure B.16), ADFRR0143, ADFRR0144, ADFRR0145 (Figure B.17), ADFRR0146, ADFRR0147.

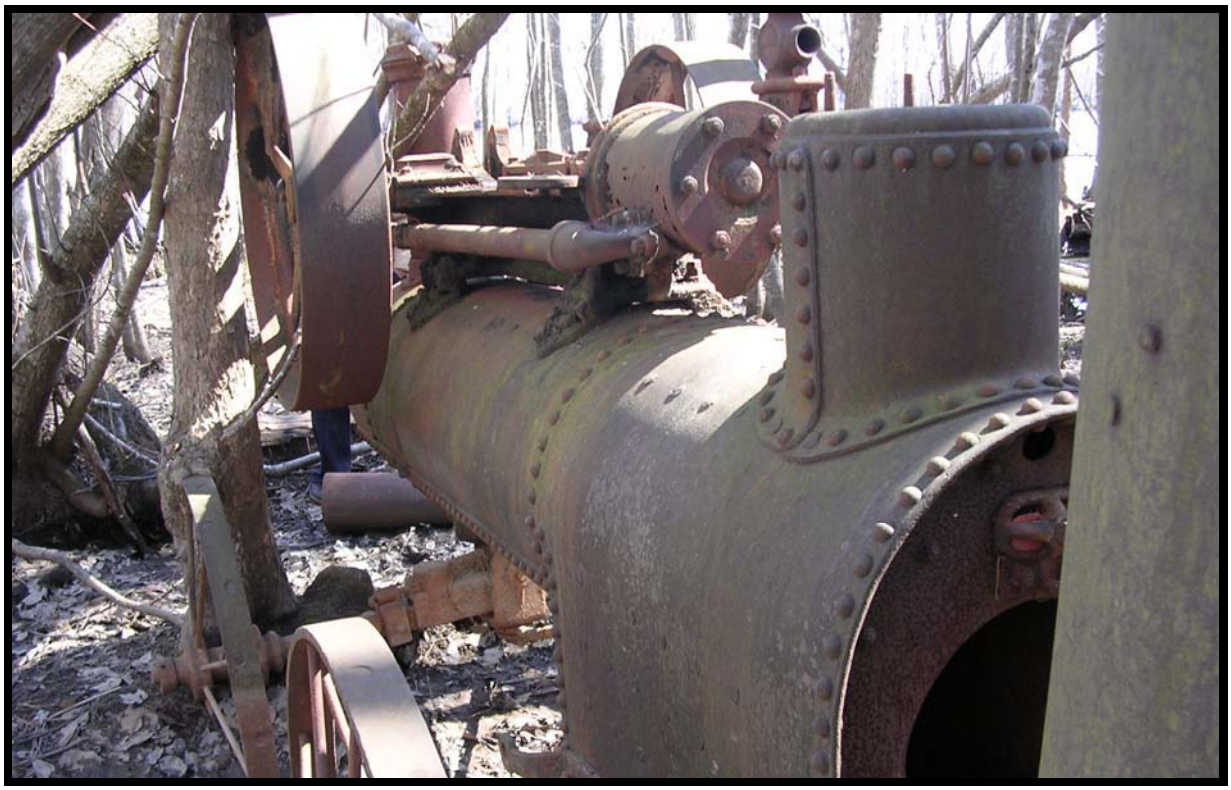

FIGURE B.15. Moveable donkey engine, facing the river (photo by author 2007).

FIGURE B.16. Boiler of moveable donkey engine (photo by author 2007).

FIGURE B.17. Vertical boiler (photo by author 2007).

Site: Foundation Remains by Hit-and-Miss Gasoline Engine/Moveable Donkey Engine/Vertical Boiler

Date: 8 March 2007

Informant: Russell Lee

Coordinates: Location Omitted

Function Classification: Logging-related

Description: Remains of structures possibly related to the equipment found at this site. See photos ADFRR0148 (Figure B.18), ADFRR0149, ADFRR0150, ADFRR0151.

FIGURE B.18. Brick foundation remains (photo by author 2007).

Site: Upriver part of Moveable Donkey Engine Site

Date: 8 March 2007

Informant: Russell Lee

Coordinates: Location Omitted

Function Classification: Logging-related

Description: This site is associated with the hit-and-miss gasoline engine/moveable donkey engine/vertical boiler site and is about 30 yards, approximately, from that site. See photos ADFRR0152 (Figure B.19), ADFRR0153, ADFRR0154 (Figure 5.10).

FIGURE B.19. Pilings, the remains of a landing (photo by author 2007).

Site: Brick Hearth

Date: 8 March 2007

Informant: Russell Lee

Coordinates: Location Omitted

Function Classification: Unknown

Description: This site is a small hearth made of mass-produced brick. It is likely not a still and is probably of recent construction. See photo ADFRR0155 (Figure B.20).

FIGURE B.20. Brick hearth (photo by author 2007).