Remembering the River: Traditional Fishery Practices, Environmental Change and Sovereignty on the Pamunkey Indian Reservation

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Remembering the River: Traditional Fishery Practices, Environmental Change and Sovereignty on the Pamunkey Indian Reservation

A thesis submitted in partial fulfillment of the requirement for the degree of Bachelor of Arts in Anthropology from The College of William and Mary

by

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Accepted for High Honors
(Honors, High Honors, Highest Honors)

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Chapter 1: Introduction

It was a warm morning, for April. Windows down, I sped past a large stretch of construction that interrupted the trees shading the highway median, enjoying the freedom of I-64 at 8am on a Saturday. The vistas of the highway gave way to development as I exited and approached the town of West Point, Virginia. The town sits between the Mattaponi River to the north and Pamunkey to the south where they converge to form the York River, 55 river kilometers west of the Chesapeake Bay.

Crossing the Pamunkey River, I glanced left over the bridge to the billowing white clouds of the West Point Paper Mill. Its towers, vats and exposed tubing composed a village of concrete and iron that loomed over the town. I turned left off the bridge and continued on until I hugged the fence of the mill to my left. In an instant, an overpowering stench assaulted my car and I hastily rolled up the windows and held my breath. The reek of industry was like nothing I had smelled before.

Buildings dropped off as I traded the factory for the trees and fields of rural Virginian farm country. The quiet beauty of the place struck me as I clung to the hills and curves of the winding road. When my GPS told me I was close, I pulled over and quickly fixed my hair in the visor mirror. Glancing over my notes, I breathed deeply, unsure of exactly what to expect despite my preparation.

I carried on and my car tires thudded over a railroad crossing as the road took a sudden bend and unexpected dip. It leveled out and the trees thinned. On the right, a sign announced the Pamunkey Indian Reservation.
All was still. A few compact rectangular houses dotted the grassy peninsula, which was almost entirely rimmed by forest. But for the signage, I could easily have mistaken the Reservation for any other rural Virginian community.

I followed the loop to the left for nearly a mile until I came to a row of structures lining the river’s edge. Directly before me was a small slate-blue panelled building with a dark blue sign that read “Pamunkey Fish Hatchery” and, from the pier that jutted out alongside it, an elderly man dressed in jeans and a t-shirt looked up as I parked in a grass field.

After calming my nerves, I walked over and introduced myself. So began the first of many interviews that would inform this project. The man, a Pamunkey fisherman, proceeded to give me a tour of the hatchery, from its history to its inner workings and recent closure. Sunlight streamed in through the hatchery windows, illuminating an interior packed full of large green tanks connected by pipes, valves and tubing. On the walls were a blend of historical resources: old fishing nets, newspaper articles from the 1940s, informational placards and complicated instructions for hatchery operation. An old plank canoe (a style which became popular around the turn of the 20th century) rested on display in one corner. Shelves held bottles of various chemicals and equipment. None of it had been used in years.

The hatchery, which the tribe first opened in 1918 to restore declining American shad stocks in the Pamunkey River, lost state funding assistance in 2014. Without that funding, the tribe has struggled to maintain and operate the hatchery. But there’s more to the story.
As we sat on a bench on the pier behind the hatchery, gazing out at the calm bend of the river, the fisherman told me that this was the worst shad season in his memory. Hatchery operation requires gathering large catch of broodstock from the river each spring. But in 2018, the shad run was so poor that Pamunkey fishermen did not even catch enough to serve at the tribe’s annual spring fish fry, where shad are traditionally eaten. They hadn’t really had shad in three years, the fisherman reckoned. Everything has changed. No one is fishing anymore. He expressed a deep nostalgia about the decline of fishing practices on the Reservation and a host of other changes he had witnessed in his lifetime.

The Pamunkey Indian Tribe has engaged in riverine-oriented subsistence practices, including fishing, for hundreds if not thousands of years. Over the course of my research, several tribal members mentioned that the tribe’s long history of fishing and its persistence into the present day is an important part of their tribal identity. That said, the decline in fishing on the Reservation over the past few decades has been dramatic. As it stands, the practice teeters on the edge of vanishing.

Shad are a fish of particular cultural significance. The decline in the health of the shad fishery over the past two centuries has coincided with a decline in traditional fishing practices by the Pamunkey. However, I have found that the decline of shad stocks and associated practices is but one window into a complex web of socio-economic, cultural and environmental change on the Reservation that stems from colonialist expansion and global economic transformations. The way that individuals have responded to shifts in global political economy and questions of environmental
sovereignty have produced the present state of natural resource practices on the Reservation.

It is with the current threat of cultural loss and potential for future environmental change in mind that I formulate the following research questions:

1) How have the history of colonial expansion and shifts in the global political economy affected traditional natural resource practices and environmental sovereignty on the Reservation?

2) How is the tribe responding to the political ecology of environmental change and natural resource management? In what ways does their recent acquisition of Federal Recognition impact this approach?

3) How do tribal members perceive that the environment is changing on the Reservation and what might this mean for the continuation of their traditional practices and culture?

I pursue these questions through an examination of traditional fishing practices and the decline of shad stocks across the mid-Atlantic. Through this research, I hope to provide the tribe with a detailed analysis of the political and economic dimensions of environmental change on the Reservation, as well as a summary of the environmental concerns of a number of tribal members.

I also aim to bring a greater awareness of native issues to the general public, many of whom know hardly anything about contemporary Virginia Indians (Waugaman and Moretti-Langholtz 2006). The extent of this ignorance was hammered into me when a friend of mine asked, after hearing me briefly explain my research, whether I required a translator to conduct interviews on the Reservation. In reality, the Pamunkey likely lost their language two hundred years ago.
Furthermore, there is little academic literature on contemporary native life in the mid-Atlantic as the majority is focused on the colonial era (Atkins 2009, Gallivan 2016, Woodard 2013). In recent years, there has been an effort by some academics to engage in collaborative scholarship that emphasizes native viewpoints (Gallivan 2016). I attempt to follow in this tradition by interrogating historical colonialism in the region and its contemporary expression through the industrial capitalist system and by emphasizing Pamunkey viewpoints through oral interviews with tribal members. It is my hope that this thesis will contribute to the small body of work concerning contemporary native issues.

**Research Methodology**

In order to develop an integrated picture of natural resource management and associated cultural, sociopolitical and historical factors on the Reservation, I approached the research from several avenues. During the period of April-December 2018, I conducted semi-structured and unstructured interviews with tribal members, attended tribal natural resource management (NRM) and cultural resource management (CRM) working group meetings on the Reservation, drew on literature and archival materials, engaged in participant observation with scientists from the Virginia Institute of Marine Science (VIMS) who conducted marshland research on and around the Reservation, and made note of my observations on visits to the Reservation. Approval for the project was granted by the Pamunkey Chief and Council and the Institutional Review Board (IRB) prior to commencing fieldwork. The completed research will be provided to the Pamunkey Indian Tribe.
Interview participants were identified with the assistance of Dr. Ashley Spivey and the American Indian Resource Center. Participants interviewed included fishermen, former hatchery workers, members of the tribe’s natural resource and cultural resource working groups, and other tribal members with knowledge of or opinions on natural resources on the Reservation. In order to protect anonymity, I will identify each interview participant by an assigned letter, rather than by name. Participants included men and women aged in their twenties to eighties. All interview participants, excluding my conversations with VIMS scientists, were Pamunkey tribal members over the age of eighteen. Despite their shared community membership, the interview participants had varied upbringings and differing opinions on certain issues. Some participants were raised on the Reservation, some were raised off the Reservation nearby and visited often during their childhood, and some were raised far off the Reservation and hardly visited during their childhood, if at all. The diverse viewpoints of these individuals, coupled with the scientific perspective that I observed by volunteering with VIMS, exposed issues of environmental and cultural change as complex and at times ambiguous.

**Theoretical Approach**

My approach to research was first and foremost through the lens of political ecology, which emphasizes the social, economic, and political factors of environmental change (Wolf 1972, Peet et al. 2011: 9). Eric Wolf (1972) pointed out that the importance of natural resources to survival necessitates their influence on social
relationships and power dynamics. Indigenous and other marginalized communities are often sidelined in the competition for control over natural resources and can face the brunt of the fallout from environmental degradation and disaster (Kottak 1999, Peet et al. 2011). The Pamunkey have faced and continue to be affected by environmental issues caused by the uneven power dynamics of resource exploitation. Tribal members by and large realize that they have been historically powerless against polluting industry, like the West Point Paper Mill, and other corporate resource extractors, like the massive offshore fishing conglomerates that demolished the shad population. With their recent acquisition of federal recognition, which I will address in more depth at a later point, the Pamunkey’s potential to influence regional natural resource management has increased.

Political ecology asserts that environmental degradation has become a part of the capitalist system, and that even conservation efforts can be a mechanism for powerful actors to cut off indigenous access to resources, particularly in cases of protected area designation (Peet et al. 2011: 27, Robbins 2012: 21). Much conservation discourse relies on colonial ideals of “natural” and “modified” landscapes, excluding native people from the narrative (Peet et al. 2011: 36). On the contrary, political ecology acknowledges that landscapes have been shaped by a long history of people reworking local ecology as they engage in broader systems (Neumann 2011: 845). Furthermore, evidence-based policymaking often marginalizes the traditional knowledge of local native groups:

The exclusive role of science as an adjudicator of environmental conditions or “truths” has historically led to the marginalization of different ways of knowing and
I would argue that this uneven power dynamic relating to environmental knowledge and native voice persists between the Pamunkey and regional scientific and management organizations, as evidenced by the continuous omission of the Pamunkey from scientific literature. Furthermore, the cultural dimensions of environmental change were rarely considered by the VIMS scientists I engaged with who were conducting relevant research in the area. Political ecology interrogates these colonial narratives while analyzing socio-ecological transformations and arguing that that the scientific community must acknowledge the intersection of environmental issues and complex social dynamics (Neumann 2011: 844, Peet et al. 2011: 38, Robbins 2012: 19). The framework further raises questions over sovereignty, regulation, and resource control and understands the environment as produced; that is, the natural world is impacted and shaped by human activity. As such, a person’s relationship with the environment can influence their identity. On the community scale, natural resource management and perceptions of environmental issues can affect how groups like the Pamunkey situate themselves in the natural world (Peet et al. 2011: 34). My discussion of Pamunkey environmental history will engage with conceptions of tribal identity and how the tribe’s changing relationship to the environment impacts how they define themselves as Pamunkey.

According to Peet et al. (2011: 15-23), who draw heavily on Marx, the uneven power structures described in political ecology were created in their present state by the
historical expansion of capitalism, which contributed to the exploitation of natural resources that transformed the environment. While the focus of this thesis is environmental change, not economic, such a discussion is inherently connected to theories of political economy and world-systems theory, which explore uneven political and economic structures. According to Marxist theory, the competition of capitalism leads to exploitation of human and natural resources. In the current economic system, the benefits of resource extraction are unevenly distributed socially, temporally, and geographically (Kottak 1999, Neuman 2011, Peet et al. 2011, Robbins 2012). Landscapes of production and consumption are particularly important to understanding how capitalism transforms the political economy of natural resource exploitation and management (Neumann 2011: 845). Immanuel Wallerstein’s world-systems theory (WST) describes international economic interconnectedness and uneven power dynamics between core and periphery nations (Woodard 2013). Wolf (1997) emphasizes within this model how capitalist expansion and resource exploitation has undermined indigenous cultural systems.

For the Pamunkey, this uneven power structure can be observed over the past few centuries through the transition from subsistence to wage labor that pulled people off the Reservation, in the pollution of the commons (ie. the river), and in the destruction of the shad fishery. While the social relations of power have greatly affected the Reservation’s environment, Foucault notes that power is not some single oppressive force, but rather one that circulates through individuals who both affect power and are affected by it (Foucault 1980: 98). Instead of passively accepting uneven power
structures, people participate in and resist emerging networks (Robbins 2012: 23). As such, environmental sovereignty on the Reservation is not a one dimensional story of oppression and exploitation, but rather a constant negotiation.

Wolf (1972) foregrounds the importance of centering local communities in larger ecological and political systems and Marshall Sahlins (2000) further emphasizes the agency, creativity, and persistence of indigenous peoples in responding to economic change. Geertz (1983) in particular argues the significance of local knowledge and culturally relative particulars in any social research. Utilizing the perspective of cultural relativism, political economy and WST can be used to examine how local peoples have responded to and impacted the economic system in their own cultural terms (Rimoldi 1992, Woodard 2013). For this study of the Pamunkey, that means anchoring my discussion of environmental and cultural change in the broader context of the tribe’s interactions with an economic system in the midst of global transformation.

In a study of the Virginia Nottoway tribe, Woodard (2013) explores how the tribe interacted with and responded to the rise of the modern global-economy, and specifically changes to their kinship, organization, and conceptions of peoplehood. He describes the shift from identity as rooted in kinship towards a more individualist identity with the expansion of capitalism, situating social and cultural relations within the capitalist world-system with a particular focus on uneven power structures. Woodard notes that the shift in how community identity is defined alters the way Nottoway people determine access to kin-resources (i.e. natural resources) (Woodard 2013). The significance of kinship in conceptions of identity is emphasized by Sahlins (2011).
Specifically, common history, shared traditions and a link to a homeland are important aspects of community identity (Hutchinson and Smith 1996; Balibar and Wallerstein 1991; Woodard 2013). Accordingly, Robbins (2012) notes that identity and ideologies can be affected by socio-political environmental change. These changes and the associated native response have a reciprocal relationship with community conceptions of identity and can impact access to natural resources.

While maintaining a local perspective, I will draw on parts of Julian Steward’s theory of cultural ecology to discuss how the relationship between culture and environment is complex, reciprocal, and culturally-relative. In this model, culture is described as a product of a society’s adaptation to its environment (Orlove 1980, Steward 1955, McGee and Warms 2017). Cultural ecology has occasionally been described as environmentally determinist. The related framework of historical ecology modifies this theory to emphasize human intentionality in transforming landscapes (Gallivan 2016, Thompson 2014). To avoid a determinist leaning, I will draw on concepts put forth in both to explore how culture, environmental change and natural resource management interact and influence each other on the Reservation.

In this work, I will draw on political ecology, political economy, and cultural ecology to investigate how the uneven economic and political system, resource exploitation, and related social responses on the Pamunkey Reservation are related to notions of tribal identity and cultural persistence. I will attempt to illustrate the associated narrative from the native perspective, which has been largely omitted.
Furthermore, I will describe the contemporary perceptions and responses of Pamunkey people to uneven power structures related to natural resources and their management.

The thesis is broken into six chapters, the first of which is this introduction. The second chapter, Pamunkey Environmental History, works through the history of the tribe’s interactions with colonial expansion and a changing global political economy with a particular focus on fishing practices. It concludes with a description of practices on the contemporary Reservation. Chapter 3 delves into the science of the York River system and the history of the shad decline. Chapter 4 draws on interviews with tribal members to discuss how the shad decline is related to contemporary environmental changes on the Reservation. Chapter 5 is a discussion of the tribe’s natural resource management practices and a detailed description of the Reservation hatchery. It concludes with a summary of current management projects. In the final chapter, I summarize the findings of my analyses.
Chapter 2: Pamunkey Environmental History

The Pamunkey Indian Tribe is a federally recognized tribe with around 300 official members. Along with the neighboring Mattaponi Tribe, they are one of two tribes in the state of Virginia with a reservation. The 1200-acre Pamunkey Indian Reservation is located on the Pamunkey River an hour east of Richmond, Virginia and is currently home to around 80 tribal members.

Historically, the Pamunkey were one of many Algonquian-speaking groups in the Virginia Tidewater region with a long history of estuarine-oriented subsistence practices. There is evidence that, in the early centuries AD, people in the region harvested resources from the river almost year-round, fishing in the spring and summer and collecting large numbers of clams and oysters during the colder months (Gallivan 2016). In the centuries leading up to European contact, groups continued to rely heavily on the estuary. Gallivan (2016) describes the region as not a landscape, but rather a waterscape from the native perspective. The significance of the estuary is further demonstrated by Algonquian place names, which often centered around fishing or the gathering of wetland plants (Gallivan 2016).

Migratory fishes, and shad in particular, were an important food source for native groups along the East Coast for centuries (Maryland Sea Grant 2011: A/1-13). A 1590 European engraving that depicts Indians fishing in present day North Carolina, less than 50 miles from Virginia, displays the bounty and diversity of the water and native peoples’ estuarine-oriented subsistence practices in the region (Figure 1). Early
colonists in Virginia observed the Indians using fishing weirs and nets to catch shad during the day and lighting fires in boats at night to attract and spear the fish (Maryland Sea Grant 2011: A/1-13, Waugaman and Moretti-Langholtz 2006).

Figure 1. 1590 engraving by Theodor de Bry based on John White’s 1585 watercolor.
The Pamunkey were the most powerful of more than thirty Algonquian-speaking communities that made up the Powhatan chiefdom at the time of European contact (Bierman 2015, Gallivan 2016, Mooney 1907, Rountree and Turner 2002, Waugaman and Moretti-Langholtz 2006). The Powhatan chiefdom was headed by Wahunsenacawh, better known simply as Powhatan, who claimed authority over a large portion of the Tidewater region and thirty-some towns within it, each with its own lesser chief. Wahunsenacawh was the father of legendary Pocahontas and the brother of the Pamunkey chief, Opechancanough (Bierman 2015, Gallivan 2016). The Powhatan territory was centered around the James and York Rivers, then known as the Powhatan and Pamunkey Rivers, and had an estimated population of 12,000-15,000 (Gallivan 2016). The Pamunkey had the highest population density within the chiefdom and their population in 1607 was estimated at 1,000 (Gallivan 2016, Mooney 1907, Pollard 1894, Virginia Department of Education 2019).

After their arrival in Jamestown in 1607, colonists were aided by the native people who brought them food and taught them agricultural and fishing techniques (Heim 2015, Maryland Sea Grant 2011: A/1-13). They made note of natural resource management practices by the native communities, including forest clearing and burning, which contradict the colonialist ontological dualism of nature and culture. The long history of natural resource subsistence and management of native people in the region supports the historical ecology perspective that nature and culture are not distinct but rather interface and influence each other (Gallivan 2016). That is, native people have
always modified the environment and the pristine natural landscape often described in early American colonial philosophy did not exist but is rather the product of omitting native agency from the historical narrative.

The decades following European contact were fraught with disease and violence. Those Indians who survived the traumas of early colonization sustained themselves on remote pockets of land through hunting, fishing and agriculture (Waugaman and Moretti-Langholtz 2006). Treaties with the Governor of Virginia (representing the King of England) in 1646 and 1677 were signed by Necotowance, (Pamunkey) King of the Indians, and the Queen of Pamunkey respectively. These treaties, also signed by a few other native leaders in the area, established Articles of Peace and several Indian reservations (Bierman 2015, Mooney 1907, Virginia Department of Education 2019, Spivey 2017, Waugaman and Moretti-Langholtz 2006). The 1677 treaty also required that a yearly tribute be paid to the English king. Although the treaty was signed with England, and therefore the United States is not bound to honor its terms, the Pamunkey take pride in the fact that they still present tribute to the Governor of Virginia every year on the day before Thanksgiving (see Figures 2 and 3; Bierman 2015, Waugaman and Moretti-Langholtz 2006).
Figure 2. A photograph of the 1983 tribute presentation. Pamunkey Chief Tecumseh Cook dances around a deer and turkey that the tribe presented to Governor Charles S. Robb. Credit: Richmond Times-Dispatch 2015.
The 1677 treaty served as a legal mechanism to preserve Pamunkey sovereignty over a portion of their traditional land and riverine resources. Article VII of the treaty reads:

That said Indians have and enjoy their wanted conveniences of Oystering, Fishing, and gathering Tuckahoe, Curtenemons, Wild Oats, Rushes, Puckoone, or anything else (for their natural support) not useful to the English.

Five hundred of the Reservation’s 1200 acres are wetlands home to a variety of useful animals and plants (Virginia Department of Education 2019). The ability of the Pamunkey to source food from and retain many of their riverine resource rights allowed
them to subsist on their original reservation adjacent to the Pamunkey River while most
other tribes lost control over their reservations during the 18th century (see Figure 4;
Spivey 2017, Waugaman and Moretti-Langholtz 2006). In 1785, Thomas Jefferson
reported that the Pamunkey and Mattaponi tribes were the last remaining of the
Powhatan Indians and that their populations were very small and language almost
completely lost (Mooney 1907, Swanton 1952).

Figure 4. Map of the Reservation. Credit: ESRI.

The tribe's traditional subsistence practices were responsible for much of their
surviving culture and the shad fishery in particular was a crucial source of food and later
income (Virginia Department of Education 2019). Fishing, hunting, trapping, and pottery
making are all traditional practices that exist in some form on the Reservation today and are closely linked to the geography of the Reservation. The connection between these surviving traditional practices, their significance to tribal identity and their rootedness in the Reservation have invented the Reservation as a significant cultural place. Gallivan (2016: 9) explains that such cultural places are defined by history, memory, and connection to a broader landscape that “combine[s] geography with a sense of the past.” In this way, traditional natural resource practices and tribal identity are inherently linked with the Reservation as a specific place in the history and memory of the tribe.

While the Pamunkey were able to preserve some of their traditional lands and practices, they experienced dramatic change over the following three centuries. Many Pamunkey children attended the Brafferton Indian School in the 18th century up to the American Revolution (Spivey 2017) and by 1844 visiting Rev. E. A. Dalrymple could find only seventeen words that remained of the tribe’s language (Pollard 1894). Pottery making was mostly abandoned in the 19th century when earthenware became cheap; only a few people retained the art. In a 1893 communication from the tribe, the Pamunkey describe themselves as “the last descendants of the Powhatan tribe of Indians, now situated on a small reservation on the Pamunkey River, 24 miles from Richmond, Va.” and make mention of their traditional natural resource practices, stating:

*We are now known as the Pamunkey tribe of Indians, following the customs of our forefathers, hunting and fishing, partly with our dugout canoes*

-- Pollard 1894

When Pollard visited the Reservation in 1894, he noted that the Pamunkey still made a living through subsistence off the land. The tribe hunted deer, raccoon, otter, muskrat,
and mink for meat and sold their skins. They also fished for perch, herring, bass, chub, rockfish, shad, and sturgeon in large numbers using seines. Other wetland animals including Sora (reedbirds), wild geese, ducks, and turkeys were also hunted. These wetland birds constituted a large part of the diet in autumn, after the end of the annual shad run. Tribal members farmed on a small scale to supplement their families’ diets. They also raised a few livestock animals, including horses, cattle, sheep, and pigs (Pollard 1894, Washburn 2014: 54). The fish and other products not consumed on the reservation were sold in markets in Richmond and Baltimore (Pollard 1894).

The existence of the Reservation has been crucial to the persistence of the Pamunkey community and subsistence practices. It allowed the tribe to selectively engage with the expansion of the industrial capitalist system and maintain some of their traditional practices (Spivey 2017). They developed a mixed economy of traditional subsistence practices and wage labor of which the river was the focal point. Seasonal rounds of pottery making, fishing, hunting, trapping and horticulture were augmented with wage labor in the winter, which typically included positions where tribal members could utilize subsistence skills like fishing. Around this time, fishermen also switched from using yellow pine dugout canoes to faster and lighter plank canoes, which were made from four bent wooden planks. Non-native fishermen picked up the ingenious design and some skilled Pamunkey boatmakers made money by building and selling this style of boat (Spivey 2017).

During the 18th and 19th centuries, the population on the reservation hovered between 80-110 (Pollard 1894). By Pollards visit in 1894, intermarriage between tribal
members and whites was so common that he noted that some tribal members appeared white to the casual observer. Despite this, for much of the 19th century the Pamunkey struggled to avoid a designation as “colored” (due to Virginia’s racial climate) and described lacking the rights awarded to white citizens and facing a great deal of racism (Washburn 2014: 41). King William County residents filed several (failed) petitions during the century to have the tribe expelled from the Reservation on accounts of being “colored” (Spivey 2017, Washburn 2014). Concerns over racial purity and land tenure in the 19th century likely led to the establishment of Pamunkey laws prohibiting marriage between tribal members and persons of any race other than Indian or white. Approved by the Pamunkey Chief and Council on February 18th, 1886, the first resolution of one legal document reads:

1st Res. No Member of the Pamunkey Indian Tribe shall intermarry with any Nation except White or Indian under penalty of forfeiting their rights in Town.

-- Pollard 1894

Several other resolutions in the same document concerned land tenure, demonstrating the importance to the Pamunkey of maintaining sovereignty over their remaining traditional land.

Another 19th century tribal law prohibited Pamunkey women with non-native husbands from living on the Reservation but allowed Pamunkey men with white wives to remain (Appelman 1989, Tribal Member T, Washburn 2014: 48). The Pamunkey were once a matriarchal society, as evidenced by the 1677 treaty which was signed by the Queen of Pamunkey. Women were respected knowledge bearers, T explained, until colonization caused a shift in tribal government to a patriarchy that mirrored the U.S.
government’s. A few contemporary Pamunkey women elaborated on the law, which was in place until 2012. “White men were the bringers of bad things,” one woman explained, so the Chief and Council did not want white men to live on the Reservation. By the early 20th century, many Indian men that Pamunkey women knew were their relatives, therefore a great number of Pamunkey women married white men and were forced to leave the Reservation (Tribal Member W, Washburn 2014: 54). These laws were likely an attempt by tribal leadership to maintain as much racial and cultural purity as possible on the Reservation.

Tribal member Q reported that, even in the early 20th century, fishing continued to be an important subsistence practice on the Reservation. Tribal members would fish for herring early in the year and shad during the spring run, salting and storing some of the excess to eat throughout the year. Terrapin was also considered a delicacy and sturgeon was fished before its population collapsed early in the century. During other times of the year, reported tribal member R, people would catch catfish and eels and trap muskrats in the winter.

With the expansion of the industrial capitalist system and rise of wage labor in the 20th century, many tribal members left the Reservation seeking opportunities to earn cash elsewhere (Bierman 2015, Spivey 2017, Tribal Members Q and R). Due to the uneven distribution of economic opportunity that accompanied the growing market economy, there were few jobs around the Reservation, especially during the Great Depression in the 1930s (Waugaman and Moretti-Langholtz 2006). Many tribal members moved to a neighborhood in Philadelphia to find work in factories, police
departments, and as nurses or mechanics. Despite this out-migration, the Philadelphia community stayed connected and many left the city yearly to follow the shad run up the coast (Bierman 2015, Washburn 2014).

Tribal member P explained that, in the 1930s, the tribe started a pottery school on the Reservation in an attempt to revitalize the traditional practice and create income for women living on the Reservation during the Depression (also see Washburn 2014). Pamunkey woman S described the challenges that her mother faced growing up on the Reservation during the Depression. “Life down here during the Depression was very difficult,” S asserted, “they were very poor.” Her grandfather was a fisherman and her mother would often help with shad fishing. Before the shift to motorboats in the 1940s, fishing was a two person job and her mother had to row the boat while her grandfather pulled in the nets. S’s mother and aunt would travel to Richmond to sell their catches at market. It was there that her mother met her father, a white man from Hanover County. Her parents married in the 1940s, which was illegal at the time because Indians were considered colored. On their marriage license, her mother is recorded as white and from Henrico County, near Richmond.

Even though S’s mother often fished with her grandfather, I was told that this was only the case because her grandfather had no sons. Women were not normally allowed on the boats during that time and still rarely are, one Pamunkey woman explained, and she described one fisherman as progressive for being prepared to allow me on his boat. Another Pamunkey woman, T, described how women were traditionally involved in pottery and net maintenance, but men were primarily the ones who did the actual
fishing. Spivey (2017) explains that fishing was predominantly a male subsistence activity, but women were involved in net maintenance and the dressing and cooking of the fish. Depictions of early fishing practices in the 1590 de Bry engraving show both men and women involved in the fishing process. Former Mattaponi Chief Webster Custalow also recalled that, during his childhood in the early 20th century, families worked together and male and female children did the same work, including fishing. The river was their main source of income, he recalled, and most children on their reservation learned how to fish (Waugaman and Moretti-Langholtz 2006). It is possible that the inclusion of female children in fishing during the early 20th century was the result of increased economic stress caused by the Depression.

Early on, the tribe practiced natural resource management of the wetlands and river. Certain areas of the wetland would be allowed to recover from hunting and trapping each year. To maintain the fishery, fishermen would often mix shad roe and sperm in buckets with river water when they caught mature shad. They believed that this would support a healthy shad population and cause the shad fry to mature more quickly (Spivey 2017). The shad population along the East Coast began to noticeably decline around the turn of the century due to external market forces (which I will discuss in the following chapter) and the Chesapeake Bay experienced the worst decline (Hoffman and Olney 2005, Latour et al. 2012, Maryland Sea Grant 2011).

In response to the declining shad population in the Pamunkey River, the Pamunkey Chief and Council took a more active role in environmental stewardship. They petitioned Virginia legislators for protective regulations for the fishery, enacted
catch limits for fishermen on the Reservation and opened a fish hatchery on the river in 1918 to replenish its shad stock (Pamunkey Fish Hatchery Educational Materials, Spivey 2017, Washburn 2014, Waugaman and Moretti-Langholtz 2006). The tribe was motivated to protect the shad population for economic reasons but also because they felt a responsibility to protect the resource (Spivey 2017). When discussing the hatchery, Pamunkey often cite a philosophy of giving back to the land when you take (Middleton 2014, Pamunkey Fish Hatchery Educational Materials, “Tecumseh Cook Dies” 2003, Pamunkey Website, Waugaman and Moretti-Langholtz 2006). I will discuss the natural resource management efforts of the tribe in greater detail in a later chapter.

Shad fishing continued to be a culturally and economically significant practice throughout the 20th century, asserted Q. The Pamunkey navigated the capitalist economy and indigenized external market processes to maintain an autonomous community rooted in the Reservation landscape (Spivey 2017). By placing themselves at the market periphery, the tribe was able to structure their market engagement. Men continued to fish and sell their catch at markets along the East Coast as far north as the Fulton Fish Market in Lower Manhattan (see Figures 5, 6, and 7). They hunted, trapped and sold furs and other wetland game, including terrapin and waterfowl. Pamunkey men also marketed themselves as hunting guides for white hunters. In doing so, they transformed their centuries of generational knowledge of the landscape into a marketable and profitable enterprise (Spivey 2017). The profitability of some of tribe’s traditional subsistence practices is likely what preserved them through the centuries of colonialism and capitalist expansion (Spivey 2017). Thus, instead of passively
submitting to the regions changing political economy, the Pamunkey consistently engaged and influenced it to benefit their tribe.

Figure 5. Fishermen return to the Reservation in April 1941 with their catch of shad, which was the most valuable commercial food fish in Virginia at that time. In that time, sometimes the tribe would catch as many as 1000 fish in 24 hours. Credit: Richmond Times-Dispatch 2015.
Figure 6. Pamunkey fishermen curing shad the traditional way in April 1941. Fish were split in half, cleaned, nailed to boards, salted and dried. Credit: Richmond Times-Dispatch 2015.
Beyond their importance as a significant food and economic resource, shad play a principal role in some tribal members’ sense of Pamunkey identity. Subsistence skills like fishing took many years to learn and were passed down generationally (Spivey 2017). “Their importance cannot be overstated,” Q passionately expressed as she described how people grew up with the fish on the Reservation. Learning about shad fishing as an ancestral tradition played a major role for her in understanding what it means to be Pamunkey. Q recalled stories of recent ancestors following the shad run.
up the coast. Her great grandfather would follow the run from Florida in January to the Pamunkey River in March to the Hudson River in New York City in May, bringing his catches to markets along the way. Q emphasized how her ancestors utilized their knowledge of the landscape to make a living.

Her emotional connection to her ancestry through the traditional practice of fishing is similar to the way pottery making is perceived by some in the community. Q confirmed that both shad fishing and pottery making have been visible expressions of traditional practice and cultural identity for community members on the Reservation. One Pamunkey woman at a CRM working group meeting reported that a tribal member who crafted a pot for the first time expressed that she felt more connected to her mother. The woman asserted that such traditional practices promote connections to family and ancestry. According to Atkins (2013), pottery is a significant cultural practice for the tribe because it proves that the Pamunkey survived and are still here. It is tied to conceptions of tribal identity related to endurance and future persistence and is further related to economic agency. Specifically, pottery signifies for tribal members “belonging to a place where the Pamunkey get to determine [their lives] for themselves” and overcome future challenges (Atkins 2013: 8). I argue that fishing is a similarly significant continuous cultural practice that is closely related to conceptions of tribal identity, agency and persistence.

After World War II, a lot of tribal members chose to give up their subsistence practices to engage the capitalist economy. Decreases in the market value of shad (Figure 8) and other natural resources like furs and bullfrogs made continuing those
subsistence practices less profitable. Whereas tribal member X recalled her uncle retired and lived for years on profits from shad in the 1970s, younger tribal members were drawn away from the Reservation towards more lucrative occupations. Some tribal members also attributed the decline in traditional practices to dwindling animal populations, which I will discuss further in the chapter on Environmental Change (Spivey 2017). Regardless, wage labor became the main way young people engaged with capitalism.

Figure 8. The adjusted price per pound (in dollars) for American shad in Maryland and Virginia from 1950-2009. Prices have remained low following an initial post-World War II decline with the exception of occasional spikes. Credit: Maryland Sea Grant 2011.

Even with its slow decline during the 20th century, shad fishing on the Reservation continued into the early 2000s (Waugaman and Moretti-Langholtz 2006). According to Q and R, shad caught during more recent seasons are often kept by fishermen or used in community events like shad plankings. A niche market for shad still exists and some fishermen bring their catch to local restaurants or long-time buyers.
One tribal member attributes the decline in demand to a lack of interest in consuming the fish by the younger generation (Spivey 2017).

Despite its market decline, shad are still an important cultural symbol for many communities along the East Coast. There are at least thirty-two seasonal shad and river herring festivals on the East Coast, most of which involve shad planking, which is a traditional Indian method of cooking shad. Shad planking (Figure 9), where the fish is placed on oak planks and roasted over hot coals for hours, breaks down its 769 tiny bones and makes it much easier to eat (Maryland Sea Grant 2011, Tribal Members Q and R).

![Figure 9. Photograph of a shad planking outside of Wakefield, VA. Credit: Bob Brown, Washington Post 2014.](image)

Historically, shad planking has been a political event and high-ranking politicians including the Governor of Virginia were invited (Waugaman and Moretti-Langholtz 2006). Shad planking is no longer practiced by the Pamunkey tribe today, but shad are still eaten at annual fish fries (Spivey 2017). In addition to acting as political events,
these fries are also community events that provide tribal members who live off the reservation with a means to stay connected to the tribal community. According to R, who is an elderly fisherman on the Reservation, about 100 tribal members attended a fish fry in April 2018. Although it should traditionally have been a shad fry, the shad run that year was so poor that there were no shad at the event, only catfish, whitefish and rockfish. The event used to be bigger, R recalled, more people used to come and even people who normally avoided shad because of its many bones would often eat it at the shad fry because of tradition.

The declining attendance at fish fries mirrors a general decline in Reservation fishing practices and community interest in the fishery. The combination of the shad’s drop in market value and plummeting fish population has eliminated the economic incentive for young people to join the fishery, especially with the high starting cost of purchasing equipment. In a 1998 study where nineteen Pamunkey were interviewed, fourteen reported fishing every spring. Sixteen reported that their parents fished and all reported that their grandparents fished (Bragdon et. al 1998). Even since then, there has been a severe decline in fishing in the past two decades. The tradition is dying out, expressed R, “No one’s fishing anymore.” These days, if people only catch five fish on a trip instead of twenty, they quit. Most fishermen are only able to catch “trash fish,” like garr and alewives. A number of fishermen quit just over a decade ago because they could only find time to fish once per month on top of their day jobs and they were not making any money. Only the old people stick with it, he asserted. As of 2018, only three tribal members continued to fish regularly and all were elderly men.
Of the eighty-some Pamunkey tribal members who resided on the Reservation in 2018, fewer than ten were children and the majority were over sixty years of age, reported Q. She explained that, due to the lack of nearby economic opportunities, in the past several decades most young adults would leave the Reservation to find work and raise families elsewhere. Now, according to Q, R and T, some young adults who were raised off the Reservation are starting to return in an effort to reconnect with their roots.

Even so, fishing as a Pamunkey traditional practice is teetering on the edge of extinction. Children stopped learning how to fish because they were no longer raised on the Reservation by fishing relatives. Shifts in the local political economy towards wage labor made it impossible for many tribal members to profit from fishing. Even younger tribal members who recognize fishing as an important traditional practice are reluctant to take up the practice. And “our young men shouldn’t have to bear that burden,” expressed one woman. It would not be fair to expect them to sacrifice the lives they have built elsewhere to take up a challenging, unprofitable practice just to preserve it.

“Why fish if you aren’t going to catch anything?” stated younger tribal member, P. The younger generation is just not interested, admitted one woman whose great-grandfather fished, trapped and hunted on the Reservation until his 90s, “It’s heartbreaking.”

Many tribal members expressed painful nostalgia about changes on the Reservation. “Everything has changed,” lamented one elderly tribal member as he described the changes he has witnessed in his own lifetime. The younger people are all gone; they leave because life here is boring. Everyone used to care about fishing, but
now most “don’t give a damn.” People used to eat a lot of shad, but now they prefer rockfish because it has fewer bones. Elders don’t care about the bones, he said with frustration, “what do you think a fish is supposed to have?”

Most young people will become interested in learning about their culture when they are older, he assured me. His father lived to be over a hundred years old and used to tell stories about the old ways, but he was not interested until he was in his 40s. It was the same with his children. But, younger tribal member X expressed sadly, “Language, religion… it’s all been gone for 200 years. Some people have stories but no one really knows anything.” And with elder tribal members containing most of the tribe’s remaining traditional knowledge and skills, the Pamunkey are aware that much of their cultural knowledge is at risk of vanishing due to the absence or disinterest of younger tribal members.

Despite the nostalgia of the older generation and fear of cultural loss, one tribal member reported that many elders want the Reservation to stay like a retirement community with no children or noise.

Living space on the Reservation is limited and the Pamunkey Chief and Council must approve any petition to move there. The land is owned by the tribe and allotted to residents. To live on the Reservation, one must be legally considered Pamunkey by the tribe, which requires proof of ancestry and a history of continuous contact with the community (Bierman 2015, Tribal Member Q). One way that tribal members who lived off the Reservation historically maintained contact was by attending spring fish fries. Many young people would care, explained T, but what are they supposed to do if they
grew up off the Reservation? Furthermore, she explained, only tribal members who reside on the Reservation can vote in tribal politics, meaning that most younger tribal members have no voice in official tribal matters.

Some Reservation residents are trying to encourage young people to return (Spivey 2017), but life on the Reservation is not easy for young people and many have no interest in residing there. The Reservation looks like any other community in rural Virginia, with the exception of its entrance sign and small museum. The 1200-acre parcel of land juts into the Pamunkey River and a single road connects it to King William County (see Figure 10).

Figure 10. Map of the Reservation’s location in present day Virginia. Credit: The Washington Post 2015.
One Reservation resident with children asserted that local schools in the county are ignorant of native issues and her children are unable to get a proper education. Income levels on the reservation vary, but some residents lack sufficient healthcare and amenities, including running water (Bierman 2015). Most residents use well water and dispose of waste at a dump on the Reservation or by burning trash, according to members of the natural resource management working group that was created to address issues pertaining to health and environmental safety on the Reservation.

As of 2015, the Reservation was 17 miles from the nearest chain supermarket (Bierman 2015). R explained that a few residents work in construction or electrical, but most are retirees as there are very few jobs nearby. Decades ago, he continued, residents used to farm arable land on the Reservation, but now they rent it to non-native farmers because the farming equipment is too expensive. Some tribal members maintain gardens where they grow foods including asparagus, eggplant, melons, beans and pecans (Bierman 2015). Little shanties on the water were once used for night fishing but now function as weekend houses for some tribal members who do not fish.¹ Many have had small piers installed in the past three years. The new piers mess up the waterway, fisherman R explained with frustration.

A turning point came for the Pamunkey in July 2015 when they became the first Virginia tribe to be federally recognized. To gain federal recognition, tribes must prove that they have maintained cultural distinction and provide documentary proof of a continuous history, which may include treaties (Bierman 2015, Gallivan 2016, Heim

¹ This is a point of disagreement as one tribal member claimed that the shanties are used as weekend getaway houses by tribal members who do not reside permanently on the Reservation, while others explained that the shanties can only legally be owned by Reservation residents.
2015, Tribal Members Q and T). Federal recognition opened many doors for the tribe including legal gambling, the sale of tax-exempt goods, and access to federal grants and loans to improve housing, education, and infrastructure (Bierman 2015, Heim 2015). Q, T, and members of the CRM working group explained that new access to funding allowed the tribe to begin building administrative capacity in key program areas including cultural and natural resource management. It also created a few jobs on the Reservation at the management level, making it possible for a few tribal members to work on the Reservation. Fisherman R hoped that some of the money would go towards reopening the Reservation’s shad hatchery, which lost state funding in 2012.

Due to the tribe’s new legal ability to open a casino, their 2015 recognition was challenged by anti-gambling groups and casino group MGM, which was planning to open a large casino in Maryland the following year (Bierman 2015, Gallivan 2016, Heim 2015, Moomaw 2015). The groups cited the old Pamunkey laws (abolished in 2012) that prohibited tribal members from marrying anyone who was not white or Indian and prohibited Pamunkey women with white husbands from living on the Reservation. Tribal leaders responded that the race rules were an attempt to defend their status as a tribe from Virginia’s racist past and ban on interracial marriages and the risk of being stripped of their land due to racial purity laws (Bierman 2015, Heim 2015, Spivey 2017). A few Pamunkey women explained that the fight for equality for Pamunkey women is ongoing. Pamunkey women only gained the right to vote in tribal politics in 2012 (Spivey 2017). According to Pamunkey woman W, one result of the law against white husbands on the Reservation is that many Pamunkey women moved elsewhere, received better
educations and raised their children with better educations. While the Chief and Council are composed almost entirely of men, the majority of the cultural and natural resource management working group members are Pamunkey women, many of whom are well educated.

Pamunkey federal recognition was confirmed in January 2016 and the tribe has since been working on grant applications and plans for a casino. The assistant secretary for Indian Affairs said that the petition was one of the best documented petitions they had ever received (Heim 2015). Even with the 1646 and 1677 treaties that established the continuously-occupied Reservation, gaining federal recognition through the Bureau of Indian Affairs (BIA) was a long and expensive process (Heim 2015, Gallivan 2016). There are many obstacles to tribes gaining federal recognition and lack of documentation and funds are huge barriers (Gallivan 2016). Six other Virginia tribes lacked sufficient documentation to complete the BIA recognition process, so sought federal recognition through an act of Congress, which they achieved in 2018 (Heim 2015, Portnoy 2018). In order to gain this recognition, they sacrificed their right to build casinos.

Federal recognition is tied by nature to notions of tribal identity. Beyond the tangible benefits awarded by the new status, federal recognition confirms for the Pamunkey that they are a distinct group with specific cultural practices. The tribe’s long history of subsistence practices is core to their identity and is what enabled them to subsist on their reservation when other tribes could not. Issues of race and land tenure in the 19th century raised questions of sovereignty over their land and resources and
emphasized the importance of kinship in resource control. The significance of kinship in contemporary access to kin-resources on the Reservation is still seen in the strict qualifications for tribal membership and residence.

While the Reservation may have legally isolated its Pamunkey residents from the rest of the state, as Spivey (2017) describes, the tribe was never immune to its broader political economy. Pamunkey people used their indigenous framework and knowledge of the landscape to engage with and manipulate the market economy in profitable ways. Although their traditional knowledge changed over time, the land and associated practices remained at the center of these systems of knowledge.

Broader changes in the global economic system in the 19th and 20th centuries drew tribal members off the reservation in search of more profitable jobs (Spivey 2017). Despite this, the Reservation land and traditional subsistence practices have remained central to Pamunkey identity -- so much so that some people who grew up away from the Reservation return for the express purpose of reconnecting with their tribal identity. The diaspora raised questions of what it meant to be Pamunkey if you did not reside on your traditional land. As the tribe shifted from self-sufficiency to dependency on wage labor in the second half of the 20th century, fishing practices became supplemental and began to dwindle. Now, some tribal members ask what it means to be Pamunkey if you lose your traditional practices.

The Pamunkey have lived on the river that bears their name for centuries. Their tribal seal displays the river and riverine animals key to the tribe’s historic subsistence, including turtle, waterfowl, and shad (Figure 11).
The tribe has engaged in natural resource management on and around the Reservation for centuries to preserve their traditional resources. The serious declines in fish stocks and general environmental health of the Chesapeake Bay and its tributaries poses a threat to the tribe’s remaining traditional fishing practices. While the Pamunkey have been largely excluded from mid-Atlantic conversations on natural resource management and environmental conservation, their new status as a federally recognized tribe awards them a new seat at the table and a chance to influence the broader political ecology of the region. It is a chance to preserve, and perhaps even restore, what remains of their estuarine-oriented traditional culture.
Chapter 3: American Shad

In diverse places, that abundance of fish lying so thick with their heads above the water as for want of nets (our barge driving against them) we attempted to catch them with a frying pan, but we found it a bad instrument to catch fish with.

-- 1608 description by colonists Russell and Todkill, Pamunkey Indian Museum

When the English first reached America’s mid-Atlantic coast, they were awed by the bounty of its estuaries, sending home accounts of the swollen fisheries by word and watercolor. Droves of American shad ran up the coast each spring, providing natives and colonists alike with an abundance of food. These reports of the continent’s abundant natural resources excited and justified the following European colonial expansion. Until the mid-20th century, shad were considered one of the coast’s most important food sources and fishers hauled in nearly twenty million pounds per year at the century’s start (Maryland Sea Grant 2011). These days, the Pamunkey River is lucky if it sees a run at all.

How did the shad fishery completely collapse in two-hundred years? In this chapter, I will walk through the decline of the fishery, beginning with an overview of the Chesapeake Bay and York River estuary before diving into the biological characteristics of American shad. I will then describe its history of decline and government management of the fishery. Finally, I will discuss the political ecology of the decline and government management initiatives.

In this section, I will draw heavily on the 2011 Alosine Species Team Background and Issue Briefs, prepared by Maryland Sea Grant in partnership with the region’s
scientific community and government agencies as a part of the Ecosystems-Based Fishery Management (EBFM) Project for the Chesapeake Bay. The project aims to provide research-based guidance for fishery management in the region and the 2011 brief, which was compiled by 85 scientists, managers and stakeholders, includes detailed historical and scientific background on the Chesapeake shad stocks.

The York River Estuary

The Chesapeake Bay watershed is the largest watershed in the United States and third largest in the world (Chesapeake Bay Foundation 2019). Its largest tributaries in Virginia (from north to south) are the Rappahannock, York, and James Rivers (Chesapeake Bay Foundation 2019, Hilton et al. 2014).

American shad (Alosa sapidissima) are an anadromous fish of the shad subfamily Alosinae of the herring family Clupeidae (Brown et al. 2000, Hoenig et al. 2008). There are four anadromous alosines of the Chesapeake Bay: American shad (Alosa sapidissima), hickory shad (Alosa mediocris), blueback herring (Alosa aestivalis), and alewife (Alosa pseudoharengus). American shad are the largest of the four, growing up to 30 inches and 12 pounds, and are specifically prized for their taste and roe (Maryland Sea Grant 2011, Hoffman et al. 2007). The scientific name, Alosa sapidissima, translates as “most delicious herring” (Maryland Sea Grant 2011: A/1-3). As the focus of this paper, American shad will hereafter be referred to simply as shad.

Anadromous fish including shad spend most of their life in the sea and return to freshwater to spawn during annual spring runs (Hoenig et al. 2008). In Virginia, shad
runs are significant on all three major rivers (Maryland Sea Grant 2011: A/4-7, Hilton et al. 2014).

The York River supports the largest shad stock in Virginia and is formed by the convergence of the Pamunkey and Mattaponi rivers at West Point, VA (Olney et al. 2006, Hoffman and Olney 2005, Olney et al. 2008, Hoffman et al. 2007). The York River is a coastal plain tributary that extends approximately 55 river kilometers (rkm) from its origin to the Chesapeake Bay and its watershed is the smallest of the three major river systems (Olney et al. 2006, Hoffman and Olney 2005, Hilton et al. 2014). The watershed covers approximately 6,900 km² of the Virginia Piedmont and Coastal Plain and is 66.6% forest, 25% agriculture, 7% wetland, and 1.4% urban (see Figure 12; Olney et al. 2008). The Pamunkey watershed (3,768 km²) is larger than the Mattaponi (2,274 km²) and has a greater average spring discharge (47.5 m³/s) (Hilton et al. 2014, Olney et al. 2008, Hoffman and Olney 2005).
The York system is a two-layer tidal estuary, with a freshwater surface layer that flows downstream and a deeper saltwater layer that flows upstream (Olney et al. 2008). The Pamunkey Reservation is located on the Pamunkey River approximately 94 rkm from the mouth of the York. Tidal propagation in the Pamunkey River extends to approximately 150 rkm from the mouth of the York River and the Pamunkey Reservation experiences tidal variation (Spivey 2017, Hilton et al. 2014, Olney et al. 2008). The salinity of the York is 16-22 ppt at its mouth and falls to zero on the Pamunkey and Mattaponi within 10-20 km of their confluence (Figure 13). Salt intrusion varies seasonally but the lower portions of the rivers often report moderate salinity greater than 2 ppt (Hilton et al. 2014, Olney et al. 2008).
Figure 13. Map showing salinity levels in Pamunkey and Mattaponi Rivers by York River rkm. The Pamunkey and Mattaponi rivers are considered freshwater above the marked isohaline region. Credit: Hoffman and Olney 2005.

Estuaries like the York River provide nursery habitat for diverse migratory fishes which, in Virginia, include striped bass (*Morone saxatilis*), white perch (*Morone americana*), American shad (*Alosa sapidissima*), hickory shad (*Alosa mediocris*), blueback herring (*Alosa aestivalis*), alewife (*Alosa pseudoharengus*), and menhaden (*Brevoortia tyrannus*) (Hoffman et al. 2007).

**American Shad**

The historical shad range stretches along the East Coast of North America from Florida to Quebec. During their seasonal migrations, shad (Figure 14) have historically supported significant commercial and recreational fisheries along the East Coast with

Figure 14. American shad. Credit: U.S. Fish and Wildlife Service.

Shad serve several cultural and ecosystem services beyond their historical importance to native people on the East Coast. They are a popular fish for recreational fishing and are important prey for striped bass and other species that are recreationally important (Hilton et al. 2018, Maryland Sea Grant 2011). Their predators include spiny dogfish, American eel, cod, hake, perch, salmon, pollock, weakfish, whales, seals, otters, cormorants, herons, bald eagles, foxes, raccoons, and turtles (Maryland Sea Grant 2011). Striped bass are extremely valuable in the commercial and recreational fishery. Changes in the abundance of shad have impacted the localized health of striped bass populations, who seasonally rely on alosines as prey for up to 70% of their diet (Maryland Sea Grant 2011).
In addition to recreational fishing, the culture around shad includes ecotourism, seasonal festivals, and volunteer monitoring programs. There are at least thirty-two seasonal shad and river herring festivals on the East Coast and, as local fisheries have been shut down, some communities have had to import fish from other states for the festivals (Maryland Sea Grant 2011: A/1-4). There are towns named after shad, such as Shadwell, VA and Shad Landing, MD. In 1936, Rachel Carson suggested in the Baltimore Sun that the shad should be considered the emblem of the Chesapeake states. The culture surrounding shad helps increase environmental awareness, stimulate local economies, foster a sense common heritage, and provide a sense of place to community members (Maryland Sea Grant 2011: A/1-4).

Furthermore, shad are an indicator of ecosystem health (Maryland Sea Grant 2011). Estuaries like the York River are greatly impacted by human activity and shad stocks have been declining since the 19th century due to overfishing, dam construction, habitat change, and pollution (Aunins and Olney 2009, Hoffman and Olney 2005, Hoffman et al. 2007). Shad population can provide a visible measure of the health of the estuarine ecosystem as it responds to human impacts. Specifically, the abundance of shad juveniles is a good indicator of water quality and habitat availability (Hilton et al. 2018). Since anadromous alosines transport energy, carbon, and nutrients between freshwater and saltwater ecosystems, shad are also important for nutrient cycling within the ecosystem. The consistent decline of shad has impacted nutrient pathways and food web dynamics in the entire Chesapeake Bay (Maryland Sea Grant 2011: A/3-12).
**Biological Characteristics**

The American shad is the largest fish in the herring family on the East Coast, growing up to 30 inches and 12 pounds. The average sizes trend towards 20 inches in New England and Canada and 15 inches in the Chesapeake Bay region and south (Hoffman et al. 2007, Maryland Sea Grant 2011: A/4-13). In the York River, the average weight was found to be 3.2 pounds and 2.3 pounds for females and males, respectively. The age of shad in the York River system typically ranges from 2-8 years, but shad up to age 10 have been reported (Maryland Sea Grant 2011: A/4-13).

Traits in shad populations vary by latitude and distinct stocks are adapted to their regions. These discrete populations are the result of accurate homing fidelity as shad nearly always return to their natal stream during runs (Maryland Sea Grant 2011: A/4-24).
For most of their lives, adult shad live in the ocean and migrate along the coast following warmer temperatures. Shad are iteroparous, meaning that they reproduce multiple times during their lifespan. Most females reach sexual maturity at age five, although the range is three to nine years (Maryland Sea Grant 2011: A/4-16).

Every spring, sexually mature adult shad leave their offshore habitats and migrate to their natal rivers to spawn while other non-sexually mature shad remain in the ocean (see Figure 15). Males and females can spawn up to four times in a lifetime and one quarter of a typical Virginia spawning run is return spawners, while the remainder are virgin spawners (Maryland Sea Grant 2011: A/4-16, Brown et al. 2000). Latitude affects the timing of the run, with southern runs occurring earlier than northern
runs (Hoenig et al. 2008). The temperature window for the spawning run in the north is around 3 weeks while that in the south is 2-3 months (Maryland Sea Grant 2011: A/4-25).

Spawning in the Chesapeake Bay tributaries takes place from late February to June (Hoffman and Olney 2005). Since shad return to their natal streams to spawn, sexually mature adults that were born in the York River system return to the York River to spawn. They will enter their natal rivers to start the spawning run in February or March after migrating north and separating from mixed-stock ocean assemblages to enter the lower Chesapeake Bay (Olney et al. 2006, Hoffman and Olney 2005, Olney et al. 2008, Maryland Sea Grant 2011). After entering the estuary, they migrate over 130 rkm to reach the freshwater spawning grounds of their natal rivers, which are located in the tidal freshwater regions of the Pamunkey and Mattaponi rivers (Olney et al. 2006, Hoffman and Olney 2005, Olney et al. 2008). Notably, the Pamunkey Reservation is located on one of the spawning stretches of the Pamunkey River tidal freshwater region. Pamunkey fishermen on the Reservation report that the run reaches their river in late March, and they look to the blooming of the shad bush to predict its exact timing (Spivey 2017). Movement up and down stream during the migration is often correlated with the tidal cycle. Upstream movement typically occurs during flood tides while downstream movement typically occurs during ebb tides, with exceptions (Aunins and Olney 2009).

Shad in the York River spawn exclusively in freshwater and when temperatures are between 15-25C. Suitable spawning habitat includes areas with islands, creaks, boulders, rocks, and shallow flats within the river (Aunins and Olney 2009, Maryland
Sea Grant 2011, Hoffman et al. 2007). Optimal spawning habitats have shallow depths (< 5m), high dissolved oxygen levels (>8 mg/l), and current velocities of 0.3-1.0 m/s (Maryland Sea Grant 2011: A/1-7). Behavior within the spawning grounds is not correlated to the tidal cycle (Aunins and Olney 2009).

Female shad are batch spawners and batch size is correlated to female body size, with the number of eggs per batch falling approximately between 11,300 and 79,000 (Maryland Sea Grant 2011). Female shad spawn in batches every 2-4 days, averaging 11-17 batches per female per season (Hoffman and Olney 2005, Olney et al. 2008, Maryland Sea Grant 2011: A/4-16). An average female can produce 800,000 eggs annually (Maryland Sea Grant 2011: A/4-17).

American shad have the largest roe of the Chesapeake Bay alosines at 2.3-3.5 mm, which is part of what makes them so desirable for eating (Aunins and Olney 2009, Maryland Sea Grant 2011: A/1-5). During spawning, the eggs are released into the water column and are semi-buoyant. Peak egg abundance is typically in April and May when water temperature is 13-19C. Hatch time is temperature dependent and ranges from 2 days at warm temperatures to 12 days at cool temperatures. The larvae hatch at around 5.7 mm in length and absorb the yolk within 3-5 days, after which they begin feeding on zooplankton. Larvae are highly susceptible to water temperature, pH, prey abundance, and predators. Optimal conditions include temperature > 20C and pH > 7 (Maryland Sea Grant 2011: A/1-5).

The spawning run lasts for about 4 months and ends in mid-May (Olney et al. 2006). After spawning, shad return to the coastal ocean (Maryland Sea Grant 2011).
The mean residence time of spawning shad on the James River is in the range of 29-33 days (Aunins and Olney 2009). Adults that have finished spawning begin exiting the mouth of the river in late March and continue migrating to the sea through June (Olney et al. 2006). Shad do not stop to feed during their spawning migration and thus consume about 30% of their energy reserves to make the round trip (Maryland Sea Grant 2011).

Shad larvae complete metamorphosis and are considered juveniles when they reach 25-30 mm in length. Juveniles remain in their natal tributaries for a few months and slowly move downstream towards the saltwater-freshwater interface as they grow larger (Maryland Sea Grant 2011: A/1-6). Food sources include zooplankton, aquatic insect larvae, and flying insects (Hoffman et al. 2007, Maryland Sea Grant 2011). As the juveniles move towards higher salinity in late fall, their diet shifts to calanoid copepods, mysid shrimp and larval fishes. Shad grow to be 60-119 mm in length after about six months. They remain in the Chesapeake Bay until February or March before entering the coastal ocean, where they remain until sexual maturity 3-7 years later (Hoenig et al. 2008, Maryland Sea Grant 2011: A/1-7).

Shad eggs and larvae are consistently more abundant in the Mattaponi River than the Pamunkey River for unknown reasons and juvenile mortality rates are higher in the Pamunkey (Hoffman and Olney 2005, Maryland Sea Grant 2011: A/1-7, Olney et al. 2008).
History of Decline and Management

American shad and river herring supported recreational and commercial fisheries since colonial times (Hilton et al. 2018). Historically, spring fisheries were the focus before the farming season began and provided significant food and income (Maryland Sea Grant 2011: A/1-13). The Chesapeake and its tributaries quickly became a site of intensive colonization and competition for resources.

Towards the end of the 19th century, shad were among the top three most harvested species along the Atlantic coast and total landings peaked in 1896 with nearly 51 million pounds before beginning to decline (Latour et al. 2012). At the time, the fishery was thought to be limitless, but it was already in decline (Maryland Sea Grant 2011: A/1-1).

Before World War II, shad were considered one of the East Coast’s most valuable food sources, but commercial harvest of shad in the Chesapeake Bay dropped from 19 million pounds in 1897 to less than 3 million pounds in 1941 (Maryland Sea Grant 2011: A/4-3).

From 1950-1978, the Chesapeake Bay accounted for over 40% of all coastwide landings and has since seen the worst decline of shad along the entire East Coast (see Figure 16; Maryland Sea Grant 2011). Annual coastwide landings from 1950-1969 and 1970-1989 averaged 7.6 million pounds and 3.6 million pounds, respectively (Latour et al. 2012).
By the 1980s, the shad population had plummeted so sharply that many in-river fisheries in the U.S. were closed in the 1980s and 1990s as a result of the fishery collapse. Fishing moratoria were enacted in the Maryland and Virginia waters of the Chesapeake Bay and tributaries in 1980 and 1994, respectively. Allowances for gill-net bycatch were made in Virginia (Hoenig et al. 2008, Maki et al. 2006, Maryland Sea Grant 2011). The moratoria are still in place (Virginia Marine Resources Commission 2012).

The collapse was attributed to overfishing, dam construction, habitat change, and pollution (Aunins and Olney 2009, Hoffman et al. 2007). Increase in stock production can be achieved by mitigating barriers to spawning habitat (ie. dams) or by replacing the lost natural reproduction with hatchery production (Maryland Sea Grant 2011).

Hatchery programs were implemented in some of the most highly degraded populations to artificially replenish stocks. The Pamunkey fish hatchery, which the tribe
first opened in 1918, gained state funding beginning in the 1990s. Another hatchery program was initiated in 1992 through a cooperative agreement between the U.S. Fish and Wildlife Service, the Virginia Department of Game and Inland Fisheries (VDGIF), and the Virginia Marine Resources Commission (VMRC) to restock the James River from the Pamunkey stock, which were the closest and healthiest population at the time (Brown et al. 2000, Hoenig et al. 2008).

Dams were identified as a barrier to the annual shad migrations, preventing spawning in freshwater stretches of several tributaries (Maryland Sea Grant 2011: A/4-7). Shad stocks on the Rappahannock and James rivers were seriously impacted by dams and, while the York River is undammed, there are a few dams in place on its tributaries (Hilton et al. 2014). Upriver fish passage has been restored in some blocked tributaries through dam removal or the installation of fishways, which allow fish to cross the dam and access historical spawning grounds. Bosher’s Dam fishway installed on the James River in 1999 to restore access to historical spawning habitat that had been blocked off with the construction of the dam in 1823 (Aunins and Olney 2009, Maryland Sea Grant 2011: A/5-7).

In-river shad monitoring programs have been active since 1998, but have shown only marginal increases in shad abundance despite moratoria (Hoenig et al. 2008). In 2000, the Atlantic States Marine Fisheries Commission (ASMFC) determined that the coastal ocean mixed-stock fishery was potentially responsible for slow recovery and in January 2005, the coastal intercept fisheries for American shad in the waters of Rhode Island, New Jersey, Delaware, Maryland, Virginia, North Carolina, and South Carolina
were closed (Hoenig et al. 2008). Loopholes in bycatch laws continued to allow for as much as 7,500 pounds of shad to be harvested in 2009 (Maryland Sea Grant 2011: A/5-2).

The Virginia systems that experienced systematic failure during the 20th century show little sign of recovery and the James River stock has only been sustained by hatchery stocking (Maryland Sea Grant 2011: A/4-5). Pamunkey fisherman R asserted in 2018 that the Reservation had not really had fish in three years.

Historically, it is estimated that shad occured in 138 rivers. Today, they occur in about half of those (Maryland Sea Grant 2011: A/4-24).

**Current Non-Native Management Agencies**

Before diving into the political ecology of the shad decline and management, it is important to recognize the actors involved. While the focus of this paper is Pamunkey engagement with the shad fishery and natural resource management, it is worth noting that there are several non-native boards and regulatory agencies with management authority over the fishery.

The agencies currently responsible for regulating and monitoring shad stocks within the Chesapeake Bay are the Maryland Department of Natural Resources (MDNR), Virginia Marine Resources Commission (VMRC), Virginia Department of Game and Inland Fisheries (VDGIF), the Virginia Institute of Marine Science (VIMS) and D.C. Department of Environment (DDOE).
Additional cooperative interstate management groups include the Potomac River Fisheries Commission, Chesapeake Bay Commission, and Chesapeake Bay Program Executive Council. States are permitted to enact more conservative measures if desired (Maryland Sea Grant 2011).

The Atlantic States Marine Fisheries Commission (ASMFC) consists of Commissioners from 15 Atlantic coastal states, including Virginia, and coordinates the management of 22 coastal fish species or species groups, including shad (Atlantic States Marine Fisheries Commission 2019; Olney et al., 2008). Their Shad and River Herring Management Board is composed of members from each state and representatives from the National Marine Fisheries Service (NMFS) and the U.S. Fish and Wildlife Service (USFWS). The Atlantic Coastal Fisheries Cooperative Management Act of 1993 requires that member states implement regulations that are consistent with ASMFC plans approved by the Board (Maryland Sea Grant 2011).

In addition to government agencies, there are several non-governmental organizations (NGOs) that operate within the Chesapeake watershed to promote environmental conservation, restoration, education, outreach, and advocacy. The Chesapeake Bay Program (CBP) identified 615 organizations involved with watershed management, of which 303 focus on rivers with alosine populations (Maryland Sea Grant 2011).

Notably, as of 2018, no Pamunkey member sat on any of these management boards or agencies and the tribe had little communication with them. Official scientific
and management communications regarding the shad have almost entirely omitted the Pamunkey, and any native group, from the shad narrative.

**The Colonialism of Shad Management**

Shad fisheries were historically concentrated in tidal and freshwater streams, but ocean fisheries increased dramatically in the second half of the 20th century with the industrialization of offshore commercial fishing. While in-river fisheries were primarily operated during the spring by traditional local fishers, ocean fisheries were operated for longer parts of the year and often by foreign fleets from Russia, Poland, and Germany (Maryland Sea Grant 2011: A/5-1).

The expansion of the ocean fishery is another link in the chain of a long history of colonial resource exploitation. In some of the earliest communications by European colonists, the bountiful abundance of the fishery is enhanced and extolled, drawing flocks of pioneering colonists to the American shore. This resulted in intense competition over resources that ultimately led to a Tragedy of the Commons (Hardin 1968). The same shifts in local political economy that increasingly drew young Pamunkey off the Reservation were symptoms of broader industrialization of the world system, the foundation of which was intensified natural resource extraction.

The post-colonial fisheries permanently altered the Chesapeake and its tributaries. Uneven power dynamics present between large offshore fishing corporations and small-scale, local fishing communities like the Pamunkey have caused uneven access to the resource as international corporations profit off of the exploitation and
small communities dependent on local shad populations bear the burden of the
collapse. In this way, the commercial fishery is an extension of colonial exploitative
forces that have impacted the Pamunkey for centuries, and against which they have
continually persisted.

Wolf (1972), Sahlins (2000) and Geertz (1983) remind us that in discussions of
global systems it is crucial to maintain a focus on local experiences and persistence.
While the Pamunkey noticed the spatially distant intensification of offshore fisheries
through declining shad populations as early as the turn of the 20th century, they
engaged more actively with local issues of stock decline and management.

In 1914, King William County residents petitioned the state government to require
fishing licenses for tribal fishermen and to tax Pamunkey nets that were laid outside of
the Reservation. By law, the Pamunkey are exempt from such taxes and licenses, thus
the petition failed (Spivey 2017). While the justification for the petition was likely on
grounds of fairness rather than conservation, it demonstrates the charged social
relationship that persisted for centuries between the Pamunkey and their neighbors due
to the distinct status of the Reservation landscape and native resources. As I described
in the previous chapter, the Pamunkey maintained control over their reservation despite
several attempts by their non-native neighbors to displace them during the 19th century.

There were several other efforts in the 20th century to restrict Pamunkey fishery
rights, all of them unsuccessful. In 1982, the VMRC recommended that Pamunkey and
Mattaponi rivers be completely closed to all net fishing to protect striped bass
populations (Spivey 2017). While not a direct attack on native people, the
recommendation demonstrates that management agencies are often either unaware of native stakeholders or consider their interests unimportant.

The Pamunkey tribe was exempted from the 1994 fishing moratorium that restricted fishing by recreational and commercial fishers (Hewitt et al. 2009, Hilton et al. 2018). In 2013, the VDGIF and VMRC challenged this exemption by inquiring an opinion from Attorney General Kenneth Cuccinelli. Cuccinelli responded that the Pamunkey had to comply with state laws and regulations including fishing seasons, moratoria, possession limits, minimum size limits, and fishing methods. This caused a small crisis on the Reservation as the decision particularly affected the hatchery, which required a higher yield to function than was permitted by the regulations (Spivey 2017). The VMRC police went as far as to give tribal fishermen a legal warning (Spivey 2017, Schilling 2014). In response, King William Commonwealth Attorney Matt Kite said that he would dismiss any charges brought upon tribal fishermen because Cuccinelli’s opinion was just that -- an opinion, not a regulation. The issue then dissipated (Spivey 2017).

This incident demonstrates that the political ecology of conservation (Peet et al. 2011: 27) can be a mechanism for powerful actors to cut off indigenous access to resources. Ironically, enforcing the moratorium regulations on the Reservation would have prevented the hatchery from functioning, hindering tribal conservation efforts that had been underway for a century. The conflict between management agencies and native people reveal the systemic omission of native narratives and perspectives from public, governmental, and scientific discourse.
Although the moratoriums do not apply to the Pamunkey, ambiguity surrounding the legal specifics have created a challenge for Pamunkey fishermen. The repeated threats to Pamunkey fishery access made it difficult to fish and many people were hesitant to buy shad because of the regulations (Spivey 2017). Thus, even while on paper the moratorium does not infringe on legally-protected Pamunkey natural resource rights on paper, it indirectly affects their practice.

These challenges present the Pamunkey with opportunities to reassert their sovereignty and resource rights (Spivey 2017). While they consistently uphold their rights despite the local political ecology, the Pamunkey have been largely absent from regional management discussions regarding the shad population.

In 2016, the shad run was so small that reservation hatchery did not open and the tribe could not serve shad at their annual spring fish fry (Spivey 2017, Tribal Member R). Tribal members Q and R were concerned that the poor run was the result of researchers taking Pamunkey stock to hatcheries on other rivers (also see Spivey 2017). These admissions were vague and suggested a lack of communication between the scientific community and the tribe. The James River hatchery program that drew broodstock from the Pamunkey was in place until 2017, but whether the removal of shad by researchers contributed to the poor run is unclear, especially because the hatchery program also annually stocked the Pamunkey River in small amounts to mitigate the effects of collection (Virginia Department of Game and Inland Fisheries 2019). Regardless, tribal members expressed frustration with scientists who they believed were exploiting the river at unfair cost to the tribe. This suggests a dynamic of
uneven resource control that either exists between scientists and the tribe or that tribal members perceive exists.

The perception of uneven power dynamics between the tribe and external actors including the surrounding community, corporations, management groups, and government agencies is the result of a long history of resistance against exploitation.

Effects of this exploitation reached far beyond overfishing to include changes in water temperature, flow and quality. The construction of dams to power increasingly urban landscapes blocked or destroyed entire habitats and ecosystems. Soaring global carbon emissions have the potential to permanently alter climate and, by extension, highly sensitive estuarine ecosystems (Maryland Sea Grant 2011: A/2-8). I will discuss these environmental concerns and more in the following chapter.
Chapter 4: Environmental Change

The collapse of the shad fishery in the Chesapeake is difficult to explain because the influence of environmental factors on shad production are complex and vary by river. Scientists cite temperature shifts, water flow variability, declining water quality, decreased food availability, increased predation, overfishing and bycatch, physical barriers and habitat loss as potential threats to shad abundance (Aunins and Olney 2009, Chislock et al. 2013, Hilton et al. 2014, Hoenig et al. 2008, Hoffman and Olney 2005, Hoffman et al. 2007, Latour et al. 2012, Maryland Sea Grant 2011, Olney et al. 2006).

When I asked tribal members about environmental issues on the Reservation, many answered that the declining shad population was a significant concern. However, they also raised concerns related to many other environmental changes they had observed on the Reservation in recent decades. More often than not, they perceived these changes as being caused by urbanization, industrialization, overexploitation, and poor management by government agencies.

In this chapter, I will discuss categories of environmental change that are perceived as affecting the Reservation. The creation of these categories was influenced primarily by my interviews with tribal members, although I have supplemented them here with scientific reports. I will also relate these environmental changes back to shad ecology as potential factors contributing to the stock decline.
Changes on the Reservation

Pamunkey tribal members and scientific publications have identified environmental changes on the Reservation and threats to the Pamunkey River ecosystem, which I have classified into the following categories:

- Declining water quality
- Native and invasive species
- Overfishing and bycatch
- Physical migratory barriers
- Water temperature
- Erosion and habitat loss
- Sea level rise

Declining Water Quality

One of the most commonly referenced environmental concerns by interview participants was a general decrease in water quality of the Pamunkey River over the past few decades. Members of the tribe’s NRM working group discussed how people used to drink water from the river in their grandfathers’ time, but that the river is now too polluted.

X and T reported that effluents from the West Point Paper Mill and an upriver cat litter factory were increasing sedimentation in the river and decreasing water quality. Altered water flow by dams, hydropower plants, reservoirs, and industries changes the natural cycles to which shad have adapted and can have detrimental effects (Hilton et al. 2014, Maryland Sea Grant 2011). High flow is necessary to prevent shad eggs from being covered by silt and provides essential nutrients from the neighboring watershed. Too much flow, however, can wash eggs and weak larvae out of the nursery, increase mortality and flush out nutrients that support the nursery food web. Overall, stable
hydrographic conditions are correlated with higher larval shad survival (Hoffman and Olney 2005). Rainfall events in Chesapeake tributaries can also cause dramatic high flow and sudden drops in pH that negatively impact larval shad survival (Maryland Sea Grant 2011).

Runoff from urbanization of the Upper Pamunkey watershed in the Hanover County area was believed by X to be a significant cause of nutrient loading and sedimentation. Urban development of the watershed increases runoff due to an expansion of impervious surfaces such as cement. This can affect flow cycles and flush additional nutrients and contaminants into streams. The 2011 Alosine Species Team Background and Issue Briefs prepared by Maryland Sea Grant disclosed that sedimentation, eutrophication, turbidity, and anoxia (low oxygen) have increased since Colonial times due to land use changes. Between 1990 and 2000 there was a 61% increase in developed land in the Chesapeake Bay watershed with projections for continued rapid development. Scientists Chislock et al. (2013) report that sediment and nutrient loading of the Chesapeake Bay is extreme and that nutrient loading from runoff can result in eutrophication, which is excessive plant and algal growth that reduces water quality and depletes oxygen. Hilton et al. (2014) confirmed that the York River is threatened by low dissolved oxygen levels in the summer. The aforementioned water quality changes associated with urbanization could negatively impact shad larval growth and increase mortality (Aunins and Olney 2009, Maryland Sea Grant 2011).

Scientists Hilton et al. reported in 2014 that the York River system is also contaminated with metals and Polychlorinated biphenyls (PCBs), a man-made chemical
used in electrical equipment. Tribal member T noted outbreaks of E. coli in the James River as a point of concern. The NRM working group also discussed management plans for the garbage dump on the Reservation, which they considered a pollution threat to the adjacent wetlands.

One older tribal member proposed insecticide pollution as the culprit behind declining populations of bullfrog, muskrat and other small game on the Reservation. Bullfrogs have not been seen on the Reservation in three decades (Spivey 2017). Notably, one elderly fisherman that I spoke to claimed that pollution was not a cause of the shad decline. Rather, he was of the perspective that the shad have unpredictable cycles and may go from no run one year to a healthy run the next. His belief that pollution in the river was not a significant concern may be shared by other elderly tribal members. During one NRM working group meeting, a tribal member recalled that one older man continued drinking the river water for a long time after other tribal members considered it polluted.

Native and Invasive Species

During these discussions regarding water quality in the NRM working group meeting, tribal members explained that native rice filters water and that a lot of other tribes with rice in their wetlands drink their water. The loss of native wetland plants including wild rice and cypress trees was a serious environmental issue for several tribal members. As of the 2018 fall, the NRM working group was considering plans to reintroduce some extirpated native species to the Reservation wetlands.
The working group also expressed concerns over the potential introduction of invasive plant species and was developing relevant guidelines for regulation. Invasive species have already disrupted the estuarine ecosystem. Tribal member X cited competition from blue catfish as a contributing factor to the shad decline. Blue catfish were introduced to the Chesapeake as a game fish in the 1970s and have since come to dominate its waters. They have been known to follow shad runs up rivers, eating shad eggs as they are spawned (Carman 2017). “Four out of five fish in our river are blue catfish,” asserted X. Another tribal member attributed the decrease in muskrat population to the state’s reintroduction of beavers to the area (Spivey 2017).

An increase in the populations of predators such as striped bass and introduced finfish due to government management initiatives could be partially responsible for the non-recovery of the shad stock. Bald eagles (*Haliaeetus leucocephalus*) and ospreys (*Pandion haliaetus*) are shad predators whose recovery in the Chesapeake since the 1970s ban on DDT could be related to their ecology (Maryland Sea Grant 2011: A/3-8).

Disturbances in native plant and animal populations have upset the balance of nutrient flow in the ecosystem. Nutrient flow between the estuary and its watershed is complex and strongly affects shad spawning success. The York River estuary watershed is relatively intact compared to other Chesapeake Bay tributaries, with remaining riparian marshes and forests and a relative abundance of prey (Hoffman et al. 2007). However, changes to the food web can affect predation and food availability for shad. Food availability for larval shad in the freshwater portion of the estuary plays a
large role in larval survivability and affects the abundance of shad that will return to spawn in the future (Hoffman et al. 2007).

**Overfishing and Bycatch**

Fisherman R attributed the majority of the shad decline to overfishing and commercial bycatch. Scientists support that in-river and coastal overfishing is a significant cause of declining shad populations, particularly in the York River system (Hilton et al. 2014). Even after the imposition of fishing moratoriums, bycatch allowances have still posed a serious threat to shad populations. Bycatch mortality of shad is high, as the catch is usually bailed into the boat and sorted later (Hoenig et al. 2008). According to R, shad are sensitive fish and die easily if they are caught as bycatch.

**Physical Migratory Barriers**

While Pamunkey tribal members did not report physical migratory barriers as a specific environmental threat, scientists believe migratory barriers to be one of the most significant causes of shad population decline as they can prevent the shad from reaching their nursery grounds (Hilton et al. 2014, Maryland Sea Grant 2011). Physical barriers include dams, culverts, road crossings, tide gates, perched utility services, and anti-erosion measures. Shad cannot jump, therefore even low dams of two or three feet in height can be barriers to migration. Turbines on dams also present a physical risk (Maryland Sea Grant 2011: A/2-1).

While the Pamunkey, Mattaponi, and York rivers are undammed, it is important to note that there are a few dams in place on their tributaries (Hilton et al. 2014).
Specifically, the Ashland Mill Dam on the South Anna River, a tributary of the Pamunkey, blocks off 37 miles of historical shad habitat. Removal of the dam was discussed as mitigation for the King William Reservoir but the dam has not been removed. While it remains a fish passage priority in Virginia, no concrete plan for its mitigation exists (Hilton et al. 2014, Maryland Sea Grant 2011: A/4-9). Tributary dams may affect the overall health of the Pamunkey River stock.²

**Water Temperature**

According to Hoffman et al. (2007), the effects of temperature and river discharge on shad spawning success likely vary along the East Coast due to the hydrologic complexity of river-estuary systems. Juveniles require water temperatures in the range of 15.6-23.9 C, while adult shad are more flexible with a range of 10-30 C (Maryland Sea Grant 2011).

Tribal members supported that there is a sensitive temperature range for shad spawning. Q and R reported that the fish prefer to spawn in warm water, but if the water temperature is too warm, the eggs will die. Scientists confirm that temperature can affect the survivability of shad spawn and shad hatched early and late are less likely to survive (Hoffman and Olney 2005). Cold temperatures below 16 C can nearly double egg mortality (Maryland Sea Grant 2011). Because of the sensitivity of shad larvae to temperature, R explained that spawning is highly dependent on weather.

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² The Mattaponi Tribe maintained a fish hatchery on their reservation for shad during the same period as the Pamunkey Tribe, as later discussed in this thesis. The fishery was threatened by plans in the 1990s to construct a dam on Cohoke Creek, a tributary of the Mattaponi River. The plans were eventually cancelled. See Bragdon, Moretti-Langholtz, et.al. 1998.
Some tribal members were concerned about warm water effluents from industry on the Pamunkey River. The North Anna Power Station was a particular concern for Q. A one-page environmental statement from Dominion Energy, which runs the station, states that “the warm water discharge from the power station may actually be helping certain sensitive species of fish thrive during cold winter temperatures.”

The statement did not provide any sources detailing the effects of warm water release on the ecosystem and it is more likely that the temperature shifts harm shad by disrupting the river’s natural cycle. Scientists Hilton et al. (2014) identified thermal effluents from industry as a particular environmental concern on the Pamunkey River.

Elevated water temperatures can also form a barrier to migration and shad migrations may be delayed or altered by warm water releases or adverse weather conditions, especially sharp declines in temperature or late-spring warming (Maryland Sea Grant 2011, Olney et al. 2006). Tribal member X also explained that increased water temperatures can lead to lower dissolved oxygen, which has consequences for the entire estuarine ecosystem.

**Erosion and Habitat Loss**

Erosion of the Reservation shoreline was a serious concern for almost every tribal member interviewed. Coastal erosion is a natural process that can be accelerated by altered water flow. Specifically, storm surge and sudden water releases from dams can increase erosion. Tribal member W attributed some of the erosion to wakes from speedboats owned by non-native neighbors. She expressed a desire to enact regulations prohibiting people from driving their boats so quickly next to the
Reservation. The tribe is currently undertaking a shoreline restoration project, which I will describe in more detail in the following chapter.

Shoreline erosion also results in habitat loss for wetland species that live near the river's edge. X cited habitat loss in the river, and specifically the loss of substrate for spawning due to increased sedimentation, as a significant environmental issue.

Other physical alterations that affect shad productivity are the construction of bulkheads and landfills, which result in the loss of natural shorelines, and the construction of jetties, platforms, and piers, which lower habitat quality and provide cover for predators (Maryland Sea Grant 2011: A/2-14). Several old fishing shanties on the Reservation recently had piers installed which, as R explained, negatively affected the waterway.

Sea Level Rise

In September 2018, the Category 4 Hurricane Florence hurtled at the mid-Atlantic coast after rapid intensification and an unpredictable trajectory. North and South Carolina declared states of emergency and eastern Virginia prepared for disaster. In preparation of expected flooding, the North Anna Power Station released huge quantities of water from their reservoir, with no warning to the tribe, according to Q. The surge flooded the Pamunkey River and the water was over the docks at the Reservation before the storm even made landfall. Luckily for the Reservation, the storm lost energy as it approached the coast of the Carolinas and Virginia saw little more than a rainstorm.
The Reservation is a low-lying peninsula that juts into the Pamunkey River and, as such, tribal members Q and X told me that they consider storm surge a serious threat, particularly in conjunction with sea level rise. X feared that the tribe may not be able to remain on the Reservation, where the highest elevation is 9 feet. She cited a recent climate report that predicted 5 feet of sea level rise by 2050, asserting that, “Even if we stay here, the habitat is going to undergo all sorts of changes.”

VIMS researchers explained to me that the greatest threat to the Reservation may not be direct flooding from sea level rise -- although storm surge may still present a risk -- but rather slow and sustained marshland encroachment. According to the researchers, over the next few hundred years, sea level rise will cause salt water to intrude farther up the river each year until the freshwater marshes of the Reservation are transformed into less biodiverse salt marshes. The forest along the edge of the river will die and the plant species will slowly change. Fleeing the rising water and salt levels, the marshes will encroach on the Reservation’s uplands, where people currently reside and farm. A Pamunkey tribal member was present during this conversation and was saddened by this prediction. She had already begun to see marshland encroachment in her lifetime. A once-open area on the Reservation called the “Pocket” where she used to swim had become overgrown (and polluted) in recent years. Even though she would not live to see the freshwater marshes turn to salt, she still expressed a sense of loss. The Reservation was changing -- in the matter of a few generations, it would likely be entirely different than how it had been for thousands of years.
Science Communication and Native Voice

It is important to note that the discussion regarding the future impacts of sea level rise on the Reservation that took place between VIMS researchers, the Pamunkey tribal member and myself are based on theoretical models that predict the sorts of changes that will likely occur due to climate change over the next few decades and centuries. While it is not certain that these changes will occur on the Reservation exactly as reported, it was the opinion of the scientific experts present that those sorts of changes will likely occur within the next few centuries if climate change and sea level rise continue on their current trajectory.

Regardless of the specifics, it seemed as though the tribal member present had not been aware of the possible environmental changes on the Reservation prior to our conversation. This indicates a poor level of communication between the scientific community and the tribe. During a private meeting with two VIMS scientists at a later date, we discussed some of the environmental changes that would likely occur on the Reservation. When I asked whether they intended to inform the tribe about what they may face in the future, it seemed as though the thought had not previously occurred to them. One VIMS scientist admitted that the focus in the scientific community tended to be publishing rather than community engagement.

Researchers rarely have malicious intent, although many tribal members express feeling exploited by the scientific community. Rather, I found through volunteering with VIMS, their priorities tend to be the pursuit of knowledge according to a strict empirical framework that leaves little room for other ways of knowing, including indigenous
knowledge. Their omission of native perspectives from research and management decisions is the product of a broader society that has largely forgotten that native people still exist outside of textbooks and memory. That said, VIMS has had a history of engagement with the Pamunkey and, until recently, a VIMS scientist advised the tribe. However, the cessation of this relationship after his retirement indicates that engagement is more the initiative of the occasional individual than a norm in the scientific community.

The Pamunkey have been fighting to have their voices heard for a long time. Despite their efforts, they had very little regional influence prior to federal recognition. As a result, the tribe was largely unable to contribute their perspective to regional management decisions.

Even with federal recognition, several members described a sense of powerlessness against large corporations and the industrial-capitalist system driving us towards global climate change.

The Pamunkey woman whom I observed converse with VIMS researchers expressed nostalgia about the Reservation of her childhood and pessimism towards the Reservation of the future. This was a common response by interview participants of all ages. Q, when describing the effects climate change would likely have on the Reservation, stated:

This is the oldest continuously occupied reservation in the U.S. and we’re probably going to be underwater in 100 years.

The Pamunkey are going to lose the natural and cultural aspects of the Reservation, she continued.
The tribe just does not have the administrative capacity to fight Dominion Energy over the North Anna Power Station, admitted one tribal member. Offshore fishers are too powerful, explained another, they have too much money. Discourse on the Reservation concerning power dynamics and natural resources ties into theories of political ecology (Peet et al. 2011) that focus on control over natural resources. As a community consistently marginalized by the local and global political economy, the Pamunkey have had very little control over how the resources crucial to their traditional subsistence practices are managed on a broader scale. In some, this has caused a sense of powerlessness as global issues pick away at the Reservation and the tribe’s sovereignty over their historical landscape.

However, while the Pamunkey have been continuously marginalized, they have also continuously persisted. Federal recognition has awarded the tribe a new legal status, of which they are still learning the limits. Q reported that Dominion Energy was recently forced to award the tribe $4.5 million in mitigation money for constructing a power line that affected the cultural viewscape due to Section 106 of the National Historic Preservation Act, which requires consultation with federal tribes on federal projects.

The tribe has historically and continues to practice natural resource management on the Reservation. Federal recognition has provided the Pamunkey with increased resources and influence that has led tribal members to propose diverse management projects and suggest joining regional management boards. I turn now to the tribe’s natural resource practices.
Chapter 5: Pamunkey Natural Resource Management

The Pamunkey tribe has engaged in and depended on fishing, hunting, trapping, and gardening for hundreds of years. During the last 150 years until recently, shad and herring were an integral part of their economy and Pamunkeys bartered with them up and down the East Coast (Pamunkey Fish Hatchery Educational Materials, Spivey 2017). Tribal members continually asserted in interviews their culture’s reliance on access to natural resources including plants, animals, and clay for traditional pottery-making. Inevitably, they also reported that these resources have declined on the reservation.

Publicly, Pamunkey members have stated to reporters, in educational materials inside the fish hatchery, and on their website that the tribes has a philosophy that if you take fish from the water, you should give some back (Middleton 2014, Pamunkey Website, Pamunkey Fish Hatchery Educational Materials, Spivey 2017, “Tecumseh Cook Dies” 2003). Examples in the literature describe Pamunkey wetland and fishery management practices likely dating back to at least the 19th century (Spivey 2017). However, the earliest example of active resource management reported to me in any interview was the construction of an indoor hatchery on the reservation in 1918, as described by R (also see Pamunkey Website, Pamunkey Fish Hatchery Educational Materials). Interestingly, most tribal members described a long tradition of resource use, but only a recent one of management.
The hatchery is the most concrete and overt sign of tribal natural resource management. The interior of the hatchery displays educational signage, old boats and fishing gear. One sign in the hatchery reads,

The Pamunkey government has also taken conservation measures regarding the raking of shad and rockfish. At the January 7, 1993 Tribal meeting, the following motions were passed: Beginning in the 1994 shad/rockfish fishing season - Pamunkey Indian Reservation residents will be limited to a total of 100 shad and 15 rockfish per boat per tide. The boat and equipment used, must be owned and operated by a Pamunkey Indian Reservation resident. The motion was passed by a unanimous vote.

As the Reservation hatchery is perhaps the most significant natural resource management project on the Reservation, I will begin this chapter by walking through the history of the hatchery and how it functions. I will then broaden the discussion of natural resource management to describe the structure of the tribal government before moving into current projects and concluding with ideas for future management projects that tribal members shared with me in interviews.

**Pamunkey Reservation Fish Hatchery**

Hatchery programs are used to restock fish populations through manual reproduction. As shad are philopatric and habitually return to the particular area where they were spawned, hatchery programs tend to be an effective restoration method because the produced fry imprint in the river under restoration and will return there to spawn in the future (Brown et al. 2000).

The Pamunkey Reservation indoor hatchery (Figure 17) first opened in 1918 and contained an 800-gallon tank, gas powered motor, hatching jars, and holding tanks.
Eggs were gravity fed back into the Pamunkey River after hatching. There was little support from the state at the time and the tribe had to diminish the operation in the 1940s. In the following decade, the VMRC approved a new approach to hatching with tidal boxes and provided some financial assistance. In 1989, the tribe approved their methodology and, with the assistance of the federal government, constructed a new hatchery with 12 hatching jars, a 500-gallon holding tank, two indoor tanks with river water input, and an exit for fry to return to the river. The cost of construction to the tribe was $10K and the federal government contributed an additional $13K. VMRC provided $3K to run the hatchery and some Pamunkey fishermen donated time to operating it. In 1992, the tribal government upgraded the facilities and doubled the number of hatching jars with the help of VMRC, which also provided $9.9K to employ one full time staff and one part time staff. These funds were also used to pay tribal fisherman to catch the shad for roe and sperm. The hatchery increased in size again in 1994 and gained an upgraded filtration system (Pamunkey Fish Hatchery Educational Materials).
Tagging of hatchery fry with Oxytetracycline (OTC) began in 1998. The tribe renovated the facility to support the tagging operation, adding 12 new holding tanks, a new plumbing system with oxygen and water to all tanks, a new filtration system, and brine shrimp hatching tanks (Figure 18). A $90K Chesapeake Bay Program Grant and matching funds from the VDGIF funded the renovation.
When the hatchery is in use, fishermen go out in the evenings starting in April with 2-3 gill drift nets (5¼ inch stretch mesh, 600 ft long, 20-25 ft deep) to catch female and male shad. They throw the net in a U shape two hours before slack tide, when the tide changes direction. When the tide is just beginning to change direction, the net is taken up. Shad are removed from the nets and milked by applying pressure along the full length of the belly with thumb and forefinger, which will cause a stream of eggs or sperm to be squirted into a bucket (Pamunkey Fish Hatchery Educational Materials). The sperm and eggs are stirred together to fertilize, which takes 3 minutes, explained
one tribal member who had worked in the hatchery. The fertilized eggs are taken to the hatchery where they are transferred to a large bucket and any scales are removed. New water is added to the eggs for the next hour, after which they are considered to be water hardened. The eggs are then transferred to hatching jars with about 3 liters to a jar. Water running from the river in pipes is gravity fed into the jars and circulates through the eggs. After 4-6 days the eggs will hatch and swim up a tube into a large holding tank. After 2-3 days, once they have developed a mouth and no longer have yolk sacs, they are referred to as fry and are fed freshly hatched brine shrimp. The fry are cultured for eight days during which OTC is added to the tank on a sequence of days determined by the Department of Game and Inland Fisheries. The OTC penetrates the otolith, or ear bone, of the fish, which grows one concentric circle per day like tree rings. The ring grown on the day of OTC treatment will appear distinct and the pattern of OTC treatment will produce a unique otolith tag that identifies the hatchery of origin (Pamunkey Fish Hatchery Educational Materials). After 8-10 days, the tank plug is pulled and the fry enter the river through pipes. The tribal member explained that this is usually done at night to avoid the minnows that prey on the fry. The fry will stay in the river until they are around 3 inches long before heading towards the bay, where they remain for another 2-3 months and then enter the ocean. Scientists examine the otolith tags of fish during future runs to measure how many hatchery fish return to spawn as an evaluation of hatchery program success. Typically, only 10% of hatchery-spawned fish survive to return.
The tribe’s website and educational materials in the hatchery assert that “All shad produced from this facility are released back into the Pamunkey River.” Newer signage in the hatchery declare that shad eggs from the Pamunkey River were used in restoration efforts in the Susquehanna River in the 1970s and that they later restored the shad population in the James River. The same sign proudly announces that “The Pamunkey Shad runs have remained the healthiest of any of the East Coast Rivers that are tributaries to the Chesapeake Bay.”

At one point this was clearly the case and the Pamunkey population was used in multiple restocking efforts in the Chesapeake watershed. A James River hatchery program started in 1992 and initially only took broodstock from the James River to minimize the risks of genetic transfer. However, two unsuccessful years of broodstock capture efforts in James River resulted in the decision to transfer broodstock from another river. The Pamunkey River stock was selected as the donor due as it historically supported a sizeable healthy stock, was the closest geographic neighbor to the James River, and the stock was less genetically distinct than other neighbors. The new program was a cooperative agreement between the U.S. Fish and Wildlife Service, the Virginia Department of Game and Inland Fisheries (VDGIF), and the Virginia Marine Resources Commission (VMRC) (Brown et al. 2000, Hoenig et al. 2008, Latour et al. 2012). It stocked 19.5 million fry into the Upper James between 1994 and 1997. A 2000 study investigated genetic diversity between the Pamunkey and James population and found that, while the rivers had slightly distinct gene pools, hatchery rearing did not seem to bias genetic selection and was a successful method of maintaining a relatively
healthy gene pool in the in James River (Brown et al. 2000). Latour et al. (2012) described a positive relationship between the presence of hatchery-derived fish and the overall adult monitoring index values in the James River, suggesting that the hatchery program was effective at improving and sustaining the James River population.

According to multiple scientific sources, the program also released around 6.5 million fry into the Pamunkey during that time to offset those sacrificed during gamete collection (Brown et al. 2000, Hoenig et al. 2008, Latour et al. 2012). However, one tribal member asserted that the state took shad from the Pamunkey without restocking, indicating a lack of communication between the scientists and the tribe.

It is worth noting that none of these scientific papers make mention of the Pamunkey Indian Tribe or their shad hatchery. Hoenig et al. write that shad gametes from the Pamunkey were taken to a “nearby hatchery,” but it is unclear in the text whether this hatchery is the one located on the Reservation (Hoenig et al. 2008: 509). I have gathered from interviews that they were taken to a different hatchery on the James River. Furthermore, Brown writes that fish were taken from “the Rockahoc region of the Pamunkey River” (Brown et al. 2000: 296). A map of the site shows this area to be the bend in the river directly adjacent to the Reservation. Hoenig et al. (2008) also write that VDGIF scientists collected all of the shad gametes from the Pamunkey River for the James River hatchery program. If the authors are not simply omitting the role of local (and possibly native) fishermen, Hoenig et al. are at least describing a sort of hatchery program that is very different from the community-run program on the Pamunkey reservation. The complete scrubbing of the native narrative and role in natural resource
management is indicative of a larger disconnect between the scientific community and local communities. Scientific knowledge that is directly applicable to local communities and native people is rarely transmitted to them in any useful form. Instead, studies of the river ecosystem tend to ignore their existence. Beyond simply serving as a source of frustration for tribal members who feel that they are being exploited by scientists, the poor communication of research findings withholds valuable information that the tribe could use to structure their natural resource management.

This pattern of poor communication even extends into the management of the Pamunkey hatchery, which lost funding from the VMRC in 2014 for reasons that, according to $R$, were unknown to the tribe. Around the same time, the DGIF stopped tagging and research. $R$ reported that the VMRC claimed that efforts to restock the Pamunkey were unsuccessful but that the VMRC would not publicly denounce the program because it would be “politically incorrect.” Multiple tribal members were of the opinion that the hatchery program was working and that its continued operation was critical to preserving the Pamunkey shad population. In recent years, the hatchery has not opened due to a lack of funding and a nonexistent shad run. In 2018, fishermen caught a few fish in the beginning of the season and then none. These days, $R$ expressed with frustration, they only catch “trash fish” like garr and alewives.

Some tribal members have emphasized the importance of reopening the hatchery, however others would rather see the time and money invested elsewhere, explained $Q$, $R$, and $P$. Discourse over the hatchery is torn between two differing perspectives. One is that there is no point in reopening the hatchery because the fish
population has declined beyond recovery and it is just not economically worth it. The opposing perspective is that the significance of the shad goes beyond its physical value. The Pamunkey tribe has long standing traditions surrounding the shad, which not only sustained the community with cash and food, but, Q explained, became a symbol of the river’s bounty and the people who fished there. The shad is even present on the Pamunkey tribal seal (see Figure 11 on pg. 44).

Supporters of reopening the hatchery, including R, wish to restore the shad population so that they may revive traditional fishing practices. This anthropocentric motivation differs notably from the cliche notion that native people have an intrinsic desire to serve as the stewards of nature. Rather, as I mentioned previously, most tribal members are more focused on their subsistence practices than on environmental conservation, unless the management of natural resources also supports cultural and economic resources.

**Tribal Organization and Resource Management**

The Pamunkey Tribe is governed by an elected Chief and Council. During a Cultural Resource Management working group meeting, I learned that in 2015 the tribe applied for and acquired funding through the competitive Administration for Native Americans Social and Economic Development Strategies Grant (ANA SEDS)\(^3\) to build administrative capacity by: 1) establishing the Tribal Resource Center to administer grants and federally funded programs, 2) providing training and educational

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\(^3\) The grant proposal was written and developed by tribal member Ashley Spivey and consultant Dr. Michelle Kiel. While federal recognition is not required to apply for ANA grants, some tribal members suggested that federal recognition may have helped the tribe secure funding.
opportunities in key program areas that included natural resource management and cultural resource management, and 3) establishing working groups such as the Natural Resource Management (NRM) and Cultural Resource Management (CRM) working groups. The Tribal Resource Center is responsible for grant writing and manages volunteer working groups. These working groups develop strategies to address various issues on the reservation and present them to the Chief and Council for approval. One CRM working group member expressed hope that the working groups would develop to eventually become departments in the tribal government. Holding formal authority would relieve the Chief and Council of having total responsibility over the minutiae of governance on the Reservation. It might allow the tribe to expand their management plans and better organize and enforce policies, which was an issue brought up by multiple tribal members.

I attended a number of NRM and CRM working group meetings. Fewer than ten people were present at each meeting and, undoubtedly, the majority were closely related. Each meeting had an agenda prepared and disseminated in advance via email. Discussion, when relevant, was focused on developing specific policies to address concrete, solvable problems impacting Reservation residents.

At one NRM working group meeting in May 2018, tribal members discussed how multiple people had complained of sickness when walking near a neighboring farm while pesticides were being administered. They considered requiring farmers to provide a list of their pesticides, then whether that list should be made public. The group debated the balance between complete transparency and withholding information from
the rest of the Reservation residents. Another subject of discussion was waste management policies. The group agreed that new policies should be put in place, but doubted their effectiveness as current methods like dumping and burning trash are habitual on the Reservation. Other items on the agenda included invasive plant species prohibition, the protection of native plant species, and regulations surrounding wetland alterations. In most cases, proposed policies came with the disclaimer “unless approved by Chief and Council.” Working group members also try to learn management techniques from other tribes, whether through observation or by attending national conferences. Many of the group’s initiatives require partnering with other organizations or agencies. As the acquisition of federal recognition and grant funding for capacity building were such recent victories, tribal members with no previous experience in natural resource management are suddenly being required to develop policies and frameworks for ensuring the health and sustainability of the Reservation.

The CRM working group strives to preserve historic resources on and beyond the Reservation. This includes physical resources like buildings and cultural resources like artwork. Pamunkey art, and particularly pottery, draws on deep traditions and pottery is one of the few surviving cultural practices of the tribe. In one meeting that I attended, the working group was faced with the impossible task to trying to determine what qualified as authentic Pamunkey art. Is a piece of art Pamunkey because it was made by a Pamunkey? Or does it need to conform to traditional styles? One tribal member referenced the Cherokee, claiming that most of the art products in their gift shops were made in China, but tourists eat it up and they turn a profit. Is it worth sacrificing cultural
integrity for profit? These sorts of questions are even more difficult when you consider the standard of living experienced by most Reservation residents. If the tribe could make a cultural practice profitable enough that people take it back up, they are ensuring its preservation. Working group members sought guidance on artwork policies from other tribes. Ideas discussed included starting a co-op artist guild, cultural classes, and community engagement.

These questions of authenticity extend to other areas of the Reservation. Fishing practices have changed over time, and so has the landscape. Does that make them less authentically Pamunkey? Much discussion surrounding the Reservation’s flora and fauna also raised deeper questions of what it means to be “native.” Change is a process that occurs passively and actively. While the environment has shifted on the Reservation due to the political ecology of global economic transformation, the tribe has also actively played a role in the landscape’s development.

Among the more concrete goals of the CRM working group was improving cell and internet service on the reservation. It was interesting to observe the contrast within a single meeting between the desire to preserve traditions and the desire to modernize. This dichotomy of traditional vs. modern is present throughout my field observations and is perhaps best characterized by the tribe’s plans to open a casino. How shifts away from historic landscapes and practices have affected and will affect “authenticity” for the Pamunkey will be discussed in more detail in the conclusion.

One responsibility of the CRM working group that is particularly relevant to this exploration of environmental change was to create archaeological policies and
procedures for the Reservation to guide development and address the loss of sites along the shoreline due to rapid erosion. Erosion, which I identified in the previous chapter as a locus of anxiety for many tribal members, is perceived to be causing not only the gradual shrinking of the tribe’s sovereign land but also the tragic loss of its tangible cultural artifacts. Culture loss was woven intensely into every discussion of environmental change on the Reservation that I observed.

**Current Projects**

As of December 2018, the tribe was working on the following projects and several others that are less relevant to discussions of natural resource management. While these projects are focused on natural resources, they are also centered in heritage spaces as the resources being managed all have a culturally significant history for the tribe. In many cases, the grants were awarded on the second or third try, which demonstrates the challenges that the tribe faces in acquiring funding even with federal recognition.

**Sturgeon Species Recovery Grant**

Sturgeon are a historically significant fish that experienced extreme decline at the turn of the 20th century. It has been over a century since the tribe actively fished for sturgeon. This grant, which was recently awarded by NOAA, will allow for water quality monitoring, mapping the river floor for appropriate spawning habitat, and tagging sturgeon. The tribe is partnered with a local contractor, Chesapeake Scientific LLC. The grant supports 3 new positions working with the contractor, including a “River
Technician,” who does hands-on work for the project. The River Technician position is currently filled by a Pamunkey woman.

**Bureau of Indian Affairs Grant**

The tribe applied for this grant two years in a row and was moving forward with it as of December 2018. It would allow the fish hatchery to reopen and undergo repairs and would also support involving younger tribal members with the hatchery.

**Shoreline Stabilization and Restoration Grant**

The Pamunkey are using this grant to partner with VIMS on a shoreline restoration project, for which they received $250K from the National Fish and Wildlife Society. A living shoreline emphasizes connectivity between marine and terrestrial organisms, which can be damaged by shoreline hardening. Shoreline hardening is a natural process that occurs when coastal erosion creates a sharp drop off in the water. The living shoreline project aims to prevent shoreline hardening, which negatively impacts ecosystem connectivity. To create a living shoreline, a wall is constructed far out in the water and the space between it and the shore is filled with sand or dirt to create a marsh. The tribe is creating living shorelines in two locations: 1) the yard of an elderly Reservation resident who reported that her yard, which was once big enough to play flag football, is now only 10 ft from the water and 2) near the “pocket,” a small inlet by the boat ramp and road. The tribe is working with VIMS and has already flown aerial imagery of the two sites and received a federal permit for the project. As of December 2018, they still required $500K to complete the project.
Wetlands Delineation

The tribe applied unsuccessfully for a wetlands grant from the EPA in 2017 but are continuing to seek sources of funding for the project. They will partner with VIMS to delineate reservation wetlands and assess the abundance of native species and wetland accumulation or loss.

Potential Future Projects

Several tribal members who I interviewed had ideas for future natural resource management projects. However, many did not and Q even expressed that most people care about preservation but do not know how to move forward. Ideas ranged from preservation policy to restoration and revitalization initiatives.

Working group members are influenced by natural resource management strategies used by other tribes, which they encounter through conferences such as the Native American Fish and Wildlife Conference. At these conferences, tribal representatives make contacts and watch presentations by other tribes. One NRM working group member described shoreline stabilization presentations by Washington State and Rhode Island tribes at the 2018 Native American Fish and Wildlife Conference, which she attended as a Pamunkey representative. Other programs of interest that she encountered at the conference concerned storms, fires, weather, and rising water. The tribe also occasionally receives management trainings. In early 2018, Q reported that VMRC held a natural resource management training during which they encouraged the tribe to join mid-Atlantic natural resource management boards so they
could have a greater say in regional issues. Some NRM working group members expressed interest in working with the Mid-Atlantic Wetland Workgroup, which is a regional organization focused on developing wetland monitoring strategies.

In terms of legal responses, $W$ suggested enacting policies to minimize coastal erosion from boat wakes by limiting boat speed around the reservation, which she considered one of their biggest environmental threats. Another tribal member described the possibility of seeking treatment as a state by the EPA in the wake of their federal recognition. This would allow the tribe to help set parameters when it comes to air and waterways that affect the reservation and will open up further funding opportunities. On a similar vein, $X$ suggested petitioning the EPA for higher water quality standards now that the tribe has federal recognition. As their federal recognition is so recent, the Pamunkey have never worked with the EPA before in any major organized way.

Other tribal members assert that the entire ecosystem on the reservation has changed too much and they hope for more proactive revitalization projects. These include reintroducing wild rice, re-planting cypress trees (which used to be used for boat construction), germinating seeds from marshes in a greenhouse and replanting to restore their wetlands, starting a wetland species bank (which will also be a source of income to the tribe), and expanding the hatchery to include mussels and other types of traditional wildlife including herring.

Several tribal members expressed the frustrations of working to restore native resources. $Q$ stated when discussing the hatchery, “While shad is culturally important, we realize it might not be viable in the future.” The NRM working group admitted the sad
possibility of native plants not being available and ceded that non-native non-invasive plant species may be used when needed in emergency conditions to protect basic resource values as interim, when native plants not available, in permanently altered plant communities. One tribal member described preservation efforts as walking the “tightrope between revitalizing and adapting.”

Despite the variety of ideas I heard during interviews, tribal members were always pessimistic about the future of natural resources on the reservation. “My hope lies in that our people have always adapted,” shared one woman. But most tribal members have come to terms with a future environment that looks very different than their traditional one.
Chapter 6: Conclusion

*The river was the glue that cemented the Pamunkey community and secured their persistent presence on the landscape beyond European colonial expansion.*

-- Spivey 2017: 176

Riverine-oriented subsistence practices, and particularly fishing, were a cultural and economic anchor on the Pamunkey Indian Reservation for hundreds of years. Through the 18th century, these practices and the Reservation’s location on the Pamunkey River allowed the tribe to maintain sovereignty over their Reservation during the period of aggressive colonial expansion when most other tribes in the region could not. As Spivey (2017) describes, tribal members continued their traditional natural resource practices into the 19th century, when they engaged with the expanding market economy by creatively utilizing their subsistence practices to produce profit. By doing so, the tribe was able to continue living on the Reservation and maintain core aspects of traditional cultural practices tied to the landscape.

The centrality of the Reservation landscape to Pamunkey tribal identity persisted even through the first half of the 20th century, when global shifts towards industrial capitalism intensified uneven distribution of economic opportunity and pulled some tribal members off the Reservation and into cities across the mid-Atlantic. During this time, many tribal members living off the Reservation continued to engage with the tribe by following the shad run up the coast and attending community fish fries, which some continue to attend today. Fishing persisted as an important economic and cultural practice until its significant decline towards the end of the 20th century, which can be
attributed to diminishing market profitability, decreasing fishery health and disinterest from the younger generation.

The significance of traditional subsistence practices to Pamunkey persistence through marginalization and threats to sovereignty solidified its importance in the narrative of tribal identity described by several contemporary tribal members. This tribal narrative emphasized the agency of historical Pamunkey people who used their generational knowledge of the landscape to navigate and control their relationship with the changing political economy of 18th and 19th century Virginia. As they engaged with the Reservation landscape, the Pamunkey community defined the meaning of the Reservation and were reciprocally defined by its landscape. Changes to the Reservation landscape and associated traditional subsistence practices therefore affect how the Pamunkey community is defined and, by extension, how tribal members define themselves as native.

For some tribal members, visible changes on the Reservation in recent years only foreshadow future environmental and cultural loss. Many tribal members were pessimistic when discussing the future of the Pamunkey. Despite this, most expressed confidence in the tribe’s ability to persist and adapt. Awareness of historical changes to the landscape and cultural practices coupled with the risk of further loss has led some tribal members to spearhead local natural and cultural resource management initiatives on the Reservation. However, the political ecology of natural resource sovereignty and management in the region has thus far largely suppressed the native perspective on environmental issues.
The tribe’s long history of shad fishing, repeated struggles to maintain control over their fishing rights, local conservation efforts (ie. the hatchery) but general omission from the broader management discourse and the recent plummet in fishing practices due to market transformations is only a window into larger issues of political ecology and political economy. Poor tribal engagement by the scientific community is indicative of a broader societal apathy and ignorance surrounding native issues. However, while conservation efforts often ignore tribal ecological sovereignty and knowledge and may even cut off indigenous access to natural resources (recall the irony of the 2013 VDGIF and VMRC effort to close the Pamunkey shad fishery that stocked the Reservation hatchery), it benefits local native populations and the environment when conservation efforts are decentralized and decolonized to incorporate indigenous agency in natural resource management.

With the opening of the hatchery in 1918 and a tradition of informal natural resource management practices, the Pamunkey have long had a stake in environmental conservation in the region. It is unfortunate that Pamunkey federal recognition, which grants the tribe greater political authority and access to regional management boards, came so late. If it had preceded the collapse of the shad fishery in the early 20th century, one wonders whether the tragedy could have been avoided. Federal recognition is not just important for the tribe, therefore, but for all of us who have a shared stake in environmental issues.

Adapting to their new status as a federally recognized tribe is a slow process for the Pamunkey. The tribe is still working to understand what sovereignty means for them
in the contemporary United States and how it can be expressed. Some members are encouraging others to raise the tribe’s regional profile, build relationships with regional and federal management agencies and initiate ambitious projects using new government funding opportunities. It is a formative time for the Pamunkey and the tribe may undergo massive transformations over the coming decades due to this sudden shift in political and legal status.

What direction they choose to take is another question. Tribal members on the Reservation disagree about the future of traditional practices, including fishing. Some assert the critical importance of these practices to Pamunkey identity and claim that massive efforts should be made to restore and preserve the traditional landscape. Others have both eyes towards modernization. The practices are too far gone, they say. It is time to move forward.

The Pamunkey have persisted on the Reservation for centuries. It is has been key to the survival of certain traditional practices and is central to the understanding for some Pamunkey members of what it means to be Pamunkey. As Spivey (2017: 68) explains:

> For Pamunkey people the land also holds the key to ensuring traditional subsistence activities continue to be taught and practiced among future generations. It is the foundation to cultural continuity in the past, present, and future.

However, the Reservation may not remain the center of cultural continuity for long.

Tribal leadership currently has plans to open a casino in Virginia. Historically, the Reservation allowed the tribe to control their engagement with the market economy and maintain aspects of traditional subsistence practices. Constructing a casino would
plunge them headlong into the capitalist system, with potential ramifications for Pamunkey traditional practices and conceptions of identity as tied to the natural landscape. For centuries, the Reservation has been the heart of the Pamunkey Tribe, but with talk of putting up apartments around the new casino, their cultural center could shift from the traditional riverine landscape to an urban one.

Development is not the only threat to continued life on the Reservation. Several tribal members identified climate change as a potential future driver of migration. With its low elevation, the Reservation faces a considerable perceived risk from storm surge and erosion. Like the destruction of the shad fishery at the hands of powerful international conglomerates, climate change is one more example of the uneven power dynamics of natural resource access in the industrial capitalist system. While federal recognition has empowered the tribe to take a more active role in regional management, the political ecology of climate change may be beyond their ability to affect. The tribe will adapt and persist, however, as multiple tribal members assured me. Local management projects are already in the works. But the Reservation landscape will look different in the future. Even some tribal members in the cultural and natural resource management working groups who are tackling these issues admit that the tribe may permanently lose some remaining aspects of their traditional way of life.

If fishing vanishes from the Reservation as an important cultural practice, conceptions of Pamunkey identity will undoubtedly change. Some tribal members would consider the loss of such a historically significant tradition that allowed the tribe to persist through centuries of colonial expansion and marginalization a great and
irreversible tragedy. Furthermore, the practice of fishing is only a visible reference for the persistence of traditional culture on the Reservation. If traditional practices cease altogether, the ancient lived history of the Pamunkey will only survive in memory.

As their environmental and political landscapes are thrown into flux, the tribe has reached a fork in the road. How they choose to engage with their new status will determine the future of what it means to be Pamunkey.
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Figure 17. Alexis Jenkins. 2018. *Pamunkey fish hatchery exterior.*

Figure 18. Alexis Jenkins. 2018. *Pamunkey fish hatchery interior.*