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“BY GOODLY RIVER'S UNINHABITED” WATERWAYS AND PLYMOUTH COLONY

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Abstract

The colonists of Plymouth were dependent on aquatic environments for the dispersal and acquisition of ideas, goods, and people. This thesis builds on of the work of Donald Worster and Michael Rawson amongst others to examine the importance of water in Plymouth Colony. Ultimately this study utilizes primary documents to argue that the abundance of aquatic environments in the colonies played a crucial role in allowing for the establishment of a permanent colony in New England. The rise of environmental history over the past several decades presents a natural tool for analyzing the experiences of Plymouth's earliest settlers. Between the years of 1620 and 1640, Plymouth colony was little more than a struggling outpost whose future success was far from granted. Lack of food, isolation, low populations, challenging environmental conditions and threats from Amerindians and other Europeans proved incessant obstacles to the establishment of a stable colony. The Pilgrims overcome these challenges largely because of the abundance of aquatic environments located in the region. Plymouth's settlers implemented these waterways for a variety of uses ranging from obtaining food and profit to fertilizing fields, establishing land ownership and maintaining their connections to England. While Plymouth's citizens intended to establish themselves on the terrestrial environments of New England, this process was invariably tied to the aquatic environments surrounding them. These waterways allowed the colony to survive and flourish and in the process Plymouth created a deep reliance on its aquatic resources that lingers on in modern New England. Placing colonial Plymouth under this environmental lens adds a degree of complexity to historical understandings of Plymouth by moving beyond the solely human elements of the colony's

establishment and survival. Accepting the environment as a historical actor is imperative to fully understanding the experiences of the earliest European colonists in the Americas. By reinterpreting Plymouth's history it is possible to gain a deeper understanding of human experience in New England while simultaneously reinforcing the interconnected nature of human and natural histories.

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Introduction: Revisiting Colonial Plymouth

When William Bradford and the other colonists aboard the *Mayflower* first caught sight of Cape Cod in 1620 they were thrilled to have completed the arduous passage across the Atlantic, and yet apprehensive as to what New England had in store for them. Bradford asked, "what could they see but a hidious and desolate wildernes, full of wild beasts and willd men?" Despite these fears they could not turn back from their chosen path as, "If they looked behind them, ther was ye mighty ocean which they had passed and was now as a maine barr and goulfe to seperate them from all ye civill parts of ye world."[1] The Atlantic Ocean stood as a barrier to the colonists, a seemingly insurmountable obstacle which, due to their lack of sustenance, could not be traversed. The ocean and the rivers running into it bent Bradford, Edward Winslow, Emmanuel Altham, John Pory and countless other Pilgrims and Englishmen to their will, dictating where and when they could travel, what types of resources they would have access too, and to a certain extent whether or not they and their colony would survive.

Despite the immense control which these waterways held over the lives of Plymouth's earliest settlers they were also sources of life, survival, sustenance and opportunity. Rivers, streams, lakes, marshes and oceans amongst other landscapes provided countless needs to the settlers. Fish and shellfish would go on to form the basis of the colonial diet. The fur trade helped the company pay its debts and remain financially viable. Sails and boats offered rapid transportation around the region on a network of rivers and coastlines, moving goods peoples and ideas around the

[1] William Bradford, *Of Plymouth Plantation*, (Boston: Wright and Potter Printing Company, 1898), 96.

Atlantic World. Finally, aquatically shaped landscapes such as meadows and marshes, provided invaluable environments for the expansion of grazing and farmlands. Maintaining access to these lands in the face of an increasingly privatized system of land ownership became an essential objective of both the colony's governing body and individual citizens.

For these reasons the waterways of Plymouth were invaluable to the establishment and maintenance of the colony. The dependence on aquatic landscapes was pervasive amongst Plymouth's first settlers and would help in the creation of a long lasting, stable colony. The accounts of colonists such as Bradford and Winslow as well as some of New England's earliest chroniclers, William Wood, Thomas Morton and Francis Higginson, all convey a fascination with aquatic landscapes and the commodities that they held. While a rich history of Plymouth's social and political development exists, few historians have concerned themselves with the environmental implications of colonial Plymouth. Such an approach reveals a colony which was dependent on water for its survival and growth, a truth which has become no less valid in America over the past four centuries.

New England has presented a fertile ground for environmental historians. William Cronon, Carolyn Merchant and Theodore Steinberg, amongst others, have examined the region and its natural qualities in seminal works in the field. Cronon's *Changes in the Land* remains one of the most important works in environmental history. Cronon's ability to place the environment at the center of New England's colonization helped establish environmental history as a legitimate field of historical

inquiry.[2] Carolyn Merchant's theoretical revisioning of the relationship between women and the natural world added diversity to what has all too often been a male dominated field.[3] Steinberg questioned the environment's role in industrialization, one of the defining developments in the history of New England. Steinberg's argument ensured that the environment remain an active player even in situations that seem to be dominated by human construction and development.[4] This literature played a central role in establishing major ideas in environmental history, however more recently environmental historians have focused on other regions and time periods. Interest in New England has shifted further west to regions where environmental issues are more readily apparent. Temporally, environmental historians have begun to shift their focus towards more recent issues.

This geographic and temporal shift in focus has left countless opportunities for environmental studies of colonial New England. The rapid growth of environmental history over the past several decades has introduced new ideas that can prove highly valuable in an analysis of New England's past. The differing regions and time periods that environmental history has embraced have provided backdrops through which a variety of novel questions can be asked and examined. Two crucial developments in the study of environmental history would be the spread of literature on issues of water as well as an increase in attention to energy consumption. These two topics have sprouted substantial amounts of literature each

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[2] William Cronon, *Changes in the Land: Indians, Colonists, and the Ecology of New England* (New York: Hill and Wang, 1983), 15.

[3] Carolyn Merchant, *Ecological Revolutions: Nature, Gender, and Science in New England* (Univ of North Carolina Press, 1989), 14.

[4] Theodore Steinberg, *Nature Incorporated: Industrialization and the Waters of New England*, 1st pbk. ed (Amherst: University of Massachusetts Press, 1994), 12.

which can provide some insights into studies of New England. By applying frameworks which other historians have developed to colonial New England it is possible to both glean a deeper understanding of the Pilgrim experience and simultaneously reinforce the interconnectedness of human and natural history.

Particularly important to any study of water would be Donald Worster's *Rivers of Empire*. Worster's analysis of the scarcity of water in the development of the West creates a framework that has universal applicability; how can the lack of a particular environmental characteristic impact the development of human institutions. Worster argues that, “The American West is not so much a colony as an empire... Indeed, since the war it has become a principal seat of the world-circling American Empire.” Furthermore, of the causes of this empire, Worster states, “that they all begin and end with water.”[5] Ultimately, in Worster's framework the control of a limited resource, in this case water, dictates the creation of an empire by centralizing power in the hands of those who control water. Worster's argument is convincing and in the context of modern droughts throughout the West, bears revisiting.

However, Worster's argument also provides an alternative explanation for the development of a region. If a lack of water can shape the development of a particular society, is it possible for an abundance of water to play a similar role? This question is entirely applicable to Plymouth Colony and New England as a whole. The region is characterized by an abundance of waterways, ponds, lakes, fountains and coastlines that are so ubiquitous as to be overlooked. As

[5] Donald Worster, *Rivers of Empire: Water, Aridity, and the Growth of the American West* (Oxford, England□; New York: Oxford University, 1992), 15.

predominantly terrestrial creatures it is unsurprising that people tend to focus on the landscapes that they inhabit and the solid earth on which they generally stand. While this is true of Plymouth, to ignore the abundance of water and its impact would be to ignore a fundamental component of Plymouth's settlement and development.

Another highly applicable trend in environmental history has been the growth in histories of energy. Following energy transfers between organisms provides another highly tangible connection between natural and human histories. In many regards energy provides a tangible entity which does not at all distinguish between the human and the natural because of its paramount importance to both. Energy at its most basic level is as Richard White defines it, "the capacity to do work."[6] In this context energy makes possible all basic functions of human existence. Energy is the capacity to walk, to speak, to hunt, to gather, to build and to destroy. At this fundamental level, history could not exist without energy and the human capacity to harness and unleash it. Understood in this context energy can provide a great deal of insight through an examination of how different societies and peoples harness and unleash particular types of energy. Alfred Crosby points out that in many ways the idea of progress is invariably tied to the ability of humans to control increasingly powerful energy sources.[7]

Questions of energy use are highly relevant to Plymouth colony as well. The capacity to harness and unleash energy was essential to the survival of the colony and of individual settlers. The need to find sources of energy to sustain life in the

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[6] Richard White, *The Organic Machine* (New York: Hill and Wang, 1995), 6.

[7] Alfred W. Crosby, *Children of the Sun: A History of Humanity's Unappeasable Appetite for Energy* (W W Norton & Company Incorporated, 2007), 5.

form of fish and crops was one of the most pressing hardships facing Plymouth's first settlers. Early accounts run rampant with discussions of food shortages starvation and the need for help from England in the form of provisions. Ultimately even the capacity to send these provisions from England was the result of energy. The ships that Pilgrims utilized harnessed wind energy to propel vessels and their cargo across the Atlantic, bridging the Old World and the New World. Similarly local Algonquins relied on energy to power their vessels. The canoes that have become synonymous with New England's Indian tribes were powered by energy expended by Amerindian bodies. In examining the different ways that Pilgrims and Indians harnessed and unleashed energy sources we can also glimpse how energy shaped their interactions with one another.

Water and energy present natural themes in examining Plymouth colony. The historiography on these topics has been well established, but has yet to be used extensively in a study of New England's earliest colonies. Such an approach should prove fruitful in understanding how the environment of the region and in particular the abundance of aquatic landscapes helped allow Plymouth colony to survive.

That said this thesis is not intended to be a comprehensive history of Plymouth Colony. Countless works of value have examined the social and political development of Plymouth and more broadly Colonial New England. The works of John Demos, James Deetz, Ethel Noyes and others have done a great deal to advance the study of the lives of Plymouth's settlers. This paper will seek to take the study of Plymouth in a different direction by examining a relatively brief time period and focusing exclusively on the role of the environment on the colony. By

focusing on the years 1620-1645, this paper will seek to understand how the initial settlers of Plymouth colony navigated the difficulties of finding food, land and water, remaining financially stable and trying to retain their identity as English citizens while dealing with external pressures from England, local Amerindian tribes and other colonists. The answer to all of these questions was fundamentally bound to the aquatic landscapes that were so prevalent in the region. To emphasize the connection between water and the successful establishment of the colony this paper has been broken down into three chapters that will thematically emphasize different facets of the colony's reliance on water.

The first chapter examines how aquatic commodities, particularly fish and furs, helped the colony survive in both a physical and economic sense. When Captain Bartholomew Gosnold first explored Cape Cod in 1602 he was struck by just how abundant the fish were.[8] This name stuck and by the time of the Pilgrims' arrival two decades later the bounty of fish had not diminished. Naturally, fish became a staple of the colonial diet. Fish could provide colonists with valuable proteins which, due to the initial lack of domesticated livestock could only otherwise be found through hunting. The ease and high yields fishing produced made this practice far more practical by minimizing human labor while maximizing production. It was not only fish, but shellfish that were essential to colonial diets. Lobsters, mussels, clams, oysters and a variety of other shellfish all were consumed when available. Local tribes also took advantage of the abundance of marine wildlife, using fish to augment the meat and vegetables that they hunted, farmed and

[8] Bradford, *Of Plymouth Plantation*, 94.

gathered. Fish also served as fertilizer to both Indian tribes and colonial farmers who sought to increase the yields of their fields. Oceanic energy provided a foundation for the New England diet by being consumed itself or utilized to make fields more productive.

Economic pursuits also were crucial to the colony's survival and again fish and furs provided a lynchpin for economic activity. The fisheries of northern New England were extremely active and, while Plymouth may not have been extensively involved with commercial fishing, it was connected to fishing outposts at Damariscove that helped provide a steady source of income to some of its adventurers. Of primary interest to the denizens of Plymouth was the fur trade. Beaver and otter in particular were seen as valuable commodities which could result in substantial economic gain. Plymouth was certainly aware of the value that the fur trade held and consequently a great many furs went through Plymouth on their way from the Americas to England. The fur trade formed an essential component of the colony's economic ventures as Bradford, Winslow and the Plymouth company's treasurer, James Sherley, sought to repay their debts by selling furs. The combination of fish and furs proved a valuable asset to the colony which often times struggled to remain financially viable. While timber, sassafras and other goods may have made the journey across the Atlantic it was fish and furs that formed the backbone of Plymouth's trade during the first decades of the colony's settlement.

The second chapter focuses on the technologies that Pilgrims and Algonquins used to traverse their aquatic environments and the energy sources they implemented to power these technologies. Because New England's landscapes were

so inundated with water they naturally offered themselves to frequent aquatic travel and transportation. Both the local Algonquin's and the Pilgrims took advantage of this by utilizing different watercraft. Indians relied on birch bark canoes to traverse their environments. These canoes were the embodiment of utilitarian values, light enough for easy portage but hearty enough for use in the oceans along the coast. The canoes were perfect for a variety of regional uses ranging from fishing to hunting to communication, transportation and wartime logistics. Despite these advantages the birch bark canoe also faced distinct limitations due to the energy source upon which it relied, organic human energy. The birch bark canoe could only traverse as far and quickly as its human operators could propel it. Human energy was subsequently regulated by the caloric intake of the individual in question. These two factors unified to place concrete limitations on the range that canoes could travel.

Pilgrims were similarly adept at traversing their aquatic landscapes, however they relied upon a different set of water craft in order to accomplish this task. Rather than birch bark canoes, Pilgrims used a variety of sailing vessels of various sizes to navigate the rivers, oceans and coastlines between England and Plymouth. Smaller vessels called shallops were used for coastal travel, fishing and transportation throughout New England while larger ships and pinnaces made fishing voyages of their own and carried goods and people across the Atlantic. This Atlantic connection proved crucial to the survival of the colony by providing a stream of goods and people that could counter the attrition taking place in the colony itself. Similarly these ships helped maintain the colonists' identities as Europeans by maintaining social and political ties with the European world. Winslow, Bradford, Sherley and

others maintained connections with family and acquaintances across the Atlantic and in the process ensured that despite their geographic isolation they still maintained their identity.

Like the Algonquins, Plymouth's settlers relied on their ships for a multitude of essential tasks. Unlike the Algonquins, they were not dependent on their own labor to complete these tasks. While they would occasionally use oars to propel their ships they more frequently relied upon wind power, harnessed by sail to move their ships across vast distances. The benefit of wind power was that colonists were no longer bound by their own physical limitations. Their reliance on wind energy meant that they could travel greater distances without suffering from fatigue and could also propel much larger vessels. These larger vessels could then carry a greater amount of rations to allow for a much greater range of travel. Perhaps no advantage was as responsible for the colony's survival as the relative ease with which they traveled between Europe and the Americas thanks to their ability to harness wind energy. Their low population, minimal food stores and lack of proper resources could be overcome due to their reliance on the European mainland to provide the goods, manpower and wealth that was necessary to establish a permanent presence in the region.

Finally, the third chapter discusses how access to the resources, landscapes and goods of New England changed during the first twenty years of colonization. Early accounts of the colony written by those hoping to encourage large scale settlement often wrote of New England as an Edenic Paradise, a landscape of health and abundance that merely required the people necessary to tap its reserves. Initially

this seemed to largely be the case. Many wrote of the sheer number of fountains, springs, rivers, meadowlands and marshlands necessary for a sustainable colony. The first group of settlers wrote of each man having access to his own wells, of immeasurable pasture lands waiting to support herds of livestock, of bountiful fish and game animals waiting to be caught and turned into a profit. Land holdings were granted, but exchanges were rare and most people seemed to be largely content with the characteristics of the land they owned. Communal success took precedent over private interests.

Within a decade the ease of access to New England's various landscapes and goods would change dramatically. The second division in 1627, a redistribution of the lands of Plymouth, set the tone for a new, more privatized ownership over landscapes. The shift to a more defined, privatized system of ownership would subsequently limit access to springs and rivers and valuable meadows and marshes for grazing. The governing court of the colony took steps to ensure that they protected access to water and landscapes, however colonists began to take a more active role in ensuring their personal access as well. Land exchanges took place with increasing regularity and were often times focused on conveying ownership and hence access to grazing lands and waterways. These exchanges were indicative of a growing individual awareness towards the limited access that was becoming more characteristic of Plymouth's lands. The second division emphasized the limitations of New England's landscapes. While New England could support a significantly higher population the second division revealed that there was a limit to the bounty of

New England and also suggested what methods may be used to navigate the tension between limited resources and access in New England's future.

Overall these three themes tied Plymouth inextricably to its environment and particularly the waterways that were so abundant in the region. These waterways proved crucial to the establishment and perpetuation of the colony by fulfilling a variety of needs. Waterways provided food and economic opportunity, they carried the English around New England and back to Europe, a crucial advantage over the Algonquins who also inhabited the region. Finally, waterways proved to be valuable resources that sat at the crux of a debate between valuable resources and private ownership. While the story of Plymouth certainly extended well beyond the 1640s the colony had grown and stabilized and a new generation of leaders stood poised to take over from the likes of Bradford, Winslow, Allerton and Sherley. New colonies had sprung up to the north and west of the colony and European presence in New England seemed to have become an accepted reality. Water was essential to reaching this point. Without the abundance of waterways in New England it seems doubtful that the colonists could have permanently established their colony. This thesis will seek to explore the role of water in that process. It will seek to prove that the Pilgrims relied on their aquatic resources for a variety of purposes, proving that aquatic and terrestrial environments do not exist in isolation, but rather in conjunction with one another as highly permeable entities. Finally it will seek to reinforce the fact that natural and human history also exist in conjunction, even in some of history's most well known stories.

Chapter 1: Aquatic Commodities

Emmanuel Altham embodies the experience of many young men who ventured across the Atlantic from Europe to the New World. Altham lived between two worlds, a European social world and a North American economic world. Altham came to the Americas intent on making wealth and was willing to work a multitude of jobs in order to do so. In a letter to his brother, Sir Edward Altham, Emmanuel claimed that he intended to take part in the fur trade beginning in September with the hope of returning to Plymouth around Christmas to prepare for fishing in the spring.[9] Altham's intentions were no secret. In the same letter Altham mentioned that, "I shall not desire to come for England unless I bring good store of profit with me, which I make no doubt of, by God's help."[10] By getting himself involved in the trade of two of the most important commodities of the region Altham saw an opportunity to better his social and economic standing. In order to do this Altham would be reliant on the aquatic environments of the New World and the goods which they held in abundance.

Altham's comments reveal a great deal about the economic character of early Plymouth colony. Like many of the men who came to New England seeking freedom from economic and religious hardship, Altham was dependent on the aquatic commodities of the region. Unlike Virginia, New England lacked the fertile soils and temperate climate necessary to grow cash crops such as tobacco in great quantities. Simultaneously, the religious nature of the New England colonies created

[9] Emmanuel Altham. "Letter from Emmanuel Altham to His Brother Sir Edward Altham," September 1623. retrieved from http://mayflowerhistory.com/primary-sources-and-books/

[10] *Ibid.*

a social atmosphere centered around family units and consequently lacking the substantial labor force necessary for plantation style agriculture. These two factors resulted in an economy dependent on the acquisition of organic goods, most notably fish and furs. These two goods were inextricably tied to the waterways that flowed through New England, which beavers called home, and the Atlantic Ocean, which housed a seemingly inexhaustible supply of fish. Economically fish and furs provided tangible goods which were in demand in European markets. Yet, fish in particular was also of greatest import as a source of food for those trying to make a living in a harsh unknown place. Thus, the economic success of the colony as well as its sustainability was tied to organisms native to the water. In short Plymouth depended on the abundance of water in the region to provide the means for its survival.

The abundance of fish was crucial to early colonial efforts, providing an essential source of sustenance for early colonists. The anonymous author of *Mourt's Relation* shares the story of the first settlers of Plymouth Colony. Upon arriving off the coast of the colony one of the first tasks necessary for survival was the acquisition of food. The author claims that, "Master Jones sent the shallop as he had formerly done to see where fish could be got, they had a great storm at Sea and were in some danger, at night they returned with three great seals, and an excellent good cod, which did allure us that we should have plenty of fish shortly."[11] Fortunately for the Pilgrims their reliance on the aquatic creatures of the region was well placed.

[11] *A Relation or Iournall of the Beginning and Proceedings of the English Plantation Setled at Plimoth in New England, by Certaine English Aduenturers Both Merchants and Others: With Their Difficult Passage, Their Safe Ariuall, Their Ioyfull Building Of, and Comfortable*

The author of *Mourt's Relation* and Altham had different expectations from their aquatic commodities. The author of *Mourt's Relation* was concerned primarily with the subsistence of himself and his fellow colonists. On the other end of the spectrum there is little doubt that Altham's chief concern with fisheries was personal profit in the emerging mercantile economy of England. Both men saw fish as a means to an end. For the author of *Mourt's Relation,* fish was a means to sustain a settlement which would provide an environment where he and his colleagues could freely practice their religion. To Altham, fish was a means to establish himself in a new economic world. The younger brother of a noble, Altham saw the colonies as a place for him to obtain a level of wealth he likely could not have acquired in England. Both men, harboring vastly different objectives, were dependent on the aquatic commodities of New England for their survival, albeit for vastly differing reasons.

Altham and Winslow were hardly the first individuals to be drawn to the waterways of New England by the abundance of fish. The Amerindian tribes of the region had long relied on these resources for their own survival. Champlain's account of the Massachusetts Bay reveals a substantial Algonquin presence in the region that was dependent upon a combination of both agriculture and fish for their survival.[12] The scale of cultivation by local tribes was quite impressive during Champlain's trip and while much of the lands Champlain describes would have been

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Planting Themselves in the Now Well Defended Towne of New Plimoth. As Also a Relation of Fovre Seuerall Discoueries since Made by Some of the Same English Planters There Resident. ... With an Answer to All Such Obiections as Are Any Way Made against Lawfulnesse of English Plantations in Those Parts. (London: Printed for Iohn Bellamie,1622), 3.

[12] Samuel de Champlain, *The Voyages of Samuel de Champlain*, (Teddington: The Echo Library, 2007), 37.

abandoned by the arrival of the *Mayflower* just a decade later due to the spread of disease, agriculture still made up a substantial part of the native diet.

That said many of the early Pilgrims were struck by just how prevalent fish were to the survival of the local tribes. The lack of large domesticated animals meant that natives had to look elsewhere for sources of protein. Moose, elk and deer could provide a sizable meal and were frequently hunted by the indigenous peoples of New England; however these hunts were extremely labor intensive and time consuming and could not be counted on for a steady source of protein. In order to ensure that they had a steady supply of meat the local tribes of New England established a strong reliance on the fish and shellfish that were so abundant on the region's coasts. Over generations the reliance on marine life bred a complex and comprehensive understanding of fishing throughout New England. William Wood described the Algonquins as “Knowing when to fish in rivers, and when at rocks, when in bays and when at seas."[13] This knowledge provided Amerindians with a steady source of protein that could not be obtained from the vegetables they grew. Over time colonists learned from the local tribes and with the introduction of more efficient tools such as metal hooks colonists built a similar degree of reliance on their aquatic resources.[14]

The experience of first generation colonists emphasizes the importance of fisheries. When going to meet with Massasoit, leader of the Wampanoag

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[13] William Wood, *New England's Prospect: A True, Lively, and Experimentall Description of That Part of America, Commonly Called New England: Discovering the State of That Countrie, Both as It Stands to Our New-Come English Planters; and to the Old Native Inhabitants. Laying Downe That Which May Both Enrich the Knowledge of the Mind-Travelling Reader, or Benefit the Future Voyager* (Printed at London: by Tho. Cotes, for John Bellamie, 1634), 89.

[14] Thomas Morton, *New English Canaan* (London: Charles Green, 1632), 62.

Confederacy, Edward Winslow and Stephen Hopkins were repeatedly offered cod. Upon their arrival they dined with Massassoit and others, eating what they described as a traditional meal of corn and various types of fish.[15] Winslow and Hopkins were struck by the fact that their guides repeatedly insisted on stopping to fish despite the fact that they had more than an ample supply of food. Their Wampanoag guides seemed to be focused on not only obtaining enough fish for immediate consumption, but also long term storage and later utilization. At several times Winslow and Hopkins were delayed in reaching both Massassoit and afterward their fellow colonists by repeated stops along rivers and lakes they passed en route.[16]

Fish provided an essential component of the native diet and the importance of fishing to Algonquin survival can be seen in the extent to which tribal society was constructed around aquatic resources. One such example can be found in the construction of canoes. These craft were fairly small and designed primarily for short travel in fairly calm seas. Champlain described the canoe as, “a clumsy though serviceable boat in still waters, nevertheless, unstable and dangerous in unskilled hands.”[17] The boat's limited range and sheer quantity suggest that a great number of the craft were used in a fairly small area along the coast of New England. It is likely then that the craft were used for a combination both of travel and, as Champlain notes, fishing.

Fishing also had implications on the social structures present in Algonquin society. One of the major responsibilities of the women was the gathering of lobsters

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[15] *Mourt's Relation*, 44-46.
[16] *Ibid*, 47.
[17] Champlain, *The Voyages of Samuel de Champlain*, 36.

and other shell fish while the men fished. William Wood described the gendered division of labor he encountered during his travels through New England.

> Another of their emploiments is their Summer processions to get lobfters for their hufbands, wherewith they bait their hooks when they go a fifhing for baff or codfifh. This is an every daies walk, be the weather cold or hot, the waters rough or calm, they must diue fometimes over head and ears for a Lobfter, which often fhakes them bye their hands with a churlish nip, and bids them adieu. The tide being fpent, they trudge home two or three miles with a hundred weight of lobfters at their backs, and if none, a hundred fcowls meet them at home and a hungry belly for two daies after.[18]

Wood's description conveys the importance placed on the woman's role in the fishing process and also stresses the importance of bass and cod in the day to day diet of native tribes, implying that men and women alike would suffer from, “a hungry belly” should the women fail to provide bait for the men.

Lobster were not the only source of aquatic food women were expected to obtain. While men fished women walked along the shores of New England in search of clams, mussels and oysters to further augment their diet. This became particularly important in the winter when the idea of venturing into water was not only uncomfortable but also dangerous. With water temperatures dipping well into the 30's and 40's and air temperatures that could drop below zero, hypothermia was an ever present threat for indigenous gatherers. Clams, mussels and oysters provided an alternative source of aquatic protein that could be obtained with minimal effort and far more safely. Additionally, gathering shellfish was less labor intensive than fishing and consequently could be done in addition to numerous other domestic

[18] Wood, *New England's Prospect,* 95.

chores which included caring for children, tending to crops and preparing fish and meat acquired by men.[19]

The impact of fish and shellfish on the day to day lives of natives was immense. It has been well documented that indigenous tribes in New England moved with the seasons to ensure their access to a continued supply of shelter and sustenance.[20] Fish and shellfish were central to the movements of Amerindians. As a central component of their diet these resources were followed to ensure a steady supply of food. The fish or shellfish consumed at any given time was dependent upon the season in question. Spring, summer and fall provided a great opportunity for the acquisition of lobsters and crabs which would require a degree of swimming while during the winter diet shifted to be more reliant upon clams, mussels and oysters which could be obtained with relative ease, although in smaller amounts.[21]

The abundance of shellfish over the summer led to some of the largest gatherings of tribes. Places where lobsters and crabs came together in abundance became meeting places for groups of natives numbering in the thousands. Natives would come to these places and remain there for several weeks or even a month if they were able to obtain enough food to remain. These meetings were largely important as they maintained tribal connections of kinship, particularly amongst more nomadic tribes. During their time at these lobster locations tribes would

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[19] Wood, *New England's Prospect*, 95-96.

[20] William Cronin examines the seasonal nomadic nature of the tribes of New England in *Changes in the Land*. Cronin's chapter "Seasons of Want and Plenty" captures very well the changing lifestyle that both natives and colonists examined due to changes in seasons.

[21] Wood, *New England's Prospect*, 95.

prepare for the winter, storing and drying food for the winter and sharing stories and information.[22]

Fishing likewise saw a shift based on the seasons. In the summer fishing was largely done along the coasts by canoe. During the winter fishing would shift primarily to ponds and lakes where fishermen could create holes in the ice from which to gather fish.[23] The fishing of streams and rivers which Winslow and Hopkins describe also suggests that native tribes were attuned to the spawning runs of salmon, alewives and even eels. By adjusting to the seasonal availability of fish and varying their diet, local tribes could both ensure a relatively steady availability of food while simultaneously not putting too much stress on a particular population of fish and allowing for their continued utilization in the future.

By the time colonists arrived off the coast of New England fishing would take two very different routes. Some, like Edward Winslow and his fellow colonists on board the *Mayflower* practiced fishing primarily for sustenance for their emerging colony. Others, like Emmanuel Altham saw commercial fishing as a means of accumulating wealth both for themselves and for England. These two processes both played a role in the establishment and maintenance of Plymouth colony.

Those pursuing fishing primarily for purposes of survival and sustenance tended to practice a method of fishing similar to their native counterparts. John Pory described his experiences in Plymouth in a letter to the treasurer of the Virginia company, “This healthfulness is accompanied with much plenty both of fish and

[22] Morton, *New English Canaan*, 61.
[23] Wood, *New England's Prospect*, 90.

fowl every day in the year, as I know no place in the world can match it. In March the eels come forth out of places where they lie bedded all winter, into the fresh streams and there into the sea and in their passages are taken in pots."[24] Pory goes on to discuss the abundance of other fish including smelts, herring, bluefish, cod, hake and even shellfish including lobster, clams and mussels.[25] Pory's account suggests that these fish form a staple in the diet of Plymouth's settlers and helped provide the colony with a readily available source of protein.

Pory's accounts are important in providing information on where and how Plymouth's settlers obtained their fish. The scale of the fishing ventures described by Pory suggests that they were geared primarily towards providing the community with a steady supply of food rather than providing enough volume for trade. This does not mean that commercial fishing was not practiced near Plymouth, but rather that locally oriented fishing and commercial fishing operated in two different worlds and required different techniques. For example Edward Sharpe suggests commercial fishing would only be pursued roughly four months of the year. The Pilgrims fished throughout the year, simply altering their practices to adapt to the behaviors of various fish. While eels may have been plentiful in March, "Into another river two miles to the northeast of Plymouth all the month of May the great smelts pass up to spawn likewise in troops innumerable, which with a scoop or bowl, or a piece of bark, a man may cast up upon the bank."[26] The seasonal awareness exhibited by Pilgrim fishing practices closely mirrors that of their Algonquin counterparts. The

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[24] John Pory, "Letter to Treasurer of the Virginia London Company," January 3, 1622, retrieved from http://mayflowerhistory.com/primary-sources-and-books/

[25] *Ibid*.

[26] *Ibid.*

objective of such fishing ventures then was not to obtain a particular type of fish for sale, but rather to obtain whatever was available for local consumption.

Isaac de Rasieres wrote about the utilization of subsistence based fishing in Plymouth in great detail in a letter to Samuel Blommaert. De Rasieres described how, "when the people have a desire for fish they send out two or three people in a sloop, whom they remunerate for their trouble, and who bring them in three or four hours time as much fish as the whole community require for a whole day; and they muster about fifty families." This type of fishing would prove practical for the community, ensuring that the majority of people could go about their daily tasks while simultaneously being ensured a vital source of protein to complement their meals. Fishing provided a tremendous return on labor by bringing exponentially more energy into the community than was expending in obtaining it. This return was even greater during spawning seasons. In the spring, shad would look to make their way up a small river to the south of the plantation. The colonists saw an opportunity to harvest even more fish with even less labor. "This river the English have shut in with planks, and in the middle with a little door, which slides up and down, and at the sides with trellis work, through which water has its course, but which they can also close with slides." writes Rasieres. The result was, "a square pool, into which the fish aforesaid come swimming in such shoals... that at one tide there are 10,000 to 12,000 fish in it."[27] This massive catch was accomplished with minimal labor by adapting to the seasonal behaviors of the shad.

[27] Isaac de Rasieres, "Letter to Samuel Blommaert" 1628 retrieved from http://mayflowerhistory.com/primary-sources-and-books/

The Pilgrims adjusted their fishing practices to gather the greatest amount of protein with the greatest ease. This approach would be practical in consideration of the relatively small population that emigrated from Holland aboard the *Mayflower.* The Mayflower Compact was signed by 41 men aboard the ship.[28] These settlers had to concern themselves initially with the survival of the colony by providing enough food for a year round sedentary lifestyle, a very demanding process. Emmanuel Altham, an adventurer undertaking commercial fishing, acknowledged the difficulties which low populations presented commercial fishing stating, "how is it possible that those men that never saw fishing in their lives should raise profit by fishing? And if they had knowne it neuer so well, yet if they had not the able of body, they could not perform any matter, for how fhall women and children do men's labors?"[29]

Subsistence based fishing also played the important role of fertilizing soils that grew the crops colonists consumed. New England's soils proved to be far less productive than those in the Virginia colonies. This was due to a variety of climactic and geological factors. One of the primary reasons for New England's lack of agricultural production was simply a lack of suitable land. Francis Higginson, a visitor to Massachusetts Bay in 1629 claimed, "It is a land of diverse and sundry sorts all about Massachusetts Bay and at Charles River, is as fat black earth as can be seen anywhere: and in other places you have clay soil, in other gravel, in other

[28] William Bradford et al "Mayflower Compact," *MayflowerHistory.com*, accessed January 28, 2014, http://mayflowerhistory.com/mayflower-compact/. .

[29] Emmanuel Altham, "Letter to Sir Edward Altham" March 1623/24.

sandy..."[30] Of the types of soil Higginson listed the "fat black earth" would have been suitable for agriculture, however sandy soils and worse gravely soils would not produce reasonable yields without being cleared of rocks and boulders and plowed. John Pory echoed Higginson's sentiment in a letter to Sir Francis Wyatt, the Governor of Virginia, in which he described the soil as, "all along, as far as I could perceive, rocky, rough and uneven..."[31] The lack of suitable farming lands meant that New Englanders had to adapt to ensure steady harvests.

The diverse landscape of the region would have prevented the implementation of commercial agriculture by the simple fact that land holdings were not large enough..[32] While these modest landholdings would expand overtime they remained comparatively small, suitable for modest agricultural ventures which were mostly designed for the growth of corn and other locally consumed crops. Higginson claimed that, "The abundant increase of corn proves this country to be a wonderment."[33] And added that, "Our turnips, parsnips and carrots, are here both bigger and sweeter than is ordinarily to be found in England. Here are alfo ftore of pumpions [pumpkins] cowcumbers [cucumbers] and other things of that nature which I knowe not."[34] Higginson's observations on the Massachusetts Bay Colony were mirrored in Plymouth where the author of *Mourt's Relation* claims, "We set the last Spring some twenty acres of Indian corn, and sowed some six acres of barley

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30 Francis Higginson, *New-Englands Plantation, with the Sea Journal and Other Writings* (Salem, Mass.□: The Essex Book and Print Club, 1908), B1.

31 John Pory, "Letter to the Governor of the Virginia Company Sir Francis Wyatt," 1623.

32 David Pulsifer ed. *Records of the Colony of New Plymouth, in New England* (Boston□: Press of W. White, 1861), 3.

33 Higginson, *New-Englands Plantation*, B2.

34 *Ibid*, B2.

and peas."[35] The diverse agriculture practiced in New England would form the foundation of the colonial diet, however it was at least initially carried out on a very small scale.

The concentrated nature of New England's initial agriculture meant that it would have a dramatic impact on the health of local soils. Corn, while containing a great deal of energy, is also extremely demanding on the soils that it grows in. The tall stalks of the plant and its nutritional content can rapidly strip plots of their nutrients.[36] The ownership of land in New England subsequently meant that unless an individual acquired a new tract of land they would be repeatedly farming the same fields from year to year, effectively stripping the soil of its capacity to continue to generate the impressive yields of which Higginson spoke. It became essential then for colonists to find a means to restore nutrients to the soil to ensure that they could maintain their crops of corn. The establishment of and maintenance of a solid corn crop was so important to early Plymouth that the colony passed legislation to ensure that corn be consumed locally. In March of 1626 an order was passed stating, "for the preventing scarcity, as also for furthering of our trade, that no corn, beans or peas be transported, embarked or sold to that end to be conveyed out of the colony..."[37] Isaac de Rasieres put it rather bluntly when, in speaking of the growth of maize, he wrote, "And if they do not lay this fish therein the maize will not grow, so that such is the nature of the soil."[38] Fish then provided a means of

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35 *Mourt's Relation*, 60.

36 David O. Percy, "Ax or Plow?: Significant Colonial Landscape Alteration Rates in the Maryland and Virginia Tidewater," *Agricultural History* 66, no. 2 (April 1, 1992): 66–74. 72.

37 Pulsifer, *Records of the Colony of New Plymouth*, 8.

38 Isaac de Rasieres, "Letter to Samuel Blommaert" 1628.

ensuring that this staple crop could be continually planted on local fields year after year.

Anxieties over the declining status of fields led to the adoption of fish as a fertilizer. Several factors made fish ideal candidates for fertilizer. Firstly, the lack of large livestock in the colonies prevented manure from being utilized. By 1627 the entire colony of Plymouth had roughly fifteen cows and twenty-two goats, not nearly enough to rely on for the fertilization of crops.[39] Also, the ease with which fish could be taken made them an ideal fertilizer for colonists. By investing relative minimal amounts of labor on fishing they could bring in considerably more fertilizer than could be utilized by moving and distributing animal manure. Higginson commented on the ease with which fish could be taken, claiming, "Of this fish, our fishers normally take many hundreds together, which I have seen lying on the shore to my admiration; yea their nets ordinarily take more than they are able to haul to land."[40]

The sheer volume of fish was essential to the perpetuation of New England agriculture and in particular corn and as such fish came to be relied upon during the establishment of a permanent European presence. According to Thomas Morton, cod and alewives were particularly useful in fertilizing farming land. Morton estimated that the utilization of fish fertilizer could improve crop yields threefold, greatly adding to harvests. In order for this to be accomplished Morton said that upwards of one thousand fish should be utilized per acre.[41] In a letter to a friend in

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[39] Pulsifer, *Records of the Colony of New Plymouth*, 8-11.
[40] Higginson, *New-Englands Plantation*, B3.
[41] Morton, *New English Canaan*, 59-60.

England, Edward Winslow also discussed the utilization of fish as fertilizer. *Mourt's Relation* describes the practices utilized in Plymouth, stating, “according to the manner of the Indians, we manured our grovnd with Herrings or rather fhads, which we have in great abundance and take with greate ease at our doors.”[42] The author's comments also reveal that the utilization of fish as fertilizer was by no means a new development in the region. Due to its accessibility and ease of capture fish would have also presented a natural fertilizer to the Amerindians who Champlain saw farming in Boston harbor decades earlier.

Colonial utilization of fish as fertilizer established a complex relationship of energy exchange between terrestrial and aquatic environments. By relying on fish to ensure the development of agriculture, colonists were effectively harnessing energy created in aquatic environments and transferring it to dry land. This brings up another important component of colonial dependence on aquatic commodities. While their diet consisted of crops, fish, shellfish and a variety of grains and any meat they could obtain, the vast majority of that diet was directly tied to aquatic landscapes. Fish's role as a fertilizer meant that the growth of crops, essentially the transformation of photosynthetic, mineral, and nutrient energy into edible forms was reliant on aquatic resources. Thus the two central sources of energy for colonial settlers both originated from aquatic sources, deepening their dependence on that environment.

Fish was not solely a tool of sustenance however. While the majority of Plymouth's colonists may not have been overly involved in commercial fishing,

[42] *Mourt's Relation*, 60.

many young men who journeyed to New England did get involved in commercial fishing ventures. Edward Sharpe, an English businessman, felt so strongly about the future of fisheries in the New World that he wrote extensively on the subject, urging his fellow Englishmen to view fishing as a potential source of income. Sharpe argued that the Dutch had already established a substantial presence in the waters of New England and that the English had to expand their own commercial fishing enterprises in order to compete with the Dutch economically.[43]

Sharpe believed that in order for fishing to become a profitable enterprise, fisherman would need to be willing to spend at minimum at least 4 months out of the year at sea. Sharpe believed that a 16 man crew working on a 70 ton boat could stand to provide a viable financial turnaround for any investors. In fact Sharpe was so bold as to predict that a well managed fishing enterprise could stand to turn an annual profit of roughly 600 pounds after two of concentrating fishing.[44] Sharpe also adopted a more nationalistic argument when he claimed that commercial fishing “"keeps (Dutch) gold & silver in their dominions and multiplies it. And I see not why the same should not be of the same use to us."[45] This mercantilistic line of thought would be acted upon by those in New England who sought to use their access to the ocean to generate a profit for themselves through Plymouth's connections to English markets.

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[43] Edward Sharpe E. S, *England’s Royall Fishing Revived; Or, A Compvtation as Well of the Charge of a Busse or Herring-Fishing Ship: As Also of the Gaine and Profit Thereby. With the States Proclamation Annexed unto the Same, as Concerning Herring-Fishing* (London: Printed for N. Bourne, 1630), A3.

[44] *Ibid*, A3, E1.

[45] *Ibid*, E6.

The aforementioned abundance of marine life in New England's waters made it a veritable treasure trove for economic utilization. Even the normally reserved Edward Winslow could not suppress his thoughts regarding the commodities of the ocean. During the trip across the Atlantic he claimed,

> And euery daie we faw whales playing hard by vs, of which in that place if we had inftruments and meanes to take them we might haue made a uery rich return, which to ovr great grief we wanted. Ovr mafter and his mate and others experienced in fifhing, profeffed, we might haue made three or four thoufand pounds worth of oil; they preferred it before Greenland Whale-fifhing and purpofe the next winter to fifh for Whale here.[46]

The abundance of whale, seal, fish and even shellfish was greatly valued by those looking to come to New England in order to make a profit. William Cronon has discussed extensively the application of European market values to the resources of New England. Cronon argues that the lack of specific goods in England made them highly sought after commodities in New England as they could then be transported to England and sold there.[47] While Cronon focuses primarily on terrestrial commodities such as timber; the manner in which Europeans discussed the abundance of fish make it clear that European values were also an essential component in forming opinions of aquatic commodities such as fish.

It did not take long for those venturing to the New World to attempt to find ways to get involved with local fisheries. As mentioned earlier, Emmanuel Altham believed the seas would be his path to wealth. When writing to his brother in reference to his interest in fishing he claimed, “I have and hope to learn that at sea

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[46] *Mourt's Relation*, 2.
[47] Cronon. *Changes in the Land*, 112.

which will prove to my extraordinary advantage."[48] Altham had reason to be enthused about the prospects of commercial fishing. During a journey off the coast of Plymouth, Altham and the men he was with were caught in fog and forced to stop sailing until the skies had cleared. During the one hour they were stopped Altham claimed that they caught 100 cod with fairly rudimentary means.[49] While Altham may have overestimated such a bountiful catch there is no denying his genuine belief that fishing could prove a highly profitable venture if it were done right.

Altham's sentiments were mirrored by William Bradford and Isaac Allerton in a letter to the Plymouth Company. In describing their economic hardships Allerton and Bradford sought "another patent for Cape Anne" largely due to the abundance of fish in the region, claiming, "it thovght to be as goode fifhing place, and feeing fifhing muft be the chiefe, if not the only means to do us goode; and it is like to be so fit a place, and lieth so near to us, we think it very neceffarie to ufe all diligenfe to procure it."[50] Bradford and Allerton, two leaders of the colony, saw commercial fishing as being a lucrative enough pursuit to warrant the expansion of colonial holdings. Fishing outposts had long operated along the coast of northern New England and Eastern Canada and Bradford and Allerton saw the potential financial benefit of the Plymouth Company establishing a similarly oriented colony along the shores of Cape Anne. While the settlers of Plymouth are generally seen as being unconcerned with wealth, they were subject to the need to repay investors in

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[48] Altham, "Letter to Sir Edward Altham"

[49] *Ibid*

[50] William Bradford and Isaac Allerton. "Letter to the Plymouth Company." September 8, 1623. retrieved from http://mayflowerhistory.com/primary-sources-and-books/

England who had provided the financial backing for the establishment of the colony. This necessity made fishing a logical economic pursuit.

Commercial fishing was a deeply expensive enterprise for one to get involved in. Sharpe estimated that to make a profit fishing it would be necessary to purchase a ship capable of hauling 70 tonnes, which would mean a boat of roughly fifty feet in length. A boat this size would require a crew of sixteen to run at peak efficiency and would require numerous provisions and supplies for each four month journey.[51] Sharpe estimated that these costs would probably cost the owner of an enterprise over £1000 in initial investments. Sharpe further guessed that it would take two years for those investing in fishing to see a return on their profit. At that point profits would increase sharply with the potential for a successful owner to make an annual income of £600.[52] While this profit was substantial, it was also dependent on the abundance of fish and the absence of catastrophe; a requirement which could proved elusive in the colonial world.

These financial concerns pushed Emmanuel Altham to pursue commercial fishing as a primary means to make economic survival. Unfortunately, Altham soon recognized how dangerous and unpredictable commercial fishing could be. In April of 1624 Altham's ship sank off the coast of Pemaquid (Bristol, Maine) taking the lives of three of his crew and costing Altham nearly 10,000 fish. Altham's investment the boat and a crew had placed him in debt to James Sherley and various other members of the Plymouth company. In a letter to Sherley, Altham begged Sherley to, “pardon me for a while in the same, until I shall come to speak with you

[51] Sharpe, *England's Royale Fishing Revived*, A3.
[52] *Ibid*, E1.

and the rest of the company" because "I know both you and many other good men have laid out much money upon Plymouth plantation, and especially as for the goods upon this ship." [53]

Altham's concerns reveal the inconsistency of commercial fishing. While some stood to make substantial profits off the industry, it lacked security due to the unpredictability of seas. Altham and other fishermen traveled substantially in their voyages, traversing the length of New England coastlines and beyond. For a captain unfamiliar with a particular area this could be a recipe for disaster. The seas of New England were teaming with hazards both natural and human. The loss of Altham's ship was the result of a massive storm which broke the cables anchoring the vessel and, "the wind and seas being very high, drove our ship ashore upon rocks where she beat."[54] The loss of a ship was a catastrophic event, particularly in a New England where serviceable vessels capable of fishing were scarce. In order to try to minimize his losses Altham quickly set about recovering his sunken ship. Altham gathered the crew of the ship and, finding any extra aid that he could, attempted to raise her. Finally, with the help of the crew and others Altham, "weighed her out of the water, and so by the help of many hands we got the ship to a place nearby, convenient to see what possibility there was of saving the ship."[55] Ultimately, Altham was successful in rebuilding his vessel. In the same letter to Sherley he proclaimed, "But blessed be God, by the help and means that I have got of

[53] Altham, "Letter to James Sherley" May 1624
[54] Altham, "Letter to James Sherley" May 1624
[55] *Ibid*

carpenters, she is now made up as strong and sufficient for the sea as ever she was."[56]

Sometimes economic calamity reared its head in the form of other captains and ship owners. In a later letter to his brother, Altham recounted a confrontation he had with a "Mr. Pemberton" of a rival company. Pemberton and his associates sought to seize a fishing stage, or outpost, owned by Plymouth. Learning of this the colony sent twenty armed men by land and Altham and his crew in a ship to attempt to retake the stage, by force if necessary. While the incident didn't result in bloodshed and Pemberton and his fellows laid down their arms it did create mutual distaste. This event, which marked Altham's arrival in the colonies would come into play in the future. In trying to work with one another, Mr. Pemberton, "took himself prejudiced" because "he thought (Altham) had concealed some things from him." While Altham may not have been physically harmed by the loss of Pemberton as a potential business partner, the exchange placed even more strain upon his attempts to garner profit in the colonies.[57] The lack of English fisherman meant that amicable partnerships were an essential component to economic success. Initially at least, English fishing enterprises in the Americas were dwarfed by the French, Dutch and Portuguese. In describing the abundance of French ships in the Grand Banks, Altham writes that, "I believe we had sight of twenty sail of Frenchmen at one time."[58] In a mercantile economic world rival fisherman of any nationality would be considered opponents, the French, more so than others. Altham was forced to defend

[56] *Ibid*
[57] Altham, "Letter to Sir Edward Altham"
[58] Altham, "Letter to James Sherley"

himself for not “taking a Frenchman” when the opportunity arose.[59] In this economic context the loss of a potential English economic partner could prove extremely detrimental not only to the individual in question, but the colony as a whole.

In fact the loss of Altham's ship and the falling out with Mr. Pemberton seems to have taken an impact on Altham's outlook as a fisherman. Frustrated by the what he perceived as unreliable investments and the fact that Plymouth, “admitted so many of the Company for adventuring” and thus would have had Altham, “adventure with them in ready money”, Altham decided that his best course of action was to take a brief hiatus from commercial fishing. Altham used some of his own wealth, “in provisions for myself, and to live some in the country here a little.” Interestingly for Altham the biggest deterrent to his continued involvement in the trade was the unsavory characters he was forced to become involved with. Altham told his brother that, “It is my resolution to venture this way again, but never to have any other but myself to be the chief manager of it, for a honest man had better deal with savages than with seaman whose god is all manner of wickedness.” Altham's spite, while directed towards those individuals he perceived as slighting him, could perhaps be more focused on the nature of commercial fishing itself. Pemberton's attempt to seize Plymouth's fishing stage, the sinking of Altham's ship and his frustration with managers are indicative of a risky yet potentially lucrative enterprise. In many way's Altham's experience is the representation of what remains unsaid in Sharpe's analysis of commercial fishing. An adventurer in commercial

[59] *Ibid*

fishing could figure to make £600 a year, assuming they were capable, ran into favorable conditions and had healthy relationships with their business partners. Unfortunately for Altham, he seems to have been lacking in all three criteria.[60]

It was not only those who financed and led fishing ventures who faced hardship and danger. The men who made up the crews of colonial fishing ventures were also at the mercy of the seas. While Altham does little to chronicle the experiences of his crew, he does leave two meaningful comments in his letter to James Sherley. In regards to the sailors, Altham writes of, "the insolences of all our company" that were borne of, "first, in regard [to] provisions went very hard with us, and the next was a foolish and needless fear they had of their wages."[61] While Altham scoffs at their allegations they seem to have been quite concerning to the sailors as according to Altham they may have, "dispersed themselves" and if any attempt was made to stop them, "threatened a more speedy revenge: either to kill us or blow up our ship."

This type of reaction, while extreme, embodies the anxieties of sailors in the early New England colonies. Provisions would have been rudimentary to say the least. Edward Sharpe's description of an outfitted ship's food stores suggest that unsurprisingly there was little variety in terms of meals with the general assumption that much of the food would be caught while at sea.[62] While fish were available in abundance they alone could not meet the nutritional needs of the young men. Fruits, vegetables and drink remained illusive throughout the voyage and consequently had

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60 Altham, "Letter to Sir Edward Altham"
61 Altham, "Letter to James Sherley"
62 Sharpe, *England's Royal Fishing Revived*, E6.

to be closely rationed. Similarly wages would have been a legitimate concern to many sailors considering Altham's own financial woes and his less than complementary description of other seafaring men. The need for wages would have likely been more acute amongst sailors as their long times at sea would take months out of the year during which they can be farming. With only their wages to show for their ventures sailors would have been entirely dependent upon payment for their survival. It is unsurprising then that upon the wrecking of Altham's ship many sailors chose to, "leave the ship and to seek out for their victuals."[63] These conditions meant that fishing was a troublesome enterprise not only for those responsible for financing it, but also for the men who journeyed around the coast of New England in search of profit.

Closely associated with commercial fishing was the acquisition and trade of furs. As in commercial fishing the Dutch and French had both established themselves as major players in the fur trade prior to the involvement of the English. Thomas Morton claims "that the Dutch have gained by beaver 20,000 pound a year."[64] This would have been a truly disturbing figure to any self respecting Englishman in a mercantile economy. Emmanuel Altham saw the beaver trade as a means to augment his interests in commercial fishing. Altham highlighted the seasonal relation between the fur trade and commercial fishing, suggesting that a particularly industrious individual could become engaged in both. Altham desired, "to get a good store of beavers', otters' and martins' skins... and towards Christmas we are to return... and so to fish in the beginning of the year, and then about May

[63] Altham, "Letter to James Sherley"
[64] Morton, *New English Canaan*, 67.

1624, go trading for furs again."[65] These interests, the quest for the economic stability of the colonies and the search for individual wealth, would become the catalyst behind Plymouth's involvement in the fur trade.

It is important to note that involvement in the fur trade did not mean that actual hunting of the animals, particularly beaver, which provided the furs. William Wood, somewhat humorously, wrote, "[The beaver's] wisdom secures them from the English, who seldom, or never kills any of them, being not patient to lay a long siege, or to be so often deceived by their cunning evasions, so that all beaver which the English have, come first from the Indians."[66] Thus the English merely served as the middlemen in this massive enterprise. Wood was not entirely correct, however, as in some situations furs originated not from Indians, but from other European powers. William Bradford's correspondence with the Dutch suggests at least a minimal degree of trade between Plymouth and the Dutch colony of New Netherlands. When approached by the Dutch to open up trade, Bradford responded, "...your friendly proposition and offer to accommodate and help us with any commodities or merchandize, which you have and we want, either for beaver, otters or other wares, is to us very acceptable, and we doubt not but in short time, we may have profitable commerce and trade together."[67] Interactions between Plymouth and the Dutch were often times contentious, but Bradford's letters suggest that goods did occasionally travel between the two colonies.

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[65] Altham, "Letter to Sir Edward Altham" September 1623

[66] Wood, *New-Englands Prospect*, 29.

[67] William Bradford, "Letter to the Director and Council of New Netherlands" March 19, 1627 from *Governor William Bradford's Letterbook 1624-1630*, (Boston: Massachusetts Society of Mayflower Descendants, 1903), 30.

Despite the involvement of the Dutch, furs generally came to the hands of the English by way of local Indians. Massachusetts held numerous lakes, ponds, and streams in which beaver and otter could be found and hunted. This presented several Algonquin speaking tribes with a valuable commodity with which they could obtain goods in return. Of particular interest to local tribes was wampampeag or wampum. In his letterbook, Bradford writes of dealing with the Dutch, "We at this time bought sundry of their commodities, especially their sewam of wampampeack, which was the beginning of profitable trade between us and the Indians."[68] The acquisition of wampum, small beads made from either quahog or whelk shells, gave Plymouth a commodity of value which they could trade for furs. Involvement in the fur trade had the impact of bringing the inhabitants of New England, be they Amerindian or European, into direct contact with major European markets. The aforementioned wealth which could be generated through the distribution of furs was a substantial incentive for Plymouth's colonists to acquire furs. Wampum became a currency which allowed this transaction to take place. Wampum's value was born of its geographic location. Because it was made of saltwater shellfish, wampum invariably originated in coastal environments. Thus it was a rare and valuable commodity to inland tribes. Similarly beaver tended to be most abundant further inland. Thomas Morton notes that near Lake Erie (or Ericoise as he called it), "There are also more abundance of beavers, deer and turkeys breed about the part of that lake, then in any place in all the country of New England."[69] In this sense the fur trade can be seen as a transitioning of goods between two isolated aquatic environments. Furs, which

[68] *Ibid*, 33.
[69] Morton, *New English Canaan*, 65.

originated in inland lakes and streams, were exchanged for wampum, originating on the coastline.

Involvement in the fur trade proved to be exceedingly valuable for the colonists of Plymouth plantation, providing them with a means of settling a great deal of their debt. Bradford tried to place the economic difficulties facing Plymouth plantation in context. In a letter to Sir Ferdinando Gorges, one of the leading proponents for English colonization in New England, Bradford wrote, "We are now upon concluding with our adventures, and shall be put upon hard straights by great payments... or else to leave all, which will be to us very difficult."[70] Just a few years after Plymouth's establishment the financial hardships facing the colonists were becoming overwhelming, to the point that the fate of the colony was very much in question. Fortunately, the trade in furs which Bradford was attempting to open up would prove to be the saving grace for the colony. At roughly ten shillings per pound the fur trade would provide one of the most lucrative ventures for Plymouth.[71] James Sherley tracked the debts passing back and forth between those in London and Plymouth colony. In 1628, the year following Bradford's attempts to get Plymouth actively involved in the fur trade, the colonists were in debt 659 shillings. This entire payment would be made in furs. Three ships arrived in England carrying over 260 otter and mink skins and over seven-hundred pounds of beaver skins.[72] The abundance of beaver and otter and the colony's access to tribes willing

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[70] Bradford, "Letter to Sir Ferdinando Gorges" June 15, 1627. From *Governor William Bradford's Letterbook*, 36.

[71] Morton, *New England Canaan*, 53.

[72] James Sherley, "James Sherley's Plymouth Company Accounts 1628" 1628. retrieved from http://mayflowerhistory.com/primary-sources-and-books/

to trade for these goods would prove essential to the ultimate survival of the colony by ensuring that they could pay off the substantial debts that were owed in England.

This is not to say that the fur trade was without any potentially hazardous complications of its own. The power which Algonquin tribes gained by providing furs was substantial. The plight of Plymouth plantation shows as much. The survival of the colony was, initially at least, dependent upon the acquisition of enough furs to cover their debts in England. This placed local tribes in a position of power as the primary means of obtaining an essential resource. While wampum may not have generated any direct dangers for colonists it could change tribal makeups by shifting balances of power within and among local tribes. As a symbol of wealth and power wampum could impact the kinship networks that formed the basis of tribal social and political relationships. More troubling than this was the fact that furs also gave tribes access to weapons they would otherwise have been cut off from. In his letter to Sir Francis Wyatt John Pory writes that, "[Colonists] undertake an hazardous attempt, considering the savages have been this year, as those to the north used to be by the French, furnished [in exchange of skins] by some unworthy people of our nation with pieces, shot, powder, swords, blades and most deadly arrow heads, and with shallops by the French."[73] These weapons would have leveled the military playing technologically by giving tribes access to the same weapons their potential enemies would be using.

The fears of Pory and others proved well founded as well. As early as 1621 the Pilgrims came under threat of the Narragansett and even the local Massachusett

[73] Pory "Letter to Sir Francis Wyatt" 1622.

tribes. Edward Winslow wrote that in the summer of 1622, “The Indians again began to cast forth many insulting speeches, glorying in our weakness and giving out how easy it would be ere long to cut us off.”[74] While these threats may not have led to open conflict they were a continued source of anxiety for the settlers at Plymouth. Local tribes gaining access to English weaponry only served to exacerbate these fears and rapidly action was taken to limit the trade of firearms for furs. Often times it was not the French or the Dutch who engaged in the trade of weapons for furs but other English colonists. One of the most contentious figures of the period was Thomas Morton. Morton, seeing the potential of the fur trade, engaged in a very open trade with many of the tribes of western New England. This action gained him the scorn of Bradford and the settlers in Plymouth. In a letter to The King's Council on New England, Bradford wrote, “Necessity has forced us... to take this course with this troublesome planter, Mr. Thomas Morton... who hath been often admonished not to trade or truck with the Indians either pieces, powder, or shot, which yet he hath done, and duly makes provisions to do.”[75] In a more detailed and less formal letter to Ferdinando Gorges, Bradford explains the extent of Morton’s trade, “(Morton) hath for his part sold twenty or twenty-one pieces, and one hundred weight of powder... We hear that the savages have above sixty pieces amongst them, besides other arms.”[76] Bradford anxieties stemmed from, “the desperate state and condition in this place, expecting almost daily to be overrun and

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[74] Edward Winslow, *Good News from New England: Or a True Relation of Things Very Remarkable at the Plantation of Plymouth in New England* (London: William Bladden and John Bellamie, 1624), B.

[75] Bradford, “Letter to the King's Council on New England” June 1628. From *Governor William Bradford's Letterbook*, 42.

[76] Bradford, “Letter to Sir Ferdinando Gorges” June 1628. From *Governor William Bradford's Letterbook*, 43.

spoiled by the Savages, who are already abundantly furnished with pieces, powder and shot."[77] While the fur trade may have provided an essential source of revenue for the Pilgrims, it was also the origin of their greatest anxieties.

Despite these fears the fur trade was an essential component of their survival. Furs and fish provided both the merchantable commodities and sustenance on which Plymouth's growth would rely on. The waterways of Plymouth provided the colony's residents with a steady, easily obtained supply of shad, bass, alewives, shellfish and a number of other animals which formed a cornerstone of the colonial diet. By practicing seasonal fishing in which they targeted the most readily available species the colonist had a means of ensuring year round access to protein. Alternating methods of obtaining fish ranging from nets, simple hooks and lures and ingenious devices such as the gate and lock system observed by Isaac de Rasieres allowed the colonists to obtain tremendous amounts of fish with minimal labor. It would not be an exaggeration to say that the ease with which fish could be obtained was the saving grace for the early Plymouth colony.

Fish also proved essential in allowing the crops upon which the colonists depended to grow. The barren soils of New England could not have supported such a demanding crop as maize without substantial amounts of fertilization. Forming the other cornerstone of the colonial diet, maize was as important as fish in ensuring the survival of English colonists. Fish contained the nutrients the soil needed to provide livable yields, particularly on fields which were used repeatedly and could otherwise have been rapidly exhausted. By all accounts the soils of Plymouth colony would

[77] *Ibid*, 43.

have borne nothing beyond dirt had the colonists not utilized shad and alewives to fertilize their fields. While they may not have understood it at the time the colonists were engaged in a complicated transfer of energy. Energy created by oceanic plankton worked its way up the food chain and was converted into a consumable product in the form of corn through the fertilization of fields with fish.

Commercial fishing provided an excellent economic opportunity for the English. Driven in part by fears of the Dutch and French gaining economic superiority and in part by their own desires for wealth, many were drawn to the coasts of New England in hopes of finding their fortune. Fishing could provide an extremely lucrative enterprise with catches numbering in the tens of thousands. If a fisherman were lucky he could look forward to a substantial profit. That said the ocean could also prove a damning enemy. The unpredictability of catches, weather and even other fisherman and business partners meant that success in commercial fishing was far from assured. Many of the men who ventured to New England in hopes of making a profit off of the bountiful fisheries soon saw their hopes dashed and found themselves stuck in a brutal world without much in the way of economic opportunity.

Closely associated with the fisheries of New England was the fur trade. Many adventurers sought to become involved in both pursuits. While in practice this seemed like a good idea it was a demanding proposition. The fur trade was highly competitive in New England as the Dutch had already established themselves as the dominant trader in the region by the time Plymouth was settled. Similarly the French had control of the trade to the north of the colonies. Despite these hardships the

colonists of Plymouth sought to get themselves involved in the trade in hopes of generating much needed revenue to pay off their substantial debts back home. They were largely successful in this enterprise and, thanks to the emergence of wampum, were able to pay off their debts and make the colony financially viable, thus saving it from destruction once again. Despite their success in fur trading the colonists found that the practice also muddled the political climate of the region. The need for furs was so substantial, and the potential profits so great, that some felt that the price of furs far outstripped their need for technological superiority over the local Algonquin tribes. Firearms, powder and shot soon found their way into Amerindian hands and presented the colonists with another obstacle to sustainability in the region.

The abundance of waterways in New England were the unifying feature between all of these commodities. Fish were born of the oceans, streams and rivers of New England and beyond and Plymouth's position in a sheltered bay and along the riverside put it in a place where it could take advantage of the abundance of aquatic life. Similarly its proximity to the Grand Banks fisheries made it a logical place to set up stages for commercial fishing. The beavers and otters that formed the backbone of the fur trade were also born of aquatic environments. Primarily located inland, the innumerable swamps, lakes, rivers and steams of New England provided a seemingly inexhaustible hunting grounds for the tribes that became engaged in the fur trade. The economic and political and social connections that Plymouth formed in New England then were the product of these resources. The very survival of the colony was owed to sheer abundance of aquatic environments.

Chapter 2: Aquatic Transportation

In addition to providing the colonists of Plymouth with the goods they would need to survive and adapt to the hostile world of New England, water also provided a means of disseminating goods, ideas and individuals around the Atlantic World. The experiences of Altham, Bradford, Winslow, Morton and others indicate that Plymouth never existed in isolation. Instead it was characterized by a constant flow of both tangible and imperceptible entities into and out of its boundaries. Edward Winslow frequently ventured back and forth between Plymouth and England to spread news of the colony, solicit money, attract future colonists and maintain social and economic ties which were essential to the plantations survival.[78] The movement of goods, people and ideas between various colonies and Europe was only possible through the utilization of water and wind as forces of movement and transportation. By harnessing the natural energy of climatic forces, viscosity (or lack thereof) and their own labor the colonists forged a complex series of navigable routes that created a degree of interaction between seemingly isolated locales.

The ability to harness and unleash energy for movement did not differentiate Plymouth's colonists from their Algonquin counterparts. Aquatic movement and transportation played a crucial role in the growth and success of the major tribes the Plymouth's colonists encountered upon their arrival. During his initial voyages off the coast of Massachusetts Samuel de Champlain made note of the abundance of canoes he saw in use.[79] Canoes were an essential component of Algonquin life,

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[78] Robert Cushman, "Letter to Governor William Bradford, Dec. 1624" from *Governor William Bradford's Letterbook*, 10.

[79] Champlain, *The Voyages of Samuel de Champlain*, 36.

crucial to the economic, social and political connections that maintained the various tribes of southern New England. These simple wooden canoes stand as one of the defining symbols of Algonquin peoples and were quickly adopted by colonists who saw their utilization in navigating the countless streams, rivers and lakes that dotted the New England countryside.

Despite their mutual reliance on New England's waterways for movement and transportation both Plymouth's colonists and local Algonquins had distinct relationships with their surrounding aquatic environments. Both groups saw the Atlantic coastline as a sort of boundary. For Algonquins the Atlantic Ocean was where their world ended, an insurmountable barrier which marked the extent of navigable territory. The vessels they used for aquatic transportation were simply incapable of traversing a massive and temperamental aquatic body. Plymouth's settlers on the other hand, at least initially, saw the woodlands, forests and fields that stretched from the coastline, westwards to be an equally substantive impediment. While explorers, fur trappers and others may have ventured into the interior of New England, it remained a formidable boundary to colonization, taking decades to be traversed and settled. For the colonists, proximity to the ocean was life. The ocean provided an influx of settlers, and their corresponding labor, as well as goods including livestock and firearms that were essential to Plymouth's survival. The ocean provided their one tangible lifeline to Europe and it was an essential lifeline to say the least.

Ultimately these unique relationships with water as a form of transportation and exploration would help shift the balance of power within New England. While

the Algonquins could easily navigate the interior of New England they were largely reliant on regional connections and lacked the substantial markets and population that Plymouth and other European colonies had at their disposal. While Plymouth's settlers and future English colonists would take decades to penetrate into the interior of the Americas, they were able to use the ocean to rapidly transport goods, peoples and ideas throughout the American colonies and beyond. The ability to effectively navigate oceans would in effect shrink the world, allowing for colonial reliance on English goods and funds. Without these connections the initially weak Plymouth colony would likely have collapsed. Thus understanding the differing ways in which Pilgrims and Algonquins utilized water for transportation is crucial to understanding the ultimate assertion of English dominance in New England.

Water's usefulness as a means to transportation stems primarily from its chemical characteristics. Firstly, water has a greater density than objects used for traversing it, in the case of colonists and Amerindians, wood. While water temperatures may have fluctuated in colonial New England, water would have invariably maintained a density of at least .99 g/cm^3.[80] Comparatively, woods that were used by both Pilgrims and Algonquins to make ships including various oaks (.65 g/cm^3 to .74 gm/cm^3), pines (.38 g/cm^3 to .6 g/cm^3), and birches (.55 g/cm^3 to .71 g/cm^3), all would have had densities less than water, thus allowing them to float and making them seaworthy.[81] While this conclusion may seem somewhat obvious

[80] United States Geology Survey, "Water Density" retrieved from, http://ga.water.usgs.gov/edu/density.html retrieved on 2/20/2014

[81] California State University Dominguez Hills, "Physical Properties of Common Woods" retrieved from http://www.csudh.edu/oliver/chemdata/woods.htm retrieved on 2/20/14

it nonetheless formed an important relationship between wood, water and peoples in the Americas.

Similarly, the fluid dynamics of water made it a practical method of movement. While fluid dynamics are a complex science, a brief explanation of one component of fluid dynamics, drag, is essential to understanding how colonists and Algonquins would navigate the water around Plymouth. Drag is the force exerted on an object moving through a fluid stream.[82] In the context of aquatic navigation, drag would be the force exerted on water craft by both water and winds. Two major factors determined how drag impacted the experience of colonial seamen. The first factor was the shape of the object, or in this case vessel, that sought to move through water. Generally, objects that have less area perpendicular to the direction of a drag flow will be less susceptible to the force exerted upon them. This means that objects that are narrow and spherical generally experience less drag than those that are wide and flat. This principle unsurprisingly can account for the shape of ships utilized by both colonists and Algonquins and more broadly speaking throughout history. By minimizing drag in the bodies of boats sailors lessened the energy needed to move ships through water.

The second impact of drag on aquatic navigation stemmed from the direction in which a fluid exerted its energy. In essence the determining factor in whether drag was a helper or hindrance to movement stemmed from the current and winds. If these forces were exerted in the direction in which a ship intended to go then the energy expended through drag would be energy that could be used to propel the ship

[82] Encyclopedia Britanica Online, "Drag", retrieved from http://www.britannica.com/EBchecked/topic/170738/drag retrieved on 3/6/2014

forward. If these forces acted in opposition to the desired direction of travel then crews would need to generate more energy than was being exerted upon the ship by drag. The need to harness and confront natural sources of drag ultimately resulted in the utilization of technologies such as sails and oars to create enough energy to overcome nature.

Finally, the geography of New England made water an efficient means of transportation. Reverend Higginson's initial description of New England reveals the myriad of different environments that one traversing the countryside would need to contend with,

> The forme of the Earth here in the fuperficies of it is neither too flat in the plainnesse nor to high in the Hils, but partakes of both in a mediocritie... though all the countrey be as it were a thicke wood for the generall; yet in divers places there is much ground cleared by the Indians and especially about the plantation...[83]

The diverse landscape illustrated by Higginson, although not unnavigable would have proved troublesome. It would require substantial energy to journey through both forests and fields. In the accounts of the initial exploration of the land surrounding Plymouth in *Mourt's Relations* spoke of bushes, and brambles that, "tore our very Armour in pieces."[84]

Clearly the landscape surrounding Plymouth was not conducive to widespread travel by foot. The lack of roads and paths meant that it would be difficult work to journey inland. Additionally the lack of navigable paths meant that those who were able to journey inland could easily get lost. In January of 1621, John Goodman and Peter Browne got lost when they chased after a dog that ran into

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[83] Higginson, *New England's Plantation*, B.
[84] *Mourt's Relation*, 5.

the woods after a deer. The men could not find the colony until the following evening after spending a night exposed to snow and freezing temperatures. The entire ordeal took place within a mile and a half of the colony lost.[85] While the story is somewhat amusing it speaks to the dangers of travel by land during the period. A night of exposure to snow and freezing conditions could be a death sentence to a settler in colonial Plymouth. While both Browne and Goodman survived their ordeal the dangers of overland travel further reinforced the need for aquatic transportation.

How Algonquins and colonists chose to propel the crafts they constructed had substantial implications on their access and utilization of different aquatic environments. The differences in the shape, size and body of ships meant that different amounts of energy were required to move goods and peoples around the waterways of New England. Different technological developments born of economic, social and cultural needs shaped the construction and physical properties of the water craft employed by both Algonquins and colonists. An in depth examination of the preconditions which led to the adoption of unique vessels is far beyond the scope of this paper and ultimately unnecessary to examining the implications of these different crafts. What is important is a brief examination of the types of ships primarily utilized by both Algonquins and colonists and the energy utilized to propel them across bodies of water.

Any examination of Algonquin aquatic transportation must invariably center on discussion of the canoe. This vessel became synonymous with local Americans to many of greater New England's early visitors and they frequently made mention of

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[85] *Mourt's Relation*, 29.

these watercraft in their early accounts of the New World. As mentioned earlier Champlain's early voyages down the coast of Massachusetts made note of the abundance of canoes. Miles Standish, Stephen Hopkins, Edward Tilley and John Winthrop were among a sixteen member exploratory mission that disembarked from the Mayflower upon catching sight of land.[86] During their brief two day excursion the men came across several seeming abandoned canoes along a riverbank.[87] The abundance of these vessels and the fact that they were left at particular locations serves as a testament to their usefulness for local transportation and movement.

William Wood leaves behind a fantastic description of the two primary types of canoes which the local Algonquins used to navigate the waterways of New England. Wood writes,

> Their cannows [canoes] be made either of pine trees, which before they were acquainted with Englifh tooles, they burned hollow, fcraping them fmooth with clam-fhells and oyfter-fhells, cutting their out-fides with ftone hatchets. Thefe boates be not above a foote and a half or two feete wide and twenty foote long. Their other cannows be made of thinne birch- rines [bark], clofe-ribbed on the in-fide with broad thinne hoopes, like the hoopes of a tub. Thefe are made very light, a man may carry one of them a mile, being purpofely made to carry from river to river and bay to bay to fhorten land-paffages.[88]

From Wood's description it seems quite obvious that Amerindian canoes were to be used primarily for local transportation. Two factors in particular can lead to this conclusion, their size and their need for labor to move. Wood's description reveals that there were distinct size limitations on the size and subsequently potential range of these Algonquin canoes. This size limit stemmed from the fact that the larger pine canoes were created from a single tree. By virtue of this fact, a canoe's size could

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[86] *Mourt's Relation*, 4.
[87] *Ibid*, 7.
[88] Wood, *New England's Prospect*, 102.

not be greater than that of any single tree. As a large vessel would be necessary for any sort of extended oceanic voyage for the storage of goods and materials it seems unlikely that these canoes experienced extended voyages on the open sea.

Additionally, it would make little sense for Algonquins to have made their canoes much longer than twenty feet. As a canoe's virtue lies in its narrow body and the resulting low drag it must invariably be a thin vessel. This characteristic had the unavoidable side effect of also making it highly vulnerable to overturning. Wood writes that, "if a crosse wave (as is seldome) turne her keele up-side downe, they by swimming free her, and scramble into her againe."[89] Had a canoe been greater in length then it would have become even more unstable and prone to rolling over. Thus the natural limitations that the trees placed on canoe lengths was compounded by the need for structural practicality. Both of these factors ensured that canoes served a very specific purpose within Algonquin society. The canoe's small size and narrow structure constrained the amount of people and goods that could be safely conveyed from one point to another.

In addition to the canoe's physical characteristics the method of propulsion also had significant implications on the utilization and role of the canoe in Algonquin society. The canoe's movement was entirely reliant on the energy expended by paddlers who manned the oars of the canoe. In order for this process to be successful rowers were dependent upon paddles to power through the water. The wide, flat face of the paddle would generate considerably more drag than the human hand could hope to and in the process maximize the amount of force pushing the

[89] Wood, *New England's Prospect*, 102.

canoe in a particular direction. In order for this process to be successful rowers had to generate more force through their strokes than was acting on the ship through drag. Unsurprisingly, in circumstances where a canoe was venturing upriver or fighting against the tide this process was far more exhausting than situations when water flows went in the direction of travel. In this context human energy was turned into drag force through the utilization of a technology, in the form of paddles, that was designed specifically to maximize drag. This technology when used in conjunction with a canoe's thin body and consequently low drag allowed the Algonquin peoples of Massachusetts to rapidly move throughout the regions aquatic landscapes.

Human energy was a readily available source of power which could be relatively consistent. However, humans, like all prime movers, required their own sources of energy in order to exert themselves and propel their canoes. William Cronon's *Changes of the Land* provides a useful account of the diets of southern New England Algonquins. Cronon states that while diets changed considerably from season to season, most tribes in the region practiced seasonal agriculture. Their staple crops consisted of squashes, beans, berries and most important maize. This vegetable diet was supplemented by meat, predominantly in the form of fish along the coast.[90]

This diet was nutritionally quite sound. Maize, which literally meant “that which sustains life,” is widely regarded as one of the most nutritious domesticated

[90] Cronon, *Changes in the Land*, 39, 40.

crops in the world.[91] Maize provides substantial amounts of carbohydrates and proteins. While specific figures may vary from crop to crop, generally maize is comprised of roughly 70% carbohydrates and 10% proteins.[92] This means that one kilogram of corn would yield roughly 700 grams of carbohydrates, ten grams of protein and most importantly well over three hundred calories. As a crop corn was extremely efficient in harnessing the energy of the sun and converting it into a form consumable by humans.

Fish, the other staple of a coastal Algonquin diet also tends to be quite nutritionally valuable. While the Algonquin diet consisted of just about any fish that was available at the time, it was particularly reliant on cod, salmon, herring, clams and mussels. Based on the fact that one gram of protein and one gram of fat yield four and nine calories respectively, one kilogram of cod (18% protein, .8% fat), salmon (20% protein, 6% fat), or herring (17.8% protein, 13.8% fat) would all yield considerably more calories than clams (10.8% protein, 1.1% fat) or mussels (11.2% protein, 1.8% fat).[93] Aquatic species, like crops, converted the energy of the sun into a form consumable by humans. The only difference was that rather than obtaining energy directly from the sun, the fish central to the diet of the Algonquins obtained their energy from sources further down the food chain. Sunlight provided various

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[91] Food and Agriculture Organization of the United Nations, "Chapter 1: Introduction" from *Maize in Human Nutrition*, (Rome: FAO, 1992) retrieved from http://www.fao.org/docrep/t0395e/T0395E01.htm#Chapter 1 – Introduction retrieved on 3/6/2014,.

[92] *Ibid*, "Chapter 2: Chemical Composition and Nurtritional Value of Maize" retrieved from http://www.fao.org/docrep/t0395e/T0395E03.htm#Nutritional value of maize retrieved on 3/7/2014.

[93] Food and Agriculture Organization of the United Nations, *Yield and Nutritional Value of the Commercially More Important Fish Species*, (Rome: FAO, 1989) retrieved from http://www.fao.org/docrep/003/t0219e/t0219e00.htm retrieved on 3/7/2014.

algae and plankton with energy that would ultimately work its way up the food chain towards eventual human consumption.

These two sources of food would have provided a substantial amount of energy so long as they were accessible. One major regulator for expendable energy on behalf of Algonquins was the inconsistency inherent in their diet. While spawning runs and harvest seasons would have provided a fairly reliable source of calories, often times food was dependent on what was readily available to be gathered. Consequently food was not always present. William Woods described the dietary habits of Amerindians claiming, “It being their fashion to eate all at some times, and sometimes nothing at all in two or three dayes... niether caring for the morrow, or providing for their owne families.”[94] While Wood's comments betray a degree of bias, the lack of consistency in caloric consumption is worth noting. William Cronon argued a similar course in *Changes in the Land.* Cronon claim's that southern New England tribes' subsistence cycles were regulated by the availability of suitable foods in a particular landscape. The tribes of southern New England, which did not range as far as their counterparts to the north, would have consequently undergone shortages of caloric energy during winter months when food was particularly sparse.[95]

The fact that they were dependent on the exertion of human energy to create drag through the utilization of paddles meant that Algonquin's relative travel range in canoes was limited by how much caloric energy they had stored. While the human body's capacity to exert energy is not as precise as machines driven by

[94] Wood, *New England's Prospect*, 76.
[95] Cronon, *Changes in the Land*. 40.

mineral energies due to its capacity to metabolize its own stores of fat and protein it nonetheless requires adequate stores of energy that can be released for particular projects. While one cannot state with certainty the energy exertion required by Algonquins to propel their canoes, on average a modern paddler of one-hundred and fifty-five pounds will exert roughly five-hundred calories per hour.[96] At this rate the National Park Service estimates that an experienced canoer can average around three miles per hour over calm waters.[97] In order to maintain this level of exertion a rower would need to consume between one-hundred fifty and two-hundred grams of corn for each hour of rowing, moving a total of three miles during that span.

The amount of energy exerted in conjunction with the fact that a canoe could only move within a small radius meant that single trips would have been fairly short. A day's worth of travel in a canoe would have probably ranged roughly twenty to thirty miles assuming the individual or individuals in question took minimal time to rest. Trips lasting multiple days would be possible, largely due to the ease of transporting canoes around land, however they would have suffered from their own sets of limitations. A day's worth of rowing would likely consume between three and four-thousand calories. An exertion of energy on this level would require an equally substantial influx of energy to replace the calories expended in movement. The canoe's narrow size and sleek body would prevent the transportation of large amounts of food necessary to replenish those calories lost. Subsequently, long trips

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[96] Nutristrategy, “Calories Burned During Exercise, Activities, Sports and Work” retrieved from http://www.nutristrategy.com/caloriesburned.htm retrieved on 3/7/2014

[97] National Park Service “St. Croix National Scenic Riverway” retrieved from. http://www.nps.gov/sacn/planyourvisit/canoeing.htm retrieved on 3/7/2014.

would require those undertaking them to acquire food during their journey, a process which would expend even greater amounts of energy.

The combination of these forces made the canoes utilized by Algonquin speaking peoples impractical for anything beyond regional use. Canoes could transport an individual rapidly through the waterways of New England and in the process allow for the maintenance of social, political and economic interactions on the local level. The natural limitations of the human body in conjunction with the canoe's reliance on the creation of drag through human labor meant that Algonquins were bound by their own, often times inconsistent, energy consumption. While corn and fish were extremely nutritious, the rigorous nature of rowing would quickly exhaust stored calories and place concrete limitations on the distance which could be traveled in a day. This factor, in conjunction with the canoe's relatively low speed and its lack of storage space, made the canoe a craft unsuited for wide spread exploration and travel. While this fact may not have been overly troublesome prior to contact with Europeans as all tribes were bound by the same regional limitations, it would prove a significant disadvantage in relation to the colonists of Plymouth who, by virtue of reliance on different sources of energy, were able to navigate a far wider expanse of the aquatic world.

Like their Algonquin counterparts Plymouth's earliest inhabitants were dependent upon the waterways of New England for their movement and transportation. They were bound by diverse landscapes of swamps, meadows, hills and forests which impeded terrestrial movement. In response to these natural obstacles they formed a society which was dependent upon the utilization of ships to

navigate their environment. Unlike the Algonquins, the technologies implemented in their ships, particularly the way they powered their craft and the implications of their chosen source of energy, created a different set of possibilities for travel. The utilization of sails and the subsequent harnessing of drag forces through wind provided a more powerful energy source which allowed Plymouth's settlers to establish consistent relationships throughout a far greater region than local Algonquins.

The primary workhorse of Plymouth colony initially was the shallop. The shallop was a small boat normally having only one mainmast and one foremast.[98] Shallops, because of their small size, could fulfill a variety of roles for early colonists. When a young boy went missing in July of 1621 the men searching for him utilized a shallop they had brought over on the *Mayflower* to search for him.[99] Similarly upon the arrival of the Pilgrims at Plymouth they remained on board their ship for several days, opting instead to survey the surrounding area with the use of their shallop. The shallop was a particular useful ship because of its capabilities in navigating areas other craft could not go such as rivers, which were readily present in the immediate vicinity of Plymouth.[100] Additionally shallops proved to be highly efficient fishing vessels as they were fairly easily made and convenient for coastal travel.[101]

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[98] John Robinson and George Francis Dow, *The Sailing Ships of New England, 1607-1907*, Marine Research Society (Salem, Mass.) Publication no. 1 (Westminster, Md: J.W. Eckenrode, 1953), 13-14.
[99] *Mourt's Relation*, 49.
[100] *Ibid*, 9.
[101] Robinson and Dow *Sailing Ships of New England*, 14.

While Plymouth's colonists included few descriptions of the dimensions of the shallop, modern scholars suggest that it was roughly 30 feet in length.[102] This small size would allow shallops to be transported in pieces on larger ships and reassembled as needed. The shallop stowed in the *Mayflower* was essential to the colony's establishment and both Bradford's *Of Plymouth Plantation* and *Mourt's Relation* make mention of the shallop being, "stowed in ye quarters of the ship".[103] This description reveals a substantial amount about the utilization of the shallop. Its small size made it impractical for long journeys. At only 30 feet long it would likely have been poorly suited for the potentially hazardous waters of an Atlantic crossing. That said, in calmer coastal waters its small size and relative ease of construction made it a truly practical vessel. Because of the numerous tasks it could carry and the small crew necessary to run such a ship it would have been perfectly suited to maintaining connections between Plymouth and other colonies throughout Massachusetts and beyond.

The other ship commonly used during the early colonial period was the "pinnace". While not as common as the shallop, the pinnace was an equally utilitarian craft. Generally larger than a shallop, a pinnace wasn't quite as big as larger ships such as the M*ayflower*. The pinnace was defined more by its shape than its size. A pinnace normally had two main masts, but could vary in size from small vessels of a few tons to larger fifty ton plus craft.[104] In this context tonnage does not

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[102] Joseph A. Goldenberg, *Shipbuilding in Colonial America*, Museum Publication - Mariners Museum□; No. 33 (Charlottesville: Published for the Mariners Museum, Newport News, Virginia, by the University Press of Virginia, 1976) 5.
[103] Bradford, *Of Plymouth Plantation*, 88.
[104] Robinson and Dow, *Sailing Ships of New England*, 15.

refer specifically to the carrying capacity of the ship, but rather a formula that estimated that figure. The tonnage was devised utilizing Baker's formula, a formula developed by Matthew Baker. Baker multiplied the length of the keel by the beam and the depth of the hold. This number was then divided by 100 to determine the actual tonnage of the vessel. While relatively accurate this process resulted in discrepancies of several tons between what a ship's stated tonnage was and its actual size and carrying capacity.[105] The fact that the term pinnace defined a type of construction, and not an actual size of ship meant that the uses of such ships could vary dramatically.

The pinnace's two masted design and larger holding space also made it capable of undertaking voyages between Plymouth and England. Not all of these voyages were successful. In November of 1625, Thomas Fletcher sent a pained note to Bradford, Allerton and Winslow describing the tragedy that had befallen the pinnace *Little James*. *Little James* sunk on the way to Fletcher in England carrying a large cargo of beaver pelts. Fletcher saw the loss of this ship as a terrible financial hardship for the colonists in Plymouth claiming, "all power therein to do you good, is wholly (by God's providence) taken from me."[106] Incidentally, while pinnace's may not have been as sturdy as the larger ships generally used for inter continental travel they made up for their lack of durability with speed. Their small size and two masts allowed them to generate far more power than other vessels and subsequently make the hazardous voyage across the Atlantic in good time. In 1636 a pinnace

[105] Goldenberg, *Shipbuilding in Colonial America*, 3.
[106] Thomas Fletcher, "Letter to William Bradford, Isaac Allerton and Edward Winslow, Novemeber 1625" from *Governor William Bradford's Letterbook*, 15.

accompanying a ship from London to Boston arrived three weeks before the ship it set out with.[107]

Pinnaces also were widely utilized for coastal transportation and movement. Their speed made them quite useful as fishing vessels. In fact, Emmanuel Altham's brief fishing career was most likely undertaken aboard a pinnace. The Council of New England noted, "Emanuel Altum to command the Pinnace built for Mr. Pierce's Plantation."[108] Coastal trade was also the responsibility of the pinnace. Thomas Prince's account of Plymouth's settlement, *Prince's Chronology*, describes how in the fall of 1623, "The pinnace, being sent about the Cape to trade with the Narragansetts, gets some corne and beaver, yet makes but a poor voyage."[109] While the transaction itself may have been less than successful the utilization of the pinnace in coastal trade is important to note. Like the shallop, the pinnace served a variety of roles for the colonists in Plymouth. Its ability to rapidly bridge the gap between London and Plymouth made it invaluable to the maintenance of the colony. Similarly its effectiveness in traversing the coastlines of New England allowed the colonists to inhabit and interact with a far greater territory than merely their settlement at Plymouth.

Finally the last ships worth noting would be the larger craft, like *The Mayflower*, that carried colonists back and forth across the Atlantic. The colonists didn't have a specific name for these larger vessels, merely referring to them by the broad term "ship". In *Good News from New England* Edward Winslow writes of

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[107] Robinson and Dow, *Sailing Ships of New England*, 15.
[108] Bradford, *Of Plymouth Plantation*. 377.
[109] Thomas Prince, *Prince's Chronology*, from Nathaniel Morton et al.,ed. Sewall Harding, *New England's Memorial* (Boston, Congregational board of publication, 1855), 309.

"The good ship called *The Fortune*, which in the moneth of November 1621 (blessed be God) brought us a new supply of 35 persons."[110] These ships provided the crucial role of maintaining seaborne communication and transportation between the colonies and England. William Bradford wrote dozens of letters across the Atlantic most of which were addressed to James Sherley.[111] The abundance of these letters is indicative of just how important accessibility to England was. This cross-Atlantic correspondence was crucial to the establishment and maintenance of the Plymouth company itself as the company was technically based and operated in England. Large ships like *The Fortune* and *The Mayflower* played an essential role in the establishment of Plymouth plantation. While they may not have been as abundant or used as widely as the pinnaces and shallops that were ubiquitous with the day to day workings of the colony, they nonetheless formed a significant component of Plymouth's seagoing capabilities.

Pinnaces, shallops and ships were all unified in the source of energy they relied on to journey across the ocean. While shallops could, in stormy seas, rely on oars to navigate, all three vessels employed by the Pilgrims utilized wind energy to move across Seascapes. Wind energy was based on the same physics principle of drag that dictated how a boat could move across water. In essence the goal of Pilgrim ships was to generate more drag in wind resistance than they were facing in water resistance. If the drag generated by the wind pushing the ship forward was greater than the drag impeding the ships progress, then, simply put, the boat would move. It was sails that allowed this process to work. Unlike the hull of a boat which

[110] Winslow, *Good News from New England*, 1.
[111] Bradford, *Governor William Bradford's Letter Book*.

was created with the purpose of minimizing drag, the sail was constructed to maximize drag. By the Seventeenth century the sail was ubiquitous with European aquatic navigation and the Pilgrims relied on sail power for all of their journeys leading up to their arrival in the Americas.[112]

Colonists were aware of the winds that propelled their ships. William Bradford wrote of the "prosperus winde" that carried the Pilgrims from Leiden to London.[113] The author of *Mourt's Relation* writes that the departure from London was powered by, "the Wind comming Eaft North Eaft, a fine fmall gale."[114] There was an innate understanding that their ability to traverse the seemingly impassable Atlantic ocean was the result of forces beyond their control. Often times the Pilgrims resorted to their understanding of God as the ultimate power in the universe to explain how the wind carried them across the ocean. William Bradford writes extensively about the providence of God in his description of the Pilgrim's journey across the Atlantic. Bradford writes of their arrival in Cape Cod, "they fell upon their knees and blessed ye God of heaven, who had brought them over ye vast and furious ocean and delivered them from all ye perils and miseries thereof."[115] The author of Mourt's Relation was equally grateful to the Lord upon seeing land, exclaiming, "it caufed vs to reioyce together and praife God that had giuen vs once againe fee land."[116] William Wood conveyed the concerns and fears of many colonists journeying to the New World when he wrote, "It is too common with many

[112] Bradford, *Of Plymouth Plantation,* 73.
[113] *Ibid*, 73.
[114] *Mourt's Relation*, 1.
[115] Bradford, *Of Plymouth Plantation,* 94.
[116] *Mourt's Relation*, 2.

that feare the Sea more than they neede... yet feldome doth it fink or over-turne, because it is kept by the carefull hand of Providence, by which it is rocked."[117] God was not absent from Emmanuel Altham's mind either. In his usual utilitarian manner the young adventurer claimed, "I have learned by this voyage that God hath made the seas more for use than pleasure... And likewise by the blessing of God, I have and hope to learn that at sea which will prove to my extraordinary advantage."[118]

Clearly God's presence in nature was responsible for the way the natural world impacted the life of man. God could generate winds, make waves and cause fish to stream into Altham's pinnace's nets. God presented a means of unifying the natural and human realms into one world. In addition to controlling the ocean, God also had control over the lives of the Pilgrims. One young sailor on the *Mayflower* mocked the colonists due to the seasickness that afflicted them during their voyage. Bradford writes with no small amount of glee that, "it pleased God before they came halfe seas over, to smite this yong man with a greeveous illnesse, of which he died in a desperate manner, and so was him selfe ye first yt was throwne overbord."[119] By dictating both the seas and human behavior, God presented a means of control over both an inclement natural and human world. The ships that were powered by wind were ultimately seen by the Pilgrims as being driven by God's will. Their gratefulness towards him at the time of their arrival reveals that providence was entirely entwined in and responsible for nature.

[117] Wood, *New England's Prospect*, 56.
[118] Altham, "Letter to Sir Edward Altham" September, 1623.
[119] Bradford, *Of Plymouth Plantation*, 91.

While God may have been generous enough, and the Pilgrims righteous enough to make the voyage across the Atlantic, their journey was very much governed by climatic factors. The reliance on wind energy meant that Pilgrims and other Atlantic travelers were dependent on the natural wind and oceanic currents that crossed the Atlantic. Flowing clockwise between Europe, Africa and South and North America, the dominant currents and winds of the Atlantic provided a veritable highway on which the ocean could be crossed. The northern Atlantic is dominated by four major currents which constantly circulate between the continents. Starting in England, colonists would take the Canary Current south towards Africa where they would then venture west across the sea on the North Equatorial Current. Upon arriving in the Caribbean they would then venture north along the Gulf Stream through New England and Canada before riding the North Atlantic Drift back to Europe.[120] The natural flows of the currents provided an aquatic highway on which Pilgrim ships could harness the natural power of the oceans to rapidly move between Europe and the Americas. While Pilgrims may not have always followed current precisely, even haphazardly riding currents ensured that ships needed to generate less drag with their sails. By sailing with the current, ships minimized the drag force that they had to overcome, thus maximizing the efficiency with which their sails operated.

The major winds of the Atlantic adhered to the same path as the major currents. Circling from Europe to Africa and across the Atlantic the prevailing trade winds provided a reliable means of navigating the ocean that moved in conjunction

[120] Arthur Mariano, Edward Ryan, "Surface Currents in the Atlantic Ocean" Ocean Currents retrieved from http://oceancurrents.rsmas.miami.edu/atlantic retrieved on 5/11/14.

with oceanic currents. Thus the drag generated in sails moved in the same direction as the currents providing additional force to help move ships along the ocean. The act of sailing around the oceans then was powered entirely by nearly inexhaustible sources of energy which allowed for larger ships carrying significant amounts of goods. Unlike Algonquins, the force of the winds meant that English colonists could bring food to last for a substantial amount of time due to their ability to harness and unleash greater amounts of energy. William Wood described the provisions which colonists would take on their journey across the Atlantic. Wood describes, "falt Beefe, Porke, falt Fifh, Butter, Cheese, Peafe, Pottage, Water-grewall and fuch kinde of Victuals, with good Biskets and fix-fhilling Beere."[121] The ability to make the expansive journey across the seas was the result of the size of ships which allowed the conveyance of enough food to make the journey. Ships of such size were only able to make the journey across the Atlantic due to the substantial amounts of power they could be directed towards human aquatic movement.

The wind powered connection with England was crucial to the sustenance of Plymouth colony. While goods and people were obvious cargo for these ships, news and information were equally precious to the colonists. In 1630, Samuel Fuller, a friend of Bradford's living in Charlestowne wrote, "There is come hither a ship... which brings news out of England; that the plague is sore, both in the city and country and that the University of Cambridge is shut up by reason thereof."[122] Fuller's tone and topic of conversation is indicative of the importance of news to

[121] Wood, *New England's Prospect*, 55.
[122] Samuel Fuller, "Letter to Mr. William Bradford, August 2nd, 1630" from *Governor William Bradford's Letter Book*, 59.

colonists. News allowed colonists to maintain their identity as members of English society. By talking about particular matters which were impacting England, the Pilgrims were able to legitimize themselves as subjects of the English crown. The information that ships from England transferred linked the colonies and the European mainland not only physically but culturally by ensuring that events and knowledge in one area were known and remarked upon in others. In this sense ships fulfilled an ideological as much as a physical process in ensuring the survival of the colony.

Materially, the ability to rapidly cross the Atlantic was essential as well. While fish and crops may have been readily available to colonists, the expenses of the intercontinental journey were generally paid in England which created a relationship economic and material interdependence between England and the colonies. William Cronon has articulated the basis of this relationship in *Changes in the Land*. Raw materials such as furs, fish and timber were transported to England in massive quantities. Cronon writes of the ideological creation of "commodities" by colonists who tended to perceive the value of resources based on their market value in England. Cronon's argument economically links the colonies and England by applying English values of goods to the material realities of New England. The importance of timber, sassafras and furs was directly related to the scarcity of these items in England.[123]

This relationship, while based on the physical realities of differing landscapes in the Americas and in England was fundamentally dependent on the

[123] Cronon, *Changes in the Land*, 76.

manner in which the Pilgrims were able to rapidly move through aquatic landscapes. Fish and to a lesser extent furs and wood required relatively rapid transit in order to be consumed in English markets. James Sherley writes of a shipment of furs that he received from England which were ruined in transit. Salt and moisture could wreak havoc on furs that were not adequately sealed and even the most well protected barrels could hope to limit water damage for only so long.[124]

The raw materials sent from the colonies to England were often traded for goods essential to the survival of the colonies. Fish and crops could provide some food for the colonists but their management of these resources often times meant that they lacked stores to provide for those months when food would be difficult to come by. Winslow writes that by May of 1622, "At which time our ftore of victuals was wholly fpent, hauing liued long before with a bare and fhort allowance."[125] As always, Providence, would provide for the devout Pilgrims, this time in the form of the ship *Difcouerie,* a ship helmed by a Captain Jones. Winslow writes that, "Of Captaine Iones wee furnifhed our felues of fuch prouifions as we moft needed and he could beft fpare."[126] The irony behind the importance of Captain Jones and his ship stems from the fact that it was the arrival of the ship *Fortune,* earlier in 1622, that created food shortages amongst the Pilgrims to begin with. Ships were harbingers of both salvation and destruction. While generally providing the tools necessary for the perpetuation and survival of the colonists, ships could also carry more mouths to Plymouth which had to be fed. This population influx created food

[124] Sherley, "James Sherley's Acount Book".
[125] Winslow, *Good News From New England,* 11.
[126] *Ibid,* 13.

shortages, suggesting just how fragile the population dynamics in Plymouth truly were. The scarcity of food was such a substantial issue that even four years after the *Discovery* provided the Pilgrims with a means to survive, the general court of the colony passed an ordinance stating, "for the preuenting scarcity, as also for the furdering of our trade, that no corne, beans or pease be transported, inbarked or sold to that end to be conveyed out of the colony without the leaue and license of the Gouernor and Counsel."[127]

Ships could provide an answer to the shortage of food not only by providing relief in the form of food itself, but also in alternative sources of food. The cows and goats which the Court split up for common use in 1627 had been conveyed across the Atlantic on board a ship. While few accounts of the ship itself can be found, the town records speak of "the old stock with half the increase" suggesting that at least some of the livestock were new arrivals.[128] Livestock provided an essential function to the colonists by providing the basic materials for dairy products. Cows and goats were unique in their ability to turn grasses and plants that humans could not consume into products which could sustain and promote human development. Cows and goats consumed grasses which harnessed the sun's energy and created the basic sugars and carbohydrates necessary to survival. Livestock then transferred this stored and converted solar energy into milk and meat which humans could consume and convert to power their own bodies. Livestock were so effective in this regard that the meadows which provided the best grasses were highly sought after plots of land.

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[127] Pulsifer, *Records of The Colony of New Plymouth*, 8.
[128] *Ibid*, 9.

Finally ships provided the materials necessary for the defense of the colonies. Despite illusions of peace, conflict was a constant component of early colonial life. Clashes between the Pilgrims and local Algonquin tribes were a frequent occurrence, particularly during the period of initial settlement. Captain Miles Standish was generally the individual in charge of leading forays into the lands surrounding Plymouth and confronting any hostile individuals whom the colonists may encounter. *Mourt's Relation* claims that during the initial exploration of Plymouth, "fixteene men were fet out, with every man his Mufket, Sword and Corflet."[129] While this first excursion went off without any open conflict or fire between the Pilgrims and the Algonquins, later explorations were not as fortunate. A few days later Captain Standish led another foray inland. This time Standish and his dozen men came into contact with a group of Algonquins who ambushed the position the colonists were holding. While it seems to have been a heated exchange the Algonquins quickly left once the element of surprise was lost. The author writes that the attack was led by an individual who, "ftood three fhots of a Musket... after which he gaue an extraordinary cry and away they all went."[130] While the exchange was brief and the Pilgrims soon settled into mostly peaceful relations with the local tribes they nonetheless relied heavily on firearms for their security. The rapidity with which the leader of the ambush retreated after the colonists were able to fire multiple shots is indicative of the significance of the musket. While the tribes of New England had been decimated by disease by the arrival of the Pilgrims they still had a substantial numerical superiority over them. The musket presented a means of

[129] *Mourt's Relation*, 4.
[130] *Ibid*, 19.

leveling an otherwise unequal military relationship by giving the outnumbered colonists superior firepower.

Ultimately the continued flow of these weapons was largely dependent on aquatic trade. While muskets could be maintained in Plymouth they were generally personal weapons crafted in England which were brought over by colonists. Each colonist who made the journey across the Atlantic with a musket added additional military power to the colony. Additionally, smiths and craftsmen who made the journey to the colonies on boats provided the means of maintaining weapons that may otherwise have worn down past their usefulness.[131] The ability to rapidly navigate water provided a means of continuing access to the firearms which were essential to colonial security. Similarly, the ocean also presented a means of preventing tribes from negating the colonial advantage by obtaining firearms of their own. As soon as they came into contact with muskets, local tribes sought to acquire these weapons for their own usage. The French and Dutch in particular often times provided willing trading partners who would part with firearms in exchange for furs.[132] These transactions often incited the ire of the Pilgrims who saw the French and Dutch as undermining European security in the region. Occasionally the offender could also be an Englishman. When Thomas Morton was accused of arming local natives Bradford implored the crown to intercede on behalf of the colonists. Again, rapid transportation across water provided a means of communicating anxieties and fears. Bradford sought to import the legal authority of

[131] Pulsifer, *Records of The Colony of New Plymouth*, 8.
[132] Bradford, Winslow et al. "Letter to Ferdinando Gorges" June 9 1628. from *Governor William Bradford's Letterbook*, 43-44.

the crown across the ocean with the aid of sail.[133] The quest for security was invariably tied to the traversal of aquatic landscapes.

Due to their ability to harness the natural forces of the wind and oceanic currents, Plymouth's colonists had a decided advantage over their Algonquin counterparts who were dependent on their own energy to propel their vessels. By controlling and unleashing greater amounts of energy the colonists were able to propel larger ships and subsequently transport more goods, and individuals over far greater distances. The ability to rapidly cross the Atlantic helped ensure that despite their geographic isolation they were inextricably connected to England. The aquatic connection with England proved to be an invaluable asset to Plymouth. It would not be an over exaggeration to say that the survival of the colony was a byproduct of the efficiency with which the Atlantic could be crossed. Ships regularly made the arduous voyage across the ocean under the guidance of Providence, carrying men, materials and ideas that helped the floundering colony of Plymouth survive. These ships brought men and women who helped work the fields and provided valuable skills such as blacksmithing and carpentry.[134] The ships brought goods ranging from food, livestock and tools to firearms and defenses to help provide for the security of the colony. Finally, the ships conveyed ideas and news which ensured that the colony remained ideologically tied to England, and preserved the identity of the Pilgrims as English.

These tangible and intangible trans-Atlantic passengers were all crucial to the survival of Plymouth. By harnessing wind and hydrological drag colonists

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[133] *Ibid*, 44.

[134] Pulsifer, *Records of the Colony of New Plymouth*, 8.

perpetuated their way of life and slowly but surely expanded their influence and autonomy throughout New England. This growth and expansion presented some interesting questions to the settlers of Plymouth. Despite the arduous hardships they faced, they were nonetheless optimistic about the abundance and promise of New England. Increasing populations ultimately created new questions in the colonies. Questions over who should have access to what had been seen as a limitless abundance of streams, meadows, fisheries and plots of land began to become commonplace. These aquatic landscapes soon became contested sites which would come to embody the tensions between communal and private ownership that characterized the development of English and American economic development.

Chapter 3: Aquatic Access

Early accounts of New England generated Puritanical religious ideals of an Edenic paradise found again in the New World. The seemingly immeasurable abundance of New England captivated the minds of her earliest visitors. The countryside was brimming with trees, flowers and plants beyond counting and was populated by deer, moose, bears and birds that entranced early settlers. Francis Higginson wrote of the woods of the region, "For Wood there is no better in the world I thinke."[135] Of the deer he wrote, "here are feuerall forts of Deere, some whereof bring three or foure young ones at once, which is not ordinarie in England."[136] Higginson was entranced by what he perceived as the natural abundance of the landscape. In some ways Higginson's observations were more a reflection of the English countryside and the shortage of biodiversity throughout the island. By the early 1600s England had cleared many of its forest and environments for large game animals. In comparison the fertile shores of New England would have seemed a veritable Eden.

And yet the fruitfulness of the landscape eluded many of the colonists who hoped to establish themselves in a land that, "may be truly sayd to be within the compasse of that golden meane, most apt and fit for habitation and generation."[137] The constant fear of starvation that hung like a cloud over Plymouth seemingly contradicts the reports of Higginson and Morton. Edward Winslow went so far as to say that the lack of food could not be blamed on incoming colonists who did not

[135] Higginson, *New England's Plantation*, B3.
[136] *Ibid*, B3.
[137] Morton, *New English Canaan*, 14.

prepare adequately, “but rather certaine amongft our felves, who were too prodigall in their writing and reporting of that plenty we enioyed.”[138] Winslow pointed out, accurately, that the reality of New England did not necessarily match the reports being received back in England. The promise of quality farming lands in New England was dependent on the availability of just that, land. Colonists expected to have access to plots of land and the resources necessary to make a stable and reliable living off the land.

Like so much in colonial Plymouth, these farm lands and other desired landscapes were dictated by water. Water shaped meadows, and streams provided a reliable source of water and the means for irrigating fields and pastures. Draft animals and people needed access to streams and springs in order to meet a fundamental need of all life, water. As mentioned earlier, waterways provided essential networks of trade, communication and travel throughout the colonies. In coastal communities such as Salem nearly every family owned some sort of watercraft for local travel.[139] Water was necessary to local transportation and survival in this regard as well. Fur traders, and loggers required access to water in order to ship their goods from one region to the other. Thomas Morton was emphatic that a fur plantation established near Lake Ericoise (Erie) would be most profitable. Morton claims that, “Here may very many brave Townes and Cities be erected which may have intercourse with one another by water very commodiously.”[140] To

[138] Winslow, *Good News from New England*, 9.
[139] Daniel Vickers, *Young Men and the Sea*, 29-30.
[140] Morton, *New English Canaan*, 66.

Morton and other aspiring fur traders, water presented a unique opportunity for the establishment of a stable and sustainable future.

Fishermen also were reliant on access to water for their survival. A small colony was established at Damariscove solely with the intent of giving the English access to fish in Northern New England. John Pory writes that this village was seen as highly important and consequently heavily defended. "And lest the French or the savages should root them out in winter, they have fortified themselves with a strong palisado of spruce trees of some ten foot high, having beside their small shot, one piece of ordinance and some ten good dogs."[141] That the colony at Damariscove was seen to be valuable enough to maintain defenses against both the French and local tribes is indicative of how important access to fisheries was to the English from an economic position. The steady supply of fish that moved from Plymouth to England helped pay for the establishment and upkeep of the colony and consequently its continuation was of the utmost important.

Conflicts and desires to maintain access to water and aquatic environments represent the contradiction between expectations of New England and the situation colonists truly encountered. New England did in fact have more readily available lands, resources, and material goods than did England. By sheer size alone New England was much larger and despite a larger tribal presence in the preceding decades, by 1620 most Amerindian lands had been abandoned due to massive population declines. While some promoters of New England undoubtedly

[141] Pory, "Letter to Sir Francis Wyatt" 1622.

exaggerated their claims it would be equally erroneous to portray New England as a barren landscape entirely without opportunity.

Limitations to interacting with the land then stemmed not only from physical characteristcs of environment, but also ideological and social constructions that the Pilgrims brought with them. While lands for grazing, hunting, fishing and farming were available, there was competition over who had control of and access to these aquatic landscapes. Questions in Plymouth abounded over how lands could be fairly divided and implemented and despite the communal ethic that the Pilgrims exercised there was a social and political hierarchy that dictated access to the land. As the colony grew and new settlers continued to expand within and outside the borders of Plymouth these questions of access became more pronounced and pressing.

The process of shaping access to land was an essential one in Plymouth's development and while this process continued for centuries, the question of access to aquatic resources was a crucial development in the character of Plymouth colony and more broadly colonial New England. In answering who had access to certain landscapes, the Pilgrims helped establish expectations and assumptions about land tenure that shaped the direction of the colony. As always water existed at the heart of this process. From streams to lakes to oceans to meadows, springs and well water would once again be at the crux of Plymouth's settlement. While Theodore Steinberg examined how water was commodified and controlled in the Nineteenth century the birth of the commodification of water occurred two centuries earlier with early ideas about control of an access to the aquatic landscapes of greater Plymouth colony.

While access to water was important for economic, political and social reasons, at a fundamental level its importance stemmed from the role it plays in the physiological well being of all life. It was imperative to Plymouth's earliest colonists then to find sources of fresh water for consumption. Often times quality drinking water was not readily available. Beer formed an important component of the Pilgrim diet, particularly at sea. William Wood adds that in addition to beer one may want to bring, "for fuch as have ability, fome Conferves and good Clarret Wine to burne at Sea; Or you may have it by fome of your Vinters or Wine-Coopers burned here and put into veffels, which will keep much better than other burnt Wine."[142] The lack of water in the passage across the sea made the finding of water an even more pressing objective to those who had successfully made the voyage. The Pilgrims were destitute when they first arrived on Cape Cod because they could not, "finde any frefh water, which we greatly defired, and stood in neede off, for we brought neither beere not water with vs."[143]

Suitable drinking water was not always readily found despite the abundance of local water sources. When pursuing a group of Algonquins, Standish and others crossed a small creek but despite their aforementioned thirst did not stop to take a drink.[144] While this could be indicative of a desire to pursue the Indians they had seen, they neglected to double back to the stream and fill up their water in the aftermath of the pursuit. It seems likely then that the Pilgrim explorers had a very well established idea of what types of fresh water sources they could utilize for

[142] Wood, *New England's Prospect*, 55.
[143] *Mourt's Relation*, 5.
[144] *Ibid*, 5

drinking water. While *Mourt's Relation* does not expand on the characteristics of a good source of drinking water it seems likely that they were largely aesthetic in nature. After further exploration Standish and his comrades eventually, "founde fprings of frefh water, of which we were heartily glad, and fat vs downe and drunke our firft New England water with as much delight as euer we drunke drinke in all our liues."[145] The identifying term of the "spring" rather than the "creek" implies further that Standish and his company had specific expectations for suitable sources of drinking water. While the water was found on their first trip the need for sources of water specifically for drinking could place limitations on where colonists could settle. Colonists needed sources of water for themselves and their families and the arrival of livestock further compounded this need as well.

The difficulty which Standish and the first visitors to Plymouth had in finding adequate drinking water was by no means univeral. Many early writers, seeking to increase colonizing efforts, wrote of how abundant drinking springs were in New England. These individuals made the ambitious claim that access to drinking water would not in any way hinder the colonization of the Americas. Water, like fish, furs, lumber and land would prove an invaluable draw to colonial pursuits and ideas surrounding the potential benefits of good and abundant springs ran rampant throughout literature designed to promote colonization. William Wood was one of the first to note the abundance of useful springs claiming,

> For the country it is as well watered as any land under the Sunne, ever family, or every two families having a fpring of fweet waters betwixt them, which is farre different from the waters of *England*, being not fo fharpe, but of a fatter fubftance,

[145] *Mourt's Relation*, 6

and of a more jetty collour; it is thought there can be no better water in the world, yet dare I not preferre it before good Beere, Wheay, or Buttermilke.[146]

Wood's analysis ensures that the reader is well aware of just how abundant the springs are. Wood's assertion that New England is "as well watered as any land under the Sunne" is clearly intended to convey that water distribution and access in New England is comparable, if not better than that of England. In this context Wood is using access to water as a means of promoting settlement and increased colonization.

Wood speaks not only to the quantity of waters that colonists in England would have at their disposal, but also the the quality of the water. Wood states that.

Thofe that drinke it be as healthfull, frefh and luftie, as they that drinke beere; Thefe frpings be not onely within land, but likewife bordering upon the Sea coafts, fo that fome times the tides overflow fome of them, which is accounted rare in the moft parts of *England*. No man hitherto hath been conftained to digge deepe for his water, or to fetch it farre, or to fetch feverall waters for feverall ufes; one kinde of water ferving for wafhing, and brewing and other things."[147]

Access to abundant amounts of water is a valuable draw to New England in of itself, access to waters of superior quality makes the idea of settling in the region even more enticing. In addition to the healthfulness of the water, Wood's assertion that the waters of New England can be used for multiple uses is also valuable. Generally, the utility of water to colonists would have been dictated by the water's mineral content. Water with a high mineral content, usually calcium and magnesium is referred to as "hard water". Hard water presented numerous challenges to colonists, most notably its high mineral content limited its effectiveness for cleaning and also had a tendency to wear down metallic containers more rapidly. Wood's comment then is

[146] Wood, *New England's Prospect*, 14.
[147] *Ibid*, 14.

likely reflective of the low mineral content of New England's waters. While it is difficult to gauge the mineral content of New England's waters during the 1600s, the United States Geological Service suggests that New England has measurably lower mineral content in waters than other areas in the country.[148]

Regardless of the chemical forces that created the conditions, the implication of Wood's assertion was blatantly obvious to potential colonists. The utilitarian nature of New England's water would have saved them valuable time transporting water back and forth from wells. What is more important to note are the specific tasks of serving and washing which Wood mentions. Carolyn Merchant talks about the sexualized differentiation of labor in her landmark book *Ecological Revolutions*. Merchant specifically points out tasks such as washing and cleaning to be the work of the homestead and hence women.[149] It seems likely then that Wood's comment on the usefulness of New England's waters was written with the intent of appeal directly to women. Using water from the same source for a variety of household tasks would have maximized female labor efficiency allowing for the completion of other tasks. The utilitarian quality of New England's waters due to its lack of minerals was a substantial selling point to William Wood, but he was not the only one who wrote of how abundant and accessible the waters of New England were.

Thomas Morton was equally engrossed by the access to water that New England offered. The first paragraph of Morton's description of New England

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[148] John C. Briggs and John F. Ficke, *Quality of Rivers of the United States, 1975 Water Year; Based on the National Stream Quality Accounting Network (NASQAN)* (United States Geological Survey, 1977), http://pubs.er.usgs.gov/publication/ofr78200.

[149] Merchant, *Ecological Revolutions*, 81.

describes, “sweete cristall fountaines, and cleare running streames, that twine in fine meanders through the meads... jetting most jocundly where they doe meete, and hand in hand runne downe to Neptunes Court.”[150] Like Wood, it is Morton's objective to attract potential colonists to New England, however Morton's approach is quite different from Wood's. Wood implements primarily utilitarian arguments in discussing the characteristics of New England's countryside. Morton, on the other hand, attempts to convey a more aesthetically oriented argument. The poetic nature used in describing his initial reactions of New England's waterways is again utilized when Morton writes that the springs make, “so sweete a murmering noise to heare, as would lull the sences with delight a sleepe.”[151] Morton makes no argument as to the usefulness of water, instead examining its aesthetic qualities. The peaceful, serene quality of New England's waters are to Morton more valuable than their usefulness.

It seems likely that Morton's emphasis on the beauty and serenity of New England waters stems from the more spiritual tone of his work. Like Wood, Morton writes of nearly constant access to drinking water in the form of wells and springs. Morton writes, “And for the water, therin excellenth Canaan by much, for the Land is so apt for Fountaines that a man cannot digg amisse.”[152] Again New England's value stems from easy access to quality water. More important in this sense is Morton's utilization of Canaan as the basis for his comparison rather than England. Wood's choice to implement England as the basis for his comparison and Morton's

[150] Morton, *New English Canaan*, 42.
[151] *Ibid*, 42.
[152] *Ibid*, 62.

decision to utilize Canaan are indicative of their personal missions in attracting colonists. Wood's utilization of England as the source of his comparison of access to springs implies that his objective is to attract colonists focused on the tangible characteristics of New England. Wood's argument would cater more directly to those Englishmen who may not have had access to water in their native land. The allure of readily available and high quality terrestrial and aquatic resources would have been highly enticing. Morton on the other hand chooses Biblical Canaan as the foundation for his comparison. It is not surprise then that Morton titles his book, *New English Canaan,* an illusion to the bountiful land which God promised Abraham and the Israelites. Morton's choice to base his comparison on an equally familiar, but symbolically significant environment is indicative of his desire to pursue his own religious beliefs and practices. Morton admired the local Algonquins claiming of their lifestyle, "They may be rather accompted to live richly wanting nothing that is needful; and to be commended for living a contended life."[153] Morton was often times seen as a radical by many of his peers. Bradford described Morton as, "the head of a turbulent and seditious crew" due to his radical views and asked Ferdinando Gorges to take actions to confront Morton.[154] Morton's decision to describe access to water in spiritual and aesthetic terms is reflective of his unorthodox views and conveys a different method in carrying through his motivations of attracting followers to New England.

Francis Higginson was also struck by just how abundant drinking water was in New England. Again ease of access to water is imperative to its utility and value

[153] Morton, *New English Canaan,* 40.
[154] Bradford, "Letter to Ferdinando Gorges" from *Governor William Bradford's Letterbook,* 36.

in the New World. Higginson writes that, “And as for frefh Water the Countrey if fulle of daintie Springs... they digged Wels and found Water at three Foot deepe in most places.”[155] While Higginson does not go into as much detail on the availability of springs as Wood and Morton, the focal point of his argument lies in the abundance of drinking water through the digging of wells. Higginson makes his argument most clearly when he states, “Thus we see both Land and Sea abound with ftore of bleffings for the comfortable fuftenance of Mans life in New England.”[156] Like Wood, Higginson realizes that the true value of drinking water is found in its ease of access. Rather than communal wells and springs, colonists would have access to their own personal aquatic resources due to the sheer abundance of palatable water in the region.

Access to water was also important when particular springs were associated with health benefits. Many springs were seen to convey good health to those who drank of them. While Wood and Higginson both merely state that those who drank from the springs of New England remained healthful, Thomas Morton goes into great depth regarding the particular qualities which individual springs conveyed. Morton claims that there is a fountain at Ma-re-Mont, “that is most excellent for the cure of Melancholly probatum.”[157] Morton identified another spring that had the power to cure barrenness and promote fertility and another one that could allegedly instill a forty-eight hour sleep if one drank enough of its water.[158] Morton's observations are important for two reasons. Firstly, Morton's awareness of these

[155] Higginson, *New England's Plantation*, B6-B7.
[156] *Ibid*, B7.
[157] Morton, *New English Canaan*, 64.
[158] *Ibid*, 64.

fountains stems primarily from “salvages”.[159] By using local knowledge, Morton, gains a degree of insight that may have eluded some of his contemporaries. Secondly and more importantly, Morton's writings suggest that access to these fountains was available to all. Morton never talks about the fountains as property or even commodities, but rather as common resources whose benefits would be available to any and all colonists who sought to take advantage of them.

Access to springs was an important characteristic of the New England countryside to countless observers. The irreplaceable importance of water to human survival invariably meant that its presence or absence could dictate settlement patterns in a particular region. The ease with which springs could be found and wells dug allowed for wide spread settlement throughout New England. Unlike more arid regions there were no aquatic environmental constraints to New England's settlement and consequently colonists had the opportunity to establish themselves in close communal villages such as Plymouth, or in isolated plantations such as Thomas Morton's Indian community. Easy access to water opened up a variety of possibilities to potential colonists by limiting one of the major limitations on their mobility.. As many early promoters of New England settlement stated, this was a substantial difference from England's waters. In some cases the plenty of springs in and of itself may have led to a desire for private ownership of wells and springs. The very abundance of water meant that wells would in most cases not need to be shared, creating a de facto privatization of water. Perhaps because of the abundance of water and the subsequent ease of access, debates over public and private

[159] Morton, *New English Canaan*, 64.

ownership of water in Boston did not come to fruition until the middle of the nineteenth century, centuries after the colonists had established themselves in New England.

It was not only the abundance of sources of drinking water, but the quality of these waters that made them valuable. Drinking water was essential to life and the day to day chores of colonists. The multiplicity of uses that New England's water could serve meant that colonists could use the same water to cook, drink and clean, saving valuable time and labor for females caring for the house. New England's waters were also perceived as being healthful and beneficial to those who drank from them. From simple refreshment to the capacity to solve a variety of medical problems the waters of New England presented tangible health benefits to those who drank them, suggesting an understanding of the permeability of the human body. All of these factors contributed to make access to drinking water one of the primary selling points for colonial promoters. However this was not the only aquatic resource to which potential colonists desired access. Different landscapes, both terrestrial and aquatic held their own enticements.

Many colonists were particularly concerned about maintaining their access to the meadows which formed between marshlands and wooded areas. While not necessarily aquatic environments per se, these landscapes often resided on drying marshes or old beaver ponds and were more often than not close to the organically rich environments of wet lands areas. Brian Donahue's examination of the meadows of Colonial Concord suggests that particular ecological conditions created the meadow lands that became so valuable to colonial livestock. Donahue writes that the

thick rich soils of meadows and marshlands presented fantastic conditions for the growth of grasses that livestock thrived on.[160]

Colonists were certainly aware of the importance of these aquatically influenced environments in other regions of New England as well. William Wood was particularly observant of environments that could support livestock. Wood specifically identifies marshes and meadows as the environments most conducive to stock animals. Wood writes, "thefe marfhes be rich ground and bring plenty of Hay, of which the cattle feed and like."[161] The richness of the marshes stemmed from the high organic content of their soils. The fish, shellfish and terrestrial animals that inhabited the region provided a steady stream of fertilizer due to their high concentrations. Equally important was the fact that the constant presence of moisture in marsh soil presents an inexhaustible source of water to promote the regeneration of the grasses that cattle relied upon.

Meadows provided a more reliable alternative to marshes. While marshes were subject to, "the overflowing of the seas" meadows were nearly almost accessible to livestock and farmers alike as they would seldom flood.[162] Because they had more separation from seas and tides meadows rarely dealt with the climactic limitations of marshes. Like marshes, meadows provided, "as much graffe as may be throwne out with a Sithe, thicke and longe as high as a mans middle;

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[160] Brian Donahue examines the importance of meadows extensively in his book *The Great Meadow: Farmers and the Land in Colonial Concord.* While Donahue focuses primarily on Concord his observations are applicable to the value that meadows held in Plymouth Colony as well.

[161] Wood, *New England's Prospect*, 11.

[162] *Ibid*, 12-13.

fome as long as the fhoulders, fo that a good mower may cut three loads a day.[163] Three loads a day would have been a substantial quantity of food that could be consumed at any time. Dried grasses in the form of hay were an extremely useful good, particularly in the winter months when grains and grasses could be hard to come by.

This steady diet of grasses was essential to the maintenance of the livestock of the colonists. Many of the objects in the colonial diet would not have been palatable to livestock and cattle in particular. Corn, while high in caloric content, was not fully digestible by cows and although it may be used occasionally did not provide the basis of bovine diets. Wood's assertion that meadows were also used for haying and long term management of cattle is another valuable insight. Cattle certainly would have consumed grasses from meadowlands, but the capacity to harvest and store grasses for more barren months was essential to the continued maintenance of cattle populations. By harvesting, storing and utilizing grasses at specific times, colonial farmers were ultimately storing solar energy for consumption at a later point in time

This storage of energy, which was simultaneously carried out through the storage of meats, corn and other vegetables for human consumption, allowed for a relatively reliable store of calories for both humans and livestock. The value of stored food can be seen in the importance Edward Winslow places on the stores that the colony kept for human consumption. A group of adventurers hired by Thomas Weston was criticized by Winslow because, “though they would fometimes feeme

[163] *Ibid*, 13.

to help vs in our labour about our corne, yet fpared not day and night to fteal the same."[164] Winslow's criticism stems not from the consumption of the corn, but from the knowledge that by consuming the colonists' corn, Mr. Weston's men were voiding the proactive measures that Plymouth's colonists had taken to prepare for sparse months. In this manner they were endangering the survival of the colony as a whole by interacting with the environment in an irresponsible manner. Despite the fact that these men had access to the goods of Plymouth they were nonetheless bound by expected behaviors and actions which they ultimately failed to uphold, garnering the wrath of Winslow in the process.

Meadows' and marshes' ability to provide such long term reliable sustenance for cattle made them valuable landscapes, both of which were defined by their aquatic characteristics. Marshes obviously were the byproduct of aquatic landscapes. The constant presence of water and the ecosystem that depended on that water provided valuable organic matter which contributed to the perpetuation of local grass species which were then consumed by cows. Access to these landscapes then was imperative to the early success of the colony. The initially low volume of livestock meant that access to meadows and marshes was not dictated by private use, but rather through communal ownership of cows themselves. The initial settlement of Plymouth saw ownership of livestock held in part by numerous individuals. This partial ownership could be transferred between individuals similar to other transactions, however, personal ownership of a creature was at least initially impractical. Early transactions in Plymouth reflected partial ownership. Edward

[164] Winslow, *Good News from New England*, 14.

Winslow sold Miles Standish six shares of a cow in January of 1627 in for six shillings.[165]

By purchasing shares in livestock, Plymouth's colonists were seeking to gain access to a limited number of livestock through shared use. This principle also meant that access to the swamplands and meadow lands that Wood discusses would not be accomplished through outright ownership of the land, but rather usufruct rights inherent in the ownership of a part of an animal. As groups of animals were divided amongst 13 individuals, each individual would gain access to the land on which the cattle lived through the milk they received and the butter they were able to make.[166] Cows provided a tangible way of turning grass and hay into products which humans could consume and utilize effectively.

Access to lands in Plymouth's colony was an easy issue to navigate during the early years of Plymouth's settlement. Initial settlers to the colony were simply given garden plots near the colony. Those arriving on the *Mayflower* and later the *Anne*, and the *Fortune* had access to lands determined by how, "their lotes were cast."[167] The fact that land distribution was undertaken based on the casting of lots further emphasizes the role God played in the relationship between humans and nature. While in practice it was dependent on chance, the process of picking lots was thought to reveal the will of God. An individual's access to landscapes of value such as meadows and marshes then were directly the result of God's will. In addition to

[165] Pulsifer, *Records of the Colony of New Plymouth*, 15.
[166] *Ibid*, 9.
[167] *Ibid*, 4.

leading the Pilgrims over the ocean, God also directly influenced access to landscapes.

The drawing of lots was not done amongst all members of Plymouth's community. The process took place on a ship by ship basis, meaning that members of the *Mayflower* would not be drawing lots against those on the *Fortune* or *Anne.* This process provided a degree of seniority to those individuals who had been instrumental to the initial settlement of the colony while still giving opportunities for later arrivals to have access to quality lands. This process seems to have been highly effective as there are no recorded land transactions from 1623, when the land holdings of those currently in the colony were written down in town records, to 1627.[168] While this may be more reflective of low populations during the colony's early settlement, it also implies that access to landscapes of value was not a substantial issue. In fact many early settlers saw the major issue addressing Plymouth to be the lack of people to inhabit the seemingly boundless lands surrounding the colony. The author of *Mourt's Relation*, lamented that, "the countrey wanteth onely induftrious men to imploy, for it would grieve your hearts (if as I) you had feene fo many myles together by goodly Riuers vninhabited..."[169] The abundance of lands and aquatic landscapes such as rivers that could create meadows and marshes, fountains and fisheries and countless other environments of value was a common theme of the first decade of settlement. Access to quality lands and waters appeared a trivial question as countless plots could provide all that would be necessary for the long term success of Plymouth.

[168] Pulsifer, *Records of the Colony of New Plymouth*, 6.
[169] *Mourt's Relation*, 62.

The year 1627 marked a substantial change in this regard as the colonial court decided to outline a new method for dividing the lands of Plymouth. The "second division" as the court called it, was meant to provide Plymouth's inhabitants with 20 acres of land each, the dimensions of which would be four acres by five acres.[170] This new division presented a major shift from the preceding method of land tenure by providing tangible and specific guidelines for the characteristics of each plot. While lots were still drawn to determine the order in which lands would be distributed the more rigid definitions of what constituted a suitable shot showed that access to particular landscapes was becoming an increasing issue as populations increased.

Pilgrim colonists took special care to ensure that their changing understandings of landscape and ownership were conducive with the communities basic needs. This meant that certain stipulations were put into the second division to keep private ownership of land from completely controlling access to Plymouth's water sources, meadows and marshes. One of the major concerns of Plymouth's settlers was proximity to the heart of the colony itself. As mentioned earlier the landscapes surrounding Plymouth were comprised of various terrains, some of which could be difficult to cross. As a result, a great deal of value was placed on areas that were easily accessible from the heart of the community where the majority of individuals, particularly the earliest colonists, dwelt. With this in mind the Second Division maintained a clause that stated, "that for our better subsistence, and conuenience; those grounds which are nearest to the towne, in whose lot soeuer they

[170] Pulsifer, *Records of the Colony of New Plymouth*, 14.

fall; shall be used by the whole for the space of 4 years from the date here of."[171] The decision to make those lands closest to town communal shows that despite a push towards a more privatized system of landholding, communal ethic still took precedence. The need to maintain access to workable land and waterways was essential to the survival of the colony and as a result the court was willing to infringe upon the rights of particular individuals to ensure that access was maintained.

It was not only proximity to lands that challenged emerging ideals of private property and ownership. Water too was a unique entity which saw regulations created to preserve its availability. While Wood and Morton may have claimed that wells were so common that every man had his own, the Second Division suggests that water was far more communal in nature. Rather than having a well of their own, each Plymouth settler was guaranteed access to sources of water. The Division of 1627 stipulated that, "That the old path-wais be still allowed; and that euery man be allowed a conuenient way to the water weer so euer the lott fall."[172] While no evidence beyond Wood or Morton's accounts suggests that each individual in Plymouth had their own well, the Second Division shows that by 1627 this was definitively not the case. The need to protect access to wells and waterways indicates that this may have in fact been a major concern of the court as they felt the need to once again limit the rights of land holders in order to promote the well being of the colony as a whole. The use of the broad term "water" rather than specific terms such as fountains, wells, rivers, streams or brooks is also revealing. Because

[171] Pulsifer, *Records of the Colony of New Plymouth*, 14.
[172] *Ibid*, 14.

of their tendency to use specific language when discussing specific sources of water it is likely that the decision to use the term water was meant to convey access to a variety of aquatic landscapes. Rivers, streams, creeks and wells all would have had value for particular reasons and during particular seasons. By broadly defining water the colonists ensured that their access to these valuable resources would not be restricted or hindered in any manner.

Finally the rights of private ownership and control were further limited by making the creatures that inhabited the waterways, land and skies of Plymouth free to hunt. The Second Division states, "That fouling, fishing and hunting be free."[173] The decision to make access to animals free would have been particularly important in the context of fishing. Waterfowl and game animals could provide valuable sources of protein, however, as mentioned earlier, early accounts of Plymouth abound with fish before all else. The multitude of uses for fish made it more intrinsic to the survival of individuals than other animals. Fowl were readily available and they too depended on aquatic environments, but could not be caught as easily as fish, particularly during spawning seasons. Game animals could provide a good source of protein, but the accounts of hunting from the period are almost exclusively focused on hunting with the intent of selling furs and skins. Fish could be consumed, turned to fertilizer and caught in greater abundance than either fowl or game. The decision to make fishing free and guarantee access to water would go hand in hand to protect the well being of Plymouth's settlers by giving them access to an environment that was integral to their very survival, the waters of the region.

[173] Pulsifer, *Records of the Colony of New Plymouth*, 14.

Despite these attempts at maintaining access to resources and environments the second division marked a substantial shift in access to the land and waterways of Plymouth. The rise of private ownership of lands and the resources upon those lands would become the norm and after the second division. Exchanges of land and conflicts between alleged landowners became an increasingly common occurrence. Some colonists recognized that the court's decision would significantly change their lifestyle by privileging those who gained possession of lands that contained rivers, fountains, streams and ponds. This led to increasingly conscious attempts to obtain and retain access to these environments. In 1630, John Winslow sold a portion of his lands to John Shawe. While this transaction gave Shawe a substantial amount of land it came with two very specific clauses. The first of these clauses was that Winthrop would have ownership of, "all the Meadow ground that butteth at the vpper end of the said arrable land to the brook side as well that that was formerly the said John Winslowes."[174] While the transaction may have consisted of Shawe obtaining more land, Winslow retained rights to his meadow lands and gained some of Shawe's meadow lands. This transaction indicates that to Winslow the value of the brook side meadow lands and the access to the brook were preferable to a larger plot. The landscape that Winslow gains control of and access to is ideal for the grazing of livestock, a fact that likely would have provided his motivation in gaining access to it. The fact that Winslow had to provide Shawe with a far greater plot in return suggests that meadows and good grazing lands were no longer available to the extent that they were described just a decade earlier.

[174] Pulsifer, *Records of the Colony of New Plymouth*, 15

The second provision made by Winslow was that, "the said John Shawe is to allow the said John Winslow his heires and Assignes a payth and heigh way with free egresse and regresse through the said land vnto any prt of the said John Winslowes grounds adjoyneing therevnto."[175] Through this stipulation, Winslow wanted to ensure that he maintained access to various resources despite the fact that he was relinquishing control of his lands. Winslow valued the meadow lands and access to water he obtained in the transaction, however he was keenly aware of the fact that increasingly private ownership of land could infringe upon his access to his own lands. By taking active steps to outline his continued access, Winslow shows an understanding of how private control over environments was becoming an increasingly central part of Plymouth colony. Winslow's transaction with Shawe was an attempt to maintain his access to the aquatic landscapes necessary to raise livestock while simultaneously ensuring that his access to water, wells and rivers would not be inhibited.

Winslow's attempt to reinforce his access to aquatic and terrestrial environments in the aftermath of the Second division was not unique. In 1640, after the second division had become widely established, William Kempe also sought to expand his holdings and access to local sources of water. Kempe purchased, "fourescore acrees of vpland and fiue acrees of meddow three whereof lying at the west end of Ilaud Creek pong and thother two in Marsh before the said house."[176] The contrast between the abundance in the uplands Kempe obtains, roughly eighty acres, and the scarcity of meadow lands, only five acres in two plots, is indicative of

[175] Pulsifer, *Records of the Colony of New Plymouth*, 15.
[176] *Ibid*, 56.

just how valuable those landscapes were. The meadows that Kempe gains access to are described in far greater detail and depth than the uplands that he also purchases. The greater emphasis placed on the geographic boundaries of his meadow lands suggests that borders to meadows, rivers, marshes and other aquatically influenced environments were particularly valuable in an emerging system of private ownership and access.

Another more complicated land exchange took place between John Browne and William Hanbury, both of whom sought to further their access to valuable lands near Plymouth. Mr. Browne sold Mr. Hanbury his home at the head of the Joanes River and all outlying buildings on that property in addition to, "all that tract of vpland and parcell of Marsh meddow thereto adjoyneing and also foure acrees of Marsh meddow be it more or less lying at the head of the Joanes River Swamp."[177] Despite the sale of his lands Mr. Browne took steps to ensure that he would maintain access to the valuable meadows that he had sold to Mr. Hanbury. The account of the sale included the requirement that Browne could, "reape and gett the Corne and graine of all sorts now growing vpon the said Marshes this year... and make use of the said Barnes and outhouses to winter his cattell and lay his fodder in."[178] Additionally Browne was granted access to all the manure that would be produced by the livestock living on meadow. Browne took steps to protect his ability to access the valuable marshlands and meadows which provided him with an irreplaceable source of sustenance for his cattle. The appreciation for marshlands is obvious in

[177] Pulsifer, *Records of the Colony of New Plymouth*, 60.
[178] *Ibid*, 60.

Browne's decision to include access in the bill of sale and suggests that meadow lands were becoming an increasing rarity by the mid 17th century.

Occasionally attempts at providing and protecting access to meadows and and waterways became sources of contention and conflict. Sir Richard Saltonstall was forced to write to John Wintrop in 1636 because a Mr. Ludlow had seized a riverside property that Saltonstall owned. Saltonstall writes that Ludlow has been "seekeing up the River aboue the falls for a place to plant upon." Ultimately Ludlow and his associates chose, "the best grounds upon yt Riuer" which happened to be those belonging to Saltonstall.[179] Saltonstall's ire is reasonable, but the fact that he felt the issue important enough to go directly to the governor of the Massachusetts Bay Colony reveals just how important the issue in question really was. Mr. Ludlow's decisions to settle on Saltonstall's lands speaks to the limited amount of river lands and meadows available to colonists and their importance to the establishment of a successful farmstead.

Despite the claims of abundant aquatic resources by Wood, Morton and other early visitors to New England the experiences of Plymouth's settlers suggest that these resources were far from universally accessible. Fountains, wells, meadows and marshes in particular provided crucial sources of drinking water for colonists and fodder for live stock and draft animals. The quality of fountains and their seemingly omnipresent nature was contradicted by Plymouth court's attempt to ensure all citizens access to sources of water regardless of whether this violated private land holdings. The abundance of meadows and marshes which could provide

[179] Sir Richard Saltonstall, “Letter from Sir Richard Saltonstall to John Winthrop” February 1636. retrieved from the collections of the Massachusetts Historical Society

valuable fodder for draft animals was destroyed by increasing privatization of land ownership from the 1630s on. The Plymouth that was characterized by universal access to aquatic landscapes and environments was fundamentally altered by the second division of 1627. While this development impacted terrestrial environments more than aquatic environments it lessened access to landscapes such as meadows and marshes, which were byproducts of aquatic environments. While the second division took steps to protect and maintain the rights of individual citizens and their access to marshes, meadows and wells it also instituted a more defined system of private ownership and land exchanges that would ultimately hinder the movement of people around Plymouth.

The increase in land transactions that took place in the aftermath of the second division was a testament to the importance of marshes, meadows and fountains. Growing private ownership led Plymouth's citizens to more aggressively pursue title to lands that held marshes, meadows or river access. Because of their high quality, these lands provided an essential landscape for the growth of farms and livestock herds. The emergence of private ownership confronted earlier practices of communal herding and livestock ownership which, while it would not go away entirely, seems to have gradually lessened as animal populations increased. Ultimately, colonists in the 1630s and 1640s had to navigate a complex system of ownership that sought to bridge private ownership of lands with desires for public access to waterways and natural commodities such as fish and fur. By creating contracts that guaranteed right of ways, ownership of grazing lands and temporary use, Pilgrims showed an understanding of their declining access to the resources of

Plymouth's landscape. As populations increased this trend would continue. Land exchanges increased year by year and gradually settlers expanded beyond the boundaries of Plymouth to form new townships and colonies. The colonies were certainly not the land of abundance that Wood, Morton and Higginson described. Increasing populations limited access to landscapes which had previously held little to no regulation for usage. Despite this fact the allure of these early descriptions of the colony was essential to promoting settlement and colonization of the region. While Plymouth may not have been a land of incomparable abundance, it provided a tangible motivation to expand and to grow, for better or worse, throughout New England and beyond.

Conclusion: Why Plymouth Matters

By 1640, colonial Plymouth was a far cry from the struggling colony that had sat on the coast of southern New England only two decades earlier. Ships had brought over substantial amounts of organic life, both human and animal, that were fulfilling crucial roles in the survival of the colony. The once isolated Plymouth now saw further European settlements to the north and the west with countless others soon on the way. Tensions with the Narragansett and Wampanoag would certainly rise and a few decades later King Philip's War would decimate both European and Amerindian livelihoods, but this conflict was still a ways off. Ultimately, by 1640 Plymouth was a well established colony which, in conjunction with the formation of English colonies throughout New England and Virginia, heralded England's arrival as a major actor in the colonization of the Americas.

These developments were invariably tied to the importance that abundant aquatic resources had on the survival of Plymouth. The waterways and coastlines of New England provided the Pilgrims with food and water, the most basic necessities of life. Waterways provided economic opportunity as fisheries and the fur trade allowed the colony to remain financially viable. Unifying all of this was the ability of colonists to harness wind energy through the use of sails, propelling ships across the ocean, up and down the coastline and around the rivers and streams of New England itself. These vessels allowed for the movement of goods, peoples and ideas around the colonial world, ensuring that while Plymouth might be isolated geographically, it still maintained its essential connections to the European

mainland. Finally, aquatic landscapes stood at the heart of the debate between communal access to the environment and limited resources which resulted in the birth of a more private system of landscape possession. In all of these issues, water was a central character. While the Pilgrims may have lived their lives on the shore lines, forests, meadows and farm lands of Plymouth, they were never beyond the influence of water.

As time went on the influence of water in New England did not wane. It has remained, a fixture, a constant in the development and growth of the region. The role that water played in the 1600s was replicated nearly two centuries later when the first mills sprang up in Rhode Island and the Merrimack River Valley.[180] Decades later water was again at the forefront of New England's development as cities such as Boston attempted to find ways to provide access to water in an increasingly urban environment.[181] Finally, as the twentieth century approached, dams that had once been used to power New England's textile mills and factories began to be used to provide electricity to her urban and later rural areas. Population

[180] Theodore Steinberg's *Nature Incorporated* is one of the most influential works of environmental history on this topic. Steinberg's focus on the Merrimack River Valley is an incredibly useful and incisive account of how the establishment of the textile industry impacted the lives of those living along the Merrimack. Chad Montrie has also done some excellent work on the waterways of New England. Montrie's "I Think Less of the Factory than of My Native Dell': Labor, Nature, and the Lowell Mill Girls" is another useful study on the Lowell Mills that focuses heavily on the experience of factory workers.
Chad Montrie, "'I Think Less of the Factory Than of My Native Dell': Labor, Nature, and the Lowell 'Mill Girls,'" Environmental History 9, no. 2 (April 1, 2004): 275–95.

[181] Michael Rawson, *Eden on the Charles: The Making of Boston* (Cambridge, Mass: Harvard University Press, 2010).
Michael Rawson's *Eden on the Charles*, is a tremendous account of the rise of the city of Boston. Rawson skillfully examines the conflict between private and public water systems while simultaneously conveying the importance of the Charles River on the development of the city.

centers still clustered around these mills and dams making them natural hubs for electricity production.

The waterways in New England have never lost their influence. Even today as New England, particularly the northern states, shifts its focus towards eco-tourism, the abundance of waterways still shape the regions development. The problem with the abundance of waterways in the region is that they have the tendency to become so ubiquitous as to be overlooked and ignored. New Englanders fail to grasp how influential these waterways have been to the development of their region. New Englanders see that center of their cities are marked by abandoned mill buildings and factories, a testament to the forces that once drove their ancestors to the region, yet they don't consider that those same waters still shape their lives. New Englanders don't think about the fact that long before they wake up to travel to their jobs, fishermen depart the harbors and bays that run along the coastline in hopes of making a living off of dwindling lobster, cod and tuna populations. New Englanders may occasionally think about the increasingly frequent storms that erode beaches, carry buildings out to sea and gradually raise our oceans by imperceptible amounts, but only when these threats manifest themselves.

New Englanders have forgotten about that heritage. They have forgotten that they are and have always been tied to the countless creeks and streams that trickle through forests and meadows. They have forgotten that the rivers they drive across on bridges were the same ones that their ancestors, both European and Amerindian traversed in canoes and shallops. They forget that the lakes and ponds they camp at and fish in were the same ones that had been supporting life in the region for

milennia. As the Twenty-first century dawns and society encounters a new set of environmental issues including pollution, energy shortages, erosion and climate change it is imperative that New Englanders remember their aquatic environments. Droughts and water shortages around the country will make responsible stewardship of New England's natural water reserves a more pressing concern than ever before. Declining fish populations present difficult decisions about protecting populations of local fish while simultaneously protecting the livelihood of fishermen who need to make a living. Climate change and increasingly extreme weather patterns finally emphasize the potential dangers of New England's waterways. Superstorm Sandy decimated southern New England and damaged swaths of northern New England in an extreme weather pattern which, in a few decades, may no longer be extreme.

If New Englanders are lethargic and passive in reasserting their connection to New England's waters then an ignored reliance may turn into disaster. New England's reliance on it's waterways is not a recent development, it did not begin with electricity, it did not begin with urban water systems or even industrialization. New England's reliance on water is as old as the region itself. The Pilgrims depended on their waterways for their survival and local Algonquins relied on it before them. Humans in New England have been invariably tied to the abundance of water and have used that environmental characteristic to their advantage, changing and adapting both their environment and their behaviors to best take advantage of the abundance of water. In shaping their waterways in increasingly dramatic ways the inhabitants of New England have not asserted their dominance over environment, instead they have deepened their dependency upon it. Hiding nature

behind machines, mechanization and science has in no way lessened its influence and interconnectedness with human society.

This is why Plymouth is important. Plymouth reinforces the tie between the human and natural worlds that has defined New England for the past four centuries and likely longer. It is imperative that this connection be understood particularly in a world of growing environmental instability. Climate change holds the potential to radically and dramatically change the environment which New Englanders encounter on a daily basis. In the process it could change a complex system of dependence four centuries in the making. Should this happen New England stands poised to be heavily impacted. Rising sea levels would decimate coastal communities by placing residential areas underwater. Massive storms and rapid snow melts hold the potential to cause large scale floods, damaging properties and adding to already widespread erosion.

It is imperative that modern New Englanders look to the past to recapture their connection to their aquatic landscapes so that they might more fully grasp the implications which changes in these waterways hold for them. Only by accepting the interconnectedness of the human and the natural in the present is it possible to plan and make meaningful changes necessary to mitigate potential environmental degradation and damage. Understanding past connections between human and natural history can allow us to perceive of and accept our current interconnectedness. The Pilgrims acknowledged and accepted their reliance on oceanic environments. They found ways to effectively nourish this relationship and as a result established a permanent settlement in the Americas. If modern New

Englanders can learn from Plymouth and take meaningful steps to act responsibly with their waterways they too can establish themselves upon the goodly rivers of New England.

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