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The Reciprocity Principle and Traditional Ecological Knowledge: Understanding the Significance of Indigenous Protest on the Presumpscot River

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Abstract

In this article we tell the story of a Wabanaki sagamore who travelled from the Presumpscot River (in present-day Maine, United States) to Boston in 1739 to protest the damming of the river that he “belongs to,” and on which his people depended for sustenance. In this account of the first documented dam protest in New England, we explore the notion of belonging and the social and ecological reciprocity embedded in that concept. Working with multiple disciplinary approaches, combining history and ecology within an Indigenous studies framework, we demonstrate that the reciprocal relationships and associated responsibilities between indigenous peoples and their environments are the very foundation of indigenous traditional ecological knowledge (ITEK). We show the complicated process through which Wabanaki communities sought to bring English settlers into this worldview and the conflicts that arose when colonists failed to engage in social and ecological reciprocity. Finally, we consider the implications of this local example within a contemporary, global context, drawing attention to the recently adopted United Nations Declaration on the Rights of Indigenous Peoples. In telling this story, we hope to learn from the past and look to a future where reciprocal and responsible relationships between and amongst communities and our environments are realized.

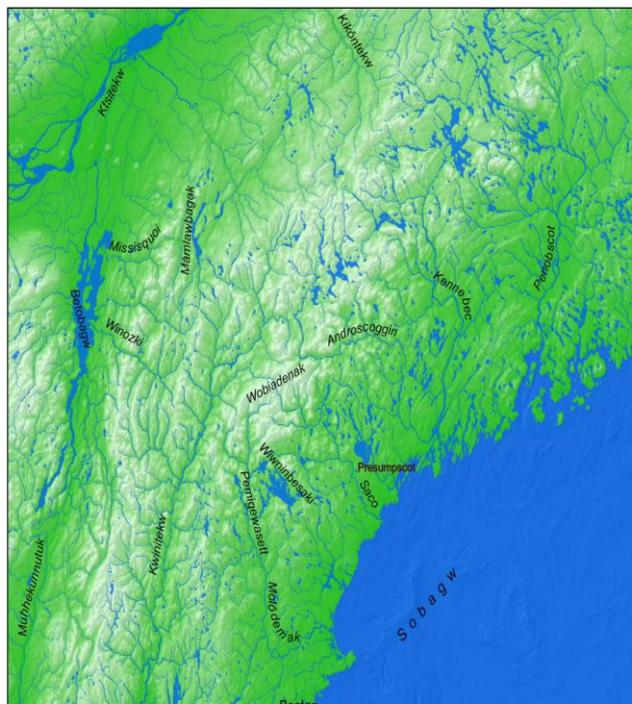


Figure 1:
Presumpscot River, shown in the context of neighboring rivers/major waterways in Wabanaki space, with the colonial town of Boston also highlighted. Area shown is in the territory otherwise known as New England, including the American states of Maine, Massachusetts, New Hampshire and Vermont.

The river which I belong to: Introducing the context of the Presumpscot

In 1739, the Wabanaki leader Polin traveled down the coast to the colonial center of Boston to meet with a neighboring leader, Jonathan Belcher, the Governor of Massachusetts Bay colony. Following the initial greetings, Polin announced, “I have to say something concerning the river which I belong to. It is barred over in sundry places.” Unaware of the geography of the territory he governed, Belcher asked “what river is it?” The Wabanaki sagamore answered, “It is [the] Pesumpscott, which is barred up, and the fish is thereby barred up, which is our food.” Laying down an otter skin, he said he desired “only that a place may be left open in the dams so that the fish may come up in the proper seasons of the year” (Baxter 1869, 23: 257). **(Figure 1)**

This little known conflict, between indigenous fisheries and colonial dams, would lead not only to the first dam protest in colonial America, but eventually to outright war between English settlers and Wabanaki families (Dole 1935; Ghere 1988, 1997; Ketover 1998). In order to grasp the significance of the protest on the Presumpscot and the circumstances that led to war, we must come to understand the matrix of social and ecological relationships that governed its participants, those human and non-human beings who “belonged” to the river and the principle of reciprocity that allowed life to thrive.

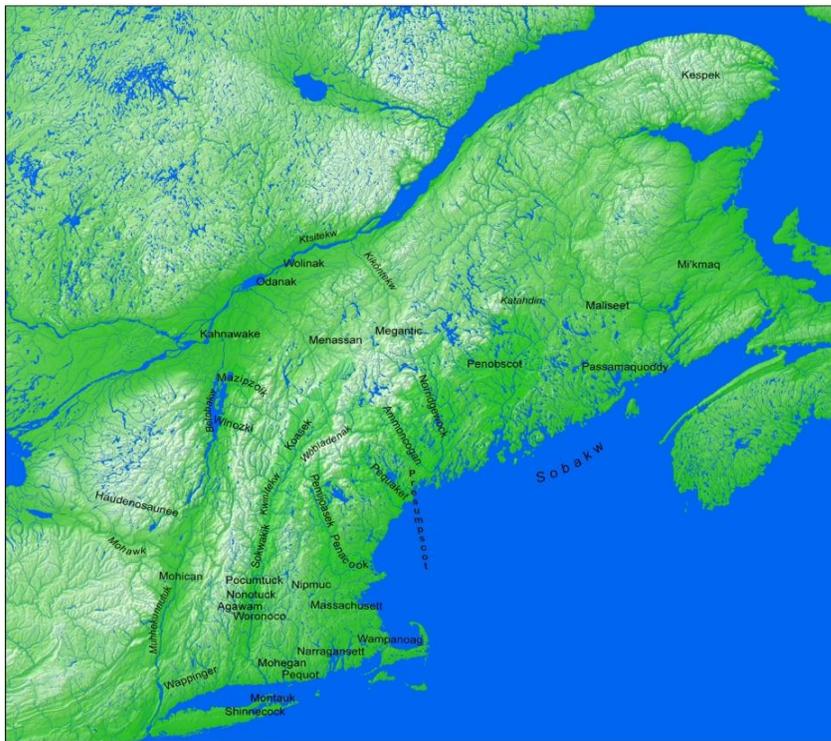


Figure 2:

Presumpscot, shown in the context of Wabanaki and neighboring Native homelands.

PART I: The reciprocity principle

Ecological relationships: Cycles of scarcity and abundance

The people who “belonged” to the Presumpscot watershed were part of an extensive network of rivers and relations in *Wabanaki*, or the land of the dawn, which reached from the northeastern coast of the Mik’maq *Kespek* (Gaspé Peninsula, Quebec), or “last land,” to the southeast coast of the Wampanoag (southeastern Massachusetts).¹ **(Figure 2)** Collectively, they were known as the “easterners” of the region; as family bands, they were identified with the rivers and places to which they belonged. Polin’s band moved with the seasonal cycles of a dynamic watershed from the mouth of *Sobagw* (the Atlantic Ocean) at Casco Bay (“place of herons”) to *Wawôbadenik*, the White Mountains (in present day New Hampshire and Maine). Connected by lines of kinship, trails and tributaries to other bands in the Saco and Presumpscot river watersheds and beyond, their main villages were at the fisheries of *Naquamqueak* (Mallison Falls, Windham, Maine), *Saccarappa* (Westbrook, Maine), and *Namascongan* (Cumberland Falls, Westbrook, Maine) (Fobes 1894; Dole 1935; Eckstorm 1941; Sévigny 1976; Morrison 1984; Ghere 1988, 1997, 1998; Calloway 1990). **(Figure 3)**



Figure 3:

Homeland of Polin's Band, with key Presumpscot villages fisheries, neighboring villages, sweetgrass gathering place, and first colonial settlements indicated

As many a visiting European observed, in the spring, the rivers of Wabanaki were “swarming” with fish. The French Jesuit Pierre Biard remarked, “In the middle of March, fish begin to spawn, and to come up from the sea into certain streams, often so abundantly that everything swarms with them. Any one who has not seen it could scarcely believe it. You cannot put your hand into the water, without encountering them” (Thwaites 1898, 3:79). Christopher Levett, the first Englishman to travel the Presumpscot, noted of Casco Bay in 1623: “There hath been more fish taken within two leagues of this place this year than in any other in the land” (Levett 1623, 41, 43). While the Basque, English, and French fishermen who fished off the coast tended to view this abundance as an “endless supply” and sought to “take” as much fish as they could hold in their seagoing vessels, Wabanaki people were keenly aware that the spring runs were only part of a cycle of scarcity and abundance (Bradbury 1975; Waterman 1975; Salisbury 1982; Cronon 1983; Morrison 1984; Ghere 1988, 1997, 1998; Calloway 1990; Harris 1998; Wigan 1998). Polin and his band were concerned with maintaining their upriver fisheries, and sustaining their relationship with the fish that migrated upstream every year. As they told Belcher in 1739, they relied on the free passage of fish for their survival.

Every spring, the Presumpscot flooded, enhancing the fertility of the soils around it. When the floods receded, families descended from mountain hunting camps to plant on the riverbanks, just as the spawning salmon arrived at the falls, providing essential sustenance after a long, hard winter. During annual gatherings on the banks, families gave ceremonial thanksgivings for the return of this precious relation. While the people on the Presumpscot had the benefit of agricultural stores, they relied on hunting to get them through the winter, and if the winter was a rainy one, or game was scarce, the spring fish runs represented the promise of endurance. The people and the salmon had adapted over thousands of years to the particular cycle of the Presumpscot. The annual planting of corn, beans, and squash stabilized the riverbanks, added nutrients to the soil, and when abandoned for a new field, created a meadow habitat where waterfowl, game animals, and edible plants abounded. Women also cultivated medicinal and edible plants in the marshes and meadows, while men cultivated the forests through controlled burns and firewood harvests, ensuring a healthy game population. During summer, the people also relied on the “abundance” of shellfish on the coast, as well as fish in the inland ponds, such as *Sobagw* (or Sebago) (Thwaites 1898, 1:69). This cyclical seasonal movement between resource bases within an ecosystem, which functioned to enhance the diversity of the environment and to facilitate the survival of its many inhabitants, had been ongoing in the Wabanaki homeland for millenia (Salisbury 1982; Morrison 1984; Cronon 1983; Ghere 1988, 1997, 1998; Calloway 1990; Bruchac, M. 2003).

Indigenous traditional ecological knowledge as cultural and ecological matrix

In declaring their “belonging” to the river, Polin and his counselors expressed an awareness of this intimate, interdependent relationship with a diverse environment. Wabanaki people had developed an embedded knowledge based on longstanding resource use and reciprocal relationships of exchange with their human and “other-than-human” relations in this place (Salisbury 1982; Morrison 1984; Ghere 1988, 1997). This knowledge that humans gain when they share an intimate relationship with a particular environment can be referred to as traditional ecological knowledge (TEK). Fikret Berkes (1999, 8), in *Sacred Ecology: Traditional Ecological Knowledge and Resource Management*, develops a working definition of TEK as “a cumulative body of knowledge, practice, and belief, evolving by adaptive processes and handed down through generations by cultural transmission, about the relationship of living beings (including humans) with one another and with their environment.” Through this “cumulative body of knowledge” Polin and his people adapted cultural practices that allowed them to sustain their communities over the long term. The seasonal cycles of scarcity and abundance had taught them that overexploitation of the river they belonged to would result in dire consequences for their own survival (Salisbury 1982; Morrison 1984; Ghere 1988, 1997).

Wabanaki people developed a matrix of stories, ceremonies, and subsistence practices that enabled long-term survival in the places to which they belonged (Salisbury 1982; Morrison 1984; Ghere 1988; Calloway 1990; Brooks 2008; Bruchac, M. 2003; Menzies and Butler 2007, 9). Numerous Wabanaki stories describe the consequences of hoarding resources, even as they illustrate opportunities for innovation and rebalancing. For example, the Penobscot tell a tale of the “huge monster”, *Aglebem*, who hoards water behind a dam, driving the people downriver to life-threatening thirst, until the culture hero Gluskabe busts open the flow of water from this “bloated giant,” transforming him into a little croaking bullfrog. Another story relates that Gluskabe once sought to trap all the fish of the ocean behind a weir at the river’s mouth, but his Grandmother Woodchuck told him that, “all the fish will be killed,” asking, “what will our descendants in the future do to live?” (Maine Indian Program 1989, C-9-12). Many stories illustrate the potential impacts of human impulse on the environment, and consequently, one’s own relations (Morrison 1984, 2002; Bruchac, J. 1985, 1988, 1996; Bruchac, M. 2003). These stories hold the lessons of TEK, accumulated over generations, and are relayed annually so that this knowledge will become embedded in each new generation. A critical lesson of these stories is that individual action can have tremendous ramifications for the whole, and therefore individual responsibility to the community, including one’s human and non-human relations, is held in utmost regard.

Social relationships: Belonging, reciprocity, and the redistribution imperative

When the English explorer Christopher Levett met Polin’s ancestors at Casco Bay in 1623, he was drawn into this matrix of kinship relations. The family leaders at Presumpscot Falls, the village closest to the sea, invited Levett to stay at their home, and, as he related, the “Queen” welcomed him and the fishermen who came to trade into the place to which she belonged:

The woman or reputed queen, asked me if those men were my friends. I told her they were; then she drank to them, and told them they were welcome to her country, and so should all my friends be at any time; she drank also to her husband, and bid him welcome to her country too; for you must understand that her father was the sagamore of this place, and left it to her at his death, having no more children. (Levett 1623, 46)

By welcoming Levett into her territory, the “Queen” initiated a diplomatic familial relationship. A Wabanaki village was essentially a “gathering” of “cabins” or extended families, tied to each other through longstanding inhabitation, intermarriage, and interdependent relationships (Salisbury 1982; Cronon 1983; Morrison 1984; Ghere 1988, 1997, 1998; Calloway 1990; Bruchac 1996). Those who “belonged” included families like the queen’s, whose ties reached back through oral tradition and kinship to time immemorial, as well as those relations who had been incorporated through marriage or adoption.ⁱⁱ “Belonging” to a village represented one’s residency in, kinship with and commitment to a particular place, of which the “sagamore” was the symbolic leader. The sagamore’s authority was dependent on the consent of the whole and his or her success in maintaining balance within the group (Salisbury 1982; Cronon 1983; Morrison 1984; Ghere 1988, 1997; Calloway 1990; Baker 2004; Brooks 2008).

This belonging also required individual responsibility to the community. For example, while each extended family planted their own field, the sagamore ensured that the harvest was equally distributed amongst the group (Baker 2004; Cronon 1983; Salisbury 1982). According to Morrison (1984, 29), “the sachems, generally the most successful providers, acted as redistributive agents. They not only created a surplus but assured its fair division.” Annual festivals formalized the distribution of resources and ensured that no one would go hungry and no one would hoard (Salisbury 1982). The most successful planters, hunters, and fishers were valued for their ability to contribute to the whole; their “skills and hard work were rewarded, not with greater wealth, but with greater responsibility, and respect within one’s family network”(Morrison 1984, 29). Leaders like the “Queen” were expected to ensure the welfare of the group, through managing the distribution of resources within the community, regulating commons like the fisheries, and ensuring that these resources would continue to sustain the village (Salisbury 1982; Cronon 1983; Morrison 1984; Brooks 2008). As Levett witnessed during his visit, the “collective sovereignty” of the group was based on longstanding, indigenous inhabitation and continuing use, which was recognized by contiguous communities (Cronon 1983, 58).

Located at the northeastern limits of agriculture, the people of the Presumpscot occupied a critical position in a distributive trade network, mediating between agricultural villages and those which relied exclusively on hunting, fishing, and gathering (Salisbury 1982; Cronon 1983; Morrison 1984; Calloway 1990; Baker 2004). While agricultural villages often had the benefit of surplus, hunting peoples occasionally suffered winters so harsh that they faced starvation. Sagamores were responsible, not only for ensuring distribution of resources within their own village, but also between villages, through a well-established ceremonial and economic system of trade (Salisbury 1982; Cronon 1983; Morrison 1984). Warfare could result from a breakdown in the redistributive system, often occurring in times of resource scarcity (Salisbury 1982, Morrison 1984). Therefore, habitual councils, more akin to “diplomatic” events than “economic” transactions, were crucial to prevent such conflicts, cementing familial relationships and ensuring that resource rights and responsibilities were clearly defined (Cronon 1983, 61). The formal and practical exchange of resources and the renewal of longstanding agreements facilitated the practice of social and ecological sustainability.

Although newcomers like Levett were not always cognizant of their place in this larger system, Wabanaki people strove to incorporate them into these reciprocal networks. Levett himself participated in a council at the indigenous meeting place of Casco Bay with sagamores from the region, who expressed a desire to bring him and his family into their kinship system. He humorously expressed that he “was not a little proud...to be adopted cousin to so many great kings at one instant, but did willingly accept of it” (Levett 1623, 44). In this world, one could not inhabit a place without belonging to a particular family, and as Levett witnessed on the Presumpscot, this “belonging” could be cultivated. The “Queen” related that her husband belonged through marriage, and Levett himself was offered a place within her family and village. However, these relationships also entailed commitment.ⁱⁱⁱ Whether men like Levett realized it or not, this honor of “belonging” came with a set of responsibilities in a reciprocal, distributive economy.

A bushel of corn: Drawing Europeans into reciprocal relations

While Christopher Levett acknowledged that the Native nations had a “natural right of inheritance” and received praise from local leaders for “acting in a right fashion,” others posed a challenge to the system of reciprocal relations (Levett 1623, 45; Morrison 1984). For example, Walter Bagnall, the first European to *settle* in Casco Bay, displayed little regard for either indigenous title or trade protocols. In 1628, he set up a trading post on “Richmond” island, and became infamous for hoarding goods and repeatedly cheating Wabanaki people in trade. Bagnall neglected to acquire title from either his own government or local indigenous leaders, but became wealthy through deception and “extortion” (Drake 1841, 2:48). In the Wabanaki world, such behavior represented the worst of infractions. In 1631, Skitterygusset, a local sagamore, likely the son of the “Queen” whom Levett befriended, killed Bagnall and burned down his trading post, enacting a violent redistribution of resources (Drake 1841; Willis 1972; Morrison 1984; Baker 2004).

Entering into Wabanaki lands entailed entering a longstanding network of relationships and responsibilities. While acquiring title from the Massachusetts colony or British crown, colonists were often compelled to follow indigenous customs of land tenure and diplomacy. Even as settlers pursued written land transactions as transfers of “property,” Wabanaki leaders often viewed them as formal agreements regarding shared inhabitation and resource use (Williamson 1832; Salisbury 1982; Cronon 1983; Morrison 1984; Ghere 1988, 1997; Calloway 1990; Baker 2004; Baker and Reid 2004; Brooks 2008).

When Skitterygusset signed an agreement allowing settler Francis Small to inhabit the southeast bank of the Presumpscot River, Small promised to pay a gallon of liquor and a trading coat every year (*York Deeds* 1887, 1:83; Baker 2004). Similarly, when Skitterygusset, his mother, and his sister Warrabitta, a sagamore in her own right, made an agreement regarding their land at the sweetgrass gathering place of *Oawascoag*, just east of the Presumpscot, the settlers allowed that Warrabitta and her mother could continue to live, plant, and gather there, and pledged an annual bushel of corn to them as “acknowledgement” (Southgate 1853: 101, *York Deeds* 1887, 2: 113-4; Eckstorm 1941; Baker 2004). This bushel of corn, recurrently pledged on deeds and treaties, was similar to the contribution an indigenous family was obliged to make to its village (Southgate 1853; Morrison 1984; Baker and Reid 2004). Rather than acquiring outright purchase, settlers engaged in an agreement by which they, too, could “belong” to this place, through their annual “acknowledgement” to local family leaders, enacting a formalized relationship to the land and its longstanding community.

Yet settlers later claimed that these agreements constituted exclusive title, particularly as they sought to push upwards on coastal rivers. By the mid-1630s, English entrepreneurs had developed the settlement of “Falmouth” at the mouth of the Presumpscot, with the primary industries being fishing and logging (Williamson 1832; Fobes 1894; Willis 1972). Settlers and fishermen sought to take advantage of the abundant resources of the region, amassing as much fish and wood as possible to ship overseas to transatlantic markets. Conflicts arose when European traders and settlers failed to participate in the local system of distribution, conservation, and “ritualized reciprocal exchange” (Salisbury 1982, 50). As Morrison (1984, 29) suggests, Wabanaki people “were not interested in capital formation for its own sake. Rather, they recognized economic success in terms of the security it achieved for the community as a whole.” However, this economic value system came into direct conflict with a European system that emphasized accumulation of goods, protection of property and wealth, and the rights of the sovereign, corporation, or individual to amass as much resources as possible for their own use and for distribution overseas.

And just as Native people sought to incorporate Europeans into their systems of exchange, so did Europeans seek to incorporate Native people into theirs. While Wabanaki people benefited from the trade in European goods, it “challenged the redistributive imperative and made the ideal more difficult to achieve” (Morrison 1984, 69).

Increasing English assertion of territorial and political sovereignty over the region and its resources led to open warfare in the late seventeenth century, including the first “Abenaki-English War” (or the northern front of King Philip’s War, 1675-1678) and the second “Abenaki-English War” (or King William’s War, 1688-97).^{iv} During this time, the Wabanaki sagamore Atecuando led raids on settlements in his home territory on the Presumpscot, Saco and Casco Bay, and in alliance with other leaders, eventually forced English settlers into a tributary relationship with Wabanaki sagamores. “For the privilege of resettlement,” the Massachusetts colony agreed that each family would pay an annual tribute, a peck of corn, to the sagamores whose territory they inhabited (Baker and Reid 2004, 5; Williamson 1832).^v However, the peace was short-lived. As Morrison (1984, 192) has written, “Certain that the northeastern wilderness had to be economically transformed and politically subdued, settlers planted themselves where they pleased, without concern that their farms and lumbering operations disrupted the Indians’ seasonal use of sea and river shores.” At the same time, however, as Baker and Reid (2004, 2) have argued, Wabanaki people asserted and maintained sovereignty over much of the region, and “colonial inroads into Amerindian territory were severely limited” by the strength of Wabanaki power.

Colonial conflict was rooted in the English failure to participate in the distributive system, combined with encroachment on subsistence grounds. As Morrison (1984, 113) has noted, the “Abenaki resented the settlers’ refusal to pay” the annual tribute stipulated by treaty, and they repeatedly complained of the settlers placing “nets across the Saco River, blocking migrating fish, and the damage to corn fields by English cattle” (Ghere 1988, 1997, 1998). Misinterpretations and misunderstandings of land use agreements erupted frequently, and Wabanaki people articulated increasingly precise territorial boundaries. In 1713, a leader from Casco Bay announced on behalf of his community: “I have my land that I have not given, and will not be giving, to anyone. I wish always to be the master of it. I know its extent, and when anyone wishes to come and live there, he will pay” (Baker 2004:2, 19). These restrictions arose not only from conflicts over land and sovereignty, but concerns about the population the land could reasonably support, expressed eloquently by the Wabanaki leader Wiwurina in diplomatic council with the Governor of Massachusetts Bay.

Speaking for his relations, he expressed “thanks” that their English friends had “come to Settle here” and pledged to “Imbrace them in our Bosoms that come to Settle on our Lands,” but they “desire[d] there may be no further Settlements made.” Wiwurna insisted, “We shan’t be able to hold them all in our Bosoms” (Baker and Reid 2004, 7).

Social and ecological relations: the reciprocity principle writ large

While much attention has been paid to indigenous peoples’ comprehension of the European concept of property, scholars of colonial America have yet to fully grasp the failure of European settlers to comprehend the complex cultural matrix into which they entered. For, in Wabanaki country, as Salisbury (1982, 43) has observed, the reciprocity “principle” extended to the non-human beings in the dawnland. Numerous stories illustrate that Wabanaki people were highly aware of the past and potential impact of their actions on their non-human relations, on whom they were dependent for survival (Morrison 1984, 2002; Bruchac, J. 1985, 1988; Maine Indian Program 1989; Bruchac, M. 2005). Humans and non-humans in a particular place were bound in relationships of “mutual responsibility and obligation,” “reinforced” by both “folklore and practical experience.” Through millenia of experience, Wabanaki people learned that “dire consequences resulted from failure to respect the integrity of other-than-human persons” and thus they developed “complicated prohibitions” regarding subsistence and “a positive sense of intimate relations” with the beings with whom they shared space (Morrison 1984, 65). And, as Menzies and Butler (2007, 10) explain, this “reciprocal relationship between the people and their environment” is the very foundation of Traditional Ecological Knowledge.

PART II: A view from the river: Indigenous protest on the Presumpscot

When the Wabanaki leader Polin traveled from the Presumpscot River to Boston to meet with Governor Belcher in 1739, he had several points to make. He had in mind his responsibility as a sagamore to the “twenty-five” families (Baxter 1869, 23:260) who lived in his village, as well as the generations to come. As he told Belcher that summer, they relied on the annual runs of fish, “which is our food” (Baxter 1869, 23:257). He also had in mind his people’s relationship to these “other-than-human” kin, his duty to ensure they were not treated wastefully. This was not just a matter of fishing rights, nor an altruistic concern for the preservation of a species, but rather a clear responsibility to ensure the continuance of the Presumpscot’s people and the non-human relations with whom their survival was entwined. He likely had in mind the stories, repeated every winter, of the people who had once hoarded fish behind a trap, and knew he had to speak carefully so that he would encourage those people to learn from their mistakes, and release the trapped fish, rather than make them turn away in anger or shame. He had in mind the agreements that Belcher himself had made, at a treaty on Casco Bay, to engage in reciprocal relations and to respect Wabanaki resource rights in order to promote peace between the two peoples (Massachusetts Bay Colony 1732). He had in mind the agreements that his own relations had made at Casco Bay, to bring any problems they might have with local settlers to the governor, rather than taking action into their own hands. As Morrison (2002, 161) has written, in the Wabanaki worldview, “Positive, powerful others share; negative, powerful others withhold.” Polin charged those who built the dams on the Presumpscot with the transgression of “withholding,” and he asked Belcher to act in the role of the “positive, powerful” leader who would let loose the flow. In return, he offered to continue to share space, with certain restrictions. Like Wiwurna and other Wabanaki leaders, Polin expressed concern that the land could not hold more settlements, and that the subsistence of his people was being increasingly impacted by colonial encroachment. He told Belcher that he could find no evidence that his ancestors had given permission for settlement in the lands “above Saukarappa on Pesumpscut River” (Baxter 1869, 23:260), and he desired that “there may be a cessation of settling any more, and stopping now as far as they are settled” (Baxter 1869, 23:258).

Logging, dams, and local ecological knowledge: Westbrook’s “enterprise” on the Presumpscot

In the 1720’s Wabanaki people from the coast of *Betobagw*, or Lake Champlain, to *Sobagw*, the sea, engaged in a war exclusively targeted at the increasingly debilitating English colonization of their homeland. According to Baker and Reid (2004, 7), “Following four more years of regular diplomatic communication, it was land – the unnegotiated expansion of British settlement and the related construction of forts – that led to a further crisis.” While many Wabanaki people from coastal rivers sought refuge in the mountains, inland marshes, and French mission villages during the war, following the signing of another Treaty at Casco Bay in 1727, small family bands returned to their “common lands” on the rivers to resume their seasonal cycles, including Polin’s on the Presumpscot.^{vi}

The commander-in-chief of the Eastern forces during this conflict known as Dummer's War or the "Fourth Anglo-Abenaki War," was a man named Thomas Westbrook. He was charged with scouting Wabanaki territory in the east, including patrols between the Presumpscot and Saco Rivers. His commission, as given to him by Lieutenant Governor Dummer, was: "You are to take, intercept, kill & destroy the Indian Enemy in all Places where they may be found" (Trask 1901, 39). Westbrook developed a keen sense of Wabanaki seasonal cycles, instructing his militia "to intercept their fishing and fowling" in the spring, to raid their villages at planting time, to track them while they were hunting in the fall, and to "range" the "islands" on the coast during "these moonlight nights" of spring and summer, "it being the time for the Indians gathering eggs and catching sea ducks" (Trask 1901, 57; Baxter 1896, 10:162). He related that his "winter scouts discovered sundry of their fishing places on Saco, Pesomscott & Amuscoggin Rivers where they made large quantities last summer" and sought to find them on these "great rivers" in the spring, "this being their time to fish for Salmon & other fish" (Trask 1901, 111). Thus, the Colonel acquired a kind of local ecological knowledge as well. During the war, Westbrook complained to Governor Dummer in particular of the cyclical spring floods: "there is no marching far into the Country, the Swamps & Rivers being so full of water" (Baxter 1869, 10:181; Trask 1901). He expressed great frustration that the "Presumpscot River and Sebago Pond was so open" that it "very much hindered" them from "getting to Madumbessuck and the hunting ground thereabout" (Baxter 1869, 10:181).

Because of this acquired knowledge of the local environment, after the war Westbrook was appointed as the King's Mast Agent, and he moved the colony's central logging operation from his hometown of Portsmouth, New Hampshire to Falmouth, in Casco Bay. This town had been cleared and resettled numerous times over the course of the wars, and colonists began to rebuild Falmouth once again following the 1727 Treaty, relying on revenue from the harvesting of local "capital," including the great white pine, which could grow to three hundred feet, an ideal size for the ship masts of the Royal Navy. Pines that grew along the river were branded with the King's mast mark and it was Westbrook's mission to manage the harvest and protection of these trees for the King, as he supervised a rising colonial industry. (Drake 1841; Chapman 1883, 1899; Fobes 1894; Wood 1935; Cronon 1982; Morrison 1984; McClellan 1992; Rivard 1990; Ghere 1997; Ketover 1998; Baker 2004).

The settlers of Falmouth rapidly transformed the Presumpscot River into a waterway for the transportation of lumber. Westbrook and his partner – Samuel Waldo, who had vast real estate interests in Wabanaki country – acquired colonial title to all of the falls on the Presumpscot, the very places where Polin's people had their fisheries and central villages. Westbrook and Waldo sought to transform the fisheries into sawmills, harnessing the power of water to prepare and transport masts, as well as wood for commercial sale. In addition, as settlers moved upriver to take advantage of the developing industry, they acquired additional sawmill rights to cut and process those trees not claimed by the King. Westbrook and his fellow settlers "swamped out" a road beside the river, so that oxen could haul the trees to the falls. Then, in the words of Blake Bradbury (1975, 50), "The logs were floated down the Sebago watershed to feed the increasing number of sawmills." Finally, the lumber was sent further downriver to be used in local manufacture and to be shipped, like the fish, to markets in Boston, the West Indies and Europe, where they could be traded for sugar, rum, corn, and other goods. The lumber industry kept settlers so busy that many of them did not have time to plant, and instead had their food shipped in from Virginia and England. At times they suffered a dire shortage of corn, a staple that indigenous women had been growing on the banks of the Presumpscot for centuries. (Freeman 1821; Williamson 1832; Chapman 1883, 1896; Forbes 1894; Wood 1935; Willis 1972; Cronon 1984; Ketover 1998; McClellan 1992).

Unsatisfied with this small fiefdom, Westbrook sought to expand his lumber operation to new heights. In 1733, he began building a huge dam – "an enterprise on a larger scale than anything before attempted" (Fobes 1894, 377). The site selected for the dam was Presumpscot Falls, the village where Levett had first been welcomed by the "Queen." With the dam, Westbrook would be able to control the water, the pines, the fish, and the Native people. The power of the river would be directed to the mill, which processed the logs, while the dam would make their flow manageable. The dam would also solve the problem of the river's 'openness,' which had obstructed Westbrook's scouting expeditions during the last war. Finally, the dam would hinder, perhaps even halt, the salmon's spring run, and Westbrook knew that the people of the Presumpscot were dependent on these fish for their survival. (Chapman 1883, 1899; Fobes 1894; Dole 1916; Bradbury 1975; Cronon 1984; Rivard 1990; McClellan 1992; Ketover 1998).

Ecological relationships disrupted: Impacts of logging and dams on the Presumpscots' salmon

Westbrook's dam was built on the site of an old beaver dam (Reiche 1978), and Wabanaki people clearly understood the similarity between the two constructions, since the word for both in the Abenaki language is *gebikhigan*, meaning an instrument that "causes [something] to be shut" (Day 1995, 2:100). Beavers cause the flow of water to "be shut" to create an environment which will provide them with a greater diversity of food (which provides the ecosystem's other inhabitants with a greater abundance, as well). Likewise, the name "Capissic" references the natural dam in this stream near the Presumpscot, which fostered an abundant environment for the people who lived there (Eckstorm 1941, 163) (See Figure 3). Similarly, the word for "weir" is *adelahigan*, a "barring-the-way instrument," which suggests that this "tool" temporarily "bars" the "way" of the fish that would pass through it, to enable a person to catch it for food (Day 1995, 2:443). However, unlike a beaver dam or weir, Westbrook's dam caused the river to be "shut" permanently, thereby "barring" the spawning fish from making their annual passage upriver, and interrupting a cycle that had been an integral part of the river for thousands of years.

Prior to the damming, the Presumpscot was "one of the finest salmon rivers of its size in Maine (NRC 2004, 73; Bradbury 1975)." As Charles Atkins (1874, 323) describes, the Presumpscot was "a river of uncommon purity, draining, as it does, the second lake in size in Maine and receiving few tributaries below." The Presumpscot and its source, Sebago Lake, were also one of only four rivers in Maine that supported a non-anadromous^{vii} Atlantic salmon population (Havey and Warner 1970). Most salmon, referred to as sea-run or anadromous salmon, feed and grow in the ocean where they find a rich abundance of food. However, Sebago Lake acted as an ocean^{viii} for this non-andromous population of salmon, where they feasted on schools of fish.^{ix} The Presumpscot provided spawning grounds for both the sea-run salmon and the Sebago Lake population. Thus, as Polin stressed to the Governor, an open passage throughout the entire river was critical to the survival of the salmon and his people.

The logging and damming of the Presumpscot had devastating effects on the salmon. Every spring they made their way up from the ocean, or down from Sebago Lake, to spawn in the river of their birth. Their life cycle was adapted to their distinctive river ecosystem, and the salmon's spawning and survival were dependent upon a healthy river, which is characterized by heterogeneity of waterflow, with a natural sequence of faster moving riffles and slower, deeper pools (Kendall 1935; Heggberget et al. 1986; Nielsen 1998; NRC 2004). The trees along the banks stabilize the soil and provide large woody debris, which create resting pools for spawning salmon as well as habitat cover to protect young salmonids from predators (Williams 1976; Verry 1986; NRC 2004). In the words of William Cronon (1983, 115), the forest "captur[ed], concentrat[ed] and retain[ed] nutrients from rainwater and other sources," providing the essential nutrient inputs to sustain the macroinvertebrate populations on which the young salmonids fed. The falls that provided the power that Westbrook coveted also provided the power to keep the river flowing, supplying necessary oxygen to the salmon as well as to the thousands of eggs each salmon laid (NRC 2004).

The damming and logging worked to destroy the diversity of the river on which the salmon were so dependent. As the riverbank was shorn of stabilizing trees, soil poured into the rivers, filling the interstitial space between gravel. High water levels caused by the dams led to shorebank erosion, increasing the sediment load and removing the curves and heterogeneity of the stream. Pools and riffles gradually disappeared, and the result was a stagnant river lacking in complexity. Temperatures, too, became more homogenous. Fish depend on flowing water for all ecological requirements: as the dams stopped up the water flow, it also, in a sense, stopped the natural rhythms of the river (Atkins 1874; Kendall 1935; Bradbury 1975; Likens et al. 1977; NRC 1996; American Rivers et al. 1999; NWPPC 2000; Heinz Center 2002; NRC 2004).

The sediment smothered and killed the salmon eggs, and the stagnancy prevented the necessary oxygen flow. Logging caused heavy inputs of woody debris for the short term, which did not leave the constant input the river ecosystem needed over the long term. If the eggs did manage to survive to become young salmonids, they would have found that the macroinvertebrate population on which they were dependent had been smothered by silt, or that the silt-free gravel beds and cover they needed from trees and large woody debris was not there. Most salmonids would perish in this hazardous environment.

Adult salmon returning from the ocean and seeking their way upriver to spawn would be impeded by the dams.^x Their resting pools were gone, and so were their gravel beds where they laid their eggs. The life cycles of salmon, salmonids, macroinvertebrates, as well as the entire spawning cycle all depended on specific temperatures, depths, velocities, and gravel composition. Logging and damming created a system that seemed to flush away all the work the riparian forest had been doing for thousands of years (Bradbury 1975; NRC 1996; American Rivers et al. 1999; NWPPC 2000; Heinz Center 2002; NRC 2004).

Protest on the Presumpscot

As buildings, mills, and dams increased on the Presumpscot, the people of the river suffered from ecological impacts alongside the salmon. Logging caused an increasingly shorter growing season and disrupted local game habitat, making the people even more reliant on the annual spring fish run to make up for the winter's scarcity (Cronon 1983; Morrison 1984; Ghere 1988, 1997, 1998).

Yet, now, when Polin and his band returned to the fishery villages from their upland territories, keenly anticipating the spring runs, they found the fish struggling to make it past the mills and dams. One visitor to the "Colonel's great dam" at Presumpscot Falls reported seeing "an acre of fish, mostly salmon," congregating below it. (Freeman 1821, 24; McClellan 1992, 248)

The Presumpscot band protested vigorously against the dam and the sawmills that settlers had built at their fishing sites (Williamson 1832; Chapman 1883, 1899; Goold 1896; Dole 1916; Bradbury 1975, Ghere 1988, 1997; McClellan 1992; Ketover 1998). As summarized by local historian Samuel Dole (1916, 20-2, 29):

the Indians appeared and strenuously opposed the proceeding, claiming that they owned the land on both sides of the river and that the necessary dams hindered the fish from coming up the river, whereby their food was endangered. By threats and warlike demonstrations they caused a suspension of the work.

Westbrook had built his dam with blockhouses on each end, "commanding the dam to protect the workmen," and three new upriver mill settlements had been built with Indian "defense" in mind (Fobes 1894, 377; Chapman 1883, 1899; Ketover 1998, 200). While New Marblehead (later Windham) and Saccarappa (later Westbrook) were constructed on prime fisheries, Gorham was built directly on the path from the Presumpscot to the White Mountains, hindering Wabanaki travel north (Sylvester 1910; McLellan 1992). **(Figure 4)** These new settlements not only disrupted the Presumpscot band's seasonal subsistence, but also blocked their access to relations on the Saco River, and to the mountains that provided winter hunting grounds and wartime protection.



Figure 4:
*Presumpscot and Saco
River with colonial
settlements*

As rumours of conflict circulated in Falmouth, Governor Belcher expressed concern that Westbrook might be instigating another “Indian War,” writing to Westbrook’s son-in-law that “if an Indian war happens (which God forbid), it may be of some service to his affairs” (MHS 1879, 6:302). In a letter to Westbrook, the Saco River truckhouse master emphasized that “Fish is their [the Wabanaki people’s] principal subsistence in the summer time and that for want of which they are like to be starved.” He told Westbrook that his “stopping the course” of the river was the cause of the recent “insults and threatening” of settlers (Baxter 1869, 11:172-3; Trask 1901, 183; Ghere 1997).

He further reported that a Wabanaki delegation was waiting to take a sloop to Boston, to complain to the Governor that “the River leading to the Sebago Ponds was so dam’d and obstructed that the Fish cou’d not pass up to the said Ponds” (Baxter 1869, 11:172-3). Wabanaki leaders had previously complained that the settlers’ method of fishing by laying more-or-less permanent “scains” across the river “prevent the Fish from going up the Falls, into the fresh ponds, as usual” (Baxter 1869, 10:400). Ironically, when Wabanaki leaders reported this problem to Governor Belcher at Casco Bay in 1732, he merely offered them English “nets” for their own use, demonstrating a lack of understanding of the seasonal spawning migration of which the Wabanaki leaders spoke (Massachusetts Bay Colony 1732, 20).

In July 1739, Belcher met with Wabanaki leaders and English settlers at Casco Bay. He dined at Westbrook’s estate at Stroudwater, and as the local minister reported, “the governor and gentlemen are on the hill almost every day, where there was a spacious great tent, with seats and benches, and where they met the Indians.” Under this “great tent,” the Governor and Wabanaki leaders renewed the reciprocal relationship pledged at the Casco Bay Treaty (Freeman 1821, 29; Williamson 1832, 2:201).

A month later, Polin and his counselors traveled south to meet with the Governor and make their complaint against Westbrook. Addressing the dams and settlements, Polin insisted that the “English are encroaching upon our Land, which we never understood was lawfully purchased, noting that “the English improvements” interfered with “hunting and fishing,” which “is our main end” (Baxter 1869, 23:259-60; Ghere 1988, 1997). He made clear that his own ancestors had not permitted colonial construction above Saccarappa, recalling agreements signed by Skitterygusset and Warrabitta, and requested that the “English may not be allow’d to settle any farther as yet, and that ye Government would put a stop to ye Settlements on those lands at present” (Baxter 1869, 23:259-261; “Deed...” 1666 (Waldo Papers); *York Deeds* 1887, 1:83).

Polin persuaded the Governor and Council of the direness of their situation, and Belcher wanted to avoid another “Indian war.” Therefore, the Governor wrote a formal letter to Westbrook detailing Polin’s complaints and insisting that he “leave open a sufficient passage for the fish” “in the proper season.” The Governor also instructed him to “take care and give orders that the people of Pesumpscot River treat the Indians kindly that come thither” (Baxter 1869, 23:261-2). A town meeting was then held in Falmouth, where the settlers voted “that John Wait go to make answer to the presentment against the dam across the Presumpscot, because of the absence of fish ways” (Fobes 1894, 377).

Two recent laws in the colony likely motivated the Governor and the local settlers. The *Act for the more effectual regulating the private trade with the Eastern & Western Indians and the preventing abuses therein 1735*, which applied specifically to Wabanaki people, and the *Act to prevent the Destruction of the Fish called Alewives 1735*, which called for the construction of fish passageways in dams, together may have pushed the colonial governors and settlers to promise Polin that Westbrook would put in a passageway on the Presumpscot. The Governor and Council further solidified their orders by renewing the Indian Trade Act and the Fish Passage Act in 1741.

However, Westbrook failed to follow through, and both the fish and the people continued to suffer the effects of the mills and dams. When King George’s War (or the “Five Years Indian War”) erupted in 1744-5, the people of the Presumpscot had their own motivations for raiding the English settlements along their river (Williamson 1832, 499). They did not join their relations from the Saco River who allied with the English, but rather joined with other Wabanaki bands to the north and west who were still determined to push the English from their homeland (Ghere 1988, 1997, 1998; Calloway 1990). According to local historian Fabius Ray, “While other factors were involved, still it was primarily the sea salmon which came up the Presumpscot River to Sebago Lake that caused a bloody war of six long years. These fish were a great food of the Indians who speared them” (Ketover 1998, 200; Chapman 1899; Dole 1916).

During the war, Wabanaki men targeted the dams and sawmills, destroying many of these “obstructions,” and letting loose the flow of the river. Local histories claim that the Presumpscot settlements “were almost constantly threatened until the defeat of Chief Polin in 1756” (Barnes and Barnes 2000, 6). Westbrook died penniless, sued by his partner Waldo, on the eve of war. His “great dam” at Presumpscot Falls was never completed, and “was carried away by a freshet” in 1751 (McClellan 1992, 248).

Polin fought through King George’s War, and through the French and Indian War that followed, taking refuge in the White Mountains when necessary, but continually maintaining his family’s claim to the Presumpscot. Settlers reported seeing their former Indian neighbors frequently ‘skulking’ in the woods outside their garrisons, in which they were “confined” through most of the war (Goold 1896, 11). In the spring of 1756, Polin came down from the White Mountains with his relatives to find armed settlers trying to plant on the riverbank outside the fort that had held them captive. One early morning in May, Polin and his kin traveled from their encampment on Sebago, down the Presumpscot to the New Marblehead settlement, and ambushed the local militia patrol. During the skirmish that ensued, at “Inkhorn Brook,” Polin was shot and killed (Smith 1873; Chapman 1899; Goold 1896; Sylvester 1910; Dole 1916; Dole 1935; Ghere 1988, 1997, 1998; McClellan 1992; Ketover 1998).

While Polin’s death was memorialized in romantic poems like Whittier’s “Funeral Tree of the Sokokis,” <http://www.poemhunter.com/poem/funeral-tree-of-the-sokokis/> (Dole 1935) the Presumpscot band’s protests are barely remembered. They are almost entirely absent from New England history and from contemporary conversations about the environment.^{xi} Traveling through the towns of Portland, Falmouth, Westbrook, Windham and Gorham today, you will see few signs of their indigenous history. Most mappings of the Wabanaki homeland do not even include a group on the Presumpscot, and until recently, most historians insisted that the “Last of the Pequawkets” died during Dummer’s War. However, as David Ghere has revealed, not only did Wabanaki families return to the Presumpscot after the war, but a record showing the murder of an Indian family on Sebago Lake in 1767, “for the sake of the beaver and other furs they were possessed of,” demonstrates that Wabanaki people were still inhabiting the watershed, long after the “last of the Pigwackets” had supposedly faded away (Baxter 1869, 24:153-6; Ghere 1988). An ironically similar account of the extermination of “the last of the beavers” at the site of Polin’s death originates from the same time (Dole 1935, 57-8). Needless to say, both Wabanaki people and beavers have managed to survive the narratives that only allowed for their extinction. Neither have the salmon “fled before the march of civilization,” (Jones 1949, 41) as the author of *Sebago Lake Land* wrote in 1949, although most of the Atlantic salmon in Maine have recently been listed as endangered (Fay et al. 2006),^{xii} along with the Presumpscot River itself (American Rivers 2000).^{xiii}

Significantly, however, in 2002, the “Smelt Hill” hydropower dam was removed, following extensive flood damage, from Presumpscot Falls, the site of the Queen’s village and Westbrook’s original dam. The removal, according to American Rivers, “is expected to restore” habitat on the lower Presumpscot, “opening passage” for salmon and other “migratory fish” (American Rivers 2007, 36).

In remembering: Belonging, reciprocity and responsibility

This story of indigenous protest on the Presumpscot emerges at a time when Traditional Ecological Knowledge is increasingly accepted as a valuable science, particularly in the face of climate change. Many Indigenous peoples, having lived intimately and interdependently in particular homelands for millennia, retain long-term knowledge of environments beyond most modern recordings. Recognizing the relevance of this body of knowledge, many scientists, particularly in the Arctic, are now turning to Native peoples as they attempt to document current and future changes in our global environment. The underlying history of the Presumpscot reveals a system of knowledge, practice, and belief in which people could exploit a resource for millennia and not deplete it. Furthermore, it demonstrates that a community can develop a conservation ethic based on surviving in an environment where resources go through cycles of scarcity and abundance. Indeed, contrary to popular myths of “disappearance,” the continuance of Wabanaki and other Native communities has depended on an ability to adapt to both minor and catastrophic changes, whether due to climate, or colonization. Such knowledge, of how to adapt in particular places, will surely be increasingly valuable as climate change brings on new cycles of scarcity and abundance. Such adaptation requires an intimate and complex knowledge of the ecosystem in which we live, from local watersheds to global networks.^{xiv}

At the same time, the story of the Presumpscot also demonstrates that ecological knowledge, in and of itself, is not necessarily benign; rather, it can be utilized for the benefit or to the detriment of the health of human and biotic communities. As TEK is increasingly valued, members of the scientific and scholarly community must bear in mind that we cannot remove this knowledge from the matrix of relationships and responsibilities in which it is embedded.

TEK practices cannot be incorporated independently of the languages and cultural systems to which they belong. Abiding by a view that resources are in endless supply, and acting on a belief that the environment is inherently exploitable, human communities will develop resource and energy development practices in parallel with those beliefs. In contrast, on the Presumpscot, the people's survival was dependent on the sustainability of their resources, thereby driving a belief system and a set of practices rooted in responsible use and reciprocity. Thus, adopting TEK practices is not nearly as important as grasping the underlying philosophies and belief systems in which the practices are embedded. With more attention paid to the TEK matrix of "knowledge, practice, and belief," (Berkes 1999, 8) then, as Menzies (2007, 240-241) states in the conclusion of his edited anthology on TEK, we might "look forward to a future in which local communities once again locate themselves as a part of, not apart from, the environment within which we must live. We look toward a world in which human sustainability is understood as occurring in concert with environmental sustainability."

Just as ITEK practices cannot be dissected from their associated philosophies, neither should they be uncoupled from their communities. Perhaps if we are to learn from the past, the time is ripe for a paradigm shift in which citizens strive to engage in reciprocal, responsible relationships with the land we inhabit and the beings and communities with which we are interdependently intertwined. Moving beyond the rhetoric of individual rights, it is essential to consider the *responsibilities* we all hold toward the places we rely on for our sustenance, to the rivers and relations that we exploit for energy, and to the First Nations who hold mutual, if not primary, rights and relationships to those resources.

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ⁱ The term "Wabanaki" refers to the "land of the dawn" and to the original peoples of northern New England, Nova Scotia, New Brunswick, and parts of southern Quebec. Today, indigenous people of Maine and the Maritimes generally refer to themselves as Wabanaki, as well as by their respective nations: Penobscot, Passamaquoddy, Maliseet and Mik'maq, while the indigenous people of Vermont, New Hampshire, and southern Quebec (as well as parts of Western Maine) are known by the general term "Abenaki," which came into increased use during the colonial period. However, "Wabanaki" is also a general term in Eastern Algonquian languages that refers to the people of the east, including variations such as "Wampanoag" and "Wappinger" in southern New England, and "Wapahnahk," used by Native people to describe Mohican and Delaware delegates to councils in the Ohio Valley to the west. On "Kespek," see Paul, "Mi'kmaq Territory." 10/3/2009.

ⁱⁱ For example, while Levett also regarded the Queen's husband, Cogawesco, as a sagamore, it is clear from his description that Cogawesco came to belong to this place through marriage. He likely came from a leadership family of a related village and shared leadership responsibilities with his wife. Although Levett portrays the "queen" as a humorous anomaly, female leaders were not uncommon in the northeast, particularly in places where women's domain of agriculture was the center of village life (Levett 1623).

ⁱⁱⁱ For example, when the Jesuit Sebastian Rasle became a part of an extended family at the Abenaki mission village of Odanak, and left for another village, his "mother" demanded, "you were of our cabin...Why then did you leave us?" (Morrison 2002, 76).

^{iv} See Morrison 1984, Calloway 1990, Baker 2004, Baker and Reid 2004, Haefeli and Sweeney 2003 and Stewart-Smith 1998.

^v A "bushel" of corn was required of one Major Philips of the Saco River, a major proprietor and sawmill owner. (Williamson 1832, 1:553)

^{vi} For the 1727 Treaty at Casco Bay, see Calloway 1991, 111-118. On the war, see Trask 1901; Morrison 1984; Ghere 1988; Calloway 1990; Baker and Reid 2004.

^{vii} Anadromous salmon migrate up rivers to spawn after feeding and growing for a period of time in the ocean, while non-anadromous fish spend their entire lives in freshwater. The non-anadromous Sebago Lake salmon population migrated down the Presumpscot (or up the Crooked River) to spawn in the upper sections of the river, and then returned to Sebago Lake to feed and grow (Havey and Warner 1970).

^{viii} Note that the name of the lake reflects this ecological reality, as it is most likely an anglicized form of the Abenaki *sobagw*, which is also the word for the Atlantic Ocean, perhaps reflecting a Wabanaki understanding of the lake's role in the salmon life cycle, as well as its size and location within the network of waterways.

^{ix} Despite sharing the Presumpscot, the Sebago Lake salmon and the sea-run salmon were likely distinct populations, as indicated by historical records. Later genetic studies have confirmed that many land-locked populations of salmon in Canada and Maine, including Sebago Lake, have distinct populations from the sea-run salmon that utilize the lakes' tributaries (Vespoor and Cole 2005; Spidle et al. 2003).

^x Later dams in the upper sections of the Presumpscot would force the Sebago Lake salmon populations to be “land-locked” as they could no longer move downriver to spawn (Havey and Warner 1970).

^{xi} In fact, even the efforts of the Wabanaki people and the Massachusetts governor to ensure a passage for fish is obscured. In *Maine Atlantic Salmon: A National Treasure*, Ed Baum (1997, 50) praises “The heroic Atlantic salmon restoration efforts of Charles Atkins, Maine’s Atlantic salmon pioneer.” Atkins is credited with “inventing the fishway” in the nineteenth-century.

^{xii} While the Presumpscot River salmon are not specifically included in the federal listing as endangered, this is not because they would not qualify, but because the obstruction of the dams prevents a wild population of salmon from proliferating in the river at all (Fay et al. 2006; Bradbury 1975).

^{xiii} In 2000, American Rivers, a national river protection group, named the Presumpscot the twelfth most endangered river in the country due to dam obstructions. “At the expense of fish, wildlife, and riverside communities, aging dams that powered mills and factories of a bygone era continue to harm the river to produce a miniscule amount of electricity for a South African-owned papermill (American Rivers 2000, 30).”

^{xiv} There are other examples of local communities that develop a conservation ethic and self-regulation in places where resources go through cycles of scarcity. Two notable ones are Johannes (1981), with his study of Palauans in Micronesia, and Berkes (1977), with his study of the Cree Indians in Canada.