

A History in Brief

Beginning more with geologic upheavals, and climatic shifts, than with any settlement, the Presumpscot's history has existed far beyond our own. The European presence along its banks is but a small fraction of its existence, yet it has altered, in many cases irreversibly, what had come to be over many millennia. The name itself is a glimpse through its now placid waters into the river's past. The word Presumpscot comes from the native Abenaki-Pennacook people who lived along its banks, and refers to the river as bearing many falls or as a place of rough waters. It was along these falls and at the confluences with its tributaries that the native peoples flourished. They ate from its abundant fishery and grew corn along its banks. For countless generations, the river was their home and sustenance, as it was for the ancestral Native American peoples before them. From Sebago Lake to Casco Bay, different seasons would find them migrating to the most appropriate places along the river, thriving upon the abundant natural resources.

In 1623 the English began to explore the Presumpscot when Christopher Levett went up-river "about three miles," or well beyond the first falls. Levett reported that he was very well received by Skedraguscett, the local sakamo.

This was the beginning of some thirty years of apparent peace between Natives and newcomers. During this time land deeds were granted, such as Sagamore Scitterygussett's to fisherman Francis Small, dated 27 July 1657. Over time, however, the Natives suffered more challenges to their existence than they were willing to accept. In the mid to late 1600's they began to attempt to kill or expel all of the English settlers in Maine. Thus began the period of deadly intermittent Indian warfare that lasted until 1763.

The English had intruded too much with too many, interfering drastically with Native life ways on all of Maine's rivers. On the Presumpscot, settlement began in 1632 with Arthur Mackworth in Falmouth. Industry started there with a sawmill in 1646 and a gristmill in 1656, both at Presumpscot Falls. Lumbering began in the area of Saccarappa Falls, in what is now Westbrook. The first dam was erected at Presumpscot Falls in 1732, and with it came the blockage of seasonal migrations of fish.

Abenaki Chief Polin first tried diplomacy to open up fishways in the dam. In 1739 Polin went to Boston to meet with the Massachusetts Governor to voice his complaint in person. Even though his objections were noted and the English settlers were ordered to allow for fish passages at every dam, little was affected back on the Maine frontier, where dam owners could ignore the Governor's orders with impunity. Chief Polin then took to war, raiding English settlements intermittently until 1756, when he was killed in an attack on New Marblehead (now Windham). There after the establishment of mills and dams along the Presumpscot increased dramatically, unable to be challenged by the now-displaced Abenaki-Pennacook natives who "disappeared" from the path of the "progress" that they abhorred. The river was used for vast log runs, including ship-mast timber, and eventually, larger industrial efforts began to take shape. Although it never turned a profit the C&O Canal was the major industrial effort of the time. Developed to transport lumber, provisions, and passengers from Portland to as far as Harrison, the canal was chartered in 1821, opened in 1830, and operated until 1870 when it was replaced by the railroads. The canal consisted of numerous locks, 27 of which existed along the major portion of the canal between Sebago Lake and the Portland waterfront. The only remaining lock that still functions is Songo Lock between Long Lake and Sebago. At its height, the canal was used extensively for material transport and leisurely excursion. The canal boats were regulated to a 3 foot draft and were powered by pole, towed by oxen, and placed under sail. The sails were designed to be lowered to make passage beneath the canal bridges. These boats were also able to leave the canal at Portland and make coastal voyages. In addition to offering a means of transport the canal allowed for the development of many communities along its route. Industry, inns and homesteads grew to service the canal and those that worked it. The most notable industry developed along the Canal was the Oriental Powder Mills located at Gambo on the Gorham side of the River. Developed for gunpowder production, the mills opened in 1828 and were the fourth largest producer of gunpowder during the Civil War. They continued operation until 1901. Many of the remains of the old mill buildings

can be seen today thanks to the efforts of Gorham Trails. Today much of the canal is submerged with only a few of the stone locks still being visible. In places though, one can still walk along the old towpath or view its remains resting beneath the still waters at North Gorham and Dundee Ponds.

In the period following the opening of the canal and up to the Civil War, textile mills, iron works, pulp mills, and shipyards flourished. In 1845, the first concerns around poor water quality were articulated when the river became choked by the sawdust and the bark of paper and saw mills. In 1889, at Smelt Hill in Falmouth, the first hydroelectric plant in Maine was established. Over the next fifty years nine more hydroelectric dams would follow, servicing the needs of the S. D. Warren Paper Company in Westbrook. These dams gave the Presumpscot the less than enviable position of being the most controlled river in the country. In the process, anadromous fish migration ceased, cold water fisheries declined, clam-flats were closed, and the stench of pollution permeated both river and estuary. The Presumpscot Jumper, which was thought to be a fresh water Salmon species, indigenous only to the Presumpscot, was forever lost. What had once been a river bearing a vibrant fishery and an abundance of swift waters had become choked by dams and polluted into a lifeless artery.

Through the latter 20th Century, the river's fate began to shift. Many of the industries and mills began to close, and in 1972 the Clean Water Act was passed. Although the dams reduced all but 5 percent of the river to impoundments, the water quality began to come back. As well, in the 1980's and 90's, citizen action groups such as the Presumpscot River Watch and the Friends of the Presumpscot were organized around monitoring water quality, maintaining access, and protecting the river. Now this once vibrant river is again gaining the appreciation and stewardship of those that live in its midst.

Michael Shaughnessy

Natural Resources Economics

Today, we assess the value of the Presumpscot in a different way than previous generations did. While they also enjoyed the river for its fishing and boating, its primary importance, from the early settlers until recently, was for power generation and waste discharge. Now, leisure time is more valued, new types of power supplies are available, and there is a strong environmental awareness, where people appreciate the intrinsic value of the natural world. Maine has always been known as a destination for hunting, fishing, boating, and other outdoor recreation. It is the heritage of those who live here, as well as the draw for outdoor enthusiasts from all over the country. Paramount in this recreation are activities that center around the waters of our lakes, ponds, rivers, streams and ocean. As much as we realize the importance of these features of Maine, we have a difficult time putting a dollar value on each of them. In our effort to restore a portion of the Presumpscot for freshwater and sea-run fish, we are including data that shows how natural resource based economic development can bring considerable dollars and increased value and worth to local communities. This benefit would not only come from economic impacts from fishing, but from kayaking, bird watching, canoeing, and a greater scenic value along a free flowing Presumpscot.

Freshwater fishing and wildlife-associated recreation is one area that a renewed fishery in the Presumpscot would improve. Studies were done in 1998 by University of Maine/Orono, Professors Kevin Boyle and Mario Teisl, Department of Resource Economics, that estimate the economic impact of hunting, inland fishing and associated wildlife recreation. In this study, the impacts of inland fishing alone generated a total economic output of \$292.7 million, with some of the most affected sectors of the economy being food stores, service stations, retail stores, and local and state governments with sales and income taxes. The participation in other wildlife-associated recreation, in Maine, excluding hunting, has a total economic output of \$331.6 million and affects food stores, service stations, lodging, agriculture, fish, forest, and landscape services, as well as local and state governments.

These dollars are the figures for all of Maine and it is difficult to determine what portion would come to Southern Maine with a renewed Presumpscot River. Dollars may be shifted from one

area of the state to another or they may be new dollars that will be spent in our local area since recreationalists would not have to drive much farther north to find suitable locations. The money might not be spent if an extra effort had to be made to do this activity. Southern Maine's population base is the largest in the state. Presently, the revived fishery at the Eel Weir By-Pass in North Windham, generates approximately 7000 fisherman visits a year to the Windham area. This segment of the Presumpscot is only a mile and a quarter long and is heavily used because there is nothing of this caliber anywhere else in Southern Maine. Its use predicts how important a thriving residential coldwater fishery in the Presumpscot could be to the local economy.

Another contribution to an increased economic and recreational impact is a thriving sea-run fish community. Returning historic runs of American shad, river herring like alewife and bluebacks, and Atlantic salmon to the Presumpscot could bring another source of income to local fishermen, bring tourists to the area and increase the productivity of Casco Bay. Smelt and other smaller fish provide forage for larger fish that are important to a recreational fishery. Since the American shad population on the Connecticut, the Susquehanna and the Merrimack rivers have been restored, local economies have benefited from these runs by holding shad festivals, bringing thousands of participants to fish and offer peripheral economic benefits. Alewives are used as lobster bait and a free flowing and accessible Presumpscot could increase their population by providing more habitat.

Project Economics and Cost-Benefit Analysis

The six small hydropower dams on the Presumpscot that are owned by Sappi have the capacity to produce 9.25MW of electricity. Sappi also has a biomass co-generation plant that is capable of producing 65MW of power. Saccarappa, Mallison and Little Falls dams, which are the three dams that FOPR contends should be removed, have the capacity to produce only 3.15MW. This is just 4% of the total power generating capacity of the Sappi's facilities. Combined with the North Gorham dam, owned by Florida Power and Light, the remaining three dams leave 75% of the hydro capacity of the Presumpscot in place. After calculating annual operating costs and the environmental measures proposed by Sappi in their application and the environmental mitigation measures proposed by the Maine Department of Environmental Protection, the net revenue from Saccarappa dam is approximately \$145,000, Mallison Falls and Little Falls combined, less than \$50,000.

The United States Fish and Wildlife Service has estimated the cost of installation of fish passage at these three small dams to be between \$1.35 million and \$2 million each, without any additional maintenance and operating costs or loss of generation capacity from diversion of flows to the fish passage facilities. If the dams remain in place, a separate plan for downstream passage for the American eel would also have to be installed, causing loss power generation from turbine shutdowns. With power generation capabilities of 3.15 MW, the cost-benefit analysis between dam removal and installation of fish passage would be heavily weighed toward dam removal. Since the structure and landscape of each project differs greatly, an estimate of the cost of removal is difficult to determine without detailed engineering. Relicensing of hydropower dams in Maine in the past few years has seen fish passage requirements as a part of the terms and conditions of a new license. These requirements would thus bring these dams up to the environmental standards of the 21st century. Balancing the environmental mitigation of fish passage against the cost of dam removal makes sense and the figures clearly show that dam removal is the most economic option. This analysis does not take into account the potential of the more profound and added economic development benefits to the local communities from a restored river. These benefits come from a variety of recreational uses and increased tourism. As well, one should not under value the demonstrated potential of significant community improvement due to the increased quality of life inherent in a locality's improved air and water resources. This most certainly would be the case with a renewed and scenic Presumpscot.

(Project economic data from Dr. Richard Parker, Analysis of Economic Value of Five Hydropower Projects to S. D. Warren Company's Westbrook Mill)

Geology of the Presumpscot River Valley

Introduction

The Presumpscot River and its tributaries flow over and through materials produced by two distinctly different groups of geological processes. The first group of processes was involved in mountain building and produced the underlying metamorphic and igneous bedrock. These formed between 550 million to 225 million years ago. Following these events the Earth's crust was stretched as the current Atlantic Ocean began to open and form. During this span of 225 million years, a long and continuous period of erosion wore down the mountains on the land and carried sediments via a series of rivers that were the ancestors of present day river system. The second major landscape and valley-forming processes were associated with the repeated continental glaciations during the past 1-2 million years. The most recent of the glacial periods covered Maine to the edge of the continental shelf with a mass of ice perhaps one mile thick some 18-20,000 years ago. The ice deepened the underlying valleys. As it retreated, the melting ice laid down a blanket of glacial gravels and sands that filled the valleys and covered much of the upland areas. In addition to these sediments, a cover of blue-gray glacio-marine clay known as the Presumpscot Formation was laid down as the finest sediments were deposited in the ice-marginal ocean. This sea covered about one-third of state (except for mountains, which stuck up out of the sea like the islands of Casco Bay,) and it extended even further inland along the major valleys. As the land began to emerge from this ocean about 13,000 years ago, processes of weathering and erosion like those we see in Maine today began to shape landscape development. Streams started cutting down into the underlying materials. Early on, the discharge from melting glaciers to the streams was significantly more than it is today. Sometimes these rivers exhumed the materials that had filled the pre-glacial bedrock valleys and sometimes they cut a new valley altogether in either bedrock or the glacial cover.

Geomorphic Features of the Presumpscot River Valley

The pre-glacial Presumpscot River cut a much deeper valley into the bedrock than the one we see now. The ancestral Presumpscot valley had been filled with glacial and glacio-marine sediments. The falls along the river attest to its relative newness; old streams are relatively devoid of falls. Geomorphologists refer to the Presumpscot's overall drainage pattern as "deranged," that is, a disordered arrangement imposed on it by glaciation. The ancestral valley went out via the Fore River, but the present valley mouth is a new location for this stream. Detailed studies made in preparation for the I-295 crossing over the river and at the Fore River near [Thompson's Point](#), reveal that the valley is cut some 160 feet into bedrock. As it leaves the Sebago Lake Basin the river flows through mostly sands and gravels deposited by the glacial melt-water. Occasionally, the river cuts through underlying bedrock. Downstream of Westbrook, the river flows mainly through the silty-clayey glacio-marine Presumpscot Formation and occasional sandy to gravelly deltaic deposits. Rivers extending from the former glacier's margins into the sea, left those deposits. Here, too, are interspersed bedrock exposures. Sand and gravel pits adjacent to the river and with its valley, provide abundant evidence and attest to the interrelationship between glacial, marine and stream process and materials. Damming of the river has drowned many of the bedrock exposures. The dominantly metamorphic (with some igneous) rocks that underlie the glacial and glacio-marine materials can still be seen in a few places. This is especially true adjacent to dam sites. Examples include: the small falls where the river joins the Eel Weir Canal; at the Covered Bridge off Hurricane Road; and where the Little River (a major [tributary](#) of the Presumpscot crosses under Route 114 in Gorham). Also at Mallison Falls, off Bridge Street in downtown Westbrook, and one-eighth mile above the Smelt Hill Dam and at the dam itself just above where the river joins Casco Bay and where it becomes an estuary.

Landslides and the Course of the River Valley

In addition to the nature of the bedrock and of the glacial deposits combined with stream erosion during deglaciation and at present, another geologic process that has contributed to the shape of the river is landsliding or slope failure of the glacio-marine deposits of the

Presumpscot Formation. In 1868, a major slope failure downstream of the then S.D. Warren Mill created a dam that flooded the lower floors of the mill. According to newspaper accounts at that time, the mill was closed for two weeks while the dam was excavated by horse-drawn draglines. Many other failures have occurred in historic time. It has been suggested that a pre-historic landslide is the major reason why the river turns northeastward from its southeastward flow at Westbrook. This slide has been called the Saccarappa slide. Landslides along the river may be the prime reason why the river has a meandering pattern along many parts of its course. The slope failure relocated the river channel in the direction of the slide. Detailed aerial photo analysis has revealed many landslides at river bends, particularly downstream of Westbrook where the river flows through more clayey and silty sediments. Larger, more open, meanders characterize the river above Westbrook. There the river generally flows through more sandy sediments left by glacial streams and deltas.

Stream Piracy

In the process called stream piracy, erosion by one stream captures the drainage of a nearby stream. The pirating stream thereby diverts the flow of the captured one. As the Presumpscot flows generally south-southeastward from Sebago Lake it cuts across the northeast-southwest oriented elongation of the bedrock formations and geologic structure. At Westbrook the river abruptly turns northeastward, paralleling the bedrock formations. Streams flowing across geologic structures are limited in their ability to deepen their valleys by more resistant rocks lying perpendicular to their course. Streams flowing parallel to geologic structures usually exploit weaker rocks and cut their valleys more rapidly. The Presumpscot River may have once flowed directly southeastward to the sea via the Stroudwater or Fore Rivers. Stream piracy by the headwaters of a stream flowing northeastward quite possibly could have captured the Presumpscot at Westbrook and diverted it towards Falmouth. The complexities of local coastal drainage further suggest the influence of the effects of sea-level change - the Deering Oaks pond that used to be a river, the Alewife Brook area, that used to be part of a different set of channels.

Irwin D. Novak, Ph.D. Associate Professor of Geology Department of Geosciences University of Southern Maine

FIRST PEOPLES OF THE PRESUMPCOT

(Colonial Period 1600 - 1763)

There were "Prehistoric" Native Americans on the Presumpscot, from the last part of the Ice Age until the beginning of the Age of European Exploration. They were the makers of most of the thousands of stone tools found in the Sebago-Presumpscot region. However, they were the forerunners of the "Historic" Indians - the Wabanakis, who are discussed here, but about whom there is relatively little tangible evidence in the Colonial Period.

The explorers and early settlers of 1600 - 1763 left us nothing more than the briefest of written remarks about the Presumpscot's Natives. However, it is clear that these Indians were part of the various political alliances of the Etchemin, Abenaki, and Pennacook peoples of southern Maine, who collectively are called the Wabanaki peoples of the Eastern Algonquians.

These independent Wabanaki peoples shared an extremely fluid societal organization and political alliance system. Each kinship-based community functioned with voluntary open membership under respected but authority-less leadership. Inter-marriage among communities and peoples gave virtually everyone some relatives elsewhere; families enjoyed frequent travel and inter-visitation. Adept political leaders (called sagamores / sakamos) married-out their children to form widespread personal alliances among traditionally-compatible neighboring communities, including those of neighboring peoples. In times of troubles, friends were everywhere; this adaptive arrangement was key to Wabanaki survival.

Their flexible socio-political organization allowed the Wabanaki peoples constantly to move and regroup their communities, both seasonally for sustenance opportunities and whenever under threat from at least three types of invasion. First came Native trade-wars, which brought repeated raids: Micmacs by sea from the eastward; Mohawks by land from the westward; both as indirect results of trading furs with Europeans for metal-goods. Second came European-

disease epidemics, which wiped out some Native communities and decimated others, especially c.1617 and c.1633. Third came European usurpation: the English pushed the Indians off of old lands in New England; the French pulled the Indians into new missionary villages in southern Quebec. A true diaspora resulted, but a cyclical one: even though the English fought the merged Abenaki-Pennacook peoples intermittently from 1675 to 1763, the Indians ranged widely but returned repeatedly to Maine.

In 1600, at the beginning of the Colonial Period, the Presumpscot's Natives seem to have been relatively numerous and densely settled. They also orbited around their settlements to form seasonal camps at appropriate places, from lake to seashore, to enjoy natural bounty (mammals, fowl, fish, plants, landscapes) whenever it occurred. Yet the resident maize (corn)-gardening village life became increasingly difficult as English encroachment increased in the region. Eventually only seasonal visits were made to the traditional territory, by non-resident hunting-fishing-gathering bands of about one-tenth their former size. By 1763, at the end of the sixth Indian War, no Natives were welcomed on the Presumpscot by the English conquerors.

Ethnohistorians know that the Presumpscot also was called "Ammecungan / Amoncongin" River, and they are generally agreed that it is the Presumpscot which is called "Ashamahaga" in an English list of Maine rivers titled "The Description of the Countrey of Mawooshen". The ten rivers listed supposedly constituted the "dominions" (meaning alliance) of Western Etchemin paramount-chief Bashaba. This document probably resulted from debriefing five Indian men who were kidnapped in 1605 from the Maine coast while peacefully parleying with Captain George Weymouth, and taken to England. Ashamahaga River supposedly "runneth into the Land two dayes journey: and on the East side there is one Towne called Agnagebcoc, wherein are seventie houses, and two hundred and fortie men, with two Sagamos, the one called Maurmet, the other Casherokenit."

From this c.1605 description, Agnagebcoc Town seems likely to have been a large maizegardening settlement. Yet unfortunately, this old account cannot be either verified or dismissed, because archaeologists have not yet found any Historic Period Indian village sites in the entire Presumpscot valley. Perhaps A-Town was at a place of massive river-bank collapse, near the "Indian cornfields" which local historians imply were at the Amoncongin (Second) Falls. Or perhaps all of the villages were hidden off-stream, to avoid easy discovery by raiders.

Our next accounts give us no clues at all. And nothing more is known about the two sagamos, beyond that their names also appear as Mawermet and Shurokinit.

English entrepreneur Christopher Levett explored "about three miles" up the Presumpscot in 1623, meaning not far enough to see the Second Falls. At the First Falls he was received cordially by local Pennacook sakamo Skedraguscett, who "hath a house" there, and later made Levett his "cousin". However in 1631, Squidrayset (alternative spelling) was accused of murdering and pillaging dishonest English trade-agent Walter Bagnall at Richmond Island (off Cape Elizabeth), so probably the sakamo and his people fled and relocated for a while, during which another Pennacook sakamo, Black William of Nahant (MA), visited Richmond Island in 1633 and was lynched by some English sailors for Bagnall's murder. Therefore, it is not clear whether the lynching of Black Will or the epidemic of c.1633 or both caused the absence of Indians in the Presumpscot area in April 1634, when Richmond Island trade-agent John Winter wrote to his boss Robert Trelawney in England that "no Indian lives nearer unto us than 40 or 50 myles, except a few about the River of Salko."

Wherever he was in 1634, Scitterygusett (alternative) on 27 July 1657 signed a deed with English fisherman Francis Small to (share? or abandon?) a very large tract of land on the Presumpscot. We only can guess what the sakamo believed he was giving, or giving-up, for an annual coat to wear and gallon to drink. Yet clearly, his much-later successor Chief Polin believed firmly that the merged Abenaki-Pennacook peoples still had seasonal fishing rights on the river which they quite possibly long before had ceased to be able to continue to reside upon because of intrusive English settlements.

As their residence lessened on the Presumpscot, the Abenaki-Pennacook bands which still used the river focused their lives increasingly at Pigwacket / Pequawket village on Saco River

(in today's Fryeburg ME) and at St. Francis / Odanak village on St. Francis River near St. Lawrence River (in southern Quebec).

Chief "Polin of Presumpscot" had appeared namelessly in Massachusetts Colony records for a few years prior to his August 1739 personal appearance in Boston, repeatedly complaining that dams on the Presumpscot were stopping seasonal fish migrations, and therefore stopping a vital means of Indian sustenance. When finally he met with Governor and Council, his diplomacy was appreciated. Governor Belcher asked: "How many Families have you at Presumpscot?" Chief Polin replied: "About 25 Men besides Women & children." (Compare that to the "240 men" of Agnabecoc Towne, c.1605.) It was agreed that fishways should be built into the dams, but back on the Maine frontier the agreement was unenforceable. The Presumpscot Indian fishery was no more.

In 1749, "Pooran of St. Francois" (alternative dialect) was expected but did not appear at a treaty conference held at Falmouth (ME), implying both that he was no longer of Presumpscot per se and that he was tired of diplomacy. In 1754, Governor Shirley complained to his Council about "the many Outrages & Hostilities" done by "Polan an Arssagunticook" (meaning St. Francis / Odanak), showing that he had gone on the warpath. Finally, according to local historians, Chief Polin returned to the Presumpscot in revenge for the river he had lost: On 14 May 1756, in a raid on New Marblehead (now Windham), near Inkhorn Brook the last sakamo of the river was shot dead. A long era had ended, unhappily.

Prepared by Alvin Hamblen Morrison PhD, Ethnohistorical Anthropologist, Mawooshen Research

Fishery of the Presumpscot, Historic to Present Day

" once one of the finest salmon rivers for its size in the state of Maine, but was early obstructed by dams and only a few salmon have since been taken .."

Fish Commissioner of Maine on the condition of the Presumpscot, 1873.

The cold, clear, highly oxygenated water from Sebago Lake provided perfect habitat for freshwater, and sea run fish alike. This historic abundance of fish provided for countless generations of Native Americans, a major source of sustenance. So substantial was the fishery, that archaeological research demonstrates that the natives utilized marine and anadromous (sea run) fish for both food and fertilizer. The locations of native villages on the Presumpscot were close to river obstacles that would have concentrated fish runs (Little Falls, Cumberland Mills, etc.), but other archeological findings regarding the settlements of indigenous peoples suggest that substantial fish resources were available throughout the length of the Presumpscot. Records show large populations of brook trout, American shad, rainbow smelt, alewives and other river herring frequented the Presumpscot. These species that once were abundant in the river are now totally absent or reduced to incidental fish occurring only below Smelt Hill Dam within the tidewater.

Ever since the European settlers came to this region in the early 1600's and the struggle has occurred to allow sea run fish to migrate upriver to their historic spawning grounds. During the period of 1732 - 1900, the building of the early dams for waterpower often included fish passage. However, these fishways were constructed and maintained only intermittently, causing erratic periods of migration. When the Commissioners of Fisheries for Maine were appointed in 1867, the Presumpscot Falls Dam (Smelt Hill) was washed out, but Cumberland Mills dam was impassable. The Commission began a program of fishway construction and stocking and by 1879 all the dams on the Presumpscot were passable. Due to fishways and the Cumberland and Oxford Canal, anadromous fish had once again, access to Sebago Lake. During this period, very large Atlantic Salmon were observed or caught in Sebago Lake and in the Crooked River. The access of Atlantic salmon to Sebago apparently increased the mean size of the salmon caught there. William Converse Kendall reported to the Boston Society of Natural History that in 1833, the average size of salmon was 2-5 lbs., but after passages were once again secured by 1886, the average size was 11.2 lbs. The period of human assisted access for anadromous fish to the Presumpscot watershed was however, limited. After 1900 industry began to dominate the river. Sea run salmon no longer had access to Sebago Lake,

and the average size again, began to decline. Although attempts were made by some dam owners to build fishways, by 1900, the river was once again, completely blocked and the anadromous runs above Smelt Hill ceased.

Since 1900, the dams that were constructed or modified for hydroelectric generation have almost completely eradicated the shallow and swift flowing former riverine character of much of the river. (About 20 of the original 25 miles of original riverbed is now covered by run-of-the-river flat water impoundments and the remaining native riverbed, is at minimal flow.) Growing municipal and industrial development created wastewater problems such as toxins, murkiness and lower levels of dissolved oxygen, dramatically degrading and destroying much of the available habitat for remaining freshwater species. Only since the Federal " Clean Water Act" in 1972 have the wastewater problems been addressed and the water quality of the river greatly improved.

Sebago Lake has always acted as a natural conditioner and regulator of the water quality in the Presumpscot River. The historic, mean annual outlet flow from Sebago Lake is 640 cubic feet per second (min. 50 cfs - max. 3240cfs) but since 1997 flows have been regulated between 300-400cfs during summer to maintain dissolved oxygen levels in the lower river. When water enters the Presumpscot River from Sebago Lake, it is extremely clear (visibility 13m), has a neutral pH (6.9-7.2), a high dissolved oxygen content (8 ppm, 80-100%saturation) and a water temperature varies seasonally from 0-25C. From the outlet of Sebago Lake to the confluence of the Pleasant River, water quality attains Maine Class A. The riverine sections, except for periods of highest temperatures during the summer, are considered excellent salmonid (any American trout species that resemble salmon) habitat, particularly in the Eel Weir By-Pass reach (the old riverbed at the head of the river).

The impoundments on the Presumpscot River are mostly small and/or shallow since hydroelectric generation occurs in a run-of-river mode where water descends the river relatively rapidly. Water velocities during normal flows (September) have been recorded from nearly imperceptible in mid-impoundment to between 40-130 cm/s (1-4 ft/sec) near the dams. These flow conditions result in very clear, well-oxygenated water available downstream into the Saccarappa headpond where the water quality continues to attain a Class B Maine standard to the Saccarappa Dam. Visibility in the Saccarappa impoundment averages 3-4m; dissolved oxygen is 7.5-8.5 ppm and summer temperature at their highest are similar to the water leaving Sebago Lake, 24-25C.

Bottom substrates found throughout the Presumpscot are a combination of the conditions in the original riverbed (now largely submerged in the impoundments) and the flooded shorelines of the impoundments. In the few sections of the original riverbed not flooded by the impoundments, the substrates are primarily sand, gravel, boulders and bedrock. In regions of flooded, former woodlands the substrate varies from marine clay to gravel and bedrock. In the submerged regions of the old riverbed, the original riverine substrates are still in place (sand, gravel, and boulders); and because of the low sediment transport from Sebago Lake, they are little over-burdened by finer grained sediments. However, under the present impounded conditions, few riverine sections exist and thus there is little availability of salmonid spawning substrate in the river.

This is regrettable, for the river's water quality, with high dissolved oxygen levels, clear water and neutral pH provide is excellent habitat for freshwater and anadromous salmonids, as well as anadromous river herring and sturgeons. Summer habitat for some salmonids, such as brook trout, is restricted by the temperature regime in the river; but for others, thermal habitat is within the range they can tolerate without lethal effect. The present impounded conditions in the majority of the Presumpscot, which has 20.7 miles of impounded water in a 25.2 mile river, reduce much of the river's biological productivity and thus result in a less than productive fishery. Currents and lack of depth in most of the impoundments restrict the primary and secondary biological production, and thus restrict the development of a sustainable lake-communities fishery. Only Dundee impoundment, because it is deeper and has more volume, seems to have lacustrine (lake-like) productivity as demonstrated by better fish growth and an abundance of eels.

Today, the Presumpscot supports a total of twenty-eight species with most all of the native anadromous species being replaced by stocked and managed warm and cold water species. The present fishery consists of three separate elements.

1. A highly managed, coldwater salmonid (any of the American trout fishes resembling a salmon) sport fishery that exists in the Eel Weir By-Pass of the upper river near route 35 in North Windham. It consists of 6700 feet of stocked fishery using hatchery-raised brook trout, land-locked salmon, and brown trout.
 2. The impounded and free-flowing sections of the rest of the river are managed for warm-water and seasonal coldwater sports fisheries. Included are warmwater varieties such as smallmouth bass, chain pickerel, yellow perch, brown bullhead, pumpkinseed (sunfish), and stocked coldwater fish like brown trout, small numbers of brook trout, and landlocked salmon.
 3. A limited anadromous run of river herring in the impoundment above Smelt Hill Dam and a population of the catadromous (fishes that go down river to sea to spawn) American eel.
- Overall, the present day warmwater fishery is relatively small in size, has reduced abundance and lack of adult populations. The habitat lacks rooted aquatic vegetation, soft mud bottom and properly developed lake-like habitat to develop significant populations that would contribute to a thriving sports fishery.

The coldwater fish species consists of brook trout, brown trout and landlocked salmon. Their size appears to be consistent with normal growth and they are in better shape comparatively to the warmwater fish. But the population is restricted by the lack of riverine habitat, lack of spawning habitat and elevated summer temperatures caused by the impoundments.

The anadromous fishery above Smelt Hill dam is limited to a population of alewife, which is largely confined to Highland Lake. They migrate to the lake through Mill Brook when access at Smelt Hill is open through various means. Estimates have concluded that the Presumpscot watershed, including Highland Lake, could support a run of 150,000 river herring (alewife and blueback herring) with adequate passage facilities. Also included in this is the diadromous (species living in freshwater rivers who go to the sea to spawn) American eel. Populations of eels exist in the Presumpscot, but have a difficult passage to the ocean to spawn because of the turbines at the dams. There are presently no passage facilities upstream or downstream for these fish. Although they can climb obstacles such as dams and waterfalls, the turbines of hydroelectric dams often decimate them.

As is the case between all ecosystems, the total interdependence of our aquatic ecosystem is becoming clearer and clear. We see such inevitabilities as river spawning habitat being eliminated and ocean stocks dwindling. As much as has been accomplished since the Clean Water Act, continued environmental diligence is demanded. It is far too easy to regress than it is to push forward. Mankind must never allow us to take for granted the preciousness of our aquatic natural resources again. As we have come to recognize the adverse impacts of pollutants, we must take the next step to recognize the tremendous impact that dams bear upon a river, and weight their benefit relative to the damage they inflict.

Only with dam removal would salmonid spawning substrate be restored. This would occur through a decreased water depth, restoring a riverine, riffle-pool environment with its variety of current speeds, depths, substrate types, and vegetation. Habitat diversity would support more individuals of more species than would the run-through, deep, steep-sided habitat of the present impoundments. Decreased water depth would lead to increased plant and algae growth due to the increased light penetration to the hard substrate of the restored river bottom.

This increased productivity would support an increase in aquatic insect life, which in turn would enhance growth and greater production of fish. The production of river plankton would also be enhanced, providing increased food resources for larval and juvenile fishes. All this would lead to a more enhanced and stable fishery. With such a restoration, there would be environmental impacts beyond the river itself. With an increased fish population through ocean access, increased spawning habitat and more riverine conditions, a small bald eagle population would be enhanced and the ocean fishery itself would be effected for the better. Although we can never turn back the clock completely to the days when the watershed was undeveloped and other societal factors were not a detrimental influence. We can provide

greater spawning access and some habitat restoration. With a concerned and conscientious stewardship much can be done to restore the Presumpscot to its historic abundance.

Sources from: The Presumpscot River, Maine, Fisheries Resources: Past, Present and Potential by Dr. Michael Dadswell, January 2001