Presumpscot River Aquatic Ecosystem Restoration Project

Smelt Hill Dam Removal
Falmouth, Maine

Environmental Assessment

U.S. Army Corps of Engineers
New England District

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Smelt Hill Dam Removal and Presumpscot River Habitat Restoration, Falmouth, Maine Environmental Assessment

I. INTRODUCTION

The Smelt Hill Dam is located in the town of Falmouth, Cumberland County Maine on the Presumpscot River (Figure 1). This river begins at Sebago Lake in the town of Standish, and flows for approximately 21 miles to the town of Falmouth, where it enters the Presumpscot River estuary, which continues for approximately 3 more miles to Casco Bay. The dam is located approximately 3 miles from the mouth of the river and one mile west (upstream) from Route I-295 at a naturally occurring bedrock outcrop. This outcrop approximately divides the head of tide, and has been historically known as Presumpscot Falls. Due to the natural bedrock formation, it has been the site of numerous river modifications designed to use the available waterpower. Mills were first built there in the 1600's, and the first dam was built in approximately 1732. In 1898, this dam was reconstructed, and hydroelectric power generating capabilities were added. Repairs to the dam occurred in 1936, and in 1983 a new powerhouse was constructed. In 1991 a fish elevator was installed in the facility. The Smelt Hill Dam generated hydroelectric power from approximately 1898 to 1946 and then intermittently until 1996. In the fall of 1996, a 250-year flood event severely damaged the hydroelectric generating facility, rendering it inoperable.

In the 1980s the Maine Department of Marine Resources began a program to restore anadromous river herring to many rivers in the state, including the Presumpscot (Note: river herring includes both alewives and blueback herring, and in this part of the state, alewives are numerically dominant). Restoration efforts in the Presumpscot River consisted of stocking alewives upstream of Smelt Hill Dam. Alewives were stocked in Highland Lake in Westbrook, which is formed by a dam on Mill Brook, a small tributary which joins the Presumpscot River several miles upstream from the Smelt Hill dam (Figures 1A and 2). This was in conjunction with the installation of a fishway at the Highland Lake Dam, as well as a fish elevator at Smelt Hill Dam.

Upstream passage of pre-spawning adult alewives over the Smelt Hill dam on route to Highland Lake was initially accomplished by drop net, using a chain hoist to lift them over the dam. In 1991 construction of the fish elevator was completed, which operated until 1996 when the flood rendered it and the hydroelectric generating facilities inoperable. Although an existing granite fish ladder is located on the northern side of Smelt Hill Dam (constructed over a hundred years ago) it was never reported to have passed fish. With the flood of 1996 and subsequent damage to the fish elevator, returning pre-spawning adult alewives can no longer pass over the dam, and other alternatives are necessary in order to sustain the existing population in the Presumpscot River.

The dam and associated fish lift is currently owned by Central Maine Power Company. With the fish lift also inoperable, the returning adult alewives are unable to migrate beyond the dam. As a temporary alternative, the Maine Department of Marine Resources has been trucking adult alewives from the mouth of the Kennebec River in Augusta to Highland Lake. However, this alternative, without specific upstream passage, will only allow for an artificially maintained

population of alewives to spawn and migrate downstream without becoming permanently established in the river. In addition, upstream migration of other anadromous fishes, such as striped bass, salmon and other alosid species (i.e. shad, blueback herring) is prevented. Therefore, in order to accommodate upstream passage of anadromous fish (without dam removal), either the fish elevator would need to be repaired or rebuilt, or some other type of passage facility would need to be constructed (i.e. fish ladder). Both of these options would require long term periodic maintenance in order to operate effectively. In addition, there would be no habitat restoration benefit since the dam itself would be left in place with its existing impoundment.

Due to the costs involved with repair of the hydropower facility, and the fact that replacing the fish trap would not provide any further financial benefit in itself, Central Maine Power is planning to sell the property. Currently, the dam itself is under the jurisdiction of the Federal Energy Regulatory Commission (FERC Project No. 7118); however it is under an "exemption from licensing" which is issued in perpetuity. This exemption carries with it several specific terms and conditions intended to protect fish and wildlife resources, one of which is the operation of a fish lift. Therefore, the owner of the dam and associated property is required to provide upstream fish passage under FERC regulations.

In July of 1998, a letter was sent from the Maine Department of Environmental Protection to the New England District U.S. Army Corps of Engineers requesting assistance in restoring the Presumpscot River aquatic ecosystem, under the authority of Section 206 of the Water Resources Development Act of 1996 (WRDA). Section 206 of the WRDA provides for restoration of degraded aquatic habitats through cost sharing between the Corps of Engineers and the requesting agency.

The proposed Presumpscot River Aquatic Ecosystem Restoration Project would involve the removal of the Smelt Hill Dam and appurtenant features, with appropriate shoreline mitigation and stabilization measures. This would restore a natural river ecosystem with significant fishery and recreational value, while enhancing water quality in the Lower Presumpscot River.

The proposed project would also remove the first barrier to upstream fish migration on the Presumpscot River, which historically supported large runs of anadromous fishes. These runs were eliminated by the construction of the Smelt Hill Dam as well as other dams along the river. Removal of Smelt Hill dam will not only re-open the lower Presumpscot River to anadromous fish migration, but it will also provide the first and most important step toward future anadromous fish restoration to their entire historical range in the watershed. This could be accomplished by additional dam removal and/or fish passage installation. A complete restoration of these historical runs is and has been in the interest of federal and state natural resource agencies. The following Environmental Assessment addresses the impacts of removing the Smelt Hill Dam and associated structures in accordance with the National Environmental Policy Act of 1969.

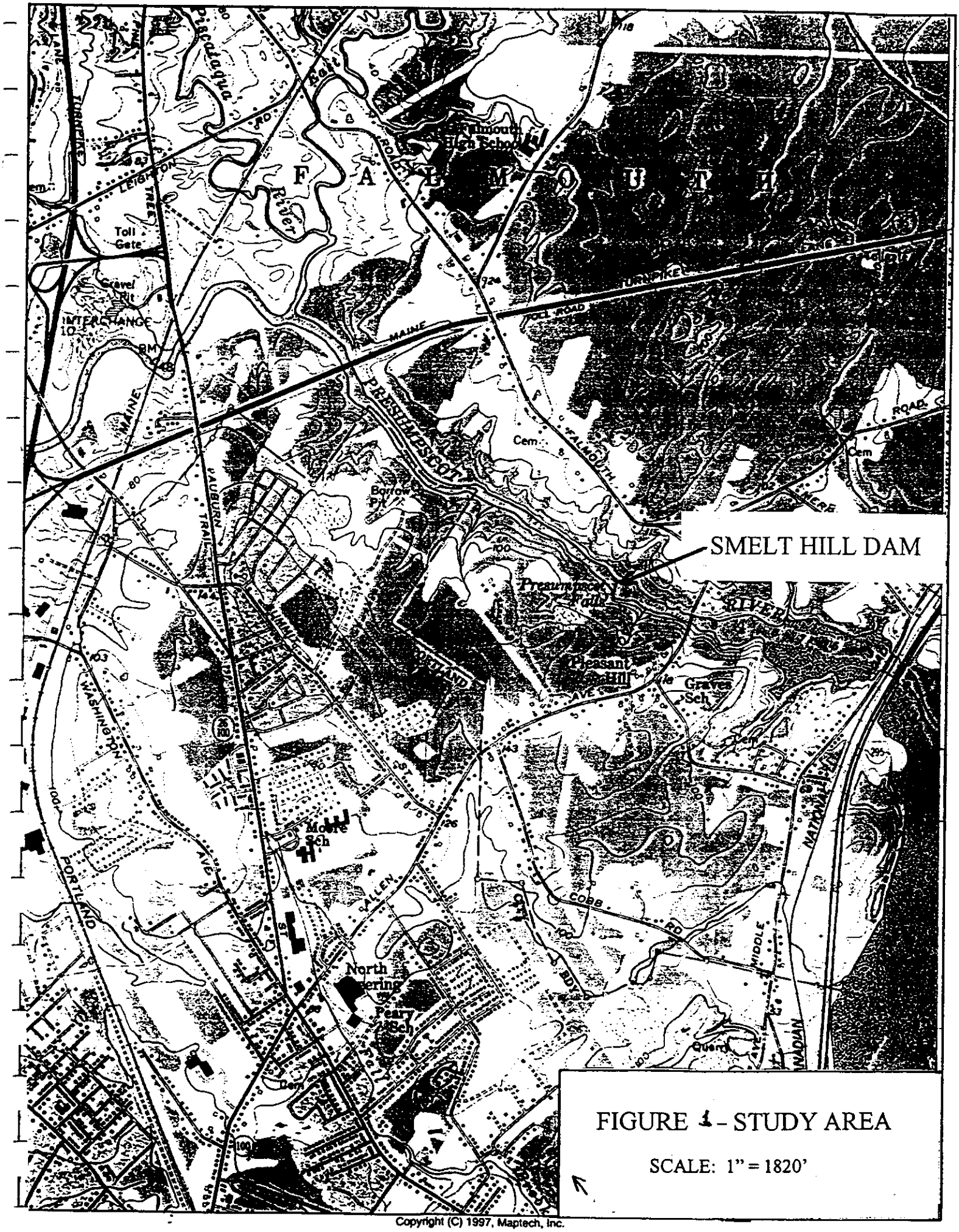

FIGURE 1 - STUDY AREA

SCALE: 1" = 1820'

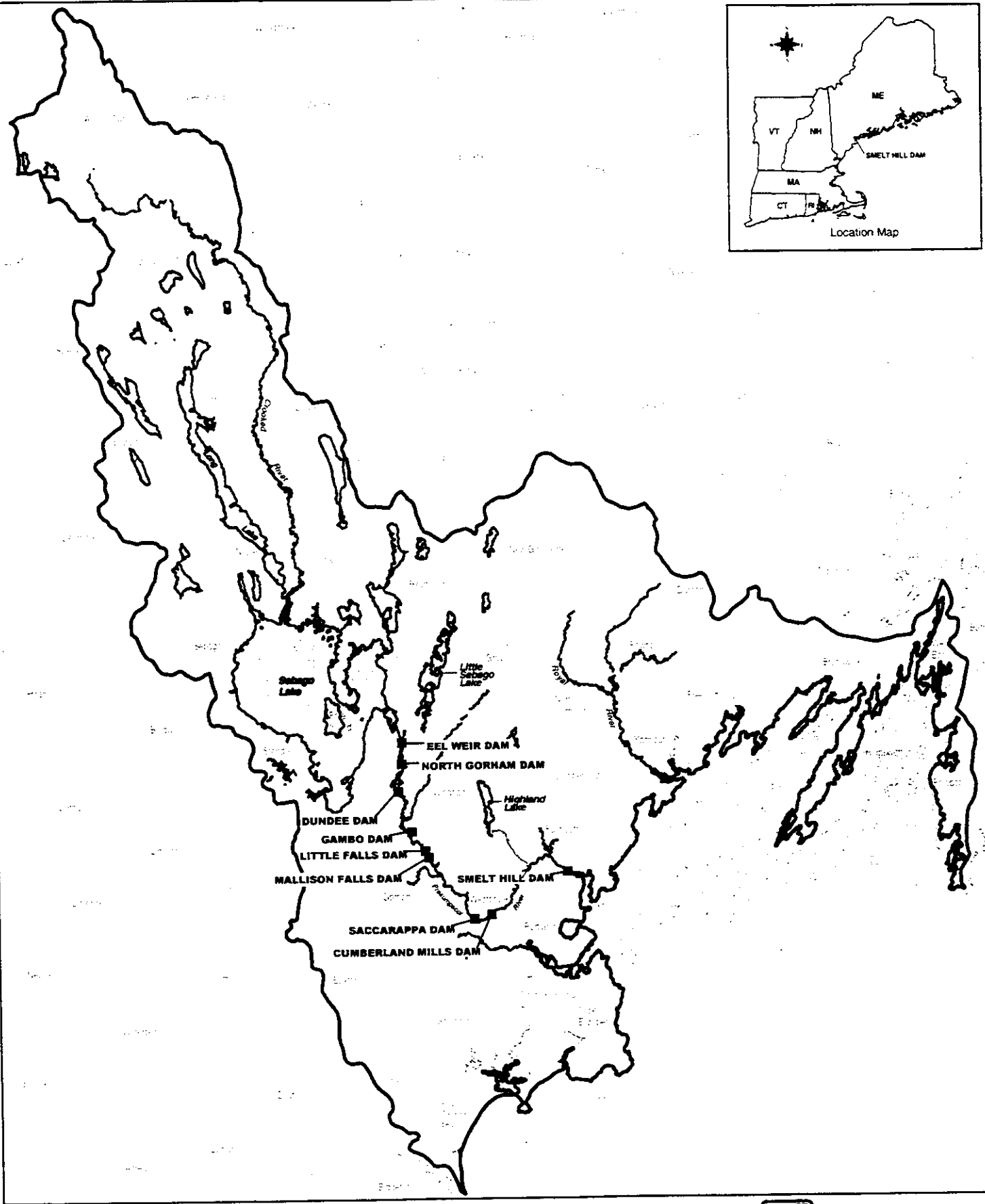

Figure 1A
Presumpscot River Watershed

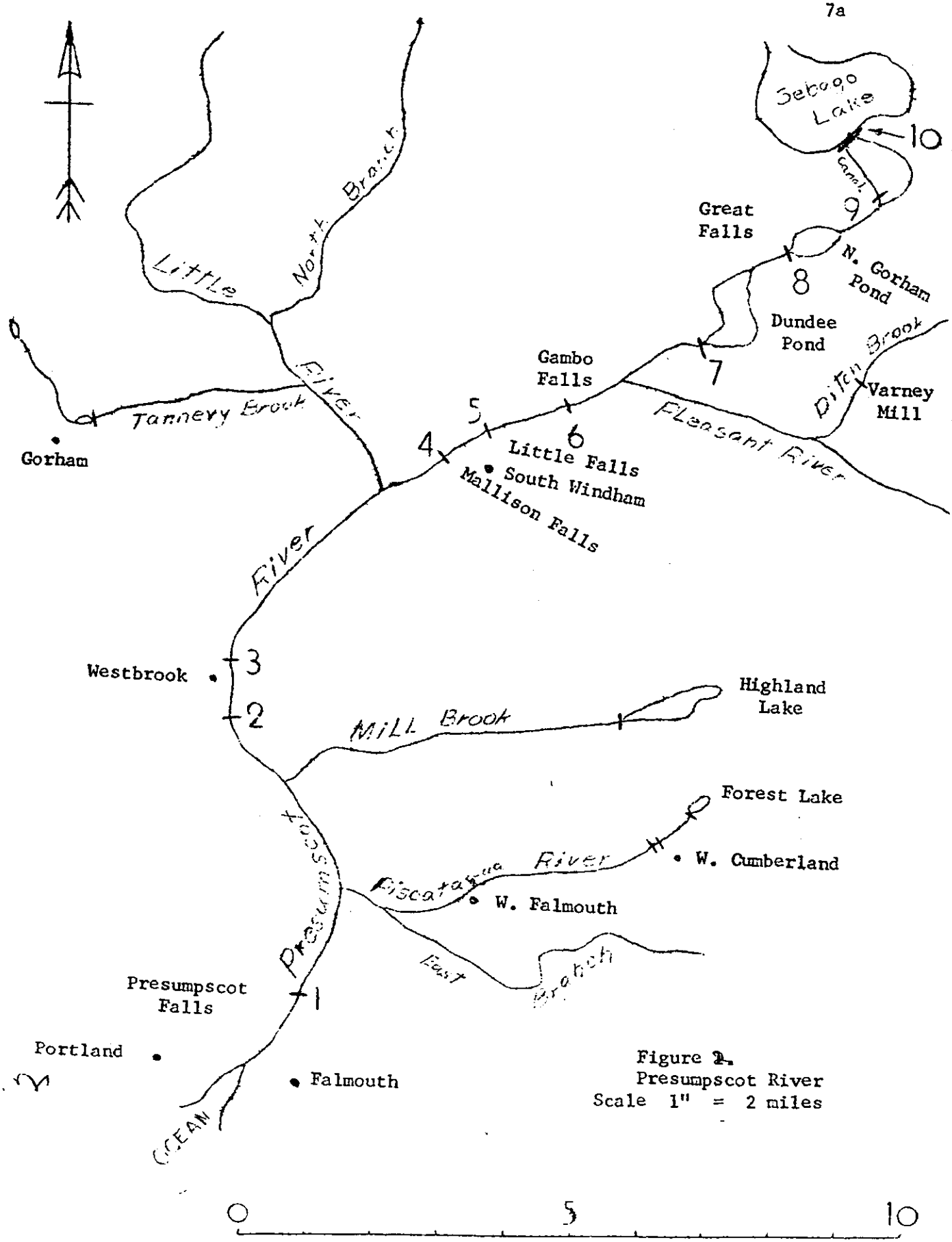

Figure 2.
Presumpscot River
Scale 1" = 2 miles

Figure 2. Major Tributaries of the Presumpscot River from Sebago Lake to Smelt Hill Dam (from DeRoche, 1967).

II. PROJECT HISTORY

In 1646, Casko Mill was first built at Presumpscot Falls by John Philips, the first settler of Falmouth. It was a sawmill, which used water wheel power. Over the next few decades, additional mills were constructed at this site using the same type of power. The first dam was built in 1732, which was used for paper and gristmill operations. In approximately 1890, a new dam was constructed with hydroelectric power generation capabilities. This was referred to as the lower falls hydro station, or Smelt Hill Dam. This dam produced power for the Westbrook Electric Power and Light Power Company, which became the Presumpscot Electric Company in 1912. In 1936, the dam was repaired and refurbished by S.D. Warren Company, and it produced power for their operations until 1946 when it was damaged by an electrical storm. It was then sold in the 1970's to a private individual, and resold in 1983 to the Cumberland Power Company, who built the existing structure and refurbished the hydroelectric power generation facilities. It was sold again in 1994 to Central Maine Power Company for whom it generated hydroelectric power until the flood in 1996 (Woodard and Curran, 1997).

III. PROJECT NEED

Due to the extensive flood damage to the hydroelectric generating facility and fish lift structure, repair is not cost effective at this time. In addition, any prospective buyer would be required to provide upstream passage for anadromous fish species under existing FERC regulations. The success of the State of Maine DMR's efforts to restore anadromous fisheries on the he Lower Presumpscot River by the stocking of Alewives in Highland Lake is dependent upon successful passage beyond the Smelt Hill Dam. Until the 1996 flood, which damaged the fish lift, upstream passage beyond the Smelt Hill Dam of returning pre-spawning adults on route to Highland Lake was accomplished via the fish lift. However, since the 1996 flood, these adults can no longer migrate beyond the dam. As a temporary alternative, the Maine Department of Marine Resources has been trucking alewives from the mouth of the Kennebec River in Augusta to Highland Lake in Westbrook, approximately five miles upstream from the Smelt Hill Dam, and connected to the Presumpscot River by a small tributary Figure 2.

The proposed dam removal would allow upstream passage of returning alewives to spawning areas above the dam, as well as provide passage for other anadromous fish species that historically inhabited the Presumpscot River. These include smelt, striped bass, shad, blueback herring, Atlantic salmon (and other salmonid species) as well as the catadromous American eel. These fishes will have access to approximately seven miles of habitat along the lower Presumpscot River as well as the significant tributaries, which include Mill Brook flowing from Highland Lake in Westbrook, and the portions of the East and West Branches of the Piscataqua River which form the mainstem approximately one mile upstream from its confluence with the Presumpscot River. The mainstem of the Piscataqua River joins the Presumpscot River approximately 1.5 miles upstream from Smelt Hill Dam (Figure 2).

In addition, the impoundment behind the dam (i.e. the artificially created lacustrine/warmwater habitat) would be eliminated, restoring the river to its original riverine habitat with its associated riffle and pool complexes more suitable for stream dwelling/coldwater

fisheries migration and spawning. The removal of the impoundment will also reduce an existing fish population that preys upon anadromous fish species as they move through the system. The benthic habitat upstream of the dam would be restored to its original condition, where depositional areas would scour to produce higher quality gravel bottoms that can be suitable for anadromous fisheries spawning. The removal of the dam would improve the existing 80-acre reach to seven miles of riverine riffle, pools, and run habitat, restoring a natural river ecosystem with significant fishery and recreational values and enhancing water quality in the Presumpscot River.

It is the assumption that the existing damaged hydropower unit and associated inoperable fish lift will remain inoperable for the next several years. Therefore, the barriers to upstream fish passage and the degraded habitat above the dam would persist, including the continued need to truck fish around the dam until an alternate passage facility could be constructed and/or repaired. The proposed removal of the dam would restore an entire anadromous fisheries migration corridor of approximately seven miles, contributing to the regional efforts for anadromous fisheries restoration in the areas of Maine where these organisms have important ecological, economic and cultural importance. Although eventual repair of the damaged fish lift would allow passage of alewives beyond the dam, the added benefit of riverine habitat restoration would not be realized as it would by dam removal.

IV. PROJECT DESCRIPTION

The proposed project would be the removal of Smelt Hill Dam in conjunction with appropriate shoreline mitigation/stabilization measures. The Smelt Hill Dam property consists of approximately 1.5 acres of land, including the dam structure and two buildings, a powerhouse and a gatehouse. The dam is approximately 151' long, 31' wide, 14' high and is constructed of stone filled timber cribs. There is an abandoned non-functioning fish passage facility on the north end of the dam and there is a fish lift structure adjacent to the powerhouse. However, this fish lift was also severely damaged during the 1996 flood event and is no longer functional without significant repairs (See Figures 3 and 4, in Main Report).

The 14-foot high dam structure impounds the river for a distance of approximately seven miles upstream to the S.D. Warren Mill in Westbrook. Although most of the water elevation gain in the river resulting from the dam occurs within the first mile upstream, the water elevation of the remaining seven miles of the river upstream is also higher than the historical level. The water level from the Smelt Hill Dam to the Route 95 Bridge (approximately one mile upstream) ranges from 6 to 10 feet above historical river elevation at the annual mean flow (1000 CFS); and the water level from the Route 95 Bridge to the S.D. Warren Mill in Westbrook ranges from 6 inches to one foot above the historical river elevation at annual mean flow. Based upon these differences from the historical river elevation, the surface area of the impoundment from Smelt Hill Dam to Westbrook is approximately 80 acres.

Proposed dam removal will be accomplished according to the attached plans (Figure 6 in Main Report, and Appendix B) during the specified time windows (low flow period). Although there are three construction alternatives (discussed in the alternatives section) the construction will generally proceed as follows. Initially a temporary access road will be constructed from the right

bank to the right upstream forebay area. Proper erosion control measures will be in place prior to and during construction. The gatehouse at this location will then be removed, and the left granite block abutment will be removed to an elevation of 6 +/- NVGD. A temporary bridge will be installed between the right and left abutments to allow access to the timber crib structure that forms the existing dam. During this time, existing river flow will be diverted through the former gatehouse area. Dam removal will proceed initially from the right bank toward the left, moving along the top of the timber crib structure. The spillway gates will first be removed to the top of the existing timber crib structure, along with the adjacent upstream sediment and granite block on the left abutment. Then moving from the left to right along the top of the timber crib, the timber crib structure will be removed to the natural invert elevation. Stones that are being removed may be temporarily placed in the areas downstream from the powerhouse. Once the timber crib has been completely removed, the bridge will be removed along with the remaining gatehouse.

After the dam structure and associated gatehouse are removed, a granite block wingwall will be constructed in the forebay area, and the concrete retaining wall at the downstream end of the powerhouse will be raised to an elevation of 18 feet. The existing outlet gate will then be removed and blocked. The powerhouse foundations and existing fish lift channel will be sealed and filled with concrete, and the remaining trash rack and metal walkways will be removed. Selected and appropriate demolition debris (including stones from the timber crib structure) will then be placed into the forebay area and covered with stone (as noted in the attached plans) to stabilize the embankment (for the alternative with on site disposal, discussed in the Alternatives section). The area will then be allowed to re-vegetate and the erosion control structures removed. Material not disposed of on site will be transported to a suitable off site disposal area (to be determined).

By removing the dam, the impoundment behind the existing structure will be eliminated with the barrier to upstream and downstream migration of anadromous fishes . This will restore the river to its historical elevation, lowering the water level at the former dam site by approximately 12.6 feet, from approximately 17.5 ft. NGVD to approximately 5 feet NGVD at the mean annual flow of 1000 CFS. With the existing warm water impoundment eliminated, riverine habitat will be restored with associated high quality riffle and pool complexes, more suitable for stream dwelling/cold water fisheries migration and spawning.

Although the greatest changes in river elevation from dam removal will occur in the first mile upstream, smaller changes in elevation will occur for an additional 3 miles or more upstream (HEC-2 Model output). Reductions in river elevation by approximately one foot can change the physical characteristics of the habitat, by exposing additional rock and riffle runs, which would be submerged at higher water elevations. Therefore, changes in habitat will be expected along an approximate 7 mile stretch of the river, from Smelt Hill Dam to Westbrook.

The removal of the dam would restore the seven-mile river reach to its historical condition prior to the construction of the dam. This would include areas of riverine riffle, pool and run habitat, formerly submerged with the dam in place. The restoration outputs will be the improvement of the structural components of the riverine habitat (acres or river miles); the opening of an anadromous fisheries corridor to species other than a previously lifted alewife population (river miles and spawning habitat acreage); and the resultant ecological increase in the

quality and quantity of riparian habitats (acres or riparian along river miles). This would be for all of the anadromous and catadromous fisheries, which by definition (ER 1105-2-100) are federally significant. Therefore, the project outputs are in the federal interest. Species include smelt, striped bass, eel, river herrings (alewife and blueback herring), Atlantic salmon and other salmonids. Finally, the impoundment will re-expose the riparian banks and the vegetation will be re-established that will provide overhanging shade and additional fish habitat along the entire restored section on each side. The re-vegetation will improve the habitat niches and help minimize temperatures, as well as shade demersal eggs from direct solar radiation. The removal of the dam and adjacent structures will restore a natural river ecosystem with significant fishery and recreational values and will enhance water quality in the Presumpscot River.

The restoration would provide both environmental and economic value and meaningful and productive ecological improvements to an area that can readily support increased populations of marine life. Maine DEP supports the dam removal proposal as a means of providing valuable ecological restoration to the lower Presumpscot River. The DEP believes removal of the dam will also have immediate and significant benefits to water quality. This restoration opportunity has arisen because the hydropower generating facilities were damaged to such an extent that Central Maine Power has decided to sell the entire project. The Maine DEP believes this is an opportunity to provide significant aquatic restoration to the lower portion of the Presumpscot River through restored anadromous fish habitat and improved water quality. However, if the hydroelectric facilities are reactivated, this restoration opportunity will be lost. The restored seven mile anadromous fisheries migration corridor resulting from the proposed project would be for all of the historical anadromous and catadromous species in the river. All of the above improvements will contribute to the regional efforts for anadromous fisheries restoration in the areas of Maine where these organisms have important ecological, economic and cultural importance.

V. ALTERNATIVES

A. No Action

The future without project condition is the assumption that the existing damaged hydro-power unit and associated inoperable smelt lift will remain inoperable for the next several years. There are no FERC requirements to remove the dam. However, the possibility of future energy needs may create the opportunity for rehabilitation of the hydroelectric facilities. The impoundment behind the existing dam has altered the structure of the habitat by changing riffle and pool complexes of high quality habitat (high dissolved oxygen & low temperature) to an impoundment more suitable for warm water fisheries. Additionally this structure establishes a fish population that preys on the anadromous fish as they move through the system. This degraded habitat will persist in the future without project condition. Also, with the fish lift remaining in its inoperable condition, pre-spawning adult alewives can no longer pass the Smelt Hill Dam. Therefore, continued trucking and stocking would be required in order to maintain any type of alewife population. The existing dam structure also would continue to limit passage of other anadromous and catadromous species listed above. For some of these species, (such as striped bass), trapping and lifting them over an existing dam is ineffective in that not enough adults can be passed in order to establish a viable population.

During the past three years, the existing floodgates at the dam have been completely opened during the spring migration season to allow for the upstream passage of alewives. Some alewives have been successfully passed during this time, often with the help of the high tide (Tom Squiers, Maine DMR, Personal communication). However, historical flow data indicate a mean flow of 1,300 to 1, 900 cfs during the months of April and May (peak migration season) which are too high to pass alewives (Letter from Woodward and Curran to Ray Peppin, S.D. Warren Company, May 7, 1997). Therefore, in high flow years, it may be necessary to limit flow from one of the other upstream dams as well as continue to truck alewives from either below Smelt Hill Dam and/or the Kennebec River to Highland Lake, in order to sustain the existing alewife population. Furthermore, debris can accumulate in front of the gates, necessitating periodic cleaning in order to maintain flows. Therefore, this measure is only considered interim while a decision is being made concerning the ownership and disposition of the dam, the associated fish lift and damaged hydropower facilities.

The effects of the dam extend approximately seven miles upstream from the dam with the first mile being affected the most; forming an area of lacustrine habitat more conducive to the support of a warm water fishery. However, although the impoundment has existed for as long as a dam has been present, the area historically has not supported a significant warm water fishery. This is due to several reasons, including previous years of poor water quality, as well as habitat limitations. Discharges into the river from numerous municipal wastewater treatment plants upstream, as well as industrial discharges from mills have historically made the river at times almost uninhabitable by most fish species. A 1967 report by the Maine Department of Fisheries and Game states that "*the 8-mile section of the Presumpscot river from Westbrook to Presumpscot Falls frequently attains nuisance condition during periods of low flow and high water temperature, and is not suitable for any purpose other than power development and the transport of wastes.*" (DeRoche, 1967). The primary factor in the degradation of the water quality appears to have been low dissolved oxygen levels resulting from the high biochemical oxygen demand of the material discharged into the river. The same report indicates a dissolved oxygen level of 0.0 ppm taken in July of 1965 from Presumpscot Falls. Therefore, no aquatic life other than anaerobic bacteria would have been able to survive in the impoundment behind Smelt Hill Dam at that time.

Since that time, there have been significant improvements to water quality by the establishment of water quality standards and implementation of discharge requirements which have resulted in reduced pollution loading. Fish now inhabit this stretch of the river, however it appears that the development of a larger warm water fishery is limited by existing habitat. The riverbed immediately upstream from the dam is predominantly steep sided bedrock gorge extending for a distance of approximately one-mile. The steep rocky sloped sides, scoured bottom, and lack of sandy substrate in this area provide only minimal spawning, nursery and forage habitat for many warm water fish species. In addition, although the actual rocky sides tend to diminish further upstream from the dam, the channel still lacks the necessary cover and shallows necessary for the development of a good warm water fishery. Therefore, it would be expected that if the dam were to remain in place, only a marginal warm-water fishery could be expected to develop with the limited habitat even if the water quality was suitable. There would not be a recreational value to this warm water fishery, however it would still affect the anadromous population due to predation on out-migrating juveniles

B. Restoration of Fish Elevator

This alternative involves restoration of the currently inoperable fish elevator only. The purpose of this alternative is to enable fish passage at a minimal cost. Benefits incurred by the repair of the fish elevator alone would be the ability to allow for upstream passage of anadromous fishes beyond the dam, without the additional expense of dam removal. This would allow the dam to remain in place in the event that the hydro electric power capabilities were to be restored. However, the dam is currently serving no function, and rehabilitating the fish lift only would require a financial investment without any immediate financial return. In addition, there would be yearly operation and maintenance costs, for which the required funding would need to be from a source other than hydroelectric power generation. In addition, electrical power to the dam would need to be supplied during the times of fish lift operation.

Also, although the fish lift has been effective in the past for transport of river herring above the dam, the additional habitat benefits associated with the opening/restoration of a riverine migration corridor would not be realized. Therefore, benefits such as restoring the impoundment to pool and riffle complexes more suitable as habitat for coldwater/stream dwelling and many anadromous fish species would not occur. In addition if other migratory fishes are to be restored to this section of the river, the ability of the fish lift to effectively provide their upstream passage may not be as great as it is for the existing alosid species (i.e. shad, alewives, blueback herring, etc). Therefore, additional anadromous species yet to be restored may not be as easily passed via a fish lift as they might be if there was no dam present.

C. Partial Dam Removal

This alternative involves the removal of the approximately 150-foot in length, 14- foot high timber crib dam and gatehouse building, and the adjacent concrete sluice gates only. The powerhouse and intake canal would be left untouched in this alternative. The purpose of this alternative is primarily to restore a natural river ecosystem with significant fishery values at a lower cost. Partial dam removal would allow passage of anadromous alewives beyond the dam, which were formerly passed via the fish lift (before the 1996 flood) and are now being trucked to Highland Lake. It will also remove the impoundment behind the dam and allow for the restoration of approximately seven miles of unobstructed riverine habitat. Essentially all of the fisheries habitat benefits to the system would be attained via a partial dam removal, since the existence or non-existence of the powerhouse intake canal should not have any effect upon the flow rates, the impounding of the river, and/or the amount of available riverine/migratory habitat. Disposal of the existing structure will require woody debris removal and timber crib stone removal. The stone material could be disposed onsite in the intake canal if the complete removal option is pursued. This would save project costs for hauling offsite the crib stone. In addition, problems may occur with the eventual deterioration of the powerhouse and related facilities, which would require periodic maintenance and associated costs. The latter issue would be an attractive nuisance with eventual safety considerations.

D. Complete Dam Removal

This alternative involves the removal of the approximately 150-foot in length, 14- foot high timber crib dam, the adjacent concrete sluice gates, and the powerhouse, with the intake canal to be filled in partly with demolition debris. The debris buried in the intake canal would be compacted and covered with fill and re-vegetated. The site under this alternative will be left in nearly a natural (pre-dam and powerhouse) state. The purpose of this alternative is primarily to restore a natural river ecosystem with significant fishery values.

This alternative would not only allow for the reopening of the five mile anadromous fishery migration corridor (and the potential restoration of all historical anadromous fisheries), the reversion to riverine habitat (and associated fishery) and the re-establishment and maintenance of a self sustaining alewife run; but would also have the added benefit of eliminating the additional maintenance costs and safety risks associated with the remaining powerhouse and intake canal. There are essentially no differences in flow rates and/or resulting habitat changes between this alternative and the previous alternative, therefore, the benefits of this are primarily in the elimination of the existing structures (which presently are not serving any purpose) requiring future maintenance. Therefore, complete dam removal is the preferred alternative.

VI. AFFECTED ENVIRONMENT

A. General

The Presumpscot River Basin drains an area of approximately 648 square miles extending from Casco Bay an approximate distance of 55 miles northwest-southeast toward Waterford, with a maximum width of approximately 20 miles near its mouth (DeRoche, 1967; New England River Basins Commission, 1981). The drainage includes Sebago Lake, of which the outflow forms the Presumpscot River itself, flowing for a distance of 24 miles through Standish, North Windham, North Gorham, South Windham, Gorham, Westbrook, Falmouth, and Portland, where it enters Casco Bay.

From Sebago Lake to tidewater, the river travels a meandering course over relatively shallow topography, with a total elevation drop of approximately 267 feet (DeRoche, 1967). Numerous small brooks enter the Presumpscot along its 24-mile course as well as several larger tributaries. These include the Pleasant River, Piscataqua River, Little River, and Mill Brook. These streams have cut gully-like shallow valleys into the flood plain extending from Sebago Lake southward through which the mainstem of the Presumpscot flows. As it approaches the head of tide, the river flows through an approximate one-mile area of bedrock gorge, beyond which there is an abrupt drop to the estuary. This drop has historically been known as Presumpscot Falls, the location of Smelt Hill Dam. The Presumpscot River estuary continues another 2.7 miles to Casco Bay. The mean tidal range in the estuary is 8.9 feet (DeRoche, 1967).

B. Terrestrial Environment

1. Geology/Soils

Geology in the Presumpscot Basin contains bedrock consisting of hard crystalline rocks, primarily schist, gneiss and granite. These are overlain by glacial till composed of silty, gravelly sand with cobbles and boulders, generally thicker in the valleys and lower hills and thinner or absent on higher steep slopes and stream beds. In the vicinity of Sebago Lake, where there is less topographic relief than the in the northern upstream area, much of the eastern section (from Gorham and Westbrook to Casco Bay) is overlain by marine clay which was deposited during the glacial recession and subsequent invasion of the sea from the New England Coast (NERBC, 1981). The lower section of the Presumpscot River is an example of a scoured streambed where much of the bottom substrate within the first several miles of Smelt Hill Dam is bedrock.

Soils in the Presumpscot River Basin vary widely due to differences in the parent material, climate and topography. They have been developed from materials which were formed by glacial action, except for the marine clays, and even those currently reflect the effects of glacial action. Within the first mile upstream from Smelt Hill Dam, most of the topsoil is underlain with sand.

2. Vegetation

The predominant land cover within the Presumpscot River drainage area is second growth mixed forest and farmland. Common hardwood and softwood species in the area include oak, maple, birch, beech, pine, spruce, and fir. Low bush vegetation includes alder, sumac, and raspberry. In the vicinity of Smelt Hill Dam, the vegetation includes mixed forests on the elevated riverbanks, as well as various grasses and wildflowers. In the Presumpscot River itself immediately upstream from the dam, the vegetation is sparse along the steep bedrock banks. The slopes descending to the river are relatively steep with mixed forest, which extends for approximately two miles upstream and characterize much of this area. The topography flattens slightly in the upstream sections of the impoundment, with the forested banks becoming gradually mixed with scrub shrub vegetation nearer to the river. Downstream from Smelt Hill Dam, well elevated above the riverbank, there is a stand of old growth white pine. The Maine State Planning Office has designated this an area of critical habitat. Its elevation above the riverbank however has protected it from any flow-related effects resulting from the operation of Smelt Hill Dam.

3. Wildlife

Wildlife in the Presumpscot River Basin is influenced by the density of the human population. The largest area of undisturbed wildlife habitat exists in the uppermost reaches of the Basin, beginning north of Bridgeton. Mammalian species in these areas include white tailed deer and black bear, as well as fisher, raccoon, fox, coyote, muskrat, beaver, mink, otter, porcupine and skunk. In the more eastern sections along the Presumpscot itself, the densities and diversity of these species decrease (to the possible exclusion of some of the larger species noted) with increased human population and reduced habitat.

Avian species common to the area include woodpeckers, swallows, chickadees, nuthatches, robins, warblers, sparrows and finches, as well as aquatic and/or migratory waterfowl including ducks, teal, cormorants, heron, sandpipers, gulls and terns. The Presumpscot River is in the general path of the North Atlantic flyway, and therefore many of the migratory species will pass through the area.

C. Aquatic Environment

1. River Hydrology

Nine dams along the Presumpscot River from Sebago Lake to Smelt Hill Dam (the most downstream) have significantly altered the natural flow from its historic condition. The impoundments behind these dams have changed the riverine habitat in those locations to lacustrine. The effects of the impoundment behind Smelt Hill Dam have extended approximately seven miles upstream to the dam at the S.D. Warren mill in Westbrook. Water depths within the impoundment range from approximately 26 feet at the dam itself to56 feet near the Route 95 bridge approximately one mile upstream; and generally from 5 to 11 feet in the remaining river miles from the Route 95 Bridge to the S.D. Warren Mill in Westbrook (HEC-2 output for annual mean profile and Presumpscot River Waste Load Allocation Final Report, 1995).

The base flow of the Presumpscot River is controlled by the Eel Weir Dam, located at the outlet of Sebago Lake. This dam also maintains the water level in Sebago Lake. It is owned by S.D. Warren Co. and enables water from the lake to be diverted into a one mile canal connecting to the powerhouse in Standish. Water not used for generation continues to flow through the main channel. The eight additional dams distributed along the remaining river miles are owned and operated by various industries for either process and/or hydroelectric power generation. These dams further regulate the flow in the River when water is diverted/held and released for various uses. In addition, these dams regulate higher flows from storm runoff in the lower Presumpscot River basin including flows from the tributaries along its 24-mile stretch to Casco Bay. Smelt Hill Dam is the most downstream dam. A listing of all of the existing dams along the Presumpscot River is presented in Table 1 and the major tributaries are shown in Figure 2.

Table 1
Dams along the Presumpscot River from Sebago Lake to Smelt Hill Dam (Estuary).

Number	Name	River Mile	Town	Gross Head (ft)
1	Smelt Hill	21.25	Falmouth-Portland	14
2	Cumberland	14.75	Westbrook	22
3	Saccarappa	14.00	Westbrook	28
4	Mallison Falls	9.00	Windham	20
5	Little Falls	8.25	Windham	17
6	Gambo Falls	7.00	Newhall	24
7	Dundee	4.00	Winham-Gorham	51
8	Great Falls	2.25	Windham-Gorham	34
9	Eel Weir	0.25	Standish	25

Several stream gage stations are located along the approximate 21-mile stretch of the Presumpscot River from Sebago Lake to Smelt Hill Dam. Some of these are operated by the USGS and are equipped with direct satellite uplinks to the Internet enabling instant access to real-time provisional flow data (USGS Real-Time Water Data; http://water.usgs.gov/realtime.html). The oldest gage is located at the Eel Weir Dam in Standish, which has been in operation since 1902. Stream gage data collected at this station over an approximate 65-year period, prior to 1967, indicated a flow range from 104 cfs to 4200 cfs, with a mean annual expected flow of 663 cfs (DeRoche, 1967). Additionally, data collected further downstream in near the confluence of the Piscataqua River indicated a flow range of 39 cfs to 12,500 cfs during the more recent period of 1975-1979. It should be noted that the low flow indicated at this location may not be representative of natural flow conditions in the river due to the artificial flow regulation that occurs at Sebago Lake Dam (the first dam which controls the base flow of the river) as well as the other dams downstream. Historical peak stream flow data collected at USGS station 01064118 (Presumpscot River at Westbrook, ME) from the water years of 1975 to 1999 has indicated a maximum flow of 23,300 cfs in October of 1996. This high flow (flood event) severely damaged the hydroelectric power generating facilities at Smelt Hill Dam.

2. Water Quality

The Presumpscot River is rated by the State of Maine as Class B from Sebago Lake to the Saccarappa Dam in Westbrook, and Class C from the Saccarappa Dam to the Estuary. The Presumpscot River Estuary is Rated Class SC. Class B waters are considered the third highest classification and are suitable for drinking water supply after treatment, fishing, recreation in and on the water, industrial process and cooling water supply, and hydroelectric power generation, (except as prohibited) as well as unimpaired habitat for fish and other aquatic life. In addition, dissolved oxygen levels should be at least 7 mg/L during the time between May 15 and October 1 and at least 8.5 mg/L (for the one-day minimum) during the period from October 1 through May 15. In addition the level of E. coli bacteria of human origin are limited to a geometric mean of 64 per 100 mL (Appendix K). Class C waters are suitable for drinking water supply after treatment, fishing, recreation, industrial processes, hydropower generation, and as habitat for fish and other aquatic life. Dissolved oxygen levels are required to be at least 5 mg/L with the exception of identified salmonid spawning and incubation habitat; where it must be sufficient to allow spawning and egg survival. E. coli bacteria are limited to a geometric mean of 142 per 100 mL. The estuarine waters classified as SC are suitable for recreation in and on the water, fishing, aquaculture, restricted shellfish propagation and harvesting, industrial process and cooling water as well as habitat for fish and other estuarine and marine life. Dissolved oxygen levels must be maintained at a minimum of 70% saturation, and enterococcus bacteria must not exceed a geometric mean of 14 per 100 mL during the time between May 15 and September 30 (Appendix K).

Historically, water quality in the Presumpscot River has been poor. As noted in the alternatives section, discharges into the river from numerous municipal wastewater treatment plants as well as industrial discharges from mills, had made the river almost uninhabitable by most fish species. The water quality became so poor that the river had attained "nuisance" conditions during summer low flow periods. These were occurring in the early 1960's. A dissolved oxygen

level of 0 mg/L was measured at Smelt Hill Dam during one of those periods (DeRoche, 1967), indicating that all aquatic life in the river with the exception of anaerobic bacteria would have been eliminated. These low dissolved oxygen levels resulted from the high biochemical oxygen demand of the material discharged into the river.

Since that time, water quality in the Presumpscot has improved to the standards noted above. However, this improvement is dependent upon the continued reduction of pollutants into the river as well as maintaining sufficient flows out of Sebago Lake (i.e. Eel Weir Dam) to remove water quality degraders (sources of high BOD) and ensure adequate dissolved oxygen levels. Currently there are four licensed discharges (Maine DEP) into the Presumpscot River between Sebago Lake and Smelt Hill Dam. Collectively, these discharge approximately 26 million GPD (40 cfs) of various stages of treated wastewater into the River (Table 2). During extremely low flow periods, these discharges could account for a large percentage of the of the river flow. In addition to these discharges, the numerous dams along the stretch of the river from Sebago Lake to Smelt Hill Dam affect water quality. Impoundments behind these dams cause any suspended solids from the discharges to settle out, creating areas of higher BOD and reduced levels of dissolved oxygen in their impoundment water, which eventually discharges downstream.

Table 2
Point source discharges into the Presumpscot River, upstream from the Smelt Hill Dam

Point Source	Type of Discharge	Flow (mgd)
Portland Water District	Municipal Wastewater	0.04
Maine Correctional Center	Domestic Wastewater	0.077
Portland Water District, Westbrook	Municipal Wastewater	4.54
SD Warren Company	Industrial Wastewater	21
	Total Discharge	**25.657**

In addition to the point source discharges noted above, there are non-point discharges in the watershed below Sebago Lake. Agricultural runoff into the Pleasant River (which joins the Presumpscot in Gorham), as well as the high clay content of the soils in that watershed have further affected the water quality in the River. The high clay content contributes to the turbidity in the Pleasant River, and has created large turbidity plumes after storm events at its confluence with the Presumpscot River (Francis Brautigam, 1999, Maine Division of Inland Fisheries and Wildlife, personal communication). This already degraded water quality further deteriorates when additional discharges downstream are added (particularly those from S.D. Warren Co. in Westbrook).

In order to maintain the mandated water quality standard in the river, proper coordination among the various users must be accomplished to limit pollutants and maintain necessary flows. Several studies have been conducted to determine the flows necessary to minimize BOD and maximize dissolved oxygen levels. The most recent of these was completed in November 1995 by the Maine DEP (Presumpscot River Waste Load Allocation Final Report) and used hydraulic modeling to determine the most effective option to maximize dissolved oxygen levels. The previous study had been conducted in 1980, before the redevelopment of the

hydroelectric generating capability in the early 1980s. This did not account for the hydraulic changes that occurred as a result of the hydropower redevelopment. These hydraulic changes extended from the Smelt Hill Dam, to the S.D. Warren mill (approximately 7 miles upstream) which resulted from raising the level of the pool behind the dam. The study also investigated dissolved oxygen levels in the estuary downstream and percent re-aeration occurring at the dam/spillway under various tidal elevations. Using the collected data, a flow curve was developed to determine the optimal flow vs. dissolved oxygen levels. The study indicated that the most effective method of maintaining the mandated water quality standards was to regulate the river flow at the Sebago Lake outflow according to the flow curve developed from the collected data. Selected dissolved oxygen and temperature data collected during this study are presented in Table 3 below.

Table 3

Temperature, dissolved oxygen, and percent dissolved oxygen saturation measured in the Presumpscot River at Smelt Hill Dam (PR10) and approximately 3 miles upstream (PR5) during July and August of 1993 (*data from Presumpscot River Final Waste Allocation Report, 1995*).

Date	Time	Station	Temp.	DO (Mg/L)	% Sat
July 20	13:26	PR5	24.75	7.3	88
	13:58	PR10	24.5	7.0	84
July 21	7:57	PR10	24	6.7	80
	7:19	PR5	24	7.4	88
July 21	14:06	PR10	24.5	6.8	82
	13:38	PR5	25	7.4	90
July 22	8:06	PR10	24	7	83
	7:28	PR5	24	7.4	88
August 24	7:55	PR5	23	7.4	86
	8:42	PR10	24	7.1	83
August 25	8:37	PR10	23	6.8	79
	7:45	PR5	23.5	7.7	91

3. Riverine Processes and Sediment Chemistry

The lower Presumpscot River near Smelt Hill Dam runs through areas of bedrock outcropping. Much of the bottom in the main channel in this section of the impoundment consists of scoured bedrock, with very little substrate. However, some sediment has deposited on the sides near the banks upstream and in shallow quieter areas closer to the Dam. These sediment deposits have been extremely difficult to sample. Attempts to collect quantities of sediment for sampling immediately behind the dam have been unsuccessful, due to the flushing of the swift flows along smooth rocky bottom (See letter in Appendix D from University of Southern Maine).

a. Metals PAH's and PCB's and Pesticides (1989-1991) - During the period from 1989 to 1992, the Maine DEP requested chemical analysis of sediments from specific locations in the Presumpscot River near the SD Warren mill in Westbrook. This was to determine contamination levels (if any) resulting from the mill discharges. Adequate sediment samples,

based on volume collected, were found only along the margins of the channel in the Smelt Hill Dam impoundment. They were analyzed for bulk chemistry to include grain size, TPH, PAH, metals and PCBs. The results generally indicated that PAH levels were either below the detection limits (ranging from 0.4 to 0.9 ug/g) or slightly above the detection limits at most of the sampling locations for the three years sampled. Those that were higher were recovered primarily from the Cumberland Impoundment, upstream from the Cumberland Dam in Westbrook. In addition, PCB's were below the detection limits, from the 1989 and 1990 samplings from all locations, with the exception of the Cumberland Impoundment, which found trace levels. However, in 1991 three samples, from the Presumpscot River Estuary (downstream from Smelt Hill Dam) were found to contain detectable levels ranging from 0.10 to 0.14 mg/kg. Since these levels were found below the Smelt Hill Dam, they are not relevant to dam removal, since they already exist downstream.

The sampling from 1989-1991 also showed that sediments from the Cumberland impoundment and the Presumpscot River Estuary had elevated metals levels above the Environment Canada freshwater threshold effect (for biological effects) and National Oceanic and Atmospheric Administration saltwater effects. However metals levels in the samples from the Smelt Hill Dam impoundment generally were below these biological effects levels, with the exception of two samples which were slightly above these effects levels for cadmium and mercury respectively. A 1999 Memorandum from the Maine DEP stated that based on the type of bottom sediments, the Smelt Hill Dam Impoundment does not appear to be a depositional area for sediments, and that the samples taken in the Smelt Hill Dam impoundment did not show levels of contamination of concern (Lee Doggett, Memo, June 10, 1999, Appendix I). These results are presented in Appendix I.

In addition to the sediment analysis noted above, another single sample was collected from the margins of the impoundment underneath the Route 100 Bridge in October of 1999. This was collected to screen for the presence of dioxin since the samples noted above were not previously analyzed for this contaminant. A study by the Maine DEP conducted in 1996 indicated that levels of dioxin in fish tissue collected from the Presumpscot River below the discharge of the SD Warren Mill in Westbrook were elevated compared to those collected from a reference reach, although not enough to warrant a health advisory (State of Maine Dioxin Monitoring Program, 1996, Mower, 1998). Therefore, it was decided to test the downstream sediments for this contaminant. The sample was also analyzed for trace metals, PAH's, PCB's and Pesticides (i.e. many of the same parameters analyzed previously for the samples collected in 1989-1991) to determine if there had been any change in levels since that time. The analytical results obtained from this sample are summarized below Table 4 (Dioxins) and Table 5 (metals, PCB's PAH's and Pesticides). The laboratory data on this sample are presented in Appendix I.

b. Dioxins, Metals, PCB's/Pesticides and PAH's (1999)

Dioxins (collected in 1999) - Detectable levels of the seven most common congeners of polychlorinated dibenzodioxin (PCDD) and the ten most common congeners of polychlorinated dibenzofuran were recovered. These dioxin congeners include tetra, penta, hexa, hepta, and octa-chloro-dibenzo-dioxin; and the dibenzofuran congeners include tetra, hexa, hepta, and octachlorodibenzofuran. Levels of polychlorinated dibenzodioxin ranged from 0.00016 parts per billion (ppb) for the congener 12378-penta-chloro-dibenzodioxin (TCDD), to 0.5874 ppb of

Octa-chloro-dibenzodioxin (OCDD). Levels of polychlorinated dibenzofuran (PCDF) ranged from 0.00019 parts per billion for the congener 123789-hexachloro-dibenzofuran (123789 HCDF), to 0.0558 ppb of Octachloro-dibenzofuran. Although there are potential sources of dioxin contamination present upstream from the Smelt Hill Dam impoundment, the levels recovered from this sediment sample are generally in the same range as those recovered from areas where there are no obvious sources of dioxin contamination.

The dioxin and furan congeners mentioned above vary considerably in their toxicity as well as their distribution in the environment. Tetrachlora-dibenzodioxin (TCDD) is considered the most toxic form, and Octa-chlorodibenzodioxin (OCDD) is considered the least toxic (Kamrin and Rodgers, 1985; and Travis et al, 1989; from USACE, NED, 1994). Generally TCDD is found in the least concentration in the environment, and OCDD is found in concentrations approximately 1 to 2 orders of magnitude higher. The results from the Smelt Hill sample appear to be consistent with that finding (Table 4).

No criteria have been established for dioxins or furans in drinking water, to protect freshwater aquatic life, or for sediments (USACE, NED, 1994). However in order to determine the extent of possible contamination, dioxin and furan levels recovered from the sediment in the Smelt Hill Dam impoundment can be compared to those levels found in sediments from other locations where there are known and/or unknown sources of dioxin.. It has been found that concentrations of TCDD (the most toxic form) in most uncontaminated soils are below the detection limit of 0.0002 ppb (Nestrick, et al, 1986; from USACE, NED, 1994). Noting this, the highest level of 0.00028 ppb 2378-TCDD recovered from the Smelt Hill Dam impoundment is only slightly higher than that,by less than one ppb, (Table_4). In addition, the level of 0.5874 ppb of OCDD (which is least toxic form of dioxin) is comparable to that of 0.41 ppb which was found in a control/reference site on the Otter River in Royalston, Massachusetts (Appendix J). There were no obvious sources of di xin at that location.

The U.S. Army Corps of Engineers, New England District, has conducted dioxin and furan sediment testing at many of its flood control projects during the 1990s. Many of these sites are considered to be clean, with no obvious sources of pollutants, while some with higher levels are considered to be marginally contaminated due to point and/or non-point source discharges in their watersheds. Generally, the levels of most of the dioxin and furan congeners recovered from the Smelt Hill Dam impoundment sediment are lower than the dioxin and furan levels recovered from many of the clean sites. Dioxin levels from these Corps projects are presented in Appendix J.

Dioxin and furan levels were determined from sediments of Swedish Lakes (Kjeller, et al. 1990). One lake where dioxin and furans were found (Lake Grovelson) receives no industrial discharges, and therefore the presence of dioxins and furans were speculated to have been from atmospheric deposition. Levels for specific dioxin and furan congeners from Smelt Hill Dam when compared to levels of these same congeners recovered from this Swedish Lake are within the same order of magnitude and generally within the same range (Table 4). Sediment dioxin levels from various locations throughout the world are summarized in Appendix J.

Considering these data, it appears that the levels of dioxin recovered from the sediment upstream from Smelt Hill Dam are within the ranges of those found in other New England impoundments which are considered to be non-contaminated.

Table 4

Levels of dioxins and furans recovered from Presumpscot River sediment approximately two miles upstream from Smelt Hill Dam (Route 100 Bridge); compared to mean dioxin and furan levels recovered from a Swedish Lake receiving only atmoshpheric deposition.

Parameter	Smelt Hill Dam (ppb)	Maximum	Minimum	Swedish Lake (mean) (ppb)[1]
2378-TCDD	0.00028			<0.0005 (total)
12378-PECDD	0.00016			0.002 (Total PECDD)
123478-HXCDD	0.00027			
123678-HXCDD	0.00171			
123789-HXCDD	0.00069			
Total HXCDD	**0.0133**	**0.0049**	**0.002**	**0.00036**
1234678-HPCDD	0.05178			No data
Total HPCDD	**0.964**			**No data**
OCDD	0.5874			0.18
2378-TCDF	0.00224			0.0049
12378-PECDF	0.00075			
23478-PECDF	0.00065			
Total PECDF	**0.0540**	**0.0098**	**0.0078**	**0.0088 (total)**
123478-HXCDF	0.00127			
123678-HXCDF	0.00052			
123789-HXCDF	0.00019			
234678-HXCDF	0.00023			
Total HXCDF	**0.0133**	**0.018**	**0.0005**	**0.00099 (total)**
1234678-HPCDF	0.01209			
1234789-HPCDF	0.00071			
Total HPCDF	**0.047**	**0.098**	**0.034**	**0.053 (total)**
OCDF	0.05576			0.026
Total Dioxins and Furans[2,3]	**0.823**			**0.519**

[1] Total includes all isomers of that specific congener.
[2] Total includes additional isomers not specifically reported, but added to totals from data report as well as all reported congeners.
[3] Total Dioxins and Furans equal to sum of all isomers and congeners reported above in totals, as well as OCDD and OCDF

Metals, PAH's and PCB's and Pesticides (Collected in 1999) - Levels of metals recovered from the sediment collected from the Smelt Hill Dam Impoundment (Route 100 Bridge) in October of 1999 were generally higher than those recovered from the sediment in 1989 –1991. However, they were below the biological effects levels (with the exception of Mercury which was 0.01 ppm higher than the biological effects level) and below the levels found downstream in the estuary. These results are presented in Table 5 below. Although the samples that were collected in 1999 as well as those collected during the period of 1989-1991 were taken from the Smelt Hill Dam impoundment, the locations of the actual sampling points varied. In some years, samples were collected, just above the dam while in other years they were collected in

the section of the River between the Maine Turnpike and Route 95 Bridge. Therefore, the single sample collected from the Route 100 Bridge (located between the Maine Turnpike and Route 95) should be as representative of the impoundment as those collected in previous years.

Table 5

Comparison of trace metal levels recovered from the Smelt Hill Dam impoundment sediment, (at the Route 100 Bridge; in October, 1999) to mean levels recovered from the Presumpscot River Estuary, relative to biological effects levels.

Metal	Smelt Hill Dam Impoundment (ug/g)	Freshwater Threshold Effects Level (ug/g)	Saltwater Effects Range Low (ug/g)	Presumpscot River Estuary (mean) (ug/g)
Silver (Ag)	0.0766	------	1	8
Arsenic (As)	4.02	5.9	33	3.84
Cadmium (Cd)	0.255	0.596	5	1.15
Chromium (Cr)	24.8	37.3	80	40.11
Copper (Cu)	14.7	35.7	70	23.55
Mercury (Hg)	0.151	0.174	0.15	.37
Nickel (Ni)	12.8	18	30	15.9
Lead (Pb)	28.8	35	35	35.4
Tin (Sn)	1.41	------	------	<5
Zinc (Zn)	65.5	123	120	97.1

Levels of Polycyclic Aromatic Hydrocarbons recovered from the sediment below the Route 100 Bridge, are presented in Appendix I. These ranged from 0.00617 ppb for biphenyl, to 0.431 ppm for fluoranthene, with a total level of 2.725 ppb for all target PAHs. Direct comparison with PAH levels collected from the Smelt Hill Dam impoundment in the 1989-1991 sampling is difficult due to the lower detection levels used in the 1999 analyses. Detection levels for the 1989-1991 analyses ranged from 0.4-0.9 ug/g, which are equal to and/or greater than the highest PAH level detected from the 1999 sample. Therefore, although the total PAH level for the 1999 sample would appear higher than the total PAH level detected in previous years, it is based upon the actual sum of analytes that were detected at lower levels; rather than summing only the higher levels of analytes (i.e. those greater than the higher detection level in use at the time) which were detected in 1989-1991. For example, the detection level achieved for Fluoranthene in the 1990 sample from the Route 100 bridge (considered as being within the Smelt Hill Dam impoundment) was 0.431ppm, while levels collected from within the impoundment in 1990 and 19991 ranged from <0.6 ppm in 1989, to 0.4 to <0.92 ppm in 1990, with one sample containing 0.7 ppm. Since the detection levels used in the earlier samples were actually higher than what was actually detected in the later 1999 sample, when calculating a total PAH level, the non detected levels would not be added to the total and would be lower. Therefore although total PAH levels determined from the sediment below the Route 100 bridge in 1999 may have had higher total

levels of PAH's than detected previously, the individual target analytes would not be higher, due to the higher detection levels in use during the earlier samplings.

In addition, levels of flouranthene in the estuary detected in 1989 and 1990 (this compound is used as an example since it was detected in the highest concentration in 1999) were generally found to be higher than the low levels detected in the Smelt Hill Dam impoundment during those samplings, as well as the sampling in 1999. Levels of fluoranthene in the estuary in 1990 ranged from slightly greater than 0.4 ppm, to slightly greater than 0.9 ppm.. Therefore, since the levels of this PAH as well as many of the others found in the sediments of the estuary are higher than those in the impoundment, there would be no increase in the estuarine levels by sediments being transported from the impoundment. In addition, the level of fluoranthene, detected in 1999 from the Smelt Hill Dam impoundment (at Route 100 Bridge), is below the lowest biological sediment effects level (ER-L) of 0.6 ppm (Long and Morgan, 1990, from NED, 1994). Therefore, it should not be a concern to aquatic life in the impoundment, and/or the estuary.

The remaining PAH results from the 1999 sampling are presented in Appendix I. All are below the lowest effects levels (ER-L) noted above with the exception of phenanthrene and pyrene, which were both slightly higher than that level. Phenanthrene was detected at 0.250 ppm (the ER-L =0.225) and Pyrene was detected at 0.363 ppm (ER-L =0.363 ppm). It should also be noted that the low level Biological Sediment Effects (ER-L) level for Total PAH's is 4 ppm, and the total PAH levels recovered from the Route 100 bridge in 1999 was 2.725 ppm. Therefore, based upon the above criteria, the levels of PAH's detected from the sediment collected from below the Route 100 Bridge in 1999 would not be of concern to aquatic life.

Results of the PCB and Pesticide analyses on the single sediment sample collected in 1999 from below the Route 100 Bridge detected low levels of PCB's (63.4 ppb total PCB) and pesticides (10.1 ppb Total DDT). As with the PAH analyses discussed earlier, the probable reason why these compounds may have been detected in the 1999 sample and not in the previous samples is the lower detection limit used in the 1999 analysis. In 1989-1991, the attained PCB detection level was 0.05 ppm (i.e. 50 ppb) for each PCB congener. In 1999, levels of some PCB congeners were detected at less than 1 ppb, or one fiftieth of the level attained during the earlier sampling. Therefore, PCB's at lower levels may have still been present, but not detected by the methods in use at the time of the earlier sampling.

The level of total PCB detected in the 1999 sample is slightly above the lowest sediment biological effects level (ER-L) of 50 ppb, as described by Long and Morgan, (1990, from NED, 1994), and approximately one tenth of the ER-M, the concentration in the sediments approximately midway in the range of reported values associated with biological effects. The ER-M is defined as the concentration above which biological effects are frequently observed. Given these criteria, the total levels of PCB detected from the one sediment sample do not appear to be high enough to be of concern to aquatic life.

Levels of individual pesticides were generally lower than either the lowest sediment biological effects levels (ER-L) or the midrange sediment biological effects levels for the respective pesticides, where available. Therefore, these also would not be of concern to aquatic life. These results are presented in Appendix I.

D. Biological Resources

1. Benthic Environment

As noted in the previous section, the bottom of the Presumpscot River in the main channel of the impoundment is scoured bedrock, with relatively little accumulated sediment. Most of the sediment samples that have been collected to date from the impoundment behind Smelt Hill Dam have been difficult to collect because the depositional areas are limited to quieter backwaters and areas along the margins. The Maine DEP collected sediment samples for aquatic macro-invertebrates in August of 1994 and 1995 from locations in the Smelt Hill Dam impoundment approximately one mile below the S.D. Warren outfall. Samples had also been collected ten years earlier in 1984 from a similar area downstream from the SD Warren outfall. Benthic organisms from the 1994 samples were primarily represented by bivalves (clams), which comprised 89% of the organisms in the sample. Only 7% of the sampled community consisted of aquatic insects, all of which, were species tolerant to low flow conditions. A normal benthic community would be comprised of 60% to greater than 90% insects. For the samples collected in 1984, although they were comprised of a greater percentage of insects, these were predominantly midges (chironomidae) (83%), a family considered to be very pollution tolerant. Pollution intolerant organisms were almost absent from that sampling location. It was concluded from these results that the Smelt Hill Dam impoundment downstream from the SD Warren Mill did not attain to the Class C standards for the maintenance of structure and function of aquatic life (DEP, 1995). Reasons for this degraded condition include the increased BOD and reduced dissolved oxygen levels resulting from the discharges from SD Warren and the additional sources upstream.

2. Fisheries

a. Finfish - Historical fisheries in the Presumpscot River included large runs of Atlantic salmon, shad, alewives and blueback herring. Atlantic salmon migrated through the river from Casco Bay to just below Sebago Lake to spawn in the river and tributaries along its length and possibly in tributaries upstream from the lake. In addition, it is believed that anadromous shad and river herring may have been able to enter Sebago Lake (Tom Squiers, Maine DMR, 1999, personal communication). With the construction of Smelt Hill Dam, as well as the nine other dams upstream, these natural anadromous populations had been eliminated from the river. The impoundments behind these dams have changed the historical riverine habitat to lacustrine, eliminating many of the fast flowing pool and riffle complexes, characteristic of its previous

habitat type. In addition to the obstruction by the dams, poor water quality from point and non-point pollution sources (mentioned previously) along the river, had severely impacted the existing populations of warmwater and non-migratory fishes in many areas, including the impoundment behind Smelt Hill Dam.

As noted in the water quality section, during the 1960's, the section of the River between Westbrook and the estuary (including the area of Smelt Hill Dam) was so polluted that it was not considered suitable for any other purpose other than power development and the transport of wastes.

Since that time the water quality has improved with the implementation of water quality standards and regulation of discharges. However, the water quality downstream from the S.D. Warren Mill in Westbrook had apparently not been sufficient to sustain a recreational fishery up until the last several years. Currently there are anecdotal reports of more fish living in the Smelt Hill Dam impoundment because of the improved water quality. In addition, with the recent closure of the SD Warren pulp facility (at the previously noted dam) it is expected that the water quality below this dam will continue to improve.

In 1982, a report entitled "State of Maine Statewide River Fisheries Management Plan" (Maine Department of Inland Fisheries and Wildlife, Maine Department of Marine Resources, Maine Atlantic Sea Run Salmon Commission) established goals for anadromous fisheries restoration in Maine Rivers. The goal for the Presumpscot called for restoration of anadromous alewives from Smelt Hill Dam to Highland Lake in Westbrook. This goal was accomplished in (1991) with the completion of both the fish lift at Smelt Hill Dam and the Fishway at Highland Lake. However, this run is being artificially maintained by trucking since the 1996 flood which damaged the fish lift at Smelt Hill Dam and rendered it inoperable.

The existing fish population in the Smelt Hill Dam impoundment is a typical warmwater assemblage supplemented by recently restored migratory river herring. This is less than a desirable situation, since some warm water fish species tend to be significant predators of outmigrating juvenile river herring as they leave this last impoundment prior to reaching the estuarine waters of Casco Bay during their fall migration. It should also be noted, that the catadromous American eel is still inhabiting the section of the river from Smelt Hill Dam to Westbrook. This species is able to climb over wetted surfaces of dams and pass areas generally impassable by other migratory species.

Selected areas of this impoundment were sampled in 1989-91 by the Maine DEP and Maine Division of Inland Fisheries and Wildlife. The sampling was to obtain fish specimens for the dioxin study noted previously. During that sampling, it was noted that there was difficulty in obtaining sufficient replicate samples of certain fish species due to the general lack of fish in the impoundment. It was stated that this was due to the degraded habitat conditions, primarily poor water quality (i.e. low dissolved oxygen in this case). Species collected are listed in Table 6 below.

Table 6

Fishes collected in the Smelt Hill Dam impoundment by gillnets in 1989 and 1991 (Data from Maine DEP and DIFW).

Common Name	Scientific Name
American eel	*Anguilla rostrata*
Black Crappie	*Poxomis nigromaculatus*
Bullhead	*Ameiurus sp.*
Fallfish	*Semotilus corporalis*
Golden Shiner	*Notemigonus crysoleucas*
Largemouth bass	*Micropterus salmoides*
Pickerel	*Esox sp.*
Pumpkinseed	*Lepomis gibbosus*
Smallmouth bass	*Micropterus dolomieu*
White Perch	*Marone americana*
White Sucker	*Catostomus commersoni*
Yellow Perch	*Perca flavescens*

In addition to the anadromous alewife stocking in Highland Lake, both branches of the Piscataqua River (which joins the Presumpscot River approximately one mile upstream from Smelt Hill Dam, (Figure 2) are stocked with brown trout. A 1967 report by the Maine Division of Inland Fisheries and Wildlife indicated the presence of small naturally reproducing populations of both brown and brook trout on the main and East Branch respectively (DeRoche, 1967). Although the report stated that brown trout could be found throughout the mainstem of the Piscataqua River, the population is limited by lack of spawning habitat. It was mentioned that brown trout have been found in the fish trap below the Smelt Hill Dam, presumably spillover fish from the Piscataqua River and/or possibly regions of the Presumpscot upstream from Smelt Hill Dam (which is also stocked with brown trout) (F. Brautigam, Maine Division of Inland Fisheries and Wildlife, personal communication, 1998). However, the sampling done in 1991 noted previously did not collect any brown trout in the Smelt Hill Dam impoundment.

It should be reiterated that much of the Smelt Hill Dam impoundment is habitat limited for warm water fisheries. The smooth scoured rocky bottom and steeply sloped bedrock sides do not provide adequate shallow spawning and nursery habitat or substrate for benthic fauna for forage. This condition would still exist regardless of improved water quality, since it is related to the morphological characteristics of the stream channel. Returning the channel to its historical configuration would not only allow anadromous migration, but could open up additional spawning area for stream dwelling fish species, and by restoring the natural contours of the streambank, some warmwater fish species as well (i.e. smallmouth bass).

Smelt Hill Dam divides the head of tide and forms a barrier to upmigrating anadromous fish. In addition, its location at the head of tide forms a boundary for those species that spawn just upstream or at the head of tide, such as smelt. Smelt spawn all along the rocky areas of the Presumpscot River Estuary immediately downstream from Smelt Hill Dam outfall.

Striped bass also enter the estuary, often following the migration of the anadromous river herring. A listing of finfish species found in the Maine's coastal waters to three miles off shore in the vicinity of Casco Bay is presented in Table 7. Many of these species are anadromous, and can therefore be found in either the Presumpscot River (i.e. assuming fish passage), the estuary, or Casco Bay depending upon life stage and/or time of year. In addition some of these species that are not anadromous may enter the estuary to feed or spawn. It is expected that many of these species may inhabit the Presumpscot River estuary at various times during the year.

Table 7

Finfish species common to Maine coastal waters to three miles off shore in the vicinity of Casco Bay. [1]

Common Name	**Scientific Name**
American Eel	*Anguilla rostrata* (C)[2]
Atlanctic sturgeon	*Acipenser oxyrhynchus* (A)[3]
Blueback Herring	*Alosa aestivalis* (A)
Alewife	*Alosa pseudoharengus* (A)
American shad	*Alosa sapidissima* (A)
Atlantic herring	*Clupea harangus*
Atlantic salmon	*Salmo salar* (A)
Striped bass	*Marone saxitalis (A)*
Rainbow smelt	*Osmerus mordax* (A)
Winter flounder	*Pleuronectes americanus*
Atlantic mackerel	*Scomber scombrus*
Atlantic halibut	*Hippoglossus hippoglossus*
Atlantic cod	*Gadus morhua*
Pollock	*Pollachius virens*
Haddock	*Melanogrammus aeglefinus*
Hake	*Merluccius bilinearis*
Bluefin tuna	*Thunnus thynnus*

[1] From Atlantic Coast Ecological Inventory, Portland Maine-New Hampshire, 1980, U.S. Fish and Wildlife Service.
[2]C- Catadromous;
[3]A- Anadromous

b. Shellfish - The Presumpscot River Estuary enters Casco Bay approximately 2.7 miles downstream from Smelt Hill Dam. The fine grained sediment bottom from this depositional area provides habitat for shellfish in the estuary itself as well as the mouth of the Presumpscot at Casco Bay. Currently the estuary downstream from Smelt Hill Dam is an active shellfish depuration area. In addition, it has been used as a clam seeding area for a commercial aquaculture facility. The numerous tidal flats located at the mouth of the estuary are also a provisionally approved shellfish area. Clams are harvested from this area, as well as lobster, scallops and crabs. The Falmouth Wastewater treatment plant discharges treated effluent into the estuary downstream

from Smelt Hill Dam. They currently chlorinate the final discharge, which reduces the bacterial load entering the estuary.

E. Threatened and Endangered Species

Recent coordination with both the U.S. Fish and Wildlife Service and the National Marine Fisheries Service, has confirmed that with the exception of occasional transient bald eagles and peregrine falcons, there are no federally-listed or proposed threatened or endangered species in the project area under the jurisdiction of either of these agencies (see letters dated 16 March 1999 and 10 March 1999; Appendix D).

F. Essential Fish Habitat

The Presumpscot River (included as the seawater mixing zone for the Casco Bay estuary) has been designated Essential Fish Habitat (EFH) for Atlantic Salmon, Atlantic herring and many groundfish species. An EFH assessment on the potential downstream effects of the removal of Smelt Hill Dam on this habitat is presented in the Environmental Effects section of this EA.

G. Historic and Archeological Resources

The town of Falmouth originally embraced all the territory in what are today the communities of Cape Elizabeth, Westbrook, Deering, Falmouth and Portland (Clayton 1880:269). The Native Americans who inhabited the Presumpscot River and vicinity were members of the Aucoisco Tribe of the Sagamore Nation. Typically, they traveled from Sebago Lake, where they spent their summers, to Mackworth Island in Casco Bay, where they spent their winters (Federal Energy Regulatory Commission (FERC) 1983:15). According to the Maine Historic Preservation Commission (MHPC), there is an Indian archaeological site located on the right bank of the Presumpscot River approximately 300 meters upstream from Smelt Hill Dam. This archaeological site is listed in the State's files as Site Number 8-10, and is located at and under the pool elevation (MHPC letter dated March 3, 1999). Some erosion of the site was noted in the past as a result of ice breakup (FERC 1983:15).

Presumpscot Falls was the site of some of the earliest settlements of Old Falmouth (now Portland). Mills were in operation at the Falls as early as the 1640's; these early mills were destroyed during conflicts with the local Natives. In the 1730's, a dam had been constructed at Presumpscot Falls. Grist mills, sawmills, combing mills, and a paper mill operated at the site over the years (FERC 1983:15). Smelt Hill Dam was constructed circa 1890 with hydroelectric power generation capabilities, as was discussed in the Project History section above.

The dam itself is 151 feet long and 31 feet wide. It is built on ledge with timber crib construction. The spillway is built of wood planks, while a granite fishway is located on the left bank. The fishway is approximately 150 feet long and six feet wide, and was built in the early 1700's. There are five concrete sluice gates with openings of 5' 3" by 8'. The 26-foot wide by

150-foot long powerhouse was fed by a canal 135-feet long and 30-feet wide. This canal was constructed with a granite wall forming the right bank of the river and a wooden plank floor. The red brick turbine housing formed the other wall. Five 48" vertical Hercules turbines and four 48" vertical Victor turbines were installed in the original powerhouse. The equipment has since been removed from the powerhouse, although the building remains (FERC 1983:3).

In correspondence from the MHPC dated March 3, 1999, the Smelt Hill Dam was found to be ineligible for listing on the National Register of Historic Places. This determination was made in the early 1980's when the dam was relicensed. There are no known National Register structures within the project area. However, there are two known archaeological sites within the project vicinity, Site 8.10 discussed above and located a few hundred meters upstream from the dam, and Site 8.7 (the Walker site) located at the confluence of the Presumpscot and Piscataquog Rivers. If habitat restoration work includes bank impacts in this area, then provision for data recovery investigations should be included prior to project implementation. This is in addition to the data recovery work needed for Site 8.10, prior to the breaching of the dam.

In addition, as no archaeological survey has ever been completed for the five miles of Presumpscot River bank upstream of the Smelt Hill Dam, at least a Phase I reconnaissance survey would be required for areas of habitat restoration or other alteration of the immediate banks of the river. Depending upon these results, further investigation at a Phase II level may then be required.

H. Environmental Justice

Executive Order 12898 "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations" requires federal agencies to examine proposed actions to determine whether they will have disproportionately high and adverse human health or environmental effects on minority or low income populations. Smelt Hill Dam is bordered by a mixture of forested upland on both the north and the south, as well as residential property on the southeast, immediately abutting the dam site. Within the residential property, there are no specific low income housing projects.

I. Protection of Children

Executive Order 13045 "Protection of Children from Environmental Health Risks and Safety Risks" seeks to protect children from disproportionately incurring environmental health risks or safety risks that might arise as a result of Army policies, programs, activities and standards. Environmental health risks and safety risks include risks to health and safety attributable to products or substances that a child is likely to come in contact with or ingest. The Smelt Hill Dam is an abandoned hydroelectric power generating facility. Although it abuts residential property, in its existing state, it is enclosed by a chain link fence, and does not provide any recreational use for children.

VII. ENVIRONMENTAL CONSEQUENCES

A. General

By removing the dam, the impoundment behind the existing structure will be removed and the barrier to upstream and downstream migration of anadromous fisheries will be eliminated. This will open an anadroumous fisheries migration corridor of approximately 7 miles, extending to the Cumberland Dam in Westbrook. Spawning habitat along this reach which will become accessible includes Highland Lake in Westbrook (discussed in the introduction) where an anadromous alewife population has already become established; as well as areas of the Piscataqua River and sections of the Presumpscot River itself which may provide spawning habitat for American shad. In addition, water quality improvements are expected to result from the removal of the former impoundment and restoring free flowing river flows across restored rock and riffle runs. Therefore, the benefits to the habitat will not only be for anadromous species, but for resident cold water and/or river dwelling species as well. Therefore, it is expected that the removal of the dam will have an overall habitat benefit, by restoring a formerly impounded river which blocked anadromous fisheries migration and contributed to degraded water quality in the impoundment. The affects of this dam removal project on individual components of the ecosystem will be discussed in the following sections.

B. Terrestrial Environment

1. Geology

The removal of the Smelt Hill Dam and the subsequent loss of the existing impoundment will cause the existing river channel in the impoundment area to scour, and re-form to its historical run of river configuration. Initially, there may by some exposed banks along sections of the river reach temporarily subject to erosion, however, plans are to stabilize them by allowing natural re-vegetation, or seeding with native species. Since the dam itself is built upon bedrock outcropping, its removal will cause the restoration of the pre-existing natural rock river bottom forming Presumpscot Falls. There will be no alteration of this underlying rock. The stream banks in the upper reaches of the impoundment may be subject to some initial erosion if there is severe runoff before stabilization, but they are expected to stabilize once the vegetation becomes established. Any effects will be short term and minimal.

2. Vegetation

It is expected that the removal of the Smelt Hill Dam will not cause any long term adverse effects to the existing vegetation. Most of the vegetation near the impoundment is mixed forest along the steep slopes, which descend to the Riverbank. These currently are unaffected by the impoundment, and with its removal, will still not be affected. In the flatter upstream areas of the impoundment, some of the scrub shrub wetland could be affected due to the lowering of the water level. However, coordination with the U.S. Fish and Wildlife Service has indicated that the removal of the dam is unlikely to have significant adverse effects on existing fish and wildlife

resources and habitats. Coordination with the U.S. Environmental Protection Agency has also indicated that there are no significant wildlife habitat, wetlands or threatened or endangered species of concern in the project area. the project area. In addition, the State of Maine Department of Conservation has no current documentation of the existence of rare or exemplary botanical features specifically within the project boundaries (see letters dated March 10, 1999, March 10, 1999 and February 10, 1999, Appendix D). Although historically *Allium canadense* (wild onion) and *Elymus hystrix* (wild rye) have been documented along the banks in Falmouth, there has been no documentation of these species since 1918. In addition, these plant species are not commonly found in wetlands. *A. canadense* has a regional indicator status of facultative upland; and *E. hystrix* is not listed (FWS, 1988) but is described to live in rich, damp, dry or rocky deciduous woods, thickets and riverbanks, indicating that it is not primarily a wetland species (Magee and Ahles, 1999). Therefore, it is unlikely that the loss of the water level in the Smelt Hill dam impoundment will have any significant effect on the existing vegetation, and/or unique vegetative communities in the area.

During project construction, a temporary access road will be installed, which may cause some disturbance to a small section of the parking area on the right bank. However, this will be removed after project completion, and the area restored to its former condition.

3. Wildlife

The removal of Smelt Hill Dam and the subsequent loss of the seven-mile long impoundment will not have any significant effects upon the existing wildlife communities in the area. There are no unique habitats in the project area, and only minimal wetlands. In addition, there are no populations of any Federally listed, threatened or endangered species in the area. The result of dam removal will result in the restoration of seven miles of historical riverine/riparian corridor and habitat, which would modify the existing wildlife population structure accordingly. Therefore, the net effect of the project will be the restoration of historical habitat along the river. It is unlikely that the proposed project will have an adverse affect on the existing terrestrial wildlife communities in the project area. Short-term effects of construction will be limited to the existing parking lot, the dam itself, and associated structures, and therefore will not affect any existing wildlife habitat. In addition, construction activities will be of a short duration.

C. Aquatic Environment

1. River Hydrology

The removal of Smelt Hill Dam will cause the seven-mile reach behind the dam to revert to its former riverine condition. This will include the re-exposure of many of the previously submerged rocky pool and riffle complexes along this section of the river. One such section is located approximately one mile upstream from the dam, and consists of an approximate 0.25-mile section of elevation drop where there are exposed rocks and pools (see below, Figure 2A). The pools in this section could potentially provide high quality holdover habitat for many stream dwelling fishes, with the exposed rocks providing aeration. During the lowering of the pool there

may be temporary erosion of some sections of the existing stream banks during conditions of higher flows and/or runoff, however it is anticipated that these will rapidly stabilize with the re-establishment of natural vegetation.

Figure 2A. Presumpscot River streambed with impoundment drawn down, exposing rocks/riffle and pool areas approximately 0.5 miles upstream from Smelt Hill Dam. Not e existing high water mark on exposed rock on stream bank.

In addition to the reversion of the upstream-impounded river channel to its historical riverine condition, unimpeded tidal flow into and out of the Presumpscot River through/over Presumpscot Falls into the Casco Bay Estuary will occur. This will enable access to the upper reaches of this former impoundment by estuarine/marine fish species during the extreme high tides, which would have inundated this river reach absent the dam. This would benefit the resident estuarine and marine (saltwater) species (as it does for the resident freshwater species) by providing additional forage base by allowing access to smaller fish in the lower Persumpscot (i.e. rainbow smelt and juvenile river herring). A portion of the historical habitat within the Presumpscot River watershed for anadromous and migratory fish would be restored to Highland Lake (and areas downriver of current barriers), sustaining significant runs of anadromous fishes and also benefiting the resident freshwater, estuarine and saltwater fish populations.

2. Water Quality

The removal of Smelt Hill Dam will cause the loss of the former seven-mile impoundment and the subsequent reversion of the river to its historical condition. As a result, the river will flow unimpeded through its original course including areas of pool and riffle. This will improve water quality in the project area by eliminating the low flow impounded areas subject to dissolved oxygen depletion resulting from the high biochemical oxygen demand of the licensed

discharges upstream. In addition, the improved flow should restore and/or improve the benthic habitat by exposing it to increased water flow and higher levels of dissolved oxygen. This will have an overall positive effect on the ecosystem. Since one of the recommended methods of maintaining the mandated water quality standards in the river was by increasing flow at Sebago Lake during low flow periods, the removal of the impoundment will assist in this water quality improvement by maintaining these flows through an area that was previously impounded. Therefore there will be an additional seven mile stretch (with the most significant effects in the first mile upstream of the dam) of un-impounded water that will maintain and/or improve the water quality by aeration over the rocky channel, rather than the previous impounded water (with its degraded water quality) caused by areas of high BOD and resulting dissolved oxygen depletion.

This more oxygenated water will continue its course through the former impoundment and over the restored channel of Presumpscot Falls into the tidewater of the estuary. Therefore, the water should be close to dissolved oxygen saturation as it passes through/over the channel at the restored Presumpscot Falls. The Maine DEP Waste Allocation Report noted in the earlier section, indicated that the re-aeration efficiency at the Smelt Hill Dam spillway varied depending upon tidal elevation. As a result, there was concern that there would be lower dissolved oxygen levels in the estuary at various flow and tidal conditions. The re-opened river channel with its resulting improved aeration should improve the estuarine dissolved oxygen levels as well. It is therefore expected the removal of the Smelt Hill dam will have a positive effect on overall water quality in the five-mile reach upstream, as well as in the estuary downstream, by providing better aeration and higher dissolved oxygen levels. It should be noted that although water quality improvements are expected to result from eliminating the impoundment itself, the primary mechanism for these improvements is the dilution of water with an existing pollution load by increased flushing of the former impoundment. This has the ultimate result of transferring the pollution load from the river to the estuary. Therefore, in order to maintain and continue to improve water quality in the river and estuary, it is necessary to minimize upstream discharges of pollutants into

Effects of actual construction (removal of the dam structure) may cause some temporary increases in turbidity in the immediate vicinity of the dam. However these are expected to be minimal and of short duration, since minimal sediment exists in the immediate area of the dam.

3. Riverine Processes and Sediment Chemistry

As noted earlier, most of the main channel of the river within the impoundment behind the dam is non-depositional, scoured bedrock. In addition, much of the area directly behind the dam is scoured bedrock, with very little sediment. This was discussed earlier in this section VI.C.3 of this EA, with various sources cited. Generally, the depositional areas are limited to the margins of the riverbank and quieter areas of backwater. Therefore, it is expected that sediment transport resulting from the proposed increased flow conditions would be minimal due to the general lack of sediment in the impoundment. Hydrologic analyses of the river has also shown that estimated flood velocities 50 feet upstream from the existing dam for an event having a 10-

year recurrence frequency, provide sufficient energy (greater than 2.5 fps) to re-suspend fine grained sediments even with the dam in place. Therefore, any contaminated sediment load will still reach Casco Bay whether the dam is in place or not.

In addition, it was reported by the Maine DEP (see Lee Doggett, Memo, June 10, 1999, Appendix I) that sediment contaminant levels from areas in the impoundment were generally lower than those downstream in the estuary. In addition, these were all below specific biological effects levels. Also, the levels of PAH's, and trace metals measured from the sediment sample collected on October 15, 1999 were found to be within levels not expected to affect aquatic life. Dioxins, although recovered from the sediment, appeared to be at levels commonly found in soils and sediments that do not have obvious sources of contamination (see Appendix J). Therefore it is anticipated that, 1) the transport of sediments from the impoundment behind Smelt Hill Dam resulting from the dam removal project would not be significant, due to the overall lack of fine grained sediments in the impoundment; and 2) there would be no contamination to the benthic environment due to the generally low levels of contaminants found in these sediments. In addition, the benthic substrate of the estuary would not be altered since it already consists of fine-grained material, similar to that found in the few depositional areas of the impoundment. It should be noted that in order to enhance water and sediment quality in downstream Casco Bay, reducing pollutant levels from their upstream discharges is necessary. These have generally been and will be the primary sources of contamination in the Presumpscot River Estuary, as well as downstream areas in Casco Bay.

D. Biological Resources

1. Benthic Environment

The benthic macroinvertabrate community in the Smelt Hill Dam impoundment approximately one mile below the S.D. Warren outfall, did not attain Class C standards for the maintenance of structure and function of aquatic life (DEP, 1995), with most of the species found represented by those most pollution tolerant and those tolerant of low flow conditions. Reasons for this included increased BOD and reduced dissolved oxygen levels from the S.D. Warren discharge and additional upstream sources (Affected Environment, Benthic Environment). Therefore, with the impoundment removed and riverine flow conditions restored, it is expected that the benthic community will improve. As noted previously, much of the main channel is scoured rock, with minimal substrate. However, with the impoundment removed, the quieter areas along the margins of the riverbank, and the newly exposed riffle run areas of the restored river; could provide habitat for stream dwelling benthic invertebrates able to colonize the undersides of rocks and gravel etc. (i.e. caddisfly, stonefly, etc.). These would have been unable to survive in the previously inundated impoundment due to the low flows and reduced dissolved oxygen levels. This re-colonization by stream dwelling benthic organisms will benefit the ecosystem, by providing an additional food supply for resident fish species.

2. Fisheries

a. Finfish - The removal of Smelt Hill Dam will have a positive effect on the overall fish habitat of the Presumpscot River by removing the barrier to upstream diadromous fish migration at Presumpscot Falls and restoring approximately seven-miles (or 80 acres) to its historical riverine condition. An anadromous alewife population has been reestablished in Highland Lake in Westbrook. This lake forms the headwaters of Mill Brook, a small tributary to the Presumpscot. A dam is located at the outflow of Highland Lake. In 1991, a fishway was installed at the Highland Lake Dam, which provided anadromous fish access to Highland Lake from Mill Brook. In addition, during that same year, a fish lift was installed at the Smelt Hill Dam. This fish lift operated from that time until 1996 apparently passing various numbers of up-migrating alewives. A 1996 report by Central Maine Power Company on the operation of the fish lift during 1995 indicated that a total of approximately 27,000 anadromous river herring (river herring includes both alewives and blueback herring) successfully passed from the Presumpscot River estuary to their spawning area of Highland Lake, via the fish passage facilities at Smelt Hill Dam and Highland Lake. With the destruction of the fish lift in 1996, these anadromous fish can no longer pass over the Smelt Hill Dam via the fish lift. Generally, it has been necessary to transport them from other areas (i.e. from below the recently removed Edwards Dam in Augusta). In addition, estimates by the Maine DMR have indicated that the habitat above Smelt Hill Dam (which includes Highland Lake) is capable of supporting over 150,000 alewives and 14,000 American shad (see letter dated April 12, 1999, Appendix D). Therefore, with the dam removed, it would be expected similar numbers of these species could become established in the lower Presumpscot River watershed.

Although during the last two seasons, river herring were able to pass Smelt Hill Dam by opening the existing gates and allowing run of river, this is not feasible as a long-term solution. Historically, the flows through the open gates have generally been too great for alewife passage. In addition, keeping the gates open during the high flow period creates a restriction that collects floating debris, which eventually clogs them. Therefore, to permanently maintain the existing alewife population, it is necessary to provide effective fish passage over Smelt Hill Dam.

It was also noted that the existing impoundment has not provided a significant warm water fishery due to historically poor water quality. It is also habitat limited in its potential to support a warm water fishery (based upon general morphology of the impounded channel, which minimizes, forage, and spawning substrate). Therefore, removal of the dam will have the effect of improving the ecosystem, and actually maximizing the fisheries potential of the existing reach by restoring flowing water (with its associated water quality improvements), and maintaining a natural riverine habitat. This will support many anadromous and stream dwelling fishes indigenous to the river.

Reintroduction of anadromous fishes to their previous spawning grounds will have a positive effect on the ecology of the freshwater portion of the Presumpscot River ecosystem. In freshwater areas where herring have been restored, studies show that resident fish populations were enhanced. The juvenile herring produced in the spawning run serve as food supply for bass and other resident and/or migratory fish species. All life stages of anadromous

herrings are important forage for many freshwater and marine fishes (i.e. striped bass); in addition, birds, amphibians, reptiles and mammals have also been documented as predators. The mortality of anadromous alewives also provides an important source of nutrients for headwater pons (e.g. Highland Lake).

In June of 1999, the floodgates at Smelt Hill Dam were opened, drawing down the impoundment and temporarily re-establishing free flowing run of river conditions in the lower Presumpscot River. During this time, it was possible to observe the physical characteristics of the affected reach of the river and estimate the potential habitat changes/improvements expected to occur with the dam removed. In October of 1999, representatives of the U.S. Army Corps of Engineers examined an approximate 2-mile stretch of the lower Presumpscot River under the temporary free flowing conditions (water level drawn down). Using the former high water mark as an indication of the normal impoundment water level, significant physical fish habitat characteristics occurring under the restored riverine conditions were noted. These included pool and riffle runs, slope of streambank and exposed bottom substrate (i.e. which could be observed without entering the river).

Exposed habitat within the observed two mile stretch ranged from rocky riffle runs in the area closer to the dam, to pool riffle combinations further upstream, combined with quieter pool areas. Generally, the rocky pool riffle combinations would provide holdover habitat for salmonid species, while the quieter areas could be used additionally for spawning by shad and other alosids. While much of the rocky areas would be scoured bedrock, sandier substrate was noted along the exposed areas in sections further upstream. This sandier substrate would provide better habitat for benthic fauna, used as forage by many stream dwelling fish species, as well as spawning for river dwelling smallmouth bass. Photographs of these areas are presented in Figures 3-12. In many of these photographs comparisons can be made between the former impounded water level, and the expected restored water level. It can be seen that the lowering of the water level exposes more riffle pool combinations characteristic of riverine habitat, than were formerly present under the impounded conditions. Also, many of the smaller riffle areas would be over topped by the water level in the impounded state.

Figure 3. Presumpscot River with water level drawn down approximately 0.5 miles upstream from Smelt Hill Dam, exposing rock and riffle run area.

Figure 4. Large pool area in Presumpscot River, in approximately 1- 1.5 miles upstream from Smelt Hill Dam, with sandy banks exposed by river drawdown.

Figure 5. Presumpscot River (with impoundment drawn down) downstream from Route 95 Bridge, showing riffle pool combinations.

Figure 6. Near view of riffle pool combinations shown in Figure 3 above.

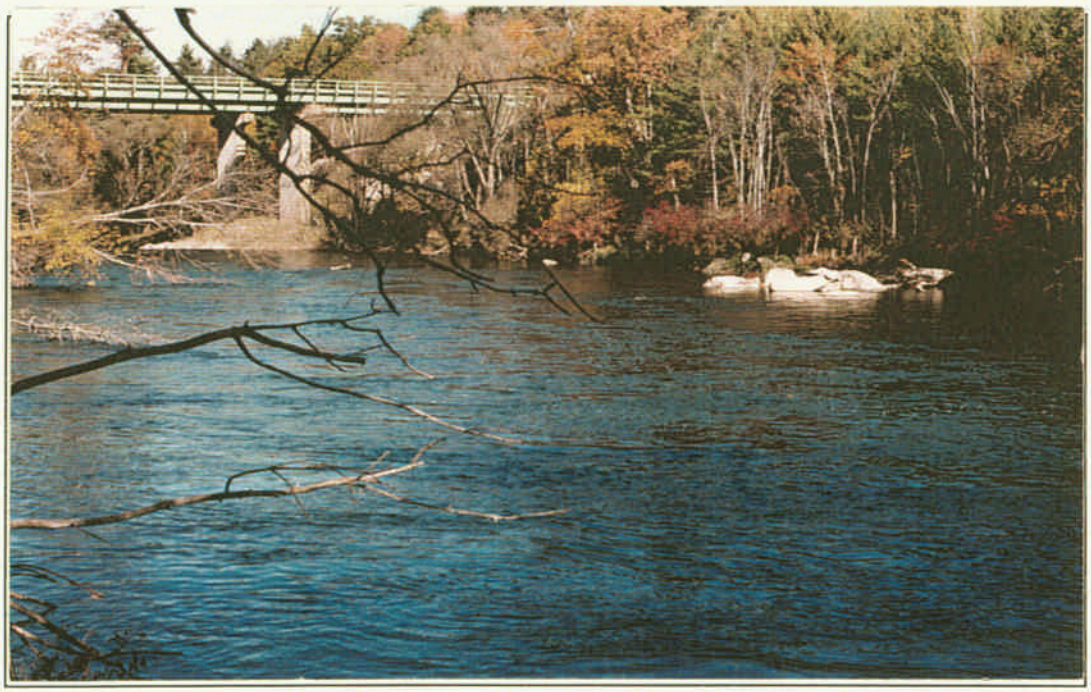

Figure 7. Presumpscot River with impoundment drawn down in reach between Route 100 Bridge and Smelt Hill Dam (approximately 1 upstream from dam) showing additional large pool, with riffle area.

Figure 8. Deeper water habitat at confluence of Presumpscot and Piscataqua rivers, approximately 1.5 miles upstream from Smelt Hill Dam.

Figure 9. Presumpscot River (with water level drawn) upstream from Smelt Hill Dam (in vicinity of confluence with Piscataqua River), showing quieter large pool area (potential shad spawning habitat).

Figure 10. Presumpscot River with water level drawn down, showing downstream side of Route 95 Bridge. Note water marks on bridge abutment, showing historic levels of impoundment.

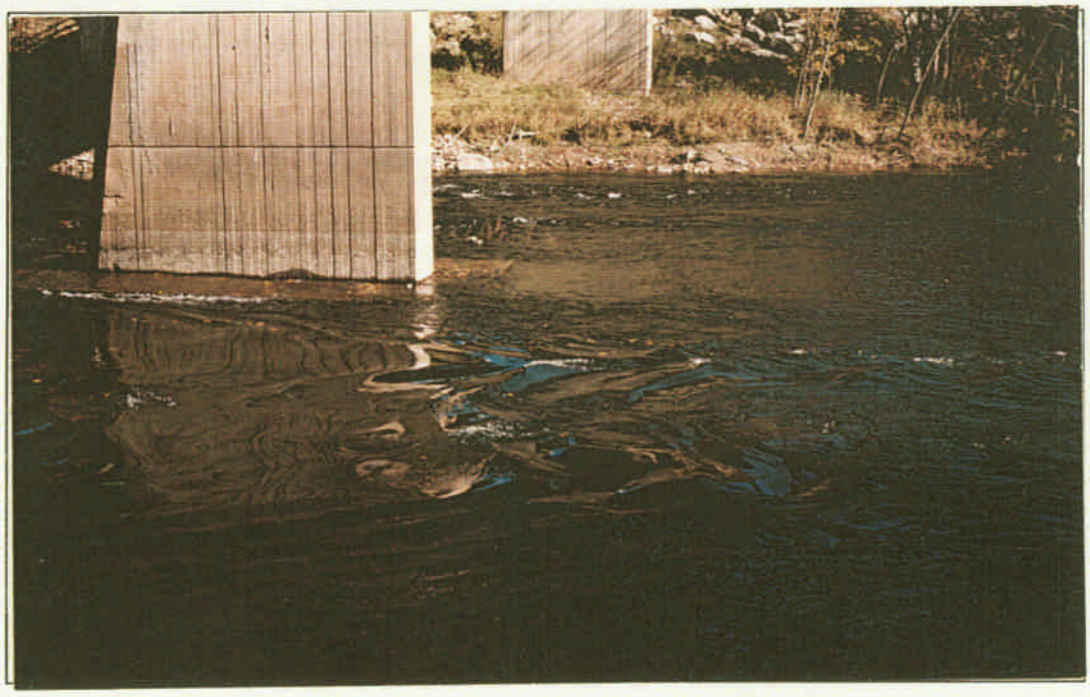

Figure 11. Pool area with small riffles, in Presumpscot River in area between Route 95 Bridge and Smelt Hill Dam. Note exposed banks, formerly underwater.

Figure 12. Additional riffle areas in Presumpscot River between Route 100 Bridge and Smelt Hill Dam. Note exposed banks on opposite shore indicating normal impoundment water level.

The following comparison table summarizes the effects of dam removal on the overall habitat for historic and existing species in the Presumpscot River.

Species	No Action (Dam in Place)	With Dam in Place and Fish Lift Restored	With Dam Removal	Net Effect	Future
Alewives	Upstream passage will be obstructed unless trucked.	Must use fish elevator. 85-90% efficient	Will be able to run naturally upriver. 100% efficient	Elimination of upstream barrier. Will allow 100% passage Efficiency	Will continue to populate upstream habitat. Improve lake fisheries and riverine fisheries.
Blueback Herring	Upstream passage will be obstructed	Must use fish elevator. 85%-90% efficient. Must compete with Alewives at fish trap.	Will be able to pass falls unimpeded. 100% efficient.	Elimination of upstream barriers will allow access to upstream spawning habitat.	May become established in other potential habitat areas, including Piscataqua River.
Shad	Upstream passage will be obstructed unless trucked.	Must use fish elevator. Can be outcompeted by Alewives in fish trap	Will be able to pass naturally upriver. 100% passage efficiency	Elimination of upstream barrier Will allow 100% passage and Access to upstream spawning areas.	Can become established in upstream areas of Presumpscot River. Below West brook. Can move into Piscataqua river.
Atlantic Salmon	Upstream passage will be obstructed unless trucked	Must use fish elevator. Not as effective as open passage	Will be able to pass unimpeded. 100% efficient	Elimination of upstream barriers Will allow access to historical/potential spawning areas below Westbrook, including those on Piscataqua.	First step in restoration of historical runs on river. Unless this dam is out potential/ historical Spawning areas cannot be accessed along remainder of river.
Smelt	Spawn below dam	Spawn below dam	Will be able to spawn in additional areas upstream from dam.	Will allow access to additional available smelt spawning habitat. Benefits to ecosystem	Will continue to benefit from increased spawning habitat. Population increase will benefit ecosystem.

Species	No Action (Dam in Place)	With Dam in Place and Fish Lift Restored	With Dam Removal	Net Effect	Future
Striped Bass	Upstream passage will be obstructed	Cannot pass effectively in Fish Traps	Can pass unimpeded to upstream areas. Can utilize available spawning and forage habitat	Will be able to access additional 5 miles previously inaccessible	Spawning population may potentially be established in 5 mile area upstream from dam.
Ameri-can Eel	Upstream passage will be hindered	Will pass less effectively in fish trap	Will be able to pass unimpeded to freshwater rearing habitat	Will be able to access additional 5 miles with increased efficiency	Population will be better established. Minimize competition at fish lift
Existing Fisheries					
Brown Trout	Sea run Brown trout will be unable to pass.	Marginal to poor habitat behind dam for trout holdover	Increased flow velocities, will increase dissolved oxygen and allow better holdover	Improved habitat for holdover and spawning. May use areas of colder water and faster flows	Self-sustaining population may become established.
Brook Trout	Sea run Brook trout will be unable to pass.	Marginal to poor habitat behind dam for trout holdover	Increased flow velocities, will increase dissolved oxygen and allow better holdover	Improved habitat for holdover and spawning. Will move into areas of colder water and faster flows.	Self sustaining population may become established.
Large-mouth and Small-mouth Bass	Will not have access to additional forage from anadromous River herring.	Marginal lacustrine habitat behind dam. Low DO, lower forage.	May move into quieter areas of better habitat.	May benefit by increased forage in river from alewives/shad	Habitat will be maximized for its potential as riverine, not artificially as lacustrine.

b. Shellfish - The primary area affected by the removal of Smelt Hill Dam will be the impoundment upstream from the dam. Since the dam is already at the head of tide, there should be no significant effect on the downstream shellfish habitat in terms of increased and/or decreased flows. During its former operation for hydroelectric power generation, the facility ran as run of river (i.e. water was not impounded and then released periodically). This condition will not change with the dam removed. Therefore, there should not be any significant hydraulic effect on the downstream environment. In addition, sampling in the immediate vicinity of the impoundment has indicated that there is very little fine-grained sediment present, with most of the bottom consisting of scoured bedrock. Therefore, it is unlikely that there will be any impacts from mobilization of sediments from behind the impoundment, due to the scarcity of these sediments. Also, chemical analysis of sediments that were collected from the margins of the impoundment has indicated that generally contaminant levels were lower than those downstream in the estuary, and were also below biological effects levels (see section on Environmental Consequences - Riverine Processes and Sediment Chemistry; above). Also, a recent sample collected from the margins of the impoundment further upstream from the dam, was analyzed for these same contaminants, as well as those not previously tested.. Results from this sample have also indicated

levels below those expected to have biological effects (see discussion in Environmental Consequences – Riverine Process and Sediment Chemistry noted above). Therefore, the removal of Smelt Hill Dam is not expected to have any significant adverse effect on the shellfish beds in estuary downstream.

E. Threatened and Endangered Species

Recent coordination with both the U.S. Fish and Wildlife Service and the National Marine Fisheries Service, has confirmed that with the exception of occasional transient bald eagles and peregrine falcons, there are no federally-listed or proposed threatened or endangered species in the project area under the jurisdiction of both these agencies (see letters dated 16 March 1999 and 10 March 1999; Appendix D). Therefore the removal of Smelt Hill Dam will not have any effect on threatened or endangered species, since they are not in the area.

F. An Assessment of the Effects of Dam Removal on Essential Fish Habitat

The Presumpscot River (included as the seawater mixing zone for the Casco Bay estuary) has been designated Essential Fish Habitat (EFH) for Atlantic Salmon, Atlantic herring and many groundfish species. Therefore any work required to remove the dam which will affect the water quality of the downstream environment will be timed within the construction windows designated by the National Marine Fisheries Service, and therefore will be unlikely to have an effect on this EFH. Most of these construction effects would be temporary increases in turbidity resulting from rock removal of the existing timber crib structure, possible disposal of this in the former intake canal, and the stabilization by rock placement. However, these will be temporary and of a short duration, as well as coordinated to be done within appropriate time windows in order to minimize any impacts to sensitive life stages of the above noted species (summer low flow period).

The removal of Smelt Hill Dam itself is not anticipated to cause any long term impacts to the EFH in Casco Bay for the above species, primarily because, 1) downstream flows will not be altered; 2) minimal sediments exist behind the dam in the impoundment; and 3) contaminant levels in these sediments are low compared to the existing levels downstream and below the biological effects levels (see Lee Dogget Memo noted in Environmental Consequences -Riverine Processes and Sediment Chemistry; above).

G. Historic and Archaeological Resources

The purpose of this study is to provide riparian habitat restoration in the vicinity of the Smelt Hill Dam along the Presumpscot River. This will entail the removal of the Smelt Hill Dam as the preferred alternative. The MHPC has determined that the Dam is not eligible for listing to the National Register of Historic Places, therefore, its removal will entail no effect upon significant historic resources as defined by the National Historic Preservation Act (NHPA) of 1966, as amended, and implementing regulations 36 CFR 800. Repair of the fish passage facility at the dam, if selected, would result in a no effect upon significant resources.

However, the removal of the dam will result in the lowering of the water level in the impoundment that is currently providing some level of protection to prehistoric site 8.10. The MHPC had noted some erosion at the site dating as far back as the 1936-46 water level. Dr. Arthur Spiess, Maine State Archaeologist, has noted in correspondence dated April 4, 1997, that site 8.10 is multi-component in nature, with material ranging from the Early to the Late Ceramic Periods in age. In a site visit in 1981, as part of FERC exemption proceedings, Dr. Spiess found that the site itself was eroded, but that the dam itself was probably not causing the ongoing erosion at the pool level that was proposed. Thus, while the existing pool level is not adversely affecting the site, a lowered pool level as a result of dam removal may cause erosion of the newly exposed, unvegetated surface of the site formerly under water. It has therefore been recommended that archaeologists monitor the site as the water level drops behind the dam, to conduct data recovery excavation of any archaeological features exposed, as well as to test the site for contents and integrity. These recommendations were provided by the MHPC, in response to a public meeting on February 17, 1999, by correspondence dated March 3, 1999.

Therefore, the removal of Smelt Hill Dam will result in an adverse effect upon a significant archaeological resource, Maine site number 8.10. As there is no prudent or feasible alternative to the removal of the dam for riparian habitat restoration, a Memorandum of Agreement (MOA) will be prepared that will outline the procedures and process to be followed for proper mitigation of this adverse impact as stipulated within 36 CFR 800.6(a)-(c). We will consult further with the MHPC and the Advisory Council on Historic Preservation (ACHP), concerning resolution and mitigation of the adverse effects and in the preparation of a MOA. Approval of this MOA by the District Engineer, MHPC, and, if necessary, the ACHP, would be required prior to project implementation, and would be a binding mitigation agreement. The MOA would spell out specific stipulations for the archaeological monitoring and potential data recovery investigations, to be conducted during the lowering of the impoundment. The coordination of survey results, reviews, dispute resolution, and any public involvement that may be required will also be stipulated.

Habitat restoration measures are not currently envisioned for banks upstream of the Presumpscot River. Erosion control fencing and a silt curtain will be placed alongside the west bank of the Presumpscot at a distance of approximately 40 feet upstream of the dam. This will minimize the impact of erosion from the construction of an access road alongside the present spillway and granite retaining wall. Impacts to archaeological resources are not anticipated, due to the previously disturbed context of the location from dam and ancillary construction. No other bank impacts are expected, based upon the current alternatives. Removal of the dam will be facilitated through the use of a temporary bridge, located at the current site of the concrete spillway building (which is to be removed), and installed between the right and left abutments. The dam will be removed in sequence from the west abutment to the east abutment, returning to the west shore for removal of the temporary bridge.

Based upon the currently preferred scenario of removal of the Smelt Hill Dam, no habitat restoration measures are expected upstream, in areas of archaeological potential. Consequently, additional investigations outside of the archaeological monitoring and data recovery for site 8.10 described above are not expected. However, the removal of the dam will result in an adverse effect upon a significant archaeological resource, and will be mitigated for as described above.

These provisions are in partial fulfillment of Section 106 of the NHPA and 36 CFR 800. The Maine State Historic Preservation Officer is expected to concur with these determinations.

H. Environmental Justice

The proposed removal of Smelt Hill Dam will not pose impacts upon any minority or low income neighborhoods adjacent to or in the vicinity of the project pursuant to Executive Order No 12898. The project involves removal of a dam and abandoned hydroelectric power generating facility to restore the historic riverine ecosystem and removal of blocks to anadromous fish migration. This will benefit the ecosystem and have a positive effect upon the fisheries. This will further benefit the recreational fishing population in general, including any low-income fishers that may be using the river for subsistence fishing.

I. Protection of Children

EO 13045 requires federal agencies to examine proposed actions to determine whether they will have disproportionately high and human health or safety risks on children. During the construction phase of the proposed project, heavy construction equipment and vehicles will be transported to the site. However, the actual site will be fenced off (as it is currently) to prevent unauthorized personnel from entering the work area (including children). In addition there will be a temporary increase in truck traffic transporting materials to and from the site. These trucks will be limited to the public roadways, and the existing project access road (right of way), and are therefore not expected to cause any disproportionate direct, indirect or cumulative impact to children associated with environmental health or safety risks. Construction itself is expected to last for approximately 3 months. Therefore this increased traffic will be for a short duration and temporary.

The proposed project will remove the dam and its impoundment (improving the aquatic ecosystem). It will also and remove the existing abandoned hydropower facility. The area is currently fenced off. It will become a restored reach of a historical river. Once the river is restored, the fencing will be removed, and the right of way will be eliminated. Public access to the restored section via the former right of way will no longer exist. Therefore the project is not expected to disproportionately impact children, since the area is currently not accessible, and will remain that way by the closure of the public right of way.

VIII. ACTIONS TAKEN TO MINIMIZE IMPACTS

During the construction phase of the proposed project erosion control fencing and silt curtain will be placed alongside the west bank of the Presumpscot, (the side of active construction) in order to minimize turbidity impacts to the aquatic environment. In addition, the construction windows recommended by the National Marine Fisheries Service will be followed. Also, the work will be done during the low flow period of the river, which will further minimize adverse

effects to the surrounding and downstream aquatic environment. The net result of the dam removal will be a restoration/improvement of a degraded aquatic habitat.

The possible adverse effects of dam removal to the long-term stability of prehistoric site 8.10 noted above will be mitigated for as noted in the section on Archaeological Resources.

IX. COORDINATION

A. Personal Communication

The following persons were coordinated with in the preparation of this report.

1. Mr. Thomas S. Squiers, Maine Dept. of Marine Resources, Augusta, Maine
2. Mr. Dana Murch, Maine Department of Environmental Protection, Dam and Hydro Supervisor, Augusta Maine.
3. Mr. John Boland, Maine Division of Inland Fisheries and Wildlife, Grey, Maine.
4. Mr. Gordon Russell, U.S. Fish and Wildlife Service, Old Town Maine.
5. Mr. Lou Charella, National Marine Fisheries Service, Gloucester Massachusetts.
6. Mr. Francis Brautigham, Maine Division of Inland Fisheries and Wildlife, Grey, Maine

B. Site Visit

A coordinated site visit was made by Corps of Engineers personnel on February 17, 1999. The attendance list is included in the EA. The following personnel were in attendance:

Mr. Arnold Banner, USFWS
Mr. Dana Murch, ME DEP
Mr. Gordan Russell, USFWS
Mr. John Boland, ME DIFW
Mr. John Kedzierski, USACE Planning Branch
Mr. Ken Levitt, USACE Evaluation Branch
Mr. Larry Miller, USFWS
Mr. Lou Chiarella, NMFS
Mr. Lou Flagg, ME DMR
Mr. Steve Timpano ME DIFW
Ms. Diane Gould USEPA
Ms. Jennie Bridge USEPA
Ms. Lois Winter, USFWS

C . Correspondence

1. Coordination Letters

Project Coordination Letters were mailed to following people prior to the preparation of this report pursuant to the Federal Fish and Wildlife Coordination Act, Federal Endangered Species Act, and the National Historic Preservation Act:

Coord. Site Visit / 2/17
Public Meeting

Attendance List

John Kedzierski	Corps of Engineers.	978-318-8521
Ken Leuzt	Corps of Engineers	978-318-8114
DANA MURCH	ME DEP	207 287 3901
DAVID GRYGIEL	Riverside Golf Course, Portland	207-797-3524
STEVE SPENCE	BPL 22 S45 Avenue	087 4920
Katherine Groves	Casco Bay Estuary Project	780-4820
LEWIS FLAGG	MAINE DMR	624-6341
JERRY RIDEOUT		878 3300
Diane Gould	US EPA	617/918-1569
Jennie Bridge	US EPA	617/918-1685
Deeste Faucher	Friends of the Presumpscot	207-892-8381
Sandra Cort	"	207-892-5224
Lou Chiarella	NMFS	978-281-9277
Tim Fish	Woodard & Curran	800-462-4862
Steve Timpano	**MDIFW**	**(207) 287-3286**
Larry Miller	USFWS	(207) 827-5938
GORDON RUSSELL	USFWS	"
JOE PAYNE	FRIENDS of CASCO BAY	207 799-8574
Larry Ely	Falmouth Cons. Comm.	207-878-1231
LINDA MOUTELL	Resident Deardam	207-878-9024
Michael Murphy	Central Maine Power	207 621-4499
Arnold Banner	USFWS	207-781-8364
Lois Winter	USFWS-Gulf of Me Program	207-781-8364
JOHN MACKINNON	WATERSHED SOLUTIONS	207-829-4730
HOWARD REICHE	NEIGHBOR	207-797-5137
Bob Patton	"	797-7242
David Polansky	"	791-[illegible]9645

Jeff McEvoy	Natural Resources Council of Me	622-3101
Karen B. Clarke	Falmouth Conservation Commission	781-359
Robert Clark	Town of Falmouth	781-41162
Brad Roland	City of Portland	874-8846
William B. Goodwin	Portland Public Works Env. Engineering	874-8820
Chris Franklin	38 Bramhall Portland	773-88
Pat Kelleher	CCA-ME	846-1015
Rob Bryan	Maine Audubon Soc.	781-2330
DANA SOUZA	City of Portland Parks/Rec	874-8793
Mike Tomas	CMPCo	727-306
Chuck Gregory	Friends of Casco Bay	767-9509

Mr. Michael Bartlett
U.S. Department of the Interior, Ecological Services
22 Bridge Street, Ralph Pill Bldg., 4th Floor
Concord, New Hampshire 03301

Mr. Steve Timpano
Maine Department of Inland Fisheries and Wildlife
State House Station
Augusta, Maine 04333

Dr. Arthur Spiess
State Archaeologist
Maine Historic Preservation Commission
65 State House Station
Augusta, Maine 04333

Mr. Chris Mantzaris
National Marine Fisheries Service
Northeast Region
One Blackburn Drive
Gloucester, Massachusetts 01930-2298

1. Information Letters

Letters announcing the Coordinated Site Visit were sent the following people prior to the preparation of this report:

Mr. Gordon Russell
U.S. Fish and Wildlife Service
1033 South Main Street
Old Town, Maine 04468

Mr..John Boland
Regional Fisheries Biologist
Maine Department of Inland Fisheries and Wildlife
RR1, 358 Shaker Road
Gray, Maine 04039

Mr. Lewis Flagg
Stock Enhancement Division
Department of Marine Resources
21 State House Station
Augusta, Maine 04333

Ms. Sarah Evans
Department of Conservation
State House Station #93
Augusta, Maine, 04333

Mr. Edward O. Sullivan
Maine Department of Environmental Protection
AMHI Complex, Ray Building
State House Station #17
Augusta, Maine, 04333

Mr. Dan Arsenault
U.S. Environmental Protection Agency - Region 1
JFK Federal Building
Boston, Massachusetts 02203

Mr. Paul Van Cott, Director
Department of Environmental Protection
312 Canco Road
Portland, Maine 04333

Mr. Dana Murch
Department of Environmental Protection
Dams and Hydro Supervisor
17 State House Station
Augusta, Maine 04333

Mr. Don Kale
Division of Watershed Management
312 Canco Road
Portland, Maine 04103

Mr. Pat Keliher
Coastal Conservation Association
40 Lafayette Street
Yarmouth, Maine 04096

Mr. Michael Murphy, Manager
Environmental Services
Central Maine Power Company
41 Anthony Avenue
Augusta, Maine 04330

Mr. Phil Bozenhard
Regional Wildlife Biologist
Maine Department of Inland Fisheries and Wildlife
RR 1, 358 Shaker Road
Gray, Maine 04333

Ms. Betsy Elder
State Planning Office
38 State House Station
Augusta, Maine 04333

Mr. Stewart Feffer
U.S. Fish and Wildlife Service
Gulf of MaineCoastal and Estuary Project
4 R Fundy Road
Falmouth, Maine 04105

Mr. George Hannum
Department of Conservation
22 State House Station
Augusta, Maine 04333

Mr. Lou Charella
National Marine Fisheries Service
Northeast Region
One Blackburn Drive
Gloucester, Massachusetts 01930-2298

Ms. Dusti Faucher
Friends of Presumpscot River
7 Covered Bridge Road
Windham, Maine 04062

Mr. Will Plumley
Presumpscot River Watershed Alliance
c/oFriends of Presumpscot River
PO Box 223
South Windham, Maine 04082

Ms. Jennifer Cost
Staff Attorney
Maine Audubon Society
PO Box 6009
Falmouth, Maine 04105

Ms. Katherine Groves
Director
Casco Bay Estuary Project
PO Box 9300
Portland, Maine 04102

Mr. Joe Payne, Bay Keeper
Friends of Casco Bay
2 Fort Road
South Portland, Maine 04106

Mr. John D. Harris
Town Manager
Town of Falmouth
271 Falmouth Road
Falmouth, Maine 04105-2098

3. Public Notice

A public notice describing the Project was distributed on November 30, 2000. A copy is included in this section of the Environmental Assessment.

4. Public Meeting

A Public Meeting was held on October 26, 2000 at Falmouth Town Hall to discuss the project. The attendance list is included in this section of the Environmental Assessment.

5. Distribution of the Draft Report

Copies of a draft of this report were provided to those on the "Smelt Hill Dam Report Distribution List". The final report shall be sent to the same parties.

6. Correspondence Received (see also Appendix D of the separately bound Technical Appendices).

a. Comments on Draft Report and EA

1. Central Maine Power Company, November 9, 2000

2. E-Mail from Robert Patton, November 30, 2000

3. Michael J. Bartlett, USFWS, November 27, 2000

4. Norman R. Dube, State of Maine, Atlantic Salmon Commission, November 28, 2000

US Army Corps
of Engineers®
New England District

News Release

Date: November 2, 2000 For Immediate Release
Release No. 2001-016
Contact Sue Douglas, 978-318-8264
susan.i.douglas@usace.army.mil
696 Virginia Road, Concord, Massachusetts 01742-2751

Report Issued, Comments Sought on Smelt Hill Dam Removal

CONCORD, Mass. – The U.S. Army Corps of Engineers has released the findings of a study about restoring the ecology of the Presumpscot River and has found the best solution, from both environmental and economic standpoints, is to remove the Smelt Hill Dam in Falmouth, Maine.

"We evaluated three alternatives during our investigation. These included partial removal of Smelt Hill Dam, complete removal of the dam, and rehabilitation of an existing hydraulic fish lift," said William Mullen, study manager for the Corps of Engineers' New England District. The existing fish lift was constructed in the 1980s and was heavily damaged during the October 1996 flood to such an extent that it is no longer serviceable.

The environmental and economic analyses found that the optimum plan would be complete removal of the dam. This would allow restoration of the existing 80-acre warm water impoundment to seven miles of riffle and pool complexes of high quality habitat more suitable for cold water fisheries migration and spawning. It is expected that around 33,000 anadromous river herring would pass upstream to Highland Lake annually once the dam is removed.

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A dam has been in place at the Smelt Hill Dam location since 1732, making the waters upstream of the impoundment more suitable for warm water rather than anadromous fish. The currently inoperable fish ladder was installed to assist species such as alewives and blueback herring to travel upstream for spawning. Since the failure of the ladder, getting these species upstream has involved either trucking from the Kennebec River (12 miles away) or opening the dam's outlet gates during the spring migration season. These efforts have only been partially successful, and those that do make it are preyed upon by the abundant warm water fishery population.

The dam removal would cost approximately $1 million, with the federal government contributing 65%, and the nonfederal sponsor, the Maine Department of Environmental Protection, contributing the remaining 35%. Much or all of the state's share is expected to be in credit it will receive by purchasing the dam and land upon which it sits. Work could begin as early as September 2001 and would take four months to complete.

Copies of the Corps of Engineers study findings may be reviewed at the Falmouth Town Library or a copy may be requested from Mr. Mullen at the New England District, U.S. Army Corps of Engineers, 696 Virginia Road, Concord, MA 01742-2751, telephone 978-318-8559, e-mail william.j.mullen@usace.army.mil. Public comments on the report will be accepted until November 30, 2000.

-30-

Attendance at Oct. 26, 2000 Smelt Hill Dam Removal Meeting

Name/Org.	Address	Tel. No.
Geoff Pellechia / Katahdin Analytical	340 County Rd. No. 5 Westbrook, ME 04092	207/874-2400 gpellechia@katahdinlab.com
Michael Murphy / EPRO Consulting (representing CMP)	41 Anthony Ave Augusta ME 04330	207 621-7080 mmurphy@eproconsulting.com
Watson L Walden	8. Pleasant Hill Rd.	772-4912
John H. Northrop	110 Winn Rd, Falmouth ME	878-2806
Robert Clark	Town of Falmouth	781-4462
Paul Christman	Atlantic Salmon Com. 220 Lyons Rd Sidney.	547-5326
ALAN J GRAVES	65 KENSINGTON ST	PWM 04103
Bob Patton	22 Lower Falls Rd.	7977242
HOWARD GEICIUS	67 ALLEN AVE EXT FAL	797-5137
Lois WINTER / Gulf of ME Program, USFWS	4R FUNDY RD. FALMOUTH,	781-8364
GORDON RUSSELL - U.S. Fish & Wildlife Service	1033 S. Main St, Old Town, ME	827-5938
FRED DILLON - PRESUMPSCOT RIVER WATCH	- 5 DAVIS ST., PORTLAND, ME 04102	774-6476/ fdillon/maine.rr.com
Dr Lobb Heldenbrand	2 Bay Rd South Portland 04106	799-2312
WAYNE MUNROE, NRCS,	381 MAIN St Gorham, ME 04038	207-839-7839 ext 101 (Great Job with the Fish Ways)

Attendance at Oct. 26, 2000 Smelt Hill Dam Removal Meeting

Name/Org	Address	Tel. No.
Amy Decker/Katahdin Analytical	340 county Rd #5 Westbrook, ME 04092	874-2400 adecker@katahdinlab.com
Sandy Cort Friends of Presumpscot	Box 223 So Windham	bjcort@jaoanet.com 04082
Dusti Faucher " " "	7 Covered Bridge Rd Windham	04062
Mike Cooney	340 County Rd #5 Westbrook, ME 04092	874-2400
John Wathen DEP	312 Canco Rd, Port. 04103	822-6300
Christopher Di Matteo	Portland Parks & Recreation, 14 Ahern St, Portland, 04103	874-8793
Dick Anderson	Coastal Conservation Association	846-1015
Lawton Hamilton	320 Falmouth Rd	781 4346
Bill McKenney	34 Ramsdell Rd. Fal.	781.4519
Charles Scribner	22 Macdonald Landing Falmouth, Maine	04105
John Burton	158 Curtis Rd Portland Me.	797-6937
David & Bernadette Polansky	20 Lower Falls Rd Falm.	797-9645
Norm Dube/ASC	650 State St. Bangor	941-4453
Megan Shore CCA	40 Lafayette St Yarmouth	846/015
Tom Howard	[redacted] Cumberland St Westbrook	04092 856-4286

John Burrows Atlantic Salmon Federation Ft. Andross, Ste 308 Brunswick, ME 04011

Mullen

October 5, 2000

Engineering/Planning Division
Planning Branch

«LastName»
«Company»
«address_2»
«Address1»
«City»

«State»

Enclosed for your review and comment is the two-volume draft copy of the "Smelt Hill Environmental Restoration Study – Falmouth, Maine". The draft report discusses a proposal to remove Smelt Hill Dam, the most downstream dam on the Presumpscot River, under the U.S. Army Corps of Engineers (Corps) Section 206 Program. The State of Maine Department of Environmental Protection (DEP) is the non-Federal sponsor of this project. Comments on this report should be addressed to the attention of the Study Manager, Mr. Bill Mullen, U.S. Army Corps of Engineers, New England District, 696 Virginia Road, Concord, Massachusetts 01742-2751. Comments will be accepted until November 6, 2000.

A Public Meeting, co-hosted by the Corps and DEP, shall be held at 10:00 a.m. on Thursday, October 26, 2000, in the Council Room of Falmouth Town Hall, 271 Falmouth Road, Falmouth, Maine, to discuss the proposed project.

If there are any questions on the draft report or the meeting, please contact Mr. Mullen at 978-318-8559.

Sincerely,

John R. Kennelly
Deputy Chief, Engineering/Planning Division

Enclosures

SMELT HILL DAM REPORT DISTRIBUTION LIST –
January 5, 2001

Martha Kirkpatrick, Commissioner
Department of Environmental Protection
17 State House Station
Augusta, ME 04333

David Van Wie, Director
Bureau of Land & Water Quality
Department of Environmental Protection
17 State House Station
Augusta, ME 04333

Dana Paul Murch
Department of Environmental Protection
Dams & Hydro Supervisor
17 State House Station
Augusta, ME 04333

Don Kale
Division of Watershed Management
Department of Environmental Protection
312 Canco Road
Portland, ME 04103

Dan Davis
Louis Berger Group
75 Second Ave., suite 700
Needham, MA 02494

Pat Keliher
Executive Director
Coastal Conservation Association
40 Lafayette Street
Yarmouth, ME 04096

Michael Murphy
E/PRO Engineering & Environmental Consulting
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Augusta, ME 04330

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PO Box 5000
Westbrook, ME 04098

Tom Howard, Project Engineer
SAPPI–S.D. Warren
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Westbrook, ME 04098

Tom Squires, Director
Stock Enhancement Division
Department of Marine Resources
21 State House Station
Augusta, ME 04333

Gordon Russell
U.S. Fish & Wildlife Service
1033 South Main Street
Old Town, ME 04468

Stuart Fefer
U.S. Fish & Wildlife Service
Gulf of Maine Coastal Program
4R Fundy Road
Falmouth, ME 04105

Ralph Abele
U.S. Environmental Protection Agency
1 Congress Street-Suite 1100
Mail Code CWQ
Boston, MA 02114-2023

Jennie Bridge
U.S. Environmental Protection Agency
1 Congress Street-Suite 1100
MailCode CME
Boston, MA 02114-2023

John Kurland
National Marine Fisheries Service
Northeast Region
One Blackburn Drive
Gloucester, MA 01930-2298

Steve Timpano
Environmental Coordinator
Dept. of Inland Fisheries & Wildlife
41 State House Station
Augusta, ME 04333

John Boland
Regional Fisheries Biologist
Dept. of Inland Fisheries & Wildlife
RR 1, 358 Shaker Road
Gray, ME 04039

Phil Bozenhard
Regional Wildlife Biologist
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\smelt hill list

Central Maine Power Company
83 Edison Drive, Augusta, Maine 04336 (207) 623-3521
Real Estate Services

November 9, 2000

Colonel Brian E. Osterndorf
US Army Corps of Engineers
New England District
696 Virginia Road
Concord, MA 01742-2751

RE: Smelt Hill Dam, Falmouth, ME

Dear Colonel Osterndorf:

Please accept this letter as Central Maine Power Company's response to the October 30, 2000 Public Notice issued by the Army Corps of Engineers regarding the removal of the Smelt Hill Dam.

Central Maine Power is the current owner of the Smelt Hill Dam and Powerhouse in Falmouth, Maine. The powerhouse became inoperative after the October, 1996 flood. As a result of the flood, and the required electric utility deregulation in the State of Maine, CMP decided to sell the project rather than rehabilitate it. Although, CMP had the opportunity to sell the project to others that were interested in rehabilitating both the powerhouse and the fish lift, CMP agreed to sell the Dam to the State of Maine in order to allow its ultimate removal.

We are submitting our comments to show our support for the Army Corps proposal to remove the project, but we would like to make one clarification to your Public Notice. In that notice, you state: "It is presently economically infeasible to rehabilitate the damaged powerhouse and fish lift." This is not an accurate statement. CMP could choose to sell the project to an entity that would rehabilitate the powerhouse and fish lift and in fact has received offers to do just that. In light of the State and Public interest in purchasing and removing the project, however, CMP has agreed to forego selling the project for purposes of generating power and instead will sell it to the State of Maine for purposes of removal.

Thank you for this opportunity to provide you with these comments. We remain eager to work with you and look forward to the ultimate completion of your efforts. If you have any questions regarding CMP's position you can call me at (207) 621-4753

Sincerely,

Kenneth Freye

Kenneth Freye
Manager Property Management

Mullen, William J NAE

From: Murch, Dana P [Dana.P.Murch@state.me.us]
Sent: Thursday, November 30, 2000 04:32 PM
To: 'Robert_Patton@fpl.com'
Cc: Mullen, William J NAE
Subject: RE: Smelt Hill Dam response

Bob, thank you for your comments. I am forwarding them to Bill Mullen at the Corps of Engineers. Dana

-----Original Message-----
From: Robert_Patton@fpl.com [mailto:Robert_Patton@fpl.com]
Sent: Thursday, November 30, 2000 2:52 PM
To: Murch, Dana P
Subject: Smelt Hill Dam response

Dana, I'm hoping this e-mail qualifies as a written response to the proposed removal of the Smelt Hill Dam. If necessary, please forward it to the appropriate person.

As an abutter to the project, I am thrilled at the prospect of the dam being removed, and the sooner, the better. Although I will miss the noise of the water falling over the dam, I believe the positive benefits of removing the dam far outweigh the negative. My main points on the removal are as follows:

The access easement to the dam is narrowly written for the construction, operation and maintenance of a hydro electric facility. All agree that once the dam is removed, the access will also terminate. The gravel access road goes only to the dam parcel, and crosses four seperate parcels of land before it gets there. The proposed Plan does not address the removal of the road. The best solution may be to re-grade the road gravel to more closely match the existing slope, then loam and seed. I can't speak for the other landowners, but I know I could take care of it from there.

The access easement to the dam is an encumberance on my land whether the dam is there or not. For example, should another dam be constructed on this site in 50 years, I assume this access could be re-opened and used. Sure, the chances are slim, but it is possible. I suggest the State grant a release of the access easement to the four encumbered landowners upon cmopletion of the project.

Similarly, Central Maine Power Company has a distribution line easement along the access road for power and telephone into and out of the dam site. These should be released as well.

The text describing the site after the dam removal states that a guard rail or fence will be constructed adjacent to the road within the powerhouse parcel. It seems the firm that put together the plan was unaware that the road is to be removed. The guard rail or fence is unnessessary after the road is removed.

Some of the positive benefts of removing the dam are increased recreational opportuities in the river. The cross section of the dam as represented in the plan seems to show that the profile of the original falls, now directly under the dam, has a sharp downstream edge and vertical fall. When the dam is removed, it appears water will course along the original ledge now under the dam and drop vertically over the edge. This may create a potential recreational hazard, as

water dropping over a vertical face can create a recirculating current that traps swimmers or boaters unlucky enough to get caught. I believe Pennsylvania has a dam infamous for its victims. A person versed in hydraulics should review the resulting falls at Smelt Hill for potential recreational hazards.

The October storm that crippled Smelt Hill also tore a walkway from one of its abutments and washed it downstream a couple hundred feet. At low tide, the handrails from the walkway protrude about two and a half feet above the water, and the rails are a hazard to outboard lower units. The plans for the dam removal should include the removal of the walkway.

The dam abutments contain two mill wheels from one of the original mills located at the site. These wheels have historical significance, and shouldn't be lost. At this December's neighborhood Christmas party, I will discuss with my neighbors a permanent resting place for one of the wheels at the head of our neighborhood. I will keep you informed if we are willing to use one.

These comments are in addition to my comments made at the recent public hearing on the dam removal. Thank you for the opportunity to include my comments, and let me say that my neighbors and I are wholly behind your efferts to remove the dam. Good work and good luck!

United States Department of the Interior

FISH AND WILDLIFE SERVICE

New England Field Office
22 Bridge Street, Unit #1
Concord, New Hampshire 03301-4986

REF: Smelt Hill Dam Environmental Restoration Study, Falmouth, ME — November 27, 2000
Ecological Restoration Report/Environmental Assessment

Mr. John R. Kennelly, Deputy Chief
Engineering/Planning Division
New England District
U.S. Army Corps of Engineers
696 Virginia Road
Concord, Massachusetts 01742-2751

Dear Mr. Kennelly:

We have reviewed the U.S. Army Corps of Engineers' two-volume draft of the Smelt Hill Dam Environmental Restoration Study - Falmouth, Maine. The draft report and Environmental Assessment (EA) were prepared under Section 206 of the Water Resources Development Act of 1996 (WRDA), and evaluate removal of Smelt Hill Dam, an action that would result in the restoration of seven miles of the lower Presumpscot River. The following comments are provided in accordance with the Fish and Wildlife Coordination Act (48 stat. 401, as amended; 16 U.S.C. 661 et seq.), and supplement our earlier reports to the Corps on this project, dated March 10, 1999 and March 20, 2000.

General Comments

We support the Corps' findings in the draft report and EA, which conclude that complete removal of the dam is the preferred alternative for restoring the lower seven miles of the Presumpscot River. The restoration project, which is to be accomplished in partnership with the state of Maine and others, will benefit a number of migratory fish species, including alewife, blueback herring, American shad, striped bass, rainbow smelt, Atlantic salmon, and American eel. As was mentioned in our previous comments on this project, achieving the environmental restoration goals for the Presumpscot River watershed that have been identified by the Corps and its cooperating agencies and non-governmental partners will require removal of additional dams and/or provision of fish passage facilities at upstream hydroelectric facilities. The Corps should acknowledge in its final report that the removal of Smelt Hill Dam is only the initial step in a much larger effort that will be required to achieve meaningful ecological restoration in the drainage.

Specific Comments

2.3 Future Without Project Conditions (also applies to Sec. 4.2, Without Project Alternative)

As discussed in our previous comments to the Corps, Smelt Hill Dam remains under the jurisdiction of the Federal Energy Regulatory Commission (FERC). The Corps should not assume in its report and EA that the Without Project conditions would result in no improvements in fish passage at the site. The FERC has the authority, using existing requirements for fish passage at the project, to order that the existing inoperable fish lift be repaired and maintained to allow for passage of alewives and other species.

3.1 Planning Objectives

1) As discussed elsewhere in the report, the seven-mile segment of the river that would be restored through removal of Smelt Hill Dam may contain limited habitat for resident and migratory fish due to gradient and substrate (predominance of scoured bedrock). Most of the high quality spawning and rearing habitat for migratory fish is located farther upstream in the main stem and tributaries. Restored use of such habitat will require additional dam removals and/or installation of upstream and downstream fish passage facilities at multiple hydropower dams in the drainage.

2) Restoration goals should focus on reestablishing a corridor for migratory fishes (alewife and blueback herring, American shad, Atlantic salmon, striped bass and rainbow smelt) immediately above the Smelt Hill Dam site. There is likely little potential for resident salmonid fisheries in the seven-mile reach above the dam due to limitations in suitable habitat, including water quality.

3) It is unclear to what extent existing "warmwater fish" (i.e., non-salmonid species) constitute a potential threat to migratory fish populations. The Corps concludes that much of the habitat potential above the dam is limited due to gradient and substrate. One would not expect large populations of predatory fish under such conditions.

4.2 Without Project Condition

See above comments on Future Without Project Conditions.

4.2.3.1 Water Quality

The statement on page 9 that wastewater discharges (cumulative total of 25 MGD or 38 cfs) account for much of the water in the river during low flow periods is not corroborated by gaging data (Table 4.2.2-1, page 8). Mean flow during July - September (the normal low flow period) is 650 cfs.

The report states that water quality conditions are degraded in the hydroelectric impoundments upstream from Smelt Hill Dam. This suggests that ecosystem restoration in the Presumpscot River watershed will involve more than simple removal of the lowermost barrier. Additional dam removals and other measures will be necessary to restore access for migratory fish and habitat quality in upstream waters.

4.2.3.2 Sediment Quality

PAH stands for polycyclic aromatic hydrocarbons (not polynuclear).

4.2.3.3 Benthic Environment

The report indicates that most of the impoundment substrate is scoured bedrock (page 11). This would appear to limit potential habitat restoration with removal of the dam (as opposed to restoration of a zone of passage for migratory fish). Photos and discussion elsewhere in the report indicate that only the first mile above the dam consists of bedrock substrate, with the remaining six miles being more of a pool environment with softer sediments. The Corps should clarify its description of the benthic environment throughout the entire impounded area.

4.3.1(a) Partial Dam Removal

The terms "lentic" and "warmwater" are not synonymous. Lentic simply describes conditions in natural or artificial lakes and ponds, including riverine impoundments. The words "warmwater fish" typically connote non-salmonid species or fishes not expected to occur with salmon and trout (e.g., largemouth bass). So-called warmwater species occur in a variety of habitats, including free-flowing rivers and streams. Similarly, "coldwater" fishes can occur in lentic environments, and are not confined to riverine riffles, pools and runs (i.e., lotic conditions).

The report states that a run of 33,000 alewives would be expected with dam removal or installation of fish passage. (This disagrees with the numbers on page 31 in the EA.) As stated in our previous correspondence, cited above, the Presumpscot River could support runs of 150,000 alewives and 14,000 shad, based on quantities of suitable habitat upstream from Smelt Hill Dam. The Corps should use the numbers displayed in its EA.

The expected extent of tidal flow without the dam should be given in the report. Based on information elsewhere in the report, it would appear that tidal flow would not be expected beyond the first mile above the dam site.

4.3.2 Rehabilitation of the Fish Lift at the Dam

If the Corps does not proceed with the removal of the dam, the FERC would require that the fish lift at the dam be repaired and operated. The burden of rehabilitating the fish lift would fall to the current

exemption holder for the site (Central Maine Power Company), not the state sponsor of the dam removal project.

5.2 Environmental Benefits

1) Barrier removal: the Corps should indicate whether there will be a natural ledge falls after the dam is removed, and if there would still be a barrier for some migratory fish, particularly at low tide levels.

2) Potential habitat restoration: restoration of high quality habitat may require additional measures to reduce wastewater discharges or remove potentially contaminated sediments (especially in the upper areas of the impoundment); it is unlikely that dam removal will restore more than the lowermost mile above the dam to riffle and pool complexes; conditions above the I-95 crossing are not likely to change; dam removal is unlikely to restore spawning habitat for migratory species, such as alewife, shad or salmon; additional dam removals and/or installation of fishways at upstream dams will be needed to achieve access to historic spawning and nursery habitat.

3) Potential for predation on migratory fish: the Corps should specify which resident species are likely to prey on migratory fish; it also should be recognized that juvenile migratory fish (shad and river herring) constitute an important source of forage for striped bass, one of the other species expected to benefit from removal of the dam.

5.4 Incremental Analysis

We recognize that the Corps' needs to perform an incremental analysis for this project under the provisions of the WRDA. However, much of the benefit of removing the dam involves restoring a zone of passage for all migratory species, including those that do not use fishways (striped bass, smelt) and others that are negatively affected by multiple barriers (shad, river herring, salmon and eels). The Corps' incremental analysis in this case results in benefits expressed as habitat units, which is misleading due to the fact that improved passage will be the major outcome of removing the dam.

6.2/6.3 Planning and Execution of Actual Dam Removal

The Corps should provide more details on the actual removal process. Information should be provided on the use and design of coffer dams or other temporary fill in the river. The Corps also should specify whether it anticipates that demolition would be accomplished via blasting or hydraulic hammering. Provisions will likely be needed to avoid sensitive times of the year, such as upstream or downstream migration periods. The Corps' proposed initiation of removal activities in September could conflict with the annual downstream migration of alewives. We recommend coordination with the Service and state fish and wildlife agencies as the Corps develops its final dam removal plans.

Thank you for the opportunity to comment on the Corps' report and EA on the Smelt Hill Dam removal project. If you have any questions, please contact Gordon Russell at (207) 827-5938.

Sincerely yours,

Michael J. Bartlett
Supervisor
New England Field Office

cc: FERC, Wash., D.C. (OHL-DPCA)
FERC, NY Reg. Office
ME DEP, Augusta (Dana Murch)
ME IFW, Augusta (Steve Timpano)
ME DMR, Augusta (Tom Squiers)
ME ASC, Bangor (Norm Dube)
GOMP, Falmouth (Stewart Fefer/Lois Winter)
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Angus. S. King, Governor

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Frederick W. Kircheis
Executive Director

November 28, 2000

Mr. Bill Mullen, Study Manager
U.S. Army Corps of Engineers
New England District,
696 Virginia Road,
Concord, MA 01742-2751

RE: Smelt Hill Dam Environmental Study – Falmouth, Maine
Ecological Restoration Report/Environmental Assessment

Dear Mr. Mullen:

The Atlantic Salmon Commission has reviewed the report entitled "Smelt Hill Dam Environmental Study – Falmouth, Maine" and offers several comments. The ASC supports the removal of the Smelt Hill Dam on the Presumpscot River. Removal of the structure will restore the lower seven-mile segment of the Presumpscot River above the dam to its free flowing condition. Such an action will improve the opportunity for the restoration of Atlantic salmon to historical spawning and nursery areas in the lower seven miles of the Presumpscot River (below the Cumberland Dam) and into lower mainstem tributaries such as the Piscataqua River.

Old dams such as the Smelt Hill project were rarely configured with fish passage in mind and, consequently, they seldom provided effective upstream and downstream fish passage. Atlantic salmon will benefit by the elimination of upstream fish passage inefficiencies associated with the present dam and existing fish passage facility (presently inoperable due to flood damage). The Corps correctly identified that with removal of the dam, upstream fish passage will be unimpeded and thus, 100% efficient. The report also states that removal of the barrier will allow access to historical/potential spawning areas below Westbrook, including the Piscataqua River. The ASC concurs with these conclusions.

The report falls short in that it does not identify benefits to downstream migrants and the elimination of potential downstream mortality at the Smelt Hill Dam. The loss of Atlantic salmon smolts passing through turbines can be significant as can injuries or death while negotiating spillways and tailraces. The report needs to identify the elimination of downstream mortality (and resultant increased smolt survival to the estuary) at the Smelt Hill Dam as an additional benefit to removal of the structure. The report did identify a significant reduction in or the elimination of warm water fish

populations in the vicinity of the former impoundment that prey upon downstream migrants, thus reducing this component of mortality occurring during downstream migrations.

Additionally, the report identifies the following: (1) the existing 80-acre warm water impoundment would be restored to seven miles of riffle and pool complexes of potentially high quality riverine habitat suitable for cold water fisheries spawning and nursery areas, and (2) the benthic habitat upstream of the former dam will be restored to natural conditions (e.g. high quality gravel bottoms) which may prove suitable for spawning by specific anadromous fish species. These conclusions contradict statements on Page 11, Section 4.2.3.3, that "the bottom of the Presumpscot River in the main channel of the impoundment being primarily scoured bedrock" and on Page 15 that "submerged rocky pool and riffle complexes now in the impoundment will be re-exposed".

The report also states, on page 19, that differences in water surface elevations and velocities above Route I-95 between the dam removal and the existing condition alternatives become minor. The ASC understands this to mean that any habitat gains for Atlantic salmon above Route I-95, an approximate six-mile stretch of river, are negligible. The report presents no evidence that the seven-mile stretch of the Presumpscot River below the Cumberland Dam was surveyed and post-impoundment conditions evaluated for quantity and quality of newly "restored" habitat for the targeted anadromous fish species. The report also does not assess the quantity of existing habitat that will become freely accessible once the dam is removed (e.g. how much habitat is currently inaccessible in the Piscataqua River subdrainage that will become freely accessible once the dam is removed?). Tangible habitat benefits for Atlantic salmon need to be measured in the accepted format where one habitat unit = 100 square meters of nursery habitat. Nursery habitat is comprised of riffle and run complexes as additive components with spawning area a subset of either the riffle or run component. The ASC will gladly furnish to the Corps Atlantic salmon habitat criteria to complete this analysis.

In summary, the ASC agrees with the Corps that removal of the Smelt Hill Dam will (1) eliminate an upstream barrier to returning Atlantic salmon and a downstream barrier to Atlantic salmon smolts and kelts, and (2) restore the natural riverine habitat in the segment upstream of the former dam. The report falls short in that definitive habitat and production benefits for Atlantic salmon are not presented. The ASC recommends to the Corps that this component of the Environmental Assessment be explored in the final draft.

The ASC looks forward to working with state and federal agencies as well as stakeholders in restoring diadromous fish runs to the Presumpscot River.

Sincerely,

Norman R. Dubé
Fisheries Scientist and
Environmental Coordinator

I concur with the comments prepared by my staff. Please direct any further questions to Norm Dubé.

Joan G. Trial
Senior Scientist
Atlantic Salmon Commission

cc: Dana Murch, DEP
Steve Timpano, IF&W
John Boland, IF&W
Paul Christman, ASC
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November 30, 2000

VIA FACSIMILE (Original by First Class Mail)

Mr. Brian Ostendorf, Colonel
United States Army Corps of Engineers
696 Virginia Road
Concord, MA 01742-2751

Comments on Draft Smelt Hill Dam
Environmental Restoration Study and Environmental Assessment

Dear Mr. Ostendorf:

The following comments are submitted in regard to the September 2000 Draft Smelt Hill Dam Restoration Study ("Study") and Draft Environmental Assessment (DEA) prepared by your office. The S. D. Warren Company owns and operates six hydroelectric dams on the Presumpscot River upstream of the Smelt Hill Dam. Each of our projects is currently undergoing relicensing by the Federal Energy Regulatory Commission (FERC). As a result, we have studied the environmental resources of the Presumpscot River watershed and developed numerous enhancement plans to protect these resources. Whatever decision is made regarding removal of the Smelt Hill Dam, a substantial record needs to be developed demonstrating that removal would result in no negative resource impacts and sufficient technical documentation needs to be presented to prove that the asserted resource enhancement goals will in fact be achieved.

In general, we find that the Study and DEA (on which the Study is based) are inadequate and technically unsubstantiated. Moreover, many of the technical analyses and conclusions presented in the reports are unsupported and conflicting. There are several key arguments used throughout your documents to support dam removal that are based upon outdated or insufficient data, or, in many cases, subjective judgments. As demonstrated by the following comments, the entire analysis should be re-evaluated using current data and a more consistent and accurate use of the facts.

1. False assumption that dam removal will change river morphology and substrates and improve fisheries habitat.

One of the principal arguments presented in the Study and DEA to support dam removal is an unsubstantiated claim that the Presumpscot River upstream of the Smelt Hill Dam will be restored to riffles and pools with gravel and cobble substrates by lowering the impoundment (Study pages 14, 15, 22; DEA pages 3, 5, 6, 20, 28, 30, 32). The Corps data presented in the reports, however, prove that this claim is false. It is stated throughout the reports that substrates in the lower Smelt Hill impoundment are generally smooth, scoured bedrock lacking sandy substrates (Study pages 3, 10, 11, 15, 23; DEA pages 1, 7, 14, 20, 22, 26, 29, 30). The reports

also describe the upper impoundment as having largely marine clay substrates (Study page 9; DEA page 10), that there is very little sediment build-up in the impoundment, and that virtually no change in substrates is expected because the impoundment is already scoured (Study page 10; DEA pages 22, 26, 29). Yet, despite these facts, the reports claim that removal of the Smelt Hill Dam will scour the impoundment and create cobble and gravel substrates. S.D. Warren's experience with the 1996 flood, which added a significant amount of land to the island at the Westbrook mill, indicates that topsoil with a high percentage of organic material -- not sand or gravel -- is being transported down the river. If the impoundment is already a scoured bedrock channel in the lower section and a thick marine clay deposit in the upper section, then there is no evidence to support claims that cobble or gravel substrates will appear after dam removal, or that, consequently, fisheries habitat will improve. The Study and DEA should be revised to accurately discuss the facts that the substrates and habitats are not expected to significantly change as a result of dam removal.

The reports also recommend dam removal based upon improbable improvements to instream cover and flow, as predicted by the Corps incremental analysis (Appendix C). The Corps incremental analysis attempts to predict changes in habitat using desktop methods that are based solely upon supposition and subjective judgement. The incremental analysis falsely predicts that instream cover for fish will improve under dam removal by *exposing* areas of the river with cover. In order for fish to utilize instream cover, it *must be inundated.* The incremental analysis also predicts a four-fold improvement in flow in the entire 5-7 miles of the existing impoundment (Appendix C, Page 5), although both the Study and DEA indicate that velocities are expected to increase only in the immediate area of the dam (Study pages 17, 19; DEA page 29). Obviously, both of these assertions cannot be true. We also question how increased flows as a result of dam removal will provide "thermal stratification and/or quieter areas with lower dissolved oxygen levels" to increase the suitability of fish habitat in the river reach as stated in the incremental analysis.

Based upon the erroneous conclusions presented in the incremental analysis, further analysis is necessary to assess potential changes in habitat as a result of dam removal, including habitat mapping and instream flow studies to quantify changes in habitat in the impoundment as a result of dam removal. Depth, cover, velocity and substrate conditions for various fish species under current and proposed conditions need to be quantified using an appropriate methodology such as one analogous to the Instream Flow Incremental Methodology (IFIM). IFIM studies are routinely recommended by regulatory agencies to assess habitat under alternative hydraulic conditions.

2. Conflicting and unsubstantiated claims regarding the existing fishery and benefits of dam removal.

The reports also attempt to support the dam removal alternative by discounting the value of the warmwater fishery presently found in the Presumpscot River upstream of the Smelt Hill Dam. The Restoration Study states that the river reach upstream of Smelt Hill lacks habitat necessary for the development of a good warmwater fishery (pages 3, 23). Data presented in the State of Maine's Statewide River Fisheries Management Plan (June 1982)[1], however, indicates

[1] State of Maine, 1982. Statewide River Fisheries Management Plan. Prepared by the MDIFW, MDMR and ASRCS, Augusta, Maine.

that natural reproduction of warmwater fishes is high in the Presumpscot River to Westbrook. Habitat quality and warmwater species composition in the river reach was rated as "medium." In order to assess the actual value of the warmwater fishery, we recommend that the existing fishery be adequately evaluated.

The reports also falsely contends that dam removal is necessary because the presence of warmwater fish in the Smelt Hill impoundment precludes a trap and truck program for anadromous fish (Study, p. 4). The reports state that warmwater species such as bass prey heavily on alewives, and thus that these species must be eliminated by dam removal to ensure successful alewife runs. This is not accurate, as shown by successful trap and truck programs that have occurred on the Kennebec and Sebasticook rivers where warmwater fish populations exist.[2] Moreover, the claim in the reports that dam removal is necessary to eliminate predation upon alewives is inconsistent with the report's stated goals of dam removal for restoration of species, including herring, as a food base for fish (DEA p. 28).

The DEA also implies that dam removal will enhance resident fish in the Presumpscot by stating that studies show that resident fish populations were enhanced where herring have been restored (p. 31), but the report provides no citations for such claims. Kohler et al. (1980),[3] however, report that alewife piscivority could have contributed to the collapse of Great Lakes resident fish populations. Kohler et al. (1980) recommend that alewife piscivority be considered in risk-benefit evaluations prior to introduction as a forage species (Kohler et al. 1980). Larval resident fish were also found in 12% of adult alewives stocked in Lake George, Maine (MDMR, 1995).[4] The conflict between the Corps analysis and the above referenced studies should be reconciled.

The reports also recommend dam removal to restore the natural habitat in the Presumpscot River for coldwater (*e.g.*, trout) fisheries. Data presented in the DEA (page 14) and incremental analyses (Appendix C), however, show that summer temperatures in the lower Presumpscot River approach the upper tolerance limit for coldwater species including brook trout and rainbow trout. Data collected at the USGS gage at West Falmouth over a period of approximately 20 years, in conjunction with data collected during upstream flow studies, show that temperatures in the lower river and the upper reaches are very uniform.[5] In addition, the Corps reports indicate that there will be no appreciable gains in velocities or reduction in wetted area, which would result in reduced water temperatures. As such, the existing evidence refutes the argument that dam removal will lower water temperatures sufficiently to support a coldwater fishery, because neither the upper nor lower Presumpscot have natural summer temperature regimes that meet habitat preferences of coldwater species, and dam removal will not increase velocities or reduce wetted areas sufficiently to lower water temperatures.

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[2] Maine State Planning Office Kennebec River Resources Management Plan, Augusta, Maine.

[3] Kohler, C.C. and J.J. Ney. 1980. Canadian Journal of Fish and Aquatic Sciences. Volume 37 pages 1314-1317.

[4] Maine Dept. of Marine Resources, 1995. Preliminary results of the Lake George Study. Augusta, Maine.

[5] Kleinschmidt Associates, 1978. Habitat and Flow Study, Bypasses and Free Flowing Reaches. Phase II Flow Demonstration. Pittsfield, Maine.

3. Failure to address potentially devastating impacts of the introduction of exotic undesirable species to lower Presumpscot and Piscataqua River basin.

The most significant omission in the entire analysis is the failure to address the introduction of undesirable exotic species such as sea lamprey, gizzard shad, and carp into the Presumpscot and Piscataqua Rivers. The existence of these species in coastal Maine rivers has been documented at fishlifts on the Saco and Androscoggin Rivers. The sea lamprey is significant in its destruction of fishes economically and aesthetically important to man (Scott and Crossman, 1973).[6] The lamprey has been documented to develop tremendous populations in very short periods and quickly to decimate populations of important fishes (Scott and Crossman, 1973). Gizzard shad have been reported to create fish management problems due to their fecundity and rapid growth (Scott and Crossman, 1973). Carp are considered detrimental to native fish populations because they increase the turbidity of the water and uproot and destroy submerged aquatic vegetation that is essential for survival of native species (Scott and Crossman, 1973). Exotic species have already begun to invade the Kennebec River since removal of the Edwards dam,[7] and could pose a real threat to the fisheries of the lower Presumpscot and Piscataquis River basins if the Smelt Hill Dam were removed.

Rehabilitation of the existing lift is presented as an alternative to be evaluated but is dismissed with no significant information provided because it is believed to be economically infeasible (DEA, page 6). No cost data are provided, however, to support this claim. More importantly, by inadequately evaluating this alternative, the DEA fails to recognize that this is the only alternative that would prevent the introduction of undesirable exotic species (lamprey, carp, and gizzard shad) to this watershed. Fish lifts on the Androscoggin and Saco Rivers are currently being utilized to prevent the introduction of these species into inland waters of Maine. In fact, the use of a fish lift may be the only reasonable means of ensuring passage of target species without the introduction of undesirable exotic species. The analysis should be redone and the rehabilitation of the lift given more serious consideration in addressing the devastating effect introduction of these exotic fish species may have on the Presumpscot and Piscataqua watersheds.

4. False assumptions regarding improvement in water quality

Another entirely unsubstantiated argument used in the reports to support dam removal is alleged improvements to water quality. The report utilizes 1967 data and infers that water quality is poor in the lower Presumpscot River. The 1967 data not surprisingly show a historic water quality problem, which was common to many Maine waters at that time. This historic perspective is entirely irrelevant, however, to an analysis of how the proposed project would impact (improve or degrade) current conditions in the Presumpscot River. Not only does more recent data need to be used to document existing conditions, but any data presented should have been collected after 1997 when flow regime changes were instituted. The report acknowledges (page 9) that the Maine Department of Environmental Protection 1995 wasteload allocation

[6] Scott, W.B. and E.J. Crossman. 1973. Freshwater Fishes of Canada. Bulletin 184. Fisheries Research Board of Canada. Ottawa, Canada.

[7] Data presented at the October 3, 2000 Lockwood Project Relicensing Fisheries Issues Workshop, Waterville, Maine.

study determined that the most significant gains in water quality could be achieved through flow regulation at Sebago Lake. That flow regulation went into effect in 1997, and thus the analysis does not take into account resulting improvements.

Similarly, claims related to improvements in the benthic community (Study page 11, DEA page 30) are not substantiated because the reports have relied on data collected 5-6 years ago prior to the implementation of the current flow management plan for the river. In fact, recent benthic macroinvertebrate community monitoring in the upper reach of the Smelt Hill impoundment shows attainment of Class B standards. This stretch of the river is Class C, and the benthic community is already attaining a higher classification standard than required by law. Claims that dam removal will aid in attainment of applicable standards are unfounded.

5. Inadequate Economic Analysis

The report presents an inadequate economic analysis by failing to include costs associated with cultural resource studies and mitigation that still need to be undertaken. The report admits that there is still Phase II survey work to be conducted, and mitigative measures need to be addressed with the Maine Historic Preservation Commission (MHPC). Based on our experience with these issues related to FERC relicensing, the costs associated with surveying and protecting cultural resources could exceed the entire removal costs shown in the report.

In addition, under FERC regulations licensees of exempt projects must apply to surrender the project exemption. There is no mention of this important procedural step and the associated costs.

The Corps' assessment should also consider the economic and socioeconomic impacts of dam removal. Economic impacts include the loss of tax revenue in the Town of Falmouth. Socioeconomic impacts include impacts to landowners along the current impoundment.

6. Factual corrections

Contrary to the reports (Study page 2; DEA page 11), there are only nine dams on the Presumpscot River. The dam at the outlet of Sebago Lake is the Eel Weir Dam, not Sebago Lake Dam (DEA page 11). There is no dam at the project powerhouse (DEA page 11). Rather, water is conveyed to the powerhouse via a man-made canal, while water not used for generation flows through the main river channel. Below the powerhouse the main river channel and powerhouse tailwaters converge. The "dam" referenced at this location is the terminus of the power canal at the powerhouse.

* * * * *

In short, the Study and DEA are inadequate and technically unsubstantiated. As demonstrated by the foregoing comments, the entire analysis should be re-evaluated using current data and a more consistent and accurate use of the facts.

Sincerely,

for Tom Howard
S.D. Warren Company

TH/MW:ems
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ANGUS S. KING, JR.
GOVERNOR

GEORGE D. LAPOINTE
COMMISSIONER

December 21, 2000

John R. Kennedy, Deputy Chief
Engineering/Planning Division
New England District - US Army Corps of Engineers
696 Virginia Road
Concord, MA 01742-2751

RE: *Smelt Hill Environmental Restoration Study - Falmouth, Maine*

Dear Mr. Kennedy:

We have reviewed the US Army Corps of Engineers' (Corps) draft *Smelt Hill Environmental Restoration Study - Falmouth, Maine* and the subsequent comments submitted by the US Department of the Interior, the State of Maine Atlantic Salmon Commission, and SAPPI. We are writing in response to the comments made by SAPPI in its letter dated November 30, 2000.

It is the goal of the Maine Department of Marine Resources (MDMR) to restore populations of alewife, American shad, blueback herring, rainbow smelt, striped bass, and tomcod, as well as enhance the stock of American eel, in the Presumpscot River. Clearly, the history of dam building had a devastating impact on migratory fishes in the Presumpscot River and restoration of these species will require providing access to upriver spawning, nursery, and growth habitat.

In its first report in 1867 (*Reports to the Commissioners of Fisheries of the State of Maine*), the Commissioners of Fisheries noted that eight dams crossed the Presumpscot River, the dam at Presumpscot Falls had been broken down for 15 years, and the dam at Cumberland Mills was impassable to fish. They also stated:

> "The Presumpscot was originally peopled with salmon, shad, alewives and several other species. We have the testimony of Mr. James Lord, aged eighty-five, who lives near the Presumpscot falls, to their abundance. **The salmon were practically destroyed by the erection of the dam at the head of the tide about 1802.** That year they accumulated in unusual numbers below the dam in their attempts to pass it, and a great many were caught. At the present time there is no doubt that a few salmon run into the river each year; for they are occasionally taken... **The shad still run, in small numbers, as far as Cumberland mills. Mr. Lord has fished for them with a dip-net at the falls, and took twenty-five large shad in one day seven years ago; but last year only twelve. A great many used to be taken in weirs at the mouth of the river. Alewives are**

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more abundant; in 1864 or '65, twenty thousand of them were taken by dip net at the falls..."

Removal of the Smelt Hill Dam will change river morphology and will improve fisheries habitat for several species of migratory fishes. Photographs provided in the document clearly show that lowering the impoundment would provide riffles and pools, important for pelagic spawners like American shad, blueback herring, and striped bass. For these fishes, substrate type is not important. Removal of the dam also will help to reestablish a migratory corridor for alewife, American eel, American shad, Atlantic salmon, and blueback herring to spawning, nursery, and growth habitat in the upper reaches of the river. One of the most significant benefits of dam removal is that access to seven miles of historical riverine habitat will be provided for all native anadromous fish including rainbow smelt, striped bass, Atlantic sturgeon, and tomcod, which do not use conventional fish lifts. In addition, both upstream and downstream passage inefficiencies at this site will be eliminated for American shad, alewife, blueback herring, and Atlantic salmon; thus, greatly improving the chances of restoring these species to the Presumpscot River.

SAPPI states that the most significant omission is the failure to address the introduction of undesirable exotic species, such as sea lamprey, gizzard shad, and carp, into the Presumpscot and Piscataqua Rivers. The **sea lamprey** is a native, not exotic species; it is found in many of Maine's coastal rivers and generally is not a threat to other native species. Juvenile lampreys are filter feeders and provide a source of food for other fishes; returning adults do not feed in the freshwater environment. **Gizzard shad** is a species native to the United States and is apparently undergoing a range expansion up the Eastern seaboard. Small numbers of adult gizzard shad have been captured in the fish lift on the Saco River and several have been captured in the Kennebec. None have been captured in fish passage facilities on the Androscoggin, as stated by SAPPI. We believe that this species would not be a problem if confined to the main stem of the river and not permitted access to large lakes. To date, there is no evidence of natural reproduction of gizzard shad in the Kennebec River, where annual juvenile beach seine surveys are conducted. **Carp** are a non-native species and were introduced into North America for pond culture. The species appears to be spread primarily by human introduction (deliberate or accidental), not by migration through marine waters into other watersheds. The only known populations of carp in the State of Maine are in the estuarial complex of the Kennebec and Androscoggin Rivers and several streams draining into Scarborough Marsh. There is no documentation of carp being present in the Presumpscot River drainage.

SAPPI recommended that the Study should seriously evaluate the alternative of maintaining the dam and restoring the fish lift as a means to restore anadromous fish and prevent the spread of "undesirable exotic" fish species. The Department of Marine Resources believes that the benefit of allowing all native anadromous fish species access to seven miles of historically accessible habitat outweighs the potential expansion of gizzard shad into the lower Presumpscot River. Dam removal is also supported by the Maine Department of Inland Fisheries & Wildlife, the Atlantic Salmon Commission, and the US Fish & Wildlife Service. The Department of Marine Resources believes that any further economic analysis of this alternative (maintaining the dam and rehabilitating/operating the fish lift for the purpose of excluding access for certain fish species) is not warranted.

In conclusion, the Department of Marine Resources supports the conclusion by the Corps that the preferred alternative is to completely remove the Smelt Hill Dam in order to restore riverine habitat and provide access of all native diadromous fish species to the lower river. This is an important first step in the restoration of these species to the Presumpscot River. This Department is working closely with other state, federal, and private partners in promoting the restoration of native diadromous fish to the Presumpscot River and looks forward to working with the Corps under Section 206 of the Water Resources Act of 1996 (WRDA) in implementing the removal of the Smelt Hill Dam.

Sincerely,

THOMAS S. SQUIERS, JR., DIRECTOR
STOCK ENHANCEMENT DIVISION

cc: Gail Wippelhauser, MDMR
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Friends of the Presumpscot River

PO Box 223
South Windham, Maine 04082

January 3, 2001

Colonel Brian Ostendorf
US Army Corps of Engineers
696 Virginia Road
Concord, MA. 01742--2751

RE: Sappi Comments on Smelt Hill Dam Removal

Dear Colonel Ostendorf:

I am writing on behalf of the Friends of the Presumpscot River (FOPR), a nine-year-old not-for-profit Maine corporation whose mission is the protection and restoration of the Presumpscot River and its shorelands through advocacy and stewardship. FOPR has been closely following the processes regarding the fate of the Smelt Hill dam, and believe removal of the dam is an essential first step for the restoration of anadromous species to their historical range in the Presumpscot River. By this letter, FOPR would like to comment on November 30, 2000 letter sent by S.D. Warren/Sappi (Sappi) concerning the Corps' Environmental Assessment/Ecological Restoration Study of the Smelt Hill Dam project in Falmouth, Maine. Because that letter contained numerous inaccuracies, confusing statements and omissions, FOPR felt that corrections to Sappi's letter were essential, and needed to be reflected in the Corps' administrative record of this proceeding.

FOPR's comments, below, are organized in the same manner as presented in Sappi's November 30 letter.

1. River morphology, substrates and fisheries habitat

• Sappi states that the claim that removal of the dam will restore riffles and pools "is false." In fact, this claim is substantiated in the Study and DEA both with photographs and sediment data. Fig 2A (page 28), a photo taken 0.5 mi. upstream of Smelt Hill during drawdown, clearly shows riffle and pool habitat of the type typically utilized by salmonids, particularly Atlantic salmon. Figs. 3, 6, 10, and 11, show similar salmonid habitat.

In general, unimpounded salmonid rivers lack sandy substrates because of the stream slope. Flow rates preferred by salmonids remove finer substrates from the main channel. The study indicates, as does the letter from Chris Pennuto, that most of the channel has a hard bottom, which is difficult for sampling with grabs. As in any salmonid river, however, these sandy and cobble substrates would be present at some sites. Pennuto's letter (App. D) describes sandy-coarse

sediments immediately above the dam, and Fig. 4 clearly shows sandy substrates 1-1.5 miles upstream of the dam. Cobble substrate, which most probably will be found in the headpond, is analogous to any other salmon stream in Maine, and would react the same to sampling as any bedrock scoured reach (no grab sample). Bedrock substrates are common in many salmonid streams and since the organisms (larval insects, snails etc.) which utilize this habitat, are well adapted to smooth surfaces and high velocity (attachment specializations). Bedrock and cobble substrate have as high a production of organisms as finer sediments (often more).

- The predominately hard bottom of the former Smelt Hill impoundment would be no detriment to shad spawning. They do not need any particular substrate since they spawn pelagically in the water column. Shad eggs roll on the bottom or remain in crevices until hatching.

- Sappi states that the Study (page 9) describes the upper impoundment as having largely marine clay substrates. Nowhere in the Corps' study does it say there is a thick, marine clay deposit in the upper impoundment of Smelt Hill. The only reference to the word clay on page 9 is that the "...high clay content of the soils in the watershed through agricultural runoff have degraded water quality", so their comment is inaccurate. Additionally on page 10 (EPA), the only mention of clay is in a description of the watershed; it says nothing about what is on the bottom of the impoundment. On page 10 of the Study, it very accurately states the origin of the marine clays, which overlay the watershed and make it productive. They are from post-glacial marine transgression, but the watercourses have mostly cut down through them to glacial till (gravel, cobble and bedrock). The Corps' study stated that dam removal will scour the impoundment and create a cobble and gravel substrate, but we believe what they mean is that the gravel, cobble, bedrock substrate is already there and will be exposed when any silty accumulations are washed away.

- Sappi comments on cover are equally unsubstantiated. The Corps' photos show clearly that after drawdown, the shoreline cover that exists now will still be present or improved and the real river bottom will be available for benthic production. The sides of the river are steep and the impoundment depth shallow so there will be little exposed, unwatered stream bank. The photos in Fig 4. 5, 6,7, 8, and 9 clearly show this. The photos also show that instream cover (i.e., rocks) is still inundated after drawdown (dam removal). Instream cover means having rocks etc, available to hide around and under. Too much water now covers the rocks to be good salmonid habitat. What the study appears to mean and Sappi has misunderstood, is that dam removal will expose the substrate to higher light levels, velocities and DO, increasing benthic productivity and fish habitat.

The Study (page 17) states that the only place velocities will increase significantly is at the dam site, due to the water depth change and the slope being greatest there. The model used is a good hydraulic one and seems to correctly predict dam removal velocities. Sappi has misunderstood the model. Because there is a four-fold increase in the model value, it does not mean that there will be a four-fold increase in velocity, but rather a four-fold increase in all the parameters related to fish habitat.

- Similarly, the comment by Sappi that they think the Corps is saying that dam removal will provide "thermal stratification and ... lower DO" is a misread. What the Corps' study

appears to be saying is that dam removal will provide less stratification and higher DO's. (App. C, page 5, line 29)

2. Existing fishery and dam removal

• It is ironic that SD Warren attacks the study because "it dis[counts] the value of the warmwater fishery presently found in the Presumpscot River upstream of the Smelt Hill Dam." The SD Warren report, "A Baseline Investigation of Fisheries Resources...," (done in 1998 for the relicensing of the five middle-river dams above Smelt hill currently before FERC) on the warmwater fishery above Cumberland clearly shows that growth of warmwater species in the river is low. There is a lack of preferred size for various warmwater species (bass, pickerel, catfish, etc). Reproduction may be high, but it appears there is a shortage of food to maintain growth. No objective observer would suggest that even a mediocre, yet alone quality warmwater fishery exists in the Presumpscot River.

By contrast, removal of Smelt Hill will expose benthic habitat to light regimes that will increase benthic production and enhance growth rates of all species, warmwater or cold. At present, the river substrate is too deeply inundated for this to happen, thereby inhibiting. Water depths are too great for most species to select during early growth and the substrate types are lacking to provide soft-bottom benthic production that would enhance growth of such species as catfish.

• While it is true that no citation is given for the improvement of warmwater fish food resources from restoring anadromous runs, it is simply an oversight: the literature is clear on this point. Bass, pickerel and salmonids will utilize juvenile shad and river herring. These juveniles will be there in addition to what is presently available. Alewife piscivority in the Great Lakes (Kohler et al 1980) is largely the result of a niche shift for alewifes in the Great Lakes. They are land-locked and have shifted their ecology accordingly. Anadromous adult alewifes remain in freshwater for a short period of time (1-2 months), do not feed until after they spawn (Scott and Scott 1988) and leave freshwater soon after they spawn. Juveniles feed in freshwater, but they utilize mostly planktonic organisms and leave freshwater after about 4 months (most of this time spent in the lake where they were born and not in the streams leading back to the sea). How the adults or juveniles would significantly impact warmwater species in the river is difficult to demonstrate, especially since most of the warmwater species in the Presumpscot (i.e. bass, catfish) do not have pelagic young and provide parental care until they are of appreciable size.

• Regarding water temperatures, the 20 years of data referred to by Sappi that was collected at the West Falmouth gauge include the large thermal impact of the Sappi pulp mill discharge on the river. We were surprised that Sappi used this data, given the closure of the pulping operation and the resultant lowering of water temperatures below the mill by 2 to 3 degrees centigrade. Removal of Smelt Hill Dam may further cool the water in the lower river by

decreasing retention time, providing natural cooling through increased aeration and allowing the influence of the natural springs and seeps to lower water temperatures.

3. Failure to address exotic species.

In this section, Sappi suggested that three "exotic" species -- lamprey, gizzard shad, and carp would populate in meaningful numbers in the lower Presumpscot and harm the ecology of the river. No biological analysis was providing to support this suggestion. In fact, the Study did not contain a significant omission because it is largely an unsupportable claim.

- Lampreys are not exotics. They occur naturally elsewhere in Maine where there are anadromous species. Further, lamprey are decidedly not a problem in freshwater streams. The juveniles live in the substrate and eat only detritus. The adults are only in the stream for a short period in the springtime to spawn, do not feed while in the river, and die after spawning. The sea lamprey only develops populations that are damaging to freshwater fish if the necessary habitat and prey components are available, such as in the Great Lakes. While it would be unadvisable to allow lamprey access to Sebago Lake since the components described above would be available there (prey, in salmon and lake trout; spawning tributaries; large water body), access to the lower Presumpscot will be entirely without impact.

- It is surprising that Sappi appears to be claiming that gizzard shad have been found in Maine since they are mainly a freshwater species of the inland drainages of North America. A reference to a document or authority verifying its occurrence in Maine, instead of another species that could be mistaken for it (hickory shad) should have been provided, including literature rebutting scientific literature showing that gizzard shad have been reported only as far north as Cape Cod (Scott and Crossman 1973).

- Carp have been introduced throughout the East Coast of North America via bait buckets and illegal transfers. Normally they require freshwater or low salinity habitat with abundant vegetation (like Merrymeeting Bay). Since there is little or no carp habitat in the lower Presumpscot and entrance to the river via Smelt Hill would require passage through the high salinity in Cobscook Bay, removal of Smelt Hill is unlikely to lead to invasion by carp. It is more likely that carp could gain access to the Presumpscot through the upstream watershed via a bait bucket or illegal transfer.

In sum, since lamprey are a naturally occurring, native Maine fish and would not pose a threat in the lower Presumpscot and neither gizzard shad or carp are likely to gain access to the Presumpscot via the high salinity of Cobscook Bay, only maintaining fishway access at this site is unjustified. The exotic species that are invading the Kennebec were probably already present in the system before the Edwards dam was removed.

4. Water Quality

- Dam removal would probably lead to Class B standards below Cumberland. The allegation that the report only uses 1967 water quality data is incorrect. The EPA does refer to the 1967 situation but goes on to say that "several studies have been conducted up till 2000", citing the 1995 Maine DEP study (EPA, page 13). It also states and comments on the Sebago Lake regulation regime that has been put into place which the EPA states is the most effective method of maintaining the water quality of the river. While we agree that water quality has greatly improved with the closure of the pulping operation at the Sappi's Westbrook mill, there are more gains to be made through the removal of Smelt Hill Dam. The great strides that have been made in aquatic life and the ecological health of the Kennebec River since the removal of the Edwards dam prove the merits of creating a free flowing river. No doubt the Presumpscot will also make these same strides given the opportunity.

******

Thank you again for the chance to comment on this letter.

Sincerely,

Dusti Faucher

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Gordon Russell, USFWS

5. Tom Howard, SAPPI; S.D. Warren Company, November 30, 2000

6. Thomas S. Squiers Jr., Stock Enhancement Division, State of Maine Department of Marine Resources, December 21, 2000

7. Dusti Faucher, Friends of the Presumpscot River, January 3, 2001

b. Responses to Comments on Draft Report and EA

Response to Central Maine Power Company's Letter of Nov. 9, 2000

Comment: Although the single comment requiring a response was actually concerning the text of the Public Notice, the same comment would apply to the Draft Ecosystem Restoration Report (ERR)/Environmental Assessment since a similar statement was made in the ERR. The comment was concerning the following statement "it is presently economically infeasible to rehabilitate the damaged powerhouse and fish lift." CMP states that this is not true, and in fact CMP had offers to purchase the dam and facility for rehabilitation purposes.

Response: This erroneous statement has been deleted from the final report.

Response to Robert Patton's Comment Email of Nov. 30, 2000

Comment: The comment concerns itself with the gravel access road/easement, and Mr. Patton's proposal for the dam removal project to include the regrading of the road gravel "to more closely match the existing slope", then to loam and seed.

Response: This proposal will be considered during Plans and Specifications phase. At that time, we shall consult with the non-Federal sponsor of the project.

Comment: The comment concerns the necessity of a guardrail or fence once the access road is removed.

Response: It appears that there is no need for a guardrail or fence, however, final determination concerning this shall be made during preparation of Plans and Specs.

Comment: The comment concerns the potential recreational hazard that could be caused by a recirculating current at the base of the falls, and suggests review of the hazard by someone versed in hydraulics.

Response: The need for this is questioned for two reasons including the fact that a natural situation will be restored, and a drop of only a few feet maximum over the falls is expected, with

the maximum drop of less than 5 feet occurring at mean low tide. During mean tides and higher, there will be no such drop.

Comment: The comment concerns the removal of a walkway that reportedly had torn away from one of the dam's abutments. It is requested that the removal of the walkway be included as part of the project.

Response: This proposal will be considered during Plans and Specifications phase. The final answer is likely to be the non-Federal sponsor's call.

Comment: The comment concerns itself with town/neighborhood ownership of the mill wheels.

Response: We should be able to comply with this request. A note shall be placed on the construction drawings prepared during Plans and Specs phase.

Response to Michael J. Bartlett, USFWS, November 27, 2000

Comment. General comments concerning the requirement to remove and/or provide fish passage at additional dams upstream of the Smelt Hill Dam in order to achieve ecological restoration to the entire River.

Response to General Comments, Page 1. Although it is recognized that a plan of restoring anadromous fish to the Presumpscot River watershed might include the inclusion of other dam removal or fish passage projects further upstream (from Smelt Hill Dam), the Corps of Engineers authority in proposing such actions, under Section 206 of the Water Resources Development Act of 1996, is limited to those actions proposed by the non-Federal sponsor of the project.

Comment 2.3. Future Without Project conditions, Page 2. The comment concerns the FERC requirement for the owner of the dam to provide fish passage.

Response to 2.3: Although FERC would likely eventually require the fish lift to be repaired, for purposes of this report we have assumed that the present-day situation of no fish passage would continue.

Comment 3.1. (1) Planning Objectives: The comment concerns the limited habitat for resident and migratory fish due to the gradient and substrate immediately upstream from the dam, therefore additional habitat upstream needs to be restored. This will require additional dam removals.

Response to 3.1 (1): Although we recognize that obtaining access to additional high quality spawning and rearing habitat further upstream in the Presumpscot River watershed would likely include other (upstream) dam removal or fish passage projects, the Corps of Engineers authority in proposing such actions, under Section 206 of the Water Resources Development Act of 1996, is limited to those actions proposed by the non-Federal sponsor of the project.

Comment to 3.1(2): The comment concerns focusing the study on re-establishing a migratory corridor for non salmonid anadromous fishes, immediately above the Smelt Hill Dam site, since the habitat (in that area) is limited as salmonid habitat.

Response to Comment 3.1(2): We concur that the habitat is limited; the wording has been changed to "Restore the riverine habitat in the segment upstream from the former dam for resident stream and river dwelling fish species (i.e. largemouth bass, smallmouth bass, trout)". The Draft EA and Incremental Analysis explain that the habitat is limited for trout due to temperature limitations, however there may be some improved holdover capacity from the dam removal due to the re-exposure of pool and riffle areas.

Comment to 3.1(3): The comment concerns clarification of the (as an objective) potential threat of warmwater fish preying on migratory fish in the section of the impoundment immediately upstream from the dam, which is currently habitat limited for warmwater fish.

Response to Comment 3.1(3): We concur, it has been removed from objective 3.

Comment to section 4.3.1. Water Quality: The comment questions the amount of discharge into the river from the upstream wastewater treatment plants. It also concerns the need to remove additional dams in order to improve degraded water quality in the Presumpscot River downstream from these dams.

Response to Comment 3.1(3): The text in the EA has been amended to read as follows: "The four licensed dischargers into the Presumpscot River between Sebago Lake and Smelt Hill Dam collectively discharge approximately 26 million gallons per day of treated wastewater into the Presumpscot River, potentially accounting for much of the river's flow during extremely low flow periods."

Response to Comment 4.2.3.1, Paragraph 2: We concur that additional dam removals and other measures will be necessary to restore access for migratory fish habitat quality in upstream waters. However, note in the response to Comment 1, that the restoration project is only authorized to the non-federal sponsor's commitment, which is removal of Smelt Hill Dam only.

Comment to 4.2.3.2. Sediment Quality: The comment concerns a correction for the abbreviation of PAH

Response: Correction to PAH made.

Comment to 4.2.3.3: Benthic Environment: The comment concerns the clarification of description of areas of the impoundment with various types of benthic habitat.

Response to Comment 4.2.3.3: Wording has been changed to reflect eg. "The Maine DEP collected sediment samples for aquatic macro-invertebrates in August of 1994 and 1995 from locations in the Smelt Hill Dam impoundment approximately one mile below the S.D. Warren outfall. This upper area of the impoundment has a benthic environment that is more depositional

than the lower section immediately upstream from the dam, which consists primarily of scoured bedrock in its main channel."

Comment to 4.3.1(a) Partial Dam Removal: The first paragraph of the comment concerns the use of the terms lentic and lotic, and their usage in describing associated fish habitat. The second paragraph concerns the total numbers of anadromous fishes expected to be passed without the dam, and the third paragraph concerns the extent of tidal flow expected with the dam removed.

Response to 4.3.1.(a) First Paragraph: We concur, the text has been changed to "Eliminating the impoundment would change the habitat upstream of the dam from a lacustrine environment, to a riverine environment with high quality riffle and pool complexes suitable for anadromous fisheries migration and spawning

Response to 4.3.1.(a) Second Paragraph: We concur that there is a discrepancy in the total numbers of fish passed. Text has been corrected to reflect this comment.

Response to 4.3.1.(a) Third Paragraph: Extent of tidal flow will be given, text changed to: "With the dam removed, tidal flow will not be experienced upstream of Route 95, one mile upstream of the dam site, due to the presence of the bedrock "hump" under Route 95. During mean low water, there will be no tidal influence at all upstream of the location of the dam due to the perched nature of Presumpscot Falls (at the dam site). During mean high water, there will be an influence upstream of Presumpscot Falls."

Comment to 4.3.2. Rehabilitation of the Fish Lift at the Dam: The comment concerns the FERC requirement for fish passage being the responsibility of the exemption holder of the license, which is Central Maine Power, and not the existing owner of the dam.

Response to Comment 4.3.2: Text has been added to reflect comment, at end of last paragraph under "Construction Cost" to: "If the dam is not removed, FERC is likely to require the repair and operation of the facility, with costs incurred being paid by the current exemption holder".

Comment to Section 5.2(1) Environmental Benefits: The comment concerns the existence of a natural ledge barrier to migration with the dam removed at various tidal elevations.

Response to Comment 5.2(1): Additional words have been added as follows: "A barrier to some migratory fish will still occur at mean low water due to the natural ledge, however, at mean and higher tides, these fish will be able to pass by."

Comment 5.2.(2): Potential Habitat Restoration: The comment concerns the need for additional measures (to improve water quality) to restore anadromous spawning habitat upstream from the impoundment due to habitat limitations in the area immediately upstream from dam.

Response to Comment 5.2.(2): We concur that additional dam removal and/or measures to reduce wastewater discharges will be necessary to provide access to historic anadromous fisheries spawning and nursery habitat beyond the seven mile area upstream from Smelt Hill dam.

However as noted previously in the first comment, the scope of the 206 project includes removal of Smelt Hill Dam only. We also concur that the most dramatic changes will occur within the first mile upstream of the impoundment. However, small changes in the water surface elevation (of approximately one foot) will occur further upstream, and according to the HEC 2 model up to and beyond the Railroad Bridge (approximately two miles from the dam). Even small drops in water level can increase riffle and pool combinations, which are important for pelagic spawners such as American shad, blueback herring, and striped bass.

Comment 5.2.(3): Potential for predation on migratory fish: The comment concerns the clarification of which resident warmwater fish species are likely to prey on migratory fishes.

Response to 5.2.(3): The resident species that are likely to prey upon the migratory fish include largemouth bass and smallmouth bass. This is mentioned on page 30 of the Draft EA, which also mentions that migratory river herring are important for other marine and freshwater fishes including striped bass. Additional freshwater resident species (in the Presumpscot River) likely to prey upon migratory fish include, pickerel, American eel, as well as black crappie, and white and yellow perch.

Comment on Section 5.4.: Incremental Analysis: The comment concerns the need to qualify the terms used in the Incremental Analysis, since the primary benefit of dam removal is the restoration of an anadromous fisheries migration corridor.

Response to Comment 5.4.: We concur that the term Habitat Units used in this study should be qualified to reflect that it is applied specifically to this project primarily as a method of comparison of the various alternatives. This is noted on page 9 of the Incremental Analysis (in the Calculations section) where the output is defined as "Habitat Units of Optimal Restored Anadromous Fisheries/Migratory Corridor" rather than just Habitat Units. In addition this text has been changed to read "Habitat Units of Optimal Restored Anadromous Fisheries/Migratory Corridor." This is also noted on the output spreadsheet.

Comment on Section s 6.2/6.3; Planning and Execution of Actual Dam Removal: The comment concerns the construction details of actual removal, the necessity of coffer dams, fill and hydraulic hammering and/or blasting and the need for coordination and development of construction windows.

Response to Comment 6.2/6.3: Details of dam removal are to be determined during Plans and Specs phase, however, no blasting or hydraulic hammering is expected, nor is the use of coffer dams or temporary fill. Also, coordination will occur with appropriate state and federal agencies in order ensure that construction does not occur during sensitive times of the year. This is also noted in the Environmental Assessment.

Response to Norman R. Dube, State of Maine, Atlantic Salmon Commission, November 28, 2000

Comment, Page 1, Paragraph 3: The comment concerns the additional benefits of dam removal to outmigrating Atlantic salmon smolts, by eliminating the possibility of passing through turbines and negotiating spillways and terraces present with the existing dam.

Response to Comment, Page 1, Paragraph 3,. We concur that benefits to downstream Atlantic Salmon migrants by the reduction of significant mortality caused by passing through turbines as well as negotiating spillways and tailraces was not addressed. These additional benefits would result from the removal of the Smelt Hill Dam. However, as noted in the Incremental Analysis as well as much of the EA, the study emphasized the benefits to anadromous species currently existing in the reach of the Presumpscot River designated to be restored (and for which active restoration efforts are in progress) which are alewives (and blueback herring). A downstream fishway designed to pass these species has already been incorporated into the existing Smelt Hill Dam Passage Facility[1] and therefore downstream passage without the dam was not a significant concern (for these species). It should be noted, however, that the Incremental Analysis does show a benefit to the downstream passage for both Alewife and Atlantic salmon with the project condition of dam removal.

Comment: The comment concerns the description in the draft report of areas of the impoundment where the bottom is scoured rock vs. those that are depositional.

Response to Comment, Page 2, Paragraph 1: The sections of the report, Page 11, Section 4.2.3.3, which states that "the bottom of the Presumpscot River in the main channel of the impoundment being primarily scoured bedrock"; as well as the section on page 15 which was referring to the "rocky pool and riffle areas now in the impoundment will become re-exposed"; refer to specific locations along the seven mile river section. For approximately one mile upstream from the Smelt Hill Dam, the channel is primarily scoured rock (see Figures 2A and 3 in the Draft Environmental Assessment) with finer materials found in the margins. Further upstream there are more depositional areas with softer sediments and quieter pools. It is these depositional areas which have the potential to scour and/or become modified from higher flow velocities which would occur with the removal of the dam.

Comment; The comment concerns the minimal discussion in the report on Atlantic salmon habitat restoration/improvements in the lower reaches of the impoundment, noting that much historical habitat exists in the Piscataqua River Watershed which was not addressed in the report.

Response: We concur that the potential amount of restored Atlantic salmon nursery and spawning habitat within the Piscataqua River watershed was not extensively evaluated. The primary benefit to Atlantic salmon from removal of the Smelt Hill Dam will be the opening of a migratory corridor enabling them access to tributaries where they historically spawned (this includes the Piscataqua River). In addition, the dam removal is the elimination of the first barrier to upstream

[1] Smelt Hill Fishway Operations Report, 1995 Results. A Report on the Operation of Central Maine Power Company's Smelt Hill Fishway, Presumpcot River, Maine, FERC No. 7118. Prepared by Central Maine Power Company's Environmental and Licensing Department and Union Water Power Company, August, 1996.

migration for this species on the Presumpscot River which prevents their access to historical spawning areas (further upstream). As noted in the response to the first comment, although one of the goals of the removal of the dam is to provide unobstructed upstream passage to Atlantic salmon (as well as restoration of riverine habitat), the study focused primarily upon benefits to the anadromous species currently existing in the system, and for which there are active restoration programs (i.e. alewife and blueback herring). Therefore, extensive evaluation of potential Atlantic salmon spawning and nursery habitat was not conducted. As noted in the Incremental Analysis, the component of potential restored Atlantic salmon habitat was estimated as only improving slightly, since it was assumed that much of their historic habitat is located in either the upstream sections of the Presumpscot River itself, and/or the tributaries which join it upstream from the Cumberland Mills Dam and beyond. We do concur however, that there will be potential Atlantic salmon habitat restored to the Piscataqua River, although this was not extensively evaluated for the reasons stated above.

Response to Tom Howard, SAPPI; S.D. Warren Company, November 30, 2000

Comment 1, Paragraph 1: The comment questions the assumption that dam removal will change river morphology and substrates and improve fisheries habitat.

S.D. Warren indicates that the report states that the impoundment consists of scoured bedrock in the lower impoundment, with marine clays in the upper impoundment, with no mention of sand and gravel. Therefore, with these features, how can the impoundment revert to sand and gravel substrate? S. D. Warren also says that organic material extended the amount of land upstream during the 1996 flood, with no sand, therefore, no sand and gravel are in the watershed.

Response to Comment 1, Paragraph 1: The impoundment is scoured in the vicinity immediately upstream from the dam, however, further upstream, in the margins of the impoundment, there are areas of finer materials. The sections from the Draft E.A. referenced in the SAPPI letter pertaining to the substrate, all mention the distinction between the lower impoundment immediately upstream from the dam which is scoured, the margins of the lower (and upper impoundment) which are depositional, and the upper impoundment (several miles upstream below the S.D. Warren Outfall where benthic fauna were sampled) as depositional. However, the SAPPI letter interpreted that the Draft EA describes the entire impoundment as scoured, when it actually refers to specific locations.

In addition S.D. Warren indicates that the Draft EA states that the upper impoundment is marine clay, whereas on page 10 of the Draft Environmental Assessment (which S.D. Warren cites) is a general description of the geology and states " much of the eastern section ..... is overlain by marine clay ....". It does not state that there are no sources of sand and gravel in the watershed. The E.A. specifically states that much of this clay is found in the watershed of the Pleasent River, not in the entire Presumpscott River. The area within the margins of the impoundment (with the finer materials) was sampled for contaminants during the previous sediment studies, indicating the presence of these materials in the margins of the impoundment.

When flow velocities are increased, as would occur in dam removal, these areas can scour, with the finer material re-suspended and washed away, leaving coarser sand and gravel substrate. During the 1996 flood, the hydro facilities at Smelt Hill Dam were damaged by the deposition of fine white sand. This came from the watershed above dam. It is expected therefore that this same material still exists, and can be transported downstream and deposited under certain flow conditions, providing a coarser substrate than previously existed in these areas. In addition, when water levels drop, more rock areas can become exposed, creating riffles, pools, and general changes in flow along these surfaces. These can cause changes in the substrate as well, when suspended materials are deposited as a result of water hitting a rock barrier previously submerged, which is now exposed. This can occur in the shallower areas of the impoundment.

Comment 1, Paragraph 2 of the letter questions the Incremental Analysis stating that cover will become exposed.

Response. We concur that the wording is awkward, and should be changed to "available". However, this section of the IA states that in an impoundment, which was formerly inundated with water having a high biochemical oxygen demand, the lower strata become subject to dissolved oxygen depletion. Therefore, whatever bottom structure and cover components exist, they may be unusable to resident fish species due to low dissolved oxygen levels in the bottom depths. With the impoundment gone, whatever dissolved oxygen stratification that may have occurred in this impoundment will be eliminated, making these areas available to resident fish species (or opening them up). This would be most evident during summer low flow conditions.

Comment 1, Paragraph 2 also questions the validity of the IA model predicting a fourfold increase in flow, throughout the entire impoundment, when the most effect will be in the first mile.

Response to Comment 1, Paragraph 2. The incremental analysis (IA) uses increased flow velocity as a benefit, and applies it to the entire impoundment rather than the immediate area upstream. Since the entire impoundment will be opened and accessible to fishes. The IA is an analytical tool, designed to compare differences in alternatives, and therefore limited in scope. The flow component comprises only 7% of the entire output, and therefore, it was not considered cost effective to micro-manipulate the model which was used as an evaluation tool since ultimately a seven mile reach of river will be restored to its historical flow condition, albeit, the most significant improvement will occur in the first mile.

Comment 1, Paragraph 2, last line. The SAPPI letter questions the IA which says flow will provide "thermal stratification and/or quieter areas with lower dissolved oxygen levels".

Response to Comment 1, Paragraph 2 last line. The IA states the increased flow will ***reduce.... possible thermal stratification and/or quieter areas with lower dissolved oxygen levels...*** in the impoundment, thereby improving fish habitat, not provide areas....etc.

Comment 1, Paragraph 3. The SAPPI letter states that "based upon the erroneous conclusions presented in the incremental analysis, further analysis is necessary to assess potential changes in habitat as a result of dam removal, including habitat mapping and instream flow studies

to quantify changes in habitat in the impoundment as a result of dam removal." The letter also states that the various components such as depth, cover and substrate need to be quantified using methodologies such as IFIM in order to assess habitat under alternative hydraulic conditions.

Response to Comment 1, Paragraph 3. It is a historical fact, that the Presumpscot River supported large runs of anadromous Atlantic salmon, as well as other anadromous species prior to the construction of the dam. Therefore, the historical habitat exists in the river and still would exist in the River if the obstruction and habitat alteration created by the dam(s) were removed. It can be reasonably assumed, that once the Smelt Hill Dam is removed, that area once affected by the dam will revert to a more historical condition which would include changes in flow velocity, substrate, as well as all of the other parameters noted above affecting habitat. These will all change along the affected reach of the river (i.e. the impoundment) to a more historical condition, which was once habitat for anadromous fish species. Therefore, since it is already known that the habitat exists, for the purposes of this study, it is not necessary to conduct an IFIM study to quantify habitat under various hydraulic regimes in order to prove that there will be habitat. The incremental analysis used in this study was a comparative tool to determine qualitative differences in various alternatives, rather than to determine exact amounts of habitat that would be restored; since it will all be restored to a more historical condition (which supported large runs of anadromous species) once the dam is removed.

Comment 2 Paragraph 1. Conflicting and unsubstantiated claims regarding the existing fishery and benefits of dam removal.

The SAPPI letter states that the study report, which indicates that the impoundment lacks the habitat necessary for the development of a good warmwater fishery, contradicts the Statewide River Fisheries Management Plan which states that natural reproduction of warmwater fishes is high in the Presumpscot River to Westbrook, and that habitat quality and warmwater species composition in the river reach was rated as "medium". The SAPPI letter also recommends that the existing fishery be adequately evaluated.

Response to Comment 2. The Draft EA states that much of the impoundment is habitat limited for warmwater fishes, due to the general characteristics of the streambed, i.e. the steep rocky sides in the vicinity immediately upstream from the impoundment and scoured bottom. It also states that these diminish somewhat upstream. Communication with representatives from Maine resource agencies have indicated that much of the lower impoundment is habitat limited for warmwater fish, based upon the morphological characteristics. These representatives have also indicated that very little recent fisheries data has been collected from the area between the Smelt Hill Dam and the S.D. Warren Dam, because there has not been any significant recreational fisheries due to the poor water quality, and that the Maine DEP has attempted to collect fish from here and has not even been able to find enough for the minimum sample size at the area due to the fact that it has not been a productive warmwater fishery. In addition, the Maine Statewide Fishery Management Plan noted above in the SAPPI letter classifies the habitat quality and warmwater species composition as "medium". Therefore given the above information, it is not an "unsubstantiated claim" to state that the area lacks habitat necessary to develop a "good" warmwater fishery, since the recent data indicates that the fishery has been less than "good". The impoundment created by the dam is in fact an artificial environment. Given the fact that it is also

significantly important. Also, much of the destruction of important fishes incurred by sea lamprey occurs when sea lamprey populations become landlocked in lakes, not in flowing rivers, as would occur by opening the lower Presumpscot. It should also be mentioned that Carp are generally found in freshwater lakes, ponds and rivers. It is unlikely that they would be inhabiting a saltwater environment where they would be an invasive threat to the Presumpscot River when the dam is removed.

Comment 3, Paragraph 2. The SAPPI letter states that the restoration of of the fish lift is dismissed as economically unfeasible without considering that it is the only alternative which would prevent the introduction of these exotic species with their potentially devastating effects on the existing fish populations in the Presumpscot and Piscataqua River watersheds.

Response to Comment 3, Paragraph 2. The prevention of exotic species from entering the system by use of a fish lift as opposed to a dam removal was never a concern by any of the resource agencies that were solicited for comments during the initial study coordination. Letters were sent out to numerous resource agencies, including the Fish and Wildlife Service, EPA, the Maine DMR, DFW, and DEP, as well as numerous river associations and environmental associations, soliciting comments. However, the restoration of the fish ladder to keep out exotic species was never mentioned as a benefit. As stated above, USACE fisheries biologists do not consider this a significant threat in the with-project flowing river conditions.

Comment 4. Paragraphs 1 and 2. False assumptions regarding improvement in water quality. The SAPPI Letter states that improved water quality as a benefit of dam removal is an unsubstantiated argument, based on the use of historical water quality data which does not reflect the current conditions. According to the SAPPI letter, the current conditions reflect the flow regulation that went into effect after 1997 as recommended by the Waste Allocation Report. The letter states that there has been an improvement in water quality and the attainment of class B standards in the upper reach of the Smelt Hill Impoundment, and that the analysis does not take into consideration the current improvements.

Response to Comment 4, Paragraphs 1 and 2: The report and draft EA do state that historically the water quality was poor, and describe the history; therefore the example using the 1967 data. They also mention that the water quality has been improving and provide more recent data from 1993 collected for the Waste Allocation Report. We concur that data after 1997 was not noted, however, much of that was not available although attempts were made to obtain it, particularly the benthic data. However, the report and draft EA make the point that increased flows, as will occur without a dam and impoundment, will improve water quality. This is not an unsubstantiated argument, since it is essentially what was recommended by the Waste Allocation Report (i.e. to regulate flows to improve water quality). If the dam and impoundment are removed, then flow velocities behind the dam will increase, which will help eliminate the need to artificially regulate them in order to maintain water quality standards as a result of the waste loads upstream.

In addition, communication with representatives from Maine State agencies prior to the study indicated that dischargers into the Presumpscot River upstream from the Smelt Hill Dam were in favor of the dam's removal since it would help them to attain required water quality

Response to Comment 2, Paragraph 3. This is not and has not been a concern of the State of Maine Natural Resource Agencies, who have been working to restore these historical runs of anadromous fish to the Maine rivers for the last decade or longer. Historically these fish inhabited the River, as well as the many tributaries and lakes in the watershed. The reintroduction of these native species to their historic habitat is the goal of the dam removal.

Comment 2, Parragraph 4. The SAPPI letter states that the EA and reports indicate that coldwater fish habitat will be restored, while at the same time reporting that the water temperatures are at the upper tolerance limits for trout species, and that removing the dam will lower the water temperatures.

Response to Comment 2, Paragraph 3. The EA indicates that riffle and pool combinations will be restored in the area immediately behind the dam, and that the pools can provide holding areas for coldwater fish species. Brown trout, which can tolerate higher temperatures, do inhabit this area of the Presumpscot River. The report is stating that better holding habitat for these species will be made available, as opposed to a pond behind a dam which is the existing condition. The Incremental Analysis, which uses temperature as a habitat component, mentions that the primary mechanism for reducing temperature is the removal of an artificial impoundment behind the dam. This (impoundment) can artificially increase the water temperature by slowing the flow of water allowing it to heat up (in the summer months). With the dam (i.e. impoundment) removed, the water will flow faster and not have the opportunity to warm in the impoundment.

The IA mentions the increased exposure to coldwater feeder streams only as a possible occurrence, and does not consider it a primary mechanism in reducing temperature. The temperature component in the IA accounts for only 7% of the entire output, and the incremental change is only an increase of 0.25. Therefore the effect of this improvement is not factoring significantly into the output, but is showing that without an impoundment, thermal stratification and warming that would occur in it will be reduced, helping to maintain a lower water temperature in that section of the river.

Comment 3. Paragraph 1. Failure to address potentially devastating impacts of the introduction of exotic undesirable species to lower Presumpscot and Piscataqua River basin. The SAPPI letter considers the above statement as the most significant omission in the entire analysis. It states that with the dam removed, exotic species such as sea lamprey, gizzard shad and carp can be introduced into the Presumpscot River, where they hadn't been previously. It states that these exotic species can have devastating effects upon the existing populations of important fishes in the Presumpscot River.

Response to Comment 3, Paragraph 1. The Maine Department of Marine Resources, the Maine Division of Inland Fisheries and Wildlife, as well as the U.S. Fish and Wildlife Service, as well as many other resource agencies, have not considered introduction of exotic species by the removal of Smelt Hill Dam to be a significant threat to the existing fish populations in the lower Presumpscot River. These agencies are responsible for managing resident fish populations in the state, and all consider removal of the dam for the restoration of anadromous fisheries to be a positive benefit to the environment. In addition, the existing fish population in the Presumpscot River was considered as "medium" as previously noted in the SAPPI letter, and therefore, not

Response to Comment 6. Factual errors have been corrected.

Response to Thomas Squiers Jr. Stock Enhancement Division, State of Maine Department of Marine Resources, December 21, 2000

The letter responds to the SAPPI comments. No response from Corps required.

Response to Dusti Faucher, Friends of the Presumpscot River, January 3, 2001

The letter responds to the SAPPI comments. No response from the Corps required.

X. REFERENCES

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standards (do to the increased flow resulting from its removal). Although the water quality may have improved recently, these improvements are the result of the artificial flow regulation recommended by the above study, and are the result of increased flow velocities to the river, (as well as mandated reductions in pollution discharges, and more recently the closing of the S.D. Warren Pulp Mill in Westbrook). These increased flow velocities would also naturally occur in the section of the river upstream from the dam if it were to be removed.

Comment 5, Paragraphs 1 and 2. The SAPPI letter states that the economic analysis is incomplete, with the costs associated with cultural resources studies and mitigation, and also with surrendering the FERC license were not included.

Response to Comment 5, par. 1 and 2. The costs associated with cultural resources studies associated with the removal of Smelt Hill Dam have been estimated to total approximately $22,500 (including associated study costs). Coordination and negotiation with the Maine Historic Preservation Commission has occurred on a preliminary basis, and the extent of work associated with the dam removal are believed known. The construction cost provided in this final report has been increased by $9,200 to more accurately reflect the estimated costs.

The costs associated with FERC license surrender are primarily those of preparing a dam removal plan and an environmental assessment, both items already included in our efforts. No other significant costs are anticipated. The State of Maine shall be surrendering the license, however they anticipate costs associated with this work to be so small that they do not plan on claiming credit for in-kind services for this work.

Comment 5, Paragraph 3. The SAPPI letter indicates that economic impacts from the loss of tax revenue to the Town of Falmouth and socioeconomic impacts to landowners along the current impoundment should be considered.

Response to comment 5, Par. 3. Loss of tax revenue to the Town of Falmouth was not included in our economic analysis. For ecosystem restoration projects, the Corps considers projects that "reasonably maximize net ecosystem benefits compared to costs" with the plan selected (dam removal) meeting planning objectives and constraints, being "efficient", and being supported by the non-Federal sponsor. Each of the alternatives that achieve some measure of environmental restoration include the removal of the land upon which the dam sits from the local tax base, and since our economic analysis examines the relative merit of the alternatives, this purely local cost needs not be considered in the analysis.

With regards to impacts to local landowners, the impacts to their land are believed minimal. This is not a case where homeowners have built waterfront properties along a lake, and will now be faced with greatly changed conditions. The local landowners are supportive of the dam removal, as could be seen from the total lack of opposition by abutters to the proposed dam removal during public meetings, and during the official 30-day Public Comment period which commenced upon the publishing of the draft report.

Comment 6. Factual Corrections

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XI. COMPLIANCE WITH ENVIRONMENTAL FEDERAL STATUTES AND EXECUTIVE ORDERS

Federal Statutes

1. Preservation of Historic and Archeological Data Act of 1974, as amended, 16 U.S.C. 469 et seq.

Compliance: Project has been coordinated with the Maine State Historic Preservation officer. Impacts to archaeological resources will be mitigated through data recovery investigations as stipulated within a Memorandum of Agreement to be Prepared between the Corps and Maine State SHPO.

2. Clean Air Act, as amended, 42 U.S.C. 7401 et seq.

Compliance: Public notice of the availability of this report to the Environmental Protection Agency signifies compliance pursuant to Sections 176c and 309 of the Clean Air Act.

3. Clean Water Act of 1977 (Federal Water Pollution Control Act Amendments of 1972) 33 U.S.C. 1251 et seq.

Compliance: A Section 404(b)(1) Evaluation and Compliance Review have been incorporated into this report. An application shall be filed for State Water Quality Certification pursuant to Section 401 of the Clean Water Act.

4. Coastal Zone Management Act of 1782, as amended, 16 U.S.C. 1451 et seq.

Compliance: A CZM consistency determination shall be provided to the State for review and concurrence that the proposed project is consistent with the approved State CZM program.

5. Endangered Species Act of 1973, as amended, 16 U.S.C. 1531 et seq.

Compliance: Coordination with the U.S. Fish and Wildlife Service (FWS) and/or National Marine Fisheries Service (NMFS) has yielded no formal consultation requirements pursuant to Section 7 of the Endangered Species Act (see letters dated March 16, 1999 and March 10, 1999

6. Estuarine Areas Act, 16 U.S.C. 1221 et seq.

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Squiers, T.S., Smith, M., Beland, K.F., McNeish, J. and R.A. DeSandre. Lower Kennebec River Anadromous Fish Restoration Plan and Inland Fisheries Management Overview. State of Maine Department of Marine Resources, Atlantic Sea-Run Salmon Commission and Department of Inland Fisheries and Wildlife.

Squiers, Thomas S. Jr. 1988. Anadromous Fisheries of the Kennebec River Estuary. State of Maine Department of Marine Resources, Augusta, Maine; in cooperation with National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Management Division, State Federal Relations Branch.

Stier, D.J., and J.H. Crance. 1985. Habitat Suitability Index models and Instream Flow Suitability Curves: American shad. U.S. Fish and Wildl. Serv. Biol. Rep 82 (10.88). 34 pp.

Compliance: No requirements for Corps' activities.

15. Wild and Scenic Rivers Act, as amended, 16 U.S.C 1271 et seq.

Compliance: Not Applicable.

Executive Orders

1. Executive Order 11988, Floodplain Management, 24 May 1977 amended by Executive Order 12148, 20 July 1979.

Compliance: Public notice of the availability of this report or public review fulfills the requirements of Executive Order 11988, Section 2(a) (2).

2. Executive Order 11990, Protection of Wetlands, 24 May 1977.

Compliance: Public notice of the availability if this report for public review fulfills the requirements of Executive Order 11990, Section 2 (b).

3. Executive Order 12114, Environmental Effects Abroad of Major Federal Actions, 4 January 1979.

Compliance: Not Applicable; project is located within the United States.

4. Executive Order 12898, Environmental Justice, 11 February 1994.

Compliance: Not Applicable; project is not expected to have a significant impact on minority or low income population, or any other population in the United States.
5. Executive Order 13045, Protection of Children from Environmental Health Risks and Safety Risks. 21 April, 1997.

Compliance: Not Applicable; the project would not create a disproportionate environmental health or safety risk for children.

Executive Memorandum

Analysis of Impacts on Prime or Unique Agricultural Lands in Implementing NEPA, 11 August 1980.

Compliance: Not Applicable; project does not involve our impact agricultural lands.

FINDING OF NO SIGNIFICANT IMPACT

The proposed Federal action involves the removal of an abandoned hydropower dam and appurtenant structures. This will open the Presumpscot River to anadromous fisheries migration. Alewife, shad, striped bass, salmon and catadromous eels are expected to flourish in the river.

No significant long term or short term adverse impacts to the environment are anticipated. Construction will begin on or after September 2001, when river conditions permit minimum impact to anadromous fish migration.

My determination of a Finding of No Significant Impact is based on the Environmental Assessment and the following considerations:

a. The project will restore a historic anadromous fisheries corridor and increase the fisheries carrying capacity of the Presumpscot River system. This loss of sandy substrate in the footprint of project fill does not contribute to the loss of any significant aquatic or seasonal wetland habitat, nor result in any cumulative degradation of the waters of the Presumpscot River.

b. This project will have no known negative impacts on any State or Federal rare or endangered species.

c. A significant prehistoric archaeological site recorded by the State of Maine will be impacted by the removal of Smelt Hill Dam. However, this impact will be mitigated by archaeological data recovery investigations conducted during dam removal. This will be in accordance with an MOA to be completed between the Corps and the Maine Historic Preservation commission during Plans and Specifications.

d. Sediment loading would be minimized by employing erosion control plans and by scheduling the construction during the seasonal low flow period. Detailed erosion control measures will be in place prior to construction activities.

Based on my review and evaluation of the environmental effects as presented in the Environmental Assessment, I have determined that the Smelt Hill Dam Aquatic Ecosystem Restoration Project is not a major Federal action significantly affecting the quality of the human environment. Therefore, I have determined that this project is exempt from requirements to prepare an Environmental Impact Statement.

Jan 22, 2001
Date

Brian E. Osterndorf
Colonel, Corps of Engineers
District Engineer

CLEAN WATER ACT SECTION 404 (b)(1) EVALUATION

NEW ENGLAND DISTRICT
US ARMY CORPS OF ENGINEERS, CONCORD, MA
CLEAN WATER ACT
SECTION 404(b)(1) EVALUATION

PROJECT: Smelt Hill Dam Removal Project Presumptscot River, Maine - Conducted under the US Army Corps of Engineers Authority contained in Section 206 of the 1996 Water Resources Development Act, as amended.

PROJECT MANAGER:	Mr. William Mullen	tel 978-318-8559
FORM COMPLETED BY:	Mr. Ken Levitt	tel 978-318-8114

PROJECT: Smelt Hill Dam Removal, Presumpscot River, Falmouth, Maine, per Section 206 of the 1996 Water Resources Development Act, as amended.

DESCRIPTION: The selected plan consists of removal of the Smelt Hill Dam and disposal of the timber crib stone in the artificial sluiceway channel. Additionally, fill in water of the United States will be placed to restore the river to its pre-development configuration. Approximately 2600 cubic yards of old crib stone and concrete debris from the dam removal will be placed in the abandoned sluiceway channel.

NEW ENGLAND DISTRICT
US ARMY CORPS OF ENGINEERS, CONCORD, MA

PROJECT: Smelt Hill Dam Removal Project Presumpscot River, Maine - Conducted under the US Army Corps of Engineers Authority contained in Section 206 of the 1996 Water Resources Development Act, as amended.

CLEAN WATER ACT
Evaluation of Section 404(b)(1) Guidelines

1. **Review of Compliance (Section 230.10(a)-(d))**.

A review of the permit application indicated that:

a. The discharge represents the least environmentally damaging practicable alternative and if in a special aquatic site, the activity associated with the discharge must have direct access or proximity to, or be located in the aquatic ecosystem to fulfill its basic purpose.

X
YES NO

b. The activity does not appear to:

1) violate applicable state water quality standards or effluent standards prohibited under Section 307 of the CWA;

2) jeopardize the existence of Federally listed threatened and endangered species or their habitat; and

3) violate requirements of any Federally designated marine sanctuary.

X
YES NO

c. The activity will not cause or contribute to significant degradation of waters of the U.S. including adverse effects on human health, life stages of organisms dependent on the aquatic ecosystem, ecosystem diversity, productivity and stability, and recreational, aesthetic, and economic values.

X
YES NO

d. Appropriate and practicable steps have been taken to minimize potential adverse impacts of the discharge on the aquatic ecosystem.

YES	NO
X	

2. **Technical Evaluation Factors (Subparts C-F).**

	N/A	Not Signi-ficant	Signi-ficant
a. Potential Impacts on Physical and Chemical Characteristics of the Aquatic Ecosystem (Subpart C).			
1) Substrate.		X	
2) Suspended particles/turbidity.		X	
3) Water column impacts.		X	
4) Current patterns and water circulation.		X	
	X		
5) Normal water fluctuations.	X		
6) Salinity gradients.	X		
b. Potential Impacts on Biological Characteristics of the Aquatic Ecosystem (Subpart D).			
1) Threatened and endangered species	X		
2) Fish, crustaceans, mollusks, and other organisms in the aquatic food web.	X		
3) Other wildlife (mammals, birds, reptiles and amphibians).	X		
c. Potential Impacts on Special Aquatic Sites (Subpart E)			
1) Sanctuaries and refuges.	X		
2) Wetlands.	X		
3) Mud flats.	X		
4) Vegetated shallows.	X		
5) Coral reefs.	X		
6) Riffle and pool complexes.	X		
d. Potential Effects on Human Use Characteristics (Subpart F).			
1) Municipal and private water supplies.		X	
2) Recreational and commercial		X	

fisheries.			
3) Water-related recreation.		X	
4) Aesthetics impacts.		X	
5) Parks, national and historic monuments, national seashores, wilderness areas, research sites and similar preserves.	X		

Remarks: Explanation of identified significant impacts: See Environmental Assessment; and Findings of No Significant Impacts

3. Evaluation and Testing (Subpart G).

a. The following information has been considered in evaluating the biological availability of possible contaminants in dredged or fill material. (Check only those appropriate.)

1) Physical characteristics.....X

2) Hydrography in relation to known or anticipated sources of contaminants.....X

3) Results from previous testing of the material or similar material in the vicinity of the project.....X

4) Known, significant sources of persistent pesticides from land runoff or percolation.....

5) Spill records for petroleum products or designated hazardous substances (Section 311 of CWA).....

6) Public records of significant introduction of contaminants from industries, municipalities, or other sources..X...

7) Known existence of substantial material deposits of substances which could be released in harmful quantities to the aquatic environment

by man-induced discharge activities..... X

8) Other sources (specify).....

See Environmental Assessment

b. An evaluation of the appropriate information in 3a above indicates that there is reason to believe the proposed dredge or fill material is not a carrier of contaminants, or that levels of contaminants are substantively similar at extraction and disposal sites and not likely to require constraints. The material meets the testing exclusion criteria.

X
YES NO

4. Disposal Site Delineation (Section 230.11(f)).

a. The following factors, as appropriate, have been considered in evaluating the disposal site.

1) Depth of water at disposal site..... X
2) Current velocity, direction, and variability at disposal site..... X
3) Degree of turbulence..... X
4) Water column stratification..... X
5) Discharge vessel speed and direction.....
6) Rate of discharge.....
7) Dredged material characteristics (constituents, amount, and type of material, settling velocities).....
8) Number of discharges per unit of time.....
9) Other factors affecting rates and patterns of mixing (specify).....

See Environmental Assessment

b. An evaluation of the appropriate factors in 4a above indicated that our disposal sites

and/or size of mixing zone are acceptable.

X
YES NO

5. **Actions To Minimize Adverse Effects (Subpart H).**

All appropriate and practicable steps have been taken, through application of recommendation of Section 230.70-230.77 to ensure minimal adverse effects of the proposed discharge.

X
YES NO

List actions taken.
See Environmental Assessment

6. **Factual Determination (Section 230.11).**

All review of appropriate information, as identified in items 2-5 above; indicate there is minimal potential for short or long term environmental effects of the proposed discharge as related to:

a. Physical substrate at the disposal site (review sections 2a, 3,4, and 5 above). YES X NO

b. Water circulation, fluctuation and salinity (review sections 2a, 3, 4, and 5). YES X NO

c. Suspended particles/turbidity (review sections 2a, 3, 4, and 5). YES X NO

d. Contaminant availability (review sections 2a, 3, and 4). YES X NO

e. Aquatic ecosystem structure, function and organisms (review sections 2b and c, 3, and 5) YES X NO

f. Proposed disposal site (review sections 2, 4, and 5). YES X NO

g. Cumulative effects on the aquatic ecosystem. YES X NO

h. Secondary effects on the aquatic ecosystem. YES X NO

7. **Findings**

The proposed disposal site for discharge of dredged or fill material complies with the Section 404(b)(1) guidelines.....YES X NO

Jan 22, 2001

DATE

Brian E. Osterndorf
Colonel, Corps of Engineers
District Engineer