

# **KENNEBUNK LIGHT AND POWER DISTRICT**

## **WORKING DRAFT FOR PUBLIC RELEASE HYDROPOWER FACILITY ALTERNATIVES ASSESSMENT STUDY**



**OCTOBER, 2015**

**WRIGHT-PIERCE**   
Engineering a Better Environment

## Statement from Kennebunk Light and Power District

The Kennebunk Light & Power District Board of Trustees has been working with Wright-Pierce, a Maine Engineering Firm, for the past 2 years on drafting a report for alternatives on the disposition of the District's three hydro power facilities located on the Mousam River. This working draft document is the culmination of input by the Board, research by Wright-Pierce, and input from members of the community. The Board of Trustees continues to deliberate on this matter, and this draft that is being provided for public consumption is still a work in progress. To date no option has been selected, and no final decision has been made in regard to the disposition of the District's hydro facilities. A final decision is due to the Federal Energy Regulatory Commission by March 31, 2017, at which time the Board will be required to file a Notice of Intent on the process being selected. KLPD's license to generate hydro power on the Mousam River expires in March of 2022.

The District's Board of Trustees will be soliciting public input on the draft of the Wright-Pierce report at a future public meeting, tentatively set for mid-November. Trustees ask that the public review this draft and come prepared to make comments and ask questions regarding the report at the November meeting. The District will continue to work with Wright-Pierce to identify and address any gaps in the information gathered to date, with the ultimate goal of a final report outlining the decision made.

Many factors are being taken into consideration as part of the Board's decision making process. The Board is weighing environmental, economic and financial factors in order to make the decision that is in the best interest of our rate paying customers. All are welcomed and invited to attend the public meeting or meetings where rate payers and the community at large can provide input to assist in this decision making process. Please stay tuned to local media, District agendas and the District's website, [www.klpd.org](http://www.klpd.org) for more information and official meeting dates. All of KLPD's Board meetings, held on the second and last Tuesday of each month, are open to the public and the Board will be deliberating on these matters, along with other business that comes before the Board, at these meetings.

General Manager and Treasurer

**Todd Shea**

Todd Shea

**KENNEBUNK LIGHT AND POWER DISTRICT  
Hydropower Facility Alternatives Assessment Study  
Kennebunk, Maine**

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## **SECTION 1**

### **SUMMARY OF ALTERNATIVES**

#### **1.1 SUMMARY OF ALTERNATIVES**

The following alternatives have been identified for consideration and were presented to, and approved to be studied, by the Kennebunk Board of Trustees in June 2015, and as revised in August 2015.

#### **1.2 ALTERNATIVE #1 - SEEK NEW LICENSE TO CONTINUE OPERATIONS**

Assuming the license is issued, this option would permit the three facilities to continue operating for a likely license term of 40 years. Renewed licenses are issued for duration of between 30 and 50 years, based on the capital costs incurred through compliance with the terms of the new license. As it is likely that upstream and downstream fish passage would be required, in part due to the current focus on the subject of diadromous fish passage for the Mousam River by the Mousam and Kennebunk River Alliance (MKRA), those costs suggest substantial investment, likely supporting a 40 year license term. We suggest that the licensing application would include all three sites as there is no benefit to eliminating any of the sites: licensing costs would not be reduced, the generation would be lost, and there would be additional cost associated with disposition of any eliminated site.

#### **1.3 ALTERNATIVE #2 - SEEK LICENSE EXEMPTION TO CONTINUE OPERATION**

A License Exemption, if issued, would similarly allow continued operation at all three sites, but the Exemption is issued in perpetuity. Application should also be made for all three sites for the same reasons noted above. While no future renewal activities are needed, the potential downside of this option is that in general, conditions set into the Exemption often have “reopener” clauses, allowing state or federal agencies to “re-open” the Exemption at any time if they believe some environmental enhancement is needed.

Two requirements that must be satisfied to file for a License Exemption, but not a License, are:

- additional capacity must be installed, but there is no threshold to how little is added; and
- KLPD must demonstrate that they have all of the land rights (which could take the form of ownership in fee or easements) that would be needed to operate and maintain the three facilities.

As there is no minimum amount of capacity that must be added to satisfy the first condition, the installation of a micro-turbine would address this requirement at a “reasonable” capital cost, although additional power generation would likely be minimal from such installation.

To confirm that the second condition can be met, confirmation of land rights needs to be examined. If such rights are not currently held, or could not be acquired, then a License Exemption would not be possible. We understand that KLPD had started this research internally, but we are unaware of the results or whether the research has been completed.

#### **1.4 ALTERNATIVE #3 - SEEK FERC NON-JURISDICTION ONLY FOR THE KESSLEN SITE**

It is our understanding that recently completed research conducted by Harvey Consulting may suggest that activities performed at the Dane Perkins and Twine Mills Dam since 1935 would prohibit a finding of non-jurisdiction by FERC for these facilities, even if the Mousam River is determined to not be navigable under FERC’s regulations. However, if the definition of the “Project” can be modified, such that it only contains the Kesslen dam and powerhouse, then this alternative may be worthy of pursuit, as it would allow continued operation of Kesslen without any FERC oversight. It is assumed that FERC would have continuing jurisdiction over Dane Perkins and Twine Mill, thus a filing of License Surrender would be required for these facilities, and KLPD would retain responsibility for implementing whatever actions may be dictated by FERC at these two dams.

Key legal uncertainties appear to exist relative to this alternative that should be resolved through KLPD’s legal counsel. These include:

- Can separate dams/powerhouses (called “developments” in FERC’s terminology) in a multi-site FERC license project be separated out of the license and non-jurisdiction filing be made on just one dam/powerhouse?
- What process would be used to make this modification to the “Project” and what is the likelihood that FERC would issue a decision by March 2017, the date by which KLPD must file its Notice of Intent associated with the “Project”.

#### **1.5 ALTERNATIVE #4 - CEASE OPERATION AND SURRENDER THE FERC LICENSE FOR ALL THREE SITES**

This alternative would result in the discontinuance of generation at the three hydropower facilities and require KLPD to purchase a corresponding amount of electric energy to meet its customers’ needs. License surrender also requires that actions be implemented to prevent future generation at the sites. KLPD would be required to implement whatever actions FERC determines to be appropriate to meet this need. Given the interest in dam removal by the MKRA, it is foreseeable that dam removal, or at least partial breaching of each dam to allow free passage of migratory species, would likely be mandated. Alternatively, if such interest exists, ownership of one or more dams could be proposed in the license surrender application to be transferred to another entity for future management.



## SECTION 2

### ASSESSMENT OF ALTERNATIVE #1 SEEK NEW LICENSE TO CONTINUE OPERATIONS

#### 2.1 ALTERNATIVE DESCRIPTION

This option would permit the three facilities to continue operating for a likely license term of 40 years. Renewed licenses are issued for a period of between 30 and 50 years, based on the capital costs incurred through compliance with the terms of the new license. As it is likely that new provisions for upstream and enhanced downstream fish passage would be required, in part due in part to the current focus on the subject of diadromous fish passage for the Mousam River by the MKRA, those costs suggest substantial investment, supporting a year license term of at least 40 years. We suggest that the licensing application would include all three sites as there is no benefit to eliminating any of the sites: licensing costs would not be reduced, the generation would be lost, and there would be additional cost associated with disposition of any eliminated site. Appendix A summarizes the licensing process and authority granted to various agencies by FERC regulations.

FERC offers three alternative licensing approaches, which are summarized in Appendix B. The use of the “traditional licensing process”, while is more “paper-driven” and a more formal process, was suggested by legal counsel to KLPD in a Memorandum dated November 17, 2014. Its “formality” may be better for managing, as best possible, the involvement of the Mousam and Kennebunk River Alliance, and involves less “meeting time” with the agencies representatives, which may be easier for them based on feedback received during the January 2015 meetings with these agencies regarding their limited available time..

It should be noted that while not common, FERC has, on occasion, denied issuance of a new license if their assessment is that the economic and power production benefits of the project do not outweigh the environmental impacts of the project. One of the few instances where this occurred was the attempted re-licensing of the Fort Halifax Project on the Kennebec River where FERC refused to issuance a license and ordered the dam to be removed.

Estimated costs associated with this alternative are discussed at the end of this Section. Operating and maintenance costs associated with the dams and generating equipment over a forty year period are discussed in Section 6.0.

## **2.2 ENVIRONMENTAL IMPLICATIONS OF THIS ALTERNATIVE**

As maintenance of the dams would remain largely unchanged, and the facilities would continue run-of-river operations, there would likely be limited environmental changes, with the exception of those associated with upstream and downstream fish and eel passage (if mandated). The following discussions provide background and our current assessment of likely impacts to the noted resources.

### **Floodplain Wetlands**

Floodplain wetlands are significant in that they provide both habitat value and assist in the temporary storage and attenuation of flood flows. Floodplain or riparian wetlands can consist of emergent wetlands, scrub-shrub wetlands and wooded wetlands, all based on the type of vegetation that is growing. For example, emergent wetlands are characterized by grassy types of vegetation. From a water quality standpoint, wetlands along rivers and streams have been established as providing significant value for their role in nutrient retention and sedimentation during floods. The terrain adjacent to the lower Mousam River varies from steeply sloping to low-lying and flat. As a result, the presence of floodplain wetlands varies from one river segment to another.

A review of area wetlands as identified on the National Wetland Inventory (NWI) database suggests that significant fringe wetlands exist along the stretch of the Mousam River extending upstream from the Kesslen Dam to the Twine Mill Dam. Due to the steeper terrain along that reach there is relatively little fringe wetland present on the stretch between the Twine Mill and Dane Perkins Dams. Although there is relatively little fringe wetland present immediately upstream of Dane Perkins, the terrain flattens and begins a meandering pattern approximately 2,000 feet above the dam, resulting in the presence of more significant floodplain wetlands.

No noticeable changes to the amount or type of wetlands that have developed since the dams were built would be expected if the projects are re-licensed and continue to operate as run-of-river facilities.

### **Wildlife Habitat**

The wetlands areas adjacent to rivers and other water bodies are generally referred to as riparian zones. The riparian zone is the area where terrestrial (upland environments) and aquatic ecosystems converge and, as a result, is a very structurally diverse and naturally dynamic ecosystem. These areas often provide habitat for a very broad range of wildlife species. In addition to providing structurally complex habitats themselves, riparian zones serve as travel corridors and help protect and enhance the adjacent aquatic habitat through retention of nutrients and eroded soil materials from up-gradient land uses.

As limited, if any, changes are expected to occur to the type or amounts of wetlands along the river in the vicinity of the three dams, in general, there is no expected change to the use of these areas by the variety of wildlife that currently use these areas. While there may be an increase in private boaters as discussed in Section 2.3 below, the increase would not likely be so significant as to change limit the use of these wetlands and adjacent uplands by waterfowl, raptors, herons deer, raccoon and the other various small mammals that typically inhabit such areas.

At this time, the extent of endangered or threatened species protected by federal or state regulation existing within the area is unknown. An assessment would be conducted as a part of the effort to prepare supporting documentation for the license application. Should they be found to occur, measures to minimize impacts to them would be required as a license condition.

### **Fisheries**

The lower Mousam River currently supports two fairly distinct types of aquatic habitats. Areas above the Kesslen Dam, the lowest dam on the river, tend to support warm water species (bass, pickerel, chub, etc.) as the impoundments created by the dams are characterized by slow moving water, and as a result the water tends to be warmer, with lower dissolved oxygen content. Below

the Kesslen dam and above the head of tide, the water tends to be more fast-moving, and is accessible to sea run fish species.

Anadromous fish start their lives in fresh water environments and spend much of their lifecycles in the sea, returning to fresh water to spawn. Catadromous fish start their lives in salt water environments and spend much of their lifecycles in fresh water, returning to the sea to spawn. Typical examples of anadromous species present in southern Maine are smelt, shad, river herring, and Atlantic salmon. The only catadromous species on the east coast is the American eel.

Information available from the Maine Department of Marine Resources (MEDMR), Maine Department of Inland Fisheries and Wildlife (MEDIFW) and the Wells National Estuarine Research Reserve (WNERR), and others, suggests that American eel, smelt, shad, alewife and blueback herring all exist within the portion of the Mousam River below the Kesslen Dam. There is also evidence that suggests the presence of a population of sea run trout in this reach. Above the Kesslen Dam fish species tend to include smallmouth bass, chub, suckers and other small fish typically found in warm water ecosystems in Maine. As a general rule, coldwater gamefish, such as trout and salmon, require cooler water and higher dissolved oxygen than is present within the impoundments during the summer months.

For planning purposes, it has been assumed that both upstream and downstream fish passage will be required as part of a new license. Providing safe and effective passage at the locations of the three dams will restore aquatic connectivity and provide fish access to approximately nine miles of the mainstem Mousam River, as well as several additional miles of habitat along tributary streams that enter the river between the Kesslen and Dane Perkins dams.

In order to quantify the fisheries benefits associated with these changes, it is necessary to understand certain habitat requirements associated with the fish species in question.

*Alewife* - Alewife spawn primarily in lakes and ponds, as well as some slow moving rivers. It is possible that provision of fish passage at the existing dam locations may provide some benefit,

under the premise that one or more of the impoundments could provide spawning habitat. The dams upstream of Dane Perkins will continue to block access to quality spawning habitat.

***American Shad*** - American shad spawn in freshwater rivers and streams. Construction of fishways at the existing dam locations would likely provide some benefit, although evidence suggests that even well-designed and constructed fishways may still present a barrier to passage of shad.

***Blueback Herring*** - Blueback herring spawn in freshwater rivers and streams. Construction of fishways at the existing dam locations would likely provide benefit to blueback herring populations by allowing access to significant additional spawning habitat.

***American Eel*** - American eel are already known to be able to pass upstream of the three dams to some extent. Upstream eel passage facilities are generally separate and distinct from fishways designed for the use of finfish. Populations of American eel will likely increase once upstream passage is installed, making it easier for more individuals to reach upstream river sections.

***Smelt*** – Smelt currently spawn in freshwater habitat below the Kessler Dam. Evidence suggests that smelt will often not utilize technical fishways.

***Downstream Passage Enhancements*** – It is presumed that the continued operation of hydroelectric generating facilities at one or more of the three dams would be accompanied by enhanced provisions for downstream fish passage. These enhancements would likely include both physical facilities and suitable flow requirements, as well as provisions, such as 1-in spacing intake screening, to protect downward moving fish from injury or death via entrainment in the turbines.

## **Water Quality and River Flows**

The KLPD's three hydroelectric dams would continue to operate as "run of river" facilities. This means that the flowrate that is arriving at each facility at any given time is essentially the same as

that which is discharged by that facility. The exceptions to this include situations when the water level within an impoundment is drawn down (typically for maintenance or inspection purposes). During re-fill of the impoundments, the amount of flow being released downstream is less than what is flowing into the impoundment, although the minimum flow required by the license is maintained. There is limited attenuation effect provided by each of the impoundments during periods of elevated peak flows (i.e. floods).

A new license and water quality certification would also likely contain similar, or perhaps greater, minimum flow requirements provisions than what is currently required. Often, such minimum flows are released at the fish passage facility rather than through opening of a gate, thus the location of these releases may change. Required formal monitoring and reporting of flows would serve to document that the projects are being operated in compliance with flow requirements, thus proving that negative impacts are not occurring.

Water quality would also likely remain unchanged, in large part, due to continued run-of-river operation. Built-up sediments in the impoundments would remain as they currently exist, which may contribute to water quality issues. However, there may be a possibility of decreased dissolved oxygen levels and increases in water temperature within the impoundments, if warmer temperatures over a greater length of time are experienced in the future, associated with certain climate change scenarios.

## **2.3 SECONDARY ECONOMIC IMPLICATIONS OF THIS ALTERNATIVE**

### **Visual Changes and Related Impacts**

With continued presence of the dams, there would be no change to the existing views along the river, with the exception of at the dams if upstream fish passage is installed. Thus no visual impacts, or changes often associated with visual impacts, namely possible decreases in property values, are expected. Likewise, the community character established by the Kesslen Dam along Main Street would remain essentially unchanged.

## **Recreational Use**

Anecdotal information suggests the impoundments are now only used by private boaters and recreational fisherman. Only one of the upstream campgrounds (Yankeeland Campground) provides river access for their campers, and they do not rent canoes/kayaks. Current research indicates that no commercial canoe/kayak companies have tours that extend close to the Kessler dam; all are focused much lower downstream in the river.

If new public boat access points or portage trails around the dams becomes a license requirement, greater numbers of boaters could have access to the river, however, it cannot be predicted how much of an increase would occur. It is uncertain that additional boat access points or portage trails would affect the tour areas, create new business opportunities or significantly increase impoundment use. Such features however could increase KLPD operational costs due to required maintenance of these new recreational facilities.

## **2.4 BENEFITS OF THE ALTERNATIVE**

Issuance of a new FERC license will have the following key benefits:

- It will allow continued operation of the facilities such that purchase of power to replace that which is generated by the plants to not be required. Operating costs however would likely increase as additional monitoring requirements would likely be required. See Section 2.5.1 for this and all other cost issues associated with this Alternative.
- A forty year license, rather than a license exemption, would mean that all enhancements and compliance mandates that becomes a requirement of the license and new Water Quality Certification (WQC) could not be changed (with the exception of public safety issues) by a resource agency or FERC until the next renewal phase. Thus, KLPD would have a better ability to plan for and manage operating costs as they would not change.
- If/when fish passage is installed, restored access to a nine mile section of the river by the anadromous fish species (most likely alewife, blueback herring and American shad, and possibly salmon) and American eel would be achieved. Eel are currently passing the dams, however new facilities to support upstream and downstream passage would likely

enhance their use of the river. No other significant environmental impacts are expected as noted above in Section 2.2.

- No significant secondary economic impacts are expected as noted above. A possible increase in private recreational boater use may result if additional boat access points or portage trails are installed.
- Previous studies in 2011 determined that replacement of the existing units to install new more efficient units would not be economically viable given the long pay-back periods. Appendix C summarizes these analyses. Logistical issues at Kesslen further challenge replacement of this unit.
- The flows in the river do not appear to support the installation of additional generation capacity with the possible exception of a small-micro-turbine (see Appendix D for a discussion of potential installation of additional generation capacity.) Based on our assessment, it appears that the only real value associated with such an installation would be to meet one of the two requirements to apply for a license exemption.

## **2.5 IMPACTS AND CHALLENGES OF THE ALTERNATIVE**

The following impacts and challenges could be expected from implementing this Alternative:

- The licensing proceedings are likely to be confrontational given the expressed interest in dam removal by the Mousam and Kennebunk River Alliance (MKRA). Such controversies tend to increase licensing costs due to probable legal filings that may be made by entities that support dam removal.
- Fish passage for anadromous species and American eel will likely be required. In addition to the MKRA, interest in passage restoration has also been expressed by the Maine Department of Marine Resources at meetings held in January 2015.
- No significant negative changes with respect to environmental issues would be expected from continued operation of the facilities, as discussed earlier.
- A new license would likely contain requirements with respect to a number of environmental measures, as detailed in the license “articles”. Appendix E summarizes the requirements contained in the nine most-recently issued FERC licenses in New England. Many of these can be expected to be included in a new license for the KLPD sites. All of



these measures will result in new capital costs and operational costs, which have been included in the estimated costs for this alternative.

- This option will result in continued and more costly operating costs, including implementation of currently identified dam repair needs (identified by FERC in the report from their 2015 site visit) as well as certain projected future repair needs. The project could also be subject to future FERC safety-related requirements.

## **2.6 COST ASSESSMENT OF THE ALTERNATIVE**

The following table summarizes the various costs associated with this Alternative. Possible cost refinement opportunities, where possible at this time, are noted.

**TABLE 2-1  
ESTIMATED COSTS TO OBTAIN A NEW LICENSE AND CONTINUE OPERATIONS**

<b>Item</b>	<b>Description</b>	<b>Estimated Costs</b>	<b>Cost Refinement</b>
Re-licensing studies, application preparation and processing	This includes all of the scoping meetings with interested agencies, studies required through the scoping process, preparation of the license renewal application and process of responding to the draft license.	\$600,000 to \$1,200,000	Secure site specific assessment to possibly refine costs. \$3,500 - \$4,000
Project Exhibit Drawings	FERC projects have specific drawings (i.e. Exhibits) requirements for application. An example includes surveyed property or ROW boundaries. Existing exhibits do not meet current requirements, thus new ones must be developed.	\$75,000 to \$110,000	
Protection, mitigation and enhancement measures other than fish passage and protection.	Based on Appendix E, it is assumed that a carry-in boat launch, parking area and fishing access will be required for access to the Kessler and Dane Perkins impoundments and that development of a cultural resource management plan will be required.	\$50,000 to \$75,000	
Annual O&M costs of new protection, mitigation and enhancement measures.	Dependent on measures required in the new license. Assumes maintenance of the new carry-in boat launches and fishing areas.	\$4,000 to \$6,000	
Design and installation of upstream fish passage facilities	Based on previous studies by Alden Research Laboratory, the costs includes Alaska Steeppass Fishways (assumes only river herring (including alewife) as target species) at each dam. Jan 2015 meetings with state and federal fishery agencies suggested such ladders could be found appropriate for river herring.	\$1,017,000 to \$1,271,000	Refinement of costs would require conceptual design of the fish passage facilities most likely required. \$20,000 to \$25,000
	The costs includes Denil ladders (assumes river herring and American shad as target species) at each dam. Jan 2015 meetings with state and federal fishery agencies suggested such ladders could be found appropriate for both species.	\$2,035,000 to \$2,544,000	See above.
Design and installation of upstream eel passage facilities	Assumes eel ramp or ladder at each dam.	\$117,500 to \$156,000	
Effectiveness testing of upstream fish and eel passage	Total estimated upstream fish and eel passage effectiveness testing for three dams.	\$48,000 to \$66,000	

Item	Description	Estimated Costs	Cost Refinement
facilities			
Annual O&M cost of upstream fish and eel passage	Total estimated annual costs for three dams. Lower costs are for Alaska Steeppass ladders; higher cost for Denil ladders.	\$36,000 to 42,000 – anadromous fish \$32,000 to \$40,000 - eel	
Design and installation of downstream fish and eel passage/protection measures	Costs assume surface bypass for downstream passage and installation of new trash rack bars. Most new licenses included 1-in spacing on trash racks to prevent / minimize entrainment and impingement. Some projects have been required to curtail generation on rainy evenings in September through December to ensure safe eel passage.	\$110,000 to \$192,000	
Effectiveness testing of downstream fish and eel passage facilities	Total estimated downstream fish and eel passage effectiveness testing for three dams.	\$36,000 to \$48,000	
Annual O&M cost of downstream fish and eel passage	Costs would vary based on type of passage installed..	\$12,000 to \$18,500	
Annual minimum flow and/or headpond level monitoring	Assumes a requirement for continuous monitoring of minimum flow discharges and headpond levels to confirm compliance, requiring monitoring equipment installation, SCADA system for remote monitoring and maintenance and staff time needed for reporting and O&M. These are common requirements of the projects listed in Appendix E.	Equipment installation - \$125,000 to \$150,000  O&M – \$5,000 to \$7,500	
Annual reports based on new FERC License conditions	Dependent on new license conditions. Assumes only annual minimum flow and headpond level compliance report and possibly FERC form 80..	\$2,000 - \$4,000	
Annual dam safety inspections/testing/plans required by FERC	These include the Dam Safety, Surveillance and Monitoring Plans and annual inspections; annual gate testing; annual inspection of downstream areas for changes in development that could change the hazard classification of the dams.	\$6,000 for DSSM inspection & reports. Other annual activities by KLPD staff estimated at \$3,500.	
Annual facility operating costs	Estimate is based on average of “cost of hydropower” values provided by KLPD from ten year period 2005-2014.	\$80,787	

## **SECTION 3**

### **ASSESSMENT OF ALTERNATIVE #2**

#### **SEEK A LICENSE EXEMPTION TO CONTINUE OPERATIONS**

##### **3.1 ALTERNATIVE DESCRIPTION**

This option involves filing for a FERC “License Exemption” in lieu of a new license for the three facilities to allow their continued operation. A License Exemption does not expire. Application should also be made for all three sites. The studies needed to support a filing as well as processing requirements for a License Exemption are essentially the same as those for obtaining a license (See Appendix B for further details). In addition to being limited to sites of 10MW or less, two additional requirements that must be satisfied to file for a license exemption, are:

- additional capacity must be installed, but there is no threshold to how little is added; and
- KLPD must demonstrate that it possesses all of the land rights (which could be ownership in fee or easements) that would be needed to operate and maintain the three sites.

FERC could deny issuance of a license exemption if their assessment is that the economic and power production benefits of the project do not outweigh the environmental impacts associated with the project.

Estimated costs associated with this alternative are discussed at the end of this Section. Operating and maintenance costs for the dams and generating equipment over a forty year period are discussed in Section 6.0.

##### **3.2 ENVIRONMENTAL IMPLICATIONS OF THIS ALTERNATIVE**

The anticipated environmental conditions discussed in Section 2.2 for Alternative No. 1, Re-licensing of the Project, also apply to this alternative. This assumes that provisions for fish passage would also be required under issuance of a license-exemption.

### **3.3 SECONDARY ECONOMIC IMPLICATIONS OF THIS ALTERNATIVE**

The anticipated secondary economic conditions discussed in Section 2.3 for Alternative No. 1, Re-licensing of the Project, also apply to this alternative.

### **3.4 BENEFITS OF THE ALTERNATIVE**

Issuance of a FERC License Exemption would provide almost all of the benefits identified for Alternative No. 1, that of acquiring a new license. A key difference is that, unlike having to eventually undertake relicensing at some time in the future if a new license is obtained, if a license exemption is obtained, no future renewal activities are needed, as it does not expire.

### **3.5 IMPACTS AND CHALLENGES OF THE ALTERNATIVE**

All of the impacts and challenges identified for securing a renewed license would also apply to this alternative. Similar new operational requirement would also apply. An additional negative of this alternative is that in general, conditions set into the exemption often have “reopener” clauses, allowing state or federal agencies to seek to modify the exemption at any time if they believe some environmental enhancement is needed. However, this has generally not been experienced by most License-Exemption holders, as the “process” to modify a License Exemption is a time consuming endeavor that most agencies do not undertake voluntarily. Since the agency(ies) would be the entities initiating the modification, they would have the burden of documenting why a change is necessary.

### **3.6 COST ASSESSMENT OF THE ALTERNATIVE**

The estimated cost elements associated with this Alternative are assumed to be the same as the costs identified in the Table in Section 2.5 for Alternative No. 1, plus the costs associated with purchase, licensing and installation of the micro-turbine, which are estimated at \$400,000. Appendix D discusses the potential for increasing capacity at the sites, including installation of a micro-turbine. The costs for this Alternative assume that KLPD already has all necessary land rights needed to qualify for a license exemption.

## SECTION 4

### ASSESSMENT OF ALTERNATIVE #3 SEEK FERC NON-JURISDICTION ONLY FOR KESSLEN DAM

#### 4.1 ALTERNATIVE DESCRIPTION

This alternative assumes that only the Kesslen Dam and powerhouse could possibly meet the requirement associated with non-jurisdiction as defined in the FERC regulations, even if the Mousam River is determined to not be navigable. This is due primarily to evidence of post-1935 construction activities at both the Dane Perkins and Twine Mill dams, as outlined in the review conducted by Harvey Consulting. As it is assumed that FERC would maintain jurisdiction over Dane Perkins and Twine Mill, a filing for License Surrender would be required for these facilities. KLPD would retain responsibility for implementing whatever actions are required at these two dams by an eventual FERC order approving the license surrender. Based on meetings held in January 2015, MEDEP stated that the Water Quality Certification now held for the sites would become null and void. While KLPD would be required to operate the remaining unit in compliance with state water quality standards, there would be no permit or certification issued. Non-compliance would likely be addressed from a regulatory perspective only if problems are brought to the attention of the MEDEP.

Key uncertainties associated with this Alternative remain, despite consultation with KLPD's FERC legal counsel. These include:

- Can separate dams/powerhouses (called "developments" in FERC's terminology) in a multi-site FERC license project be separated out of the license and non-jurisdiction filing be made on just one dam/powerhouse?
- What process would be used to make this modification to the "Project" and what is the likelihood that FERC would issue a decision by March 2017, when KLPD must file its Notice of Intent for the "Project"?

Legal opinion relative to these questions suggests that, while it is theoretically possible to separate out the Kessler facilities from the FERC license, it is uncertain whether FERC's analysis would be in favor of doing so given their assessment criteria that measure the interrelationship between the developments. This opinion also found that while such a decision could possibly be made within an 18-month period, this timeframe would require substantial advance briefing on the planned filing with FERC staff, and presumes that such pre-discussions would suggest that a favorable decision is likely.

Should this alternative be selected, and a finding of non-jurisdiction be found for the Kessler dam and powerhouse, then Kessler could continue operations indefinitely and future licensing actions would be eliminated.

Estimated costs associated with this alternative are discussed at the end of this section.

#### **4.2 ENVIRONMENTAL IMPLICATIONS OF THIS ALTERNATIVE**

The environmental impacts that would likely occur should the Kessler dam remain, but the Twine Mill and Dane Perkins dams be removed, include, to varying degrees, a combination of the items discussed in Section 2 for Alternative No. 1 (relicensing of the dams) and Section 5 for Alternative No. 4 (license surrender and dam removal). The primary exception to this relates to implications regarding fisheries within the river. It may be appropriate to consult Sections 2 and 5 to facilitate understanding of the summary discussions below.

##### **Floodplain Wetlands**

Removal of the Dane Perkins and Twine Mill dams would likely result in changes in the amount, type and location of wetlands located adjacent to the impoundments associated with these dams, however, it is likely that new fringe wetlands would be formed along the "new" shorelines of the river. It is also likely that removal of the two impoundments would result in some enhancement of water quality in the form of cooler summer temperatures and higher dissolved oxygen. It is important to note that the wetlands bordering the Kessler impoundment would not likely be altered in any measurable way.

## **Wildlife Habitat**

No significant changes in wildlife use are expected in the event this alternative is selected for implementation.

## **Fisheries**

If the Kesslen dam is found to not be under the jurisdiction of FERC, it is assumed that the KLPD would not immediately proceed with implementation of provisions for upstream fish passage at this location, hence the environmental benefits provided by upstream and downstream fish passage facilities are assumed not to occur. It is important to note that the possibility exists that such facilities could conceivably be imposed under state law or voluntarily installed by KLPD. Without the implementation of upstream fish passage facilities at this location, few noticeable changes to river fisheries would be expected. However, if upstream and downstream structures are implemented, then blueback herring and American eel would likely be the primary benefitting species. Access to suitable alewife spawning habitat would still be limited and the use of the fishway by American shad may still be limited.

## **Water Quality and River Flows**

Overall water quality would likely be improved even within the Kesslen impoundment. This is due to the fact that restored riverine conditions from removal of Twine Mill and Dane Perkins would improve the quality of the water in these upstream areas, which would then flow into the Kesslen impoundment. Flow conditions within the portion of the river corresponding to the formerly impounded areas above Twine Mill and Dane Perkins would be altered as discussed in Section 5.2. However, changes in the flow regime in the Kesslen impoundment would not be expected to change, assuming the project continues to be operated in a run-of-river mode.



## **4.3 SECONDARY ECONOMIC IMPLICATIONS OF THIS ALTERNATIVE**

### **Recreational Boating**

It is assumed that if the Kesslen Dam is not under FERC jurisdiction, development of additional boat access or a portage trail in that vicinity would be at the discretion of KLPD. Unobstructed boating would occur above Kesslen to the Old Falls Dam. Section 5.3 provides additional discussion of how river flows may affect boating in areas impacted by dam removal. It is uncertain whether any significant change in boating use would be experienced.

### **Visual Changes and Related Impacts**

With the continued presence of the Kesslen Dam, changes in views along this impoundment, where most of the residences close to the water occur, would be unchanged from current conditions. Likewise, the role of the dam and impoundment on the visual character of the downtown area would not be impacted. As there are very few, if any, residences with unobstructed river views along the impounded areas upstream of the Twine Mill and Dane Perkins dams, visual impacts in those areas would be expected to be minimal. Thus concerns relative to reduced property values would also likely be limited.

### **Shoreline Stability and Infrastructure Impacts**

The reduction of water levels upstream of the Twine Mill and Dane Perkins Dams may result in some impacts related to shoreline stability. The potential for scouring impacts to the railroad crossing and Interstate 95 above Twine Mill and the Mill Street Bridge above Dane Perkins would be discussed in Section 5.3. The continued presence of the Kesslen Dam would preclude such issues along its impoundment.

### **Kennebunk Sewer District Operations**

No impacts to this facility's operations would be expected for the reasons discussed in Section 5.3.

#### **4.4 BENEFITS OF THE ALTERNATIVE**

Issuance of a finding of non-jurisdiction for the Kesslen Dam and powerhouse can be expected to result in the following key benefits:

- It will allow continued operation of the Kesslen powerhouse. Because it would not be regulated by FERC, additional monitoring requirements that would be expected under a new license or license exemption would not be required, thus operating costs would likely remain similar to current requirements. There would also be no future requirements associated with re-licensing.
- State dam safety requirements, which tend to be less onerous than those of FERC, would apply. For example, the Dam Safety Surveillance and Monitoring program and annual FERC requirements, such as gate testing, would not apply. Inspections would no longer be done by FERC, but instead by the dam safety staff within the Maine Emergency Management Agency (MEMA).
- Environmental and secondary economic benefits from this alternative are discussed above.
- Fish passage could still potentially be required, but if so it would be mandated under state law (12 MRSA 12760/6121), rather than FERC regulation. The state process would require the major effort in proving the need for fish passage to fall to those promoting the passage. In contrast, through the FERC licensing process, KLPD would have the obligation to conduct studies that would likely be requested from such parties through the Environmental Report scoping process conducted as part of the re-licensing effort. It is uncertain if such a state mandate would be issued, as the time needed on part of the state regulators is also significantly increased over that which would be needed during a FERC licensing process. This is because fish passage mandates are the responsibility of federal not state agencies during FERC relicensing/license exemption processes.

#### **4.5 IMPACTS AND CHALLENGES OF THE ALTERNATIVE**

The following impacts and challenges could be expected from implementing this Alternative:

- License surrender and dam removal costs would be incurred for Dane Perkins and Twine Mill dams. Section 5 further discusses license surrender and dam removal issues.
- Replacement power would need to be purchased for the loss of generation at Twine Mill and Dane Perkins.
- Previous studies in 2011 determined that replacement of the existing unit at Kesslen to install a new more efficient unit would not be a reasonable given the long pay-back periods. See Appendix C for this data. Logistical issues at Kesslen further challenge replacement of this unit.
- It is probable that continued pressure to restore migratory passage to the Mousam River would remain. However, a state-ordered mandate would need to be issued under 12 MRSA 12760 or 6121. Until fish passage is installed, anadromous fish species would not have access to the Mousam River upstream of the Kesslen dam.
- Ongoing maintenance costs of the Kesslen dam would remain to ensure it is kept in a safe condition.

#### **4.6 COST ASSESSMENT OF THE ALTERNATIVE**

The following table summarizes the various costs associated with this Alternative.

**TABLE 4-1**  
**ESTIMATED COSTS TO FILE FOR NON-JURISDICTION AND IMPLEMENT REQUIRED**  
**MEASURES AT DANE PERKINS AND TWINE MILL**

Item	Description	Current Estimated Costs	Cost Refinement
Application preparation and associated activities for filing for a non-jurisdictional declaratory order from FERC.	Includes the activities summarized in Appendix F as well as well as legal fees required to file for non-jurisdiction declaration for just the Kessler site. It is assumed that limited additional studies by Harvey Consulting will be required.	\$50,000 to \$70,000	Confirmation of costs with legal counsel
Project Exhibit Drawings for Non-jurisdiction filing	FERC projects have specific drawings (i.e. Exhibits) requirements for application. An example includes surveyed property or ROW boundaries. Existing exhibits do not meet current requirements, thus new ones must be developed.	\$45,000 to \$75,000	Confirmation needed from legal counsel for drawing needs
Application preparation and associated activities for filing for license surrender for Dane Perkins and Twine Mill.	Includes the activities summarized in Appendix G, including FERC License Surrender application, and environmental studies to support the application. Does not include actual dam removal costs or permitting for removals.	\$150,000 to \$300,000	Consultation with legal counsel
Project Exhibit Drawings for License Surrender Filing	Included in above estimate for exhibit drawings.	\$75,000 to \$110,000 Pat confirming with FERC to see what drawings would be needed	
Annual facility operating costs	Estimate is based on average of “cost of hydropower” values provided by KLPD from ten year period 2005-2014. Assumes 1/3 of these costs for Kessler operation only.	\$26,900	
Annual dam safety inspections/testing/plans required by MEMA	Required only for Kessler dam. Assumes KLPD inspections would nonetheless continue but DSSM costs would be eliminated.	\$1,500	

Item	Description	Current Estimated Costs	Cost Refinement
<b>For Kesslen Dam Only if Mandated</b>			
Design and installation of upstream fish passage facilities	Based on previous studies by Alden Research Laboratory, the costs includes Alaska Steeppass Fishways (assumes only river herring (including alewife) as target species) at Kesslen dam. Jan 2015 meetings with state and federal fishery agencies suggested such ladders could be found appropriate for river herring.	\$340,000 to \$423,700	Refinement of costs would require conceptual design of the fish passage facilities most likely required. \$8,000 to \$12,000
	The costs includes Denil ladders (assumes river herring and American shad as target species) at Kesslen dam. Jan 2015 meetings with state and federal fishery agencies suggested such ladders could be found appropriate for both species.	\$678,400 to \$848,000	See above.
Design and installation of upstream eel passage facilities	Assumes eel ramp or ladder at Kesslen dam.	\$39,200 to \$52,000	
Effectiveness testing of upstream fish and eel passage facilities	Total estimated upstream fish and eel passage effectiveness testing for Kesslen dam. Assumes state agencies would require same level of testing as federal agencies.	\$16,000 to \$22,000	
Annual O&M cost of upstream fish and eel passage	Total estimated annual costs for Kesslen dam. Lower costs are for Alaska Steeppass ladders; higher cost for Denil ladders.	\$12,000 to \$14,000 – anadromous fish \$10,700 to \$13,400 - eel	
Design and installation of downstream fish and eel passage/protection measures	Costs assume surface bypass for downstream passage and installation of new trash rack bars. Most new licenses included 1-in spacing on trash racks to prevent / minimize entrainment and impingement. Some projects have been required to curtail generation on rainy evenings in September through December to ensure safe eel passage.	\$36,700 to \$64,000	
Effectiveness testing of downstream fish and eel passage facilities	Total estimated downstream fish and eel passage effectiveness testing for Kesslen dam.	\$12,000 to \$16,000	

Item	Description	Current Estimated Costs	Cost Refinement
Annual O&M cost of downstream fish and eel passage	Costs would vary based on type of passage installed.	\$4,000 to \$6,200	
<b>Only Applicable to Dane Perkins and Twine Mill</b>			
Sediment testing at Dane Perkins and Twine Mill	Assumes that initial sediment screening samples indicate contamination is present at levels that cannot be released downstream.	\$20,000	Conduct screening sampling at estimated cost of \$12,000.
Disposal of contaminated sediments	Assumes disposal at a licensed site.	\$125,000	Conduct assessment to determine accumulated sediment quantity. at estimated cost of \$6,000 to \$10,000.
Dam removal costs at Twine Mill and Dane Perkins	Includes costs of obtaining required permits, design of dam removal and actual removal costs.	\$500,000	
Infrastructure protection or restoration	Assumed infrastructure potentially impacted includes the RR bridge at Twine Mill impoundment and Mill St Bridge at Dane Perkins impoundment. I-95 crossing at unaffected river section between Kessler and Twine Mill dams.	\$75,000	

## SECTION 5

### ASSESSMENT OF ALTERNATIVE #4 LICENSE SURRENDER

#### 5.1 ALTERNATIVE DESCRIPTION

This alternative involves surrender of the FERC license and cessation of hydropower generation at all locations. License surrender also requires that actions be implemented to prevent future generation at the sites. Appendix G further discusses the requirements of the license surrender process and potential requirements associated with approval of such a request. It should be noted that the Water Quality Certification would become void once the FERC issues its order in response to the surrender filing. Although the FERC process does allow other entities to seek a license to operate the facilities once KLPD files the NOI stating a license will not be sought, based on a review of recent license surrender projects, it does not appear any of these projects resulted in application for a license by other parties.

Given the above assumption that no other entities would seek/obtain a license, KLPD would be required to implement whatever actions FERC determines to be appropriate to meet this need. Given the interest in dam removal by MKRA with respect to migratory fish access to the Mousam River, dam removal, partial breaching of each dam or installation of fishways to allow free passage would likely be mandated. Interest in passage restoration has also been expressed by the Maine Department of Marine Resources at meetings held in January 2015. Another possible option would be the transfer in ownership of one or more of the dams to another entity if maintaining the dam(s) is of significant value to that entity. Such a transfer would need to be addressed in the license surrender application as the plan for “disposition” of the assets. Either the KLPD or the new owner would still be required to implement the conditions established in the FERC order approving the license surrender for any dam that may be maintained, including the possibility of installation of fish passage.

A license surrender application must identify the plan for the disposition of the dams and generating equipment. The cost estimates developed for this Alternative assumed that the

powerhouse and equipment would be removed at Dane Perkins and Twine Mill. However, at Kesslen, the assumption is that generating equipment would be disabled and left in place. In all three situations, it was assumed that the dams would be substantially removed.

Based on observations of recent license surrenders at other sites, including the Saccarappa Dam on the Presumpscot River, installation of fish passage is generally more expensive than dam removal (and less palatable to most agencies and NGO's). Estimates developed for this study confirms our impressions relative to likely costs. Fish passage installation also requires continuing operation and maintenance efforts, as well as continuing maintenance of the dams, even though there is no longer any financial benefit associated with power generation. Review of available data relative to Maine projects suggests that partial or full removal of the associated dams has generally accompanied FERC license and license exemption surrenders. Review of a MEDEP list of dam removals in Maine shows that five of twenty dam removal projects to date have been associated with hydropower projects. One recently completed surrender of a FERC license was in 2002 at the Fort Halifax Hydropower Project, located on the Sebasticook River, which included the licensee's proposal to partially remove the dam (removal of 87 feet width of the 553-foot wide dam.). SAPPI / S.D. Warren recently filed an application for surrender of the license for the Saccarappa Hydropower project and dam on the Presumpscot River. Appendix G further discusses the status of this project. Given our observations, this Alternative assumes that the dams will be removed, rather than fishways installed.

Estimated costs associated with this alternative are discussed at the end of this section.

## **5.2 ENVIRONMENTAL IMPLICATIONS OF THIS ALTERNATIVE**

As noted above, it has been assumed that removal of the dams would be required by FERC in the Order approving license surrender. The following summarizes the changes that would be expected to occur should the dams be removed. Sections 2.3 and 2.3 provide background on current conditions for each subject addressed below.



## **Floodplain Wetlands**

Removal of one or more of the dams will result in lowering of water levels within the currently impounded areas, hence the location of the interface between the aquatic and terrestrial regimes, i.e. the riparian or wetland area, will change. As a result, it is expected some of the existing wetlands along the impoundments may evolve into upland habitats. Increased velocities within the river and changes in the dynamics associated with breakup of river ice in the spring will influence the natural regrowth of vegetation along the portions of the riverbanks that become exposed due to dewatering of the impoundments. Depending on these changes, and the topography along the river, it is reasonable to assume that new wetlands will be formed in other areas. The return to more natural flow conditions will eventually result in better flushing of the wetlands that remain or are formed, and thus enhancing the overall health of these wetlands.

Dam removal will also result in reduction of the sediments currently built-up behind each dam. Unless found to be contaminated, these sediments will be released downstream in a controlled fashion. (Sediment management is discussed further below.) While initial movement of these sediments may result in temporary siltation of current downstream wetlands and aquatic ecosystems, natural spring high flow conditions should minimize any long-term negative effects. In natural riverine conditions, routine downstream sediment transport results in movement of nutrient rich materials to downstream river reaches. Thus, in time, removal of the dams would allow this section of the Mousam River to return to a more natural state.

Assessment efforts to date have not included sufficient detail in this area to accurately project the net impacts to wetland habitat associated with any dam removal scenarios.

## **Wildlife Habitat**

Significant changes in the type of wildlife using the wetlands are not expected, although as the health of the wetland areas improves, the numbers of individual animals may increase. While the location of some wetlands may change, the overall use of the river's riparian areas by wildlife is not expected to change significantly. Studies that would be done in support of the license surrender application would likely examine the potential for impacts, positive or negative, to protected species.

## **Fisheries**

The following summaries potential effects on fisheries within this section of the Mousam River as a result of dam removal. In general, dam removal provides unimpeded, more effective passage upstream for anadromous and catadromous species than fish passage structures.

***Alewife*** - Provision of upstream passage through dam removal at the three sites is not expected to provide significant immediate benefit to alewife populations, as the upstream dams will continue to block access to quality spawning habitat.

***American Shad*** – Upstream passage via dam removal should provide benefit to shad populations by allowing unimpeded access to significant additional spawning habitat.

***Blueback Herring*** - Blueback herring populations are expected to benefit from dam removal by allowing access to significant additional spawning habitat.

***American Eel*** - Provision of upstream passage through dam removal should provide meaningful benefit to area eel populations by facilitating their access to significant additional habitat.

***Smelt*** –Provision of upstream passage through dam removal at the three sites is not expected to provide significant benefit to smelt populations as the fish do not typically swim very far up past the limit of salt water for spawning purposes. It is possible that dam removal would be beneficial

for smelt under a scenario where long term sea level rise resulted in loss of spawning habitat below the location of the Kesslen Dam.

***Downstream Passage Enhancements*** – Removal of the dams would provide unchallenged movement of fish downstream.

### **Impacts to Wells**

The removal of one or more of the dams may be accompanied by a reduction in levels of the groundwater table near the river. In cases where residents are dependent on shallow dug wells for water supply in close proximity (typically within 500 feet) to existing impoundments that may be lowered further investigation of the potential for impact may be warranted. Deeper (including bedrock) wells are typically not affected. An assessment into the potential impact to wells typically involves a review of the area's hydrogeology, which is largely dependent on the permeability of the various soil deposits and a survey of the presence of wells within approximately 500 feet of the river.

### **Water Quality and River Flows**

As previously discussed, the KLPD's three hydroelectric dams all currently operate as "run of river" facilities, except during times when the impoundments are drawn down and then re-filled. There is also limited attenuation effect provided by each of the impoundments during periods of elevated peak flows (i.e. floods). As a result, the removal of one or more of the dams is unlikely to result in any meaningful changes in flow patterns that are currently experienced within the river downstream of the Kesslen dam. It should also be noted that the operation of other dams upstream of the KLPD facilities currently exercise some influence over the hydrology of the river, and can be expected to do so for some time to come.

Removal of the dams can be expected to significantly alter the velocity of flows within the river sections that are currently impounded. Water flowing through an impoundment typically moves more slowly than that flowing in an unobstructed river channel. Faster moving water generally results in cooler water temperatures during the summer months, and correspondingly higher

dissolved oxygen, improving the quality of the aquatic habitat. The increased velocity will also tend to result in greater sediment transport capacity and changes in channel morphology. In other words, absent the dams, changes in the channel geometry and form are likely. Additional hydrologic modeling and assessment of the river sediments would need to be done to better predict what specific changes are likely to occur. Should this Alternative be selected, it is likely that an assessment of the river's morphology would be prepared for inclusion in the license surrender application.

Questions were raised regarding impacts to beach dynamics at the mouth of the river, change to the extent of the tides in the river, changes in the amount of water that would flow over downstream clam beds, and whether removal will affect how the river will respond to major storms and floods. While the above-mentioned hydrological modeling will confirm these current understandings, it is not expected that changes in the river's flow would affect beach dynamics and water levels over shellfish beds, which are several miles downstream of the Kesslen Dam. The removal of the dams would have no measurable impact on the limits of tidal action within the river.

The removal of the three KLPD dams can be expected to result in some changes in the way the section of the river between the Kesslen and Dane Perkins dams performs during flooding events, however, as the non-storm water levels will be generally lower than the current impoundment water elevations, the extent of flooding onto adjacent lands should be no greater (and generally less than) the limits of flooding currently observed. Other sections of the river should not experience any measurable changes in flooding, as the dams do not offer flood control capacity, and simply pass flows as they are received within the impoundment.

### **5.3 SECONDARY ECONOMIC IMPLICATIONS OF THIS ALTERNATIVE**

As noted in Appendix H, several questions were raised by members of the public regarding the potential impact of dam removal on certain uses of the river. The following paragraphs briefly discuss these potential impacts as well as other secondary economic issues.

## **Recreational Boating**

One of the expressed concerns is diminished recreational boating opportunities given loss of the stable water level of the impoundments. Dam removal will result in restoration of more normal river flows, which change seasonally, based on precipitation amounts. During dryer months, boating use on the Mousam River will likely be limited in some areas due to the shallow water levels. High spring flows will allow for canoe and kayak activity under conditions that may actually encourage use by more experienced boaters, due to the more challenging conditions that will occur. Increased recreational use is has been observed on the Penobscot River where the Great Works and Veazie Dams were recently removed, allowing more dynamic river flow conditions to occur. It is difficult to accurately predict the magnitude of changes in boating use on the Mousam River and whether such changes would have any economic effect on local businesses.

## **Visual Changes and Related Impacts**

The potential for negative impacts to the value of properties adjacent to the impoundments was expressed by several residents, with change in views and potential odors caused by exposed sediments as concerns. Almost all of the residences having waterfront views are located on the Kesslen impoundment. The few homes upstream of Twine Mill and Dane Perkins appear to be set-back from the river with trees blocking direct views. As more dams are being removed nationwide, studies are being completed assessing such impacts. Because the nature and magnitude of impacts to a property tend to vary widely based on the property in question, it is difficult to make broad statements regarding such impacts. Certainly, impacts experienced by individual properties along the Mousam River can be expected to vary, based on proximity to the river, the magnitude of change to water levels at that location, the extent to which the river is visible from the premises, the extent to which the current use takes advantage of the river, and a host of other considerations.

Another property-related concern is whether the acreage of properties adjacent to the river will increase if the width of the river narrows. The boundaries of a property are based on the description stated in the deed. If the property boundary is described as “from the center of the

river”, than the formerly submerged but now exposed land becomes part of the subject property. However, if the legal description sets the property line at the edge of the impoundment or flowage, than the newly exposed land may remain with KLPD, assuming that KLPD has such legal flowage rights.

### **Shoreline Stability and Infrastructure Impacts**

Lowering of the river’s water level could have a negative effect on the stability of the river banks. Erosion of soils during high spring flows, which will have greater velocity than currently experienced, can occur in areas that had previously always been submerged. Based on a cursory review of the river channel and hydrology, we do not expect widespread issues relating to bank stability. Additional hydrologic modeling and assessment of the soil types along the river banks would need to be done to ascertain the areas that would be most subject to erosion and overall stability issues. KLPD would be required to provide shoreline stabilization measures in areas where such studies indicate substantial erosion with negative impacts may occur.

Due to the generally undeveloped nature of most of the affected section of the river, there are relatively few infrastructure elements (e.g. roads/bridges, intakes or outfalls, etc.) of potential concern. These include the Interstate 95 crossing, the railroad crossing upstream of Twine Mill and the Mill Street crossing upstream of Dane Perkins. Based on review of state records, there are no licensed water intakes or outfalls between the Kessler Dam and the upper limit of the impoundment created by the Dane Perkins Dam (See below for discussion of the interrelationship of KLPD’s dams and the Kennebunk Sewer District’s operations). Most structures along this section of the river are set-back from the riverbank, so potential impacts to building foundations are limited. The apparent exceptions include the mill building and condominiums just upstream of the Kessler dam, and the powerhouses at Twine Mill and Dane Perkins. Should this alternative be selected, stability studies should be performed to determine impacts to these building foundations and river crossings. The Twine Mill and Dane Perkins powerhouses are expected to be substantially removed along with the dams. KLPD would be responsible to provide protective measures to minimize/prevent damage to such structures.

Thus, no secondary cost impacts are expected to be placed on others from this dam removal alternative.

### **Kennebunk Sewer District Operations**

Removal of the dams is not expected to have any impacts on the operation of the Kennebunk Sewer District, based on discussions held between KLPD and the Sewer District in 2015. The current Sewer District permit is based on an agreement with the owners of Old Falls Dam to release a minimum of 26 cubic feet second, or inflow, whichever is less. The three KLPD dams operate as run-of-river, so such flows are simply passed through. Thus, the removal of the KLPD dams would not reduce the flows in the river upon which the Sewer District's permitted discharge limits were based.

### **5.4 BENEFITS OF THE ALTERNATIVE**

The receipt of a FERC order to surrender a license would have the following key benefits. As noted above, it is assumed that the dams will be breached or removed.

- If determined not to be critical to the safety of the dams through 2022, and if approved by FERC, the estimated \$125,000 in concrete repairs at the Kesslen and Twine Mill dams identified as being needed by FERC from their 2015 site inspection, would be avoided. However, it is uncertain at this time whether or not FERC would agree with not making such repairs.
- KLPD operating and capitals costs associated with these facilities will be eliminated, as would any potential liabilities associated with their possible failure.
- Section 5.2 addresses the anticipated environmental benefits of removing the dams. Possible secondary economic benefits are discussed in Section 5.3.
- The costs to make such a filing and remove the dams are projected to be less than obtaining a new license or license exemption.

## 5.5 IMPACTS AND CHALLENGES OF THE ALTERNATIVE

The following impacts and challenges could be expected from implementing this Alternative:

- Replacement power would need to be purchased to replace power previously generated.
- A number of concerns were raised by community members at the March 31<sup>st</sup> 2015 meeting regarding dam removal. (See Appendix H for a list of these concerns.) Most of these are discussed in sections 5.2 and 5.3. While investigations could be conducted to better assess some of these concerns, as discussed above, many are very difficult to predict for certain. If a public vote is needed to implement this alternative due to funding needs, it will be important to address as many of these concerns as possible so the residents have factual data on them before they are asked to vote. Such studies would also be incorporated into the license surrender filing's environmental assessment. The cost estimate noted below includes optional costs should KLPD elect to study some of these concerns.
- The need for removal and disposal of contaminated sediments could have a significant impact on dam removal costs. Past research did not identify any existing data for the Mousam River. Thus, it may be appropriate to do screening level sediment sampling in the impoundments at this time to determine whether contamination might be present to confirm the current cost assumptions.
- Legal issues can continue even after the dams have been removed. In the case of the Fort Halifax dam removal, lawsuits were filed against the dam owner requiring river bank preservation and restoration due to significant erosion of the river banks following the dam's removal. It is less likely that similar issues will occur on the Mousam River, since flows experienced in the Kennebec River are significant faster in during high flow events than in the Mousam River.

## 5.6 COST ASSESSMENT OF THE ALTERNATIVE

The following table summarizes the various costs associated with this Alternative. For purposes of this analysis, it was assumed that some sediments will be found to be contaminated, and will



be dredged out and disposed of at a licensed facility. However, currently there is no data that suggests that such contamination exists.

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**FIGURE 5-1  
ESTIMATED COSTS TO FILE FOR LICENSE SURRENDER AND DAM REMOVAL**

<b>Item</b>	<b>Description</b>	<b>Current Estimated Costs</b>	<b>Cost Refinement</b>
Application preparation and associated activities for filing for license surrender for all three dams.	Includes the activities summarized in Appendix G, including FERC License Surrender application, and environmental studies to support the application. Does not include actual dam removal costs or permitting for removals.	\$150,000 to \$300,000	Consultation with legal counsel
Project Exhibit Drawings for License Surrender filing	A license surrender application would only need the drawings indicating the property boundary and others that would be used to illustrate how the dam would be breached or removed. Existing exhibits do not meet current requirements, thus new ones must be developed.	\$35,000	
Sediment testing at all three dams	Assumes that initial sediment screening samples indicate that contamination is present at levels that cannot be released downstream.		Conduct screening sampling at estimated cost of \$12,000.
Disposal of contaminated sediments	Assumes disposal at a licensed site.		Conduct assessment to determine accumulated sediment quantity. at estimated cost of \$6,000 to \$10,000.
Dam removal costs for all three dams	Includes costs of obtaining required permits, design of dam removal and actual removal costs.	\$1,000,000	
Infrastructure protection or restoration	Assumed infrastructure potentially impacted includes apartments at Kessler impoundment, the RR bridge at Twine Mill impoundment and Mill St Bridge at Dane Perkins impoundment. I-95 crossing at unaffected river section between Kessler and Twine Mill dams.	\$125,000	

## SECTION 6

### COST COMPARISON

#### 6.1 ANALYSIS DEVELOPMENT AND ASSUMPTIONS

An economic analysis was completed to allow for a cost comparison of the four identified alternatives. The results of these analyses are in the form of spreadsheets which can be found in Appendix I. Generally, the intent has been to provide “life cycle” projections of both capital and operating costs, as well as the avoided costs associated with energy generation for those alternatives that presume continued operation of one or more of the hydro facilities. The resulting figures are intended to support comparison of net costs on a common basis.

Given the level of effort conducted in support of this study, as well as the uncertainty regarding certain elements, a number of assumptions were made in the development of these analyses. The tables have been constructed as spreadsheets which should allow for refinement as better data becomes available. In addition, the use of the spreadsheets should facilitate the performance of additional iterations of the cost analysis in the event it is desired to adjust certain cost components based on varying assumptions.

It must also be noted that the economic analysis is intended to provide a basis for comparison for those factors for which fiscal values can be reasonably projected. In determining a path forward with respect to the future of its hydro facilities, the KLPD will clearly wish to include consideration of a number of other important elements, which may not readily translate into financial terms.

For the purpose of the economic analysis tables included in Appendix I, key assumptions include:

- The analyses have been developed for a forty-year period based on the assumption that if relicensed, that license would have a forty-year term.
- Estimated costs for filing FERC applications are assumed to include both technical studies and legal costs. Clearly, the actual legal expenditures associated with any given

scenario would be affected greatly by any challenges issued by opponents to the selected KLPD alternative.

- Costs associated with studies leading up to the KLPD's selection of an alternative have not been incorporated (an example of this might be costs associated with any short-term screening level sampling and analysis of sediments performed to better inform the decision-making process)
- The KLPD operations and maintenance costs are based on large part on the average annual costs (\$80,787) from the ten-year period from 2005 through 2014, based on data provided by the KLPD in July of 2015. These were split as 30% labor and 70% non-labor.
- The projected kWh generation value (1,400,000 kWh) was based on a review of historical operational data provided by KLPD in July of 2015.
- The projected cost per kWh to purchase replacement energy was assumed to be 0.105 per kWh, based on information provided by KLPD.
- We have assumed an annual kWh generation associated with installation of a new mini-turbine of 150,000 kWh.
- The current assessment does not include consideration of any additional generation from KLPD units that may be obtained if the units' efficiencies are improved following performance testing and implementation of modifications that may be needed. Likewise, it does not factor in loss of generation that may result from potential diversion of flows that may be necessary at times for operation of fish passage facilities.
- The initial economic analysis assumes that the time value of money (interest rates) are essentially equivalent to inflation. It may be decided to adjust this assumption for future versions of the analysis.
- Dam removal costs assume that the powerhouses at Dane Perkins and Twine Mill would be removed, but at Kesslen decommissioning would be limited to disabling of the generating equipment. The Kesslen generating equipment may be left in its current location given the logistical challenges associated with removing it. All oils would need to be drained and electrical connections severed.

## 6.2 SUMMARY CONCLUSIONS

The net values associated with the cost analyses for the four alternative scenarios can be summarized as follows. Note that two versions have been developed for Alternative scenario 1 due to the broad range of projected costs associated with some elements.

**FIGURE 6-1**  
**NET VALUES ASSOCIATED WITH THE COST ANALYSIS**

<b>Alternative</b>	<b>Costs</b>	<b>Equivalent Revenues</b>	<b>Net Present Worth</b>
1a - Re-license Sites - Low End of \$ Range	\$8,844,989	\$6,909,000	(\$1,935,989)
1b – Re-license Sites - High End of \$ Range	\$11,680,989	\$6,909,000	(\$4,771,989)
2 - License Exemption	\$9,194,989	\$7,554,750	(\$1,640,239)
3 - Non-jurisdiction (Kesslen only)	\$4,392,122	\$2,819,250	(\$1,572,872)
4 - Surrender License - (Remove all dams)	\$2,321,722	\$882,000	(\$1,493,772)

**APPENDIX A**  
**Summary of Key FERC Licensing and License  
Exemption Filing and Processing Requirements**

## **A-1 - FERC License Renewal Process**

Under the Federal Power Act (FPA), the FERC has exclusive authority to license the construction, operation and maintenance of non-federal hydropower projects located on navigable waterways that effect interstate commerce. However, many other federal and state resource agencies, as well as other stakeholders all have the right to participate in the process.

The resource agencies may exercise authority in the relicensing process through the Fish and Wildlife Coordination Act, the Endangered Species Act, and Sections 4(e) and 10(j) and 18 of FPA. The FERC has the obligation of balancing the need for power, project economics and environmental, cultural and recreational issues, with such balancing demonstrated through an analysis conducted under the National Environmental Policy Act (NEPA). The resource agencies focus only on their particular areas of interest. Issues included under Section 10(j) are handled as "recommendations" which FERC may or may not adopt. Requirements dealing with passage for anadromous and catadromous fish species falling under Section 18 of the FPA are considered "mandatory prescriptions" which FERC is obligated to adopt into a license. Section 4(e) is only applicable to projects located on federally reserved lands, such as national forests, Indian reservations, etc. If a protected species is found in the project area, following assessment of possible impacts to the species, the applicable state and federal agencies would issue a "biological opinion" as to whether the protective measures recommended for the project by the FERC are appropriate and sufficient.

Additional agency requirements that must be incorporated into the re-licensing process are found under Section 401 of the Clean Water Act, which are issued via a Water Quality Certification issued (in Maine) by the Maine Department of Environmental Protection, and the "consultation process" required under National Historic Preservation Act, which is managed through the State Historic Preservation Office (SHPO). This latter process is not an approval or permit, per se, but a process under which impacts to historic and/or archaeological resources are assessed and mitigated. Review under the Coastal Zone Management Program is also required.

Regardless of which of the three licensing processes is being used, a licensee must initiate the process by filing a Notification of Intent (NOI) And Pre-Application Document (PAD) to renew the license with FERC, and provide copies of this filing with all relevant Federal, State, interstate resource agencies as well as applicable Indian Tribes and other interested stakeholders, such as non-governmental organizations that have interest in the project and its potential environmental, recreational, cultural and related issues. The NOI must be filed not earlier than 5 ½ years or later than 5 years before a license expires. The process to be implemented is identified in the NOI. An Application must be filed no later than two years prior to expiration of the existing license.

The licensing process involves scoping sessions, development and implementation of environmental studies, filing of an application, development of an Environmental Assessment and/or Environmental Impact Statement, issuance of a draft license for comment, with the end product being final license issuance. All issued licenses have appeal processes available, and history has shown that in many situations, either the applicant or other stakeholder will appeal the license conditions. This has led to lengthy court proceedings and many months or years of delay in license issuance.

A new FERC license will include a series of requirements that must be implemented by the licensee. Such requirements are identified through the license Articles, which can be general or very specific in their requirements and schedule. License conditions may generate both fixed capital costs and variable costs that arise from changes in operational or management techniques. Example fixed capital costs could include fish passage facilities, recreational boat ramps or canoe put-ins, and fish screens. Changes in operations may decrease hydropower production potential through minimum flows and fishway flow releases. Other costs might include maintenance costs associated with installed fishways and recreational features. Appendix E includes a summary of requirements included in the nine most recent licenses issues by FERC to New England projects. Many of these could be expected to be included in a new license issued for the KLPD sites.



## **A-2 - FERC License Exemption Process**

If KLPD elected to file for a License Exemption, then in lieu of filing a NOI for license renewal, an application for a 5MW license exemption would be filed. This licensing process is the same as that for a license renewal with the following exceptions:

- an applicant has less time (45 days rather than 90 days) to correct any application deficiencies;
- exemption requests are generally supported by an Environmental Assessment and seldom require a full Environmental Impact Statement;
- procedures for post-filing consultation between the applicant, FERC agencies and Indian tribes are different;
- all timely fish and wildlife recommendations under Section 30(e) FPA are mandatory, and
- a fee must be submitted to reimburse fish and wildlife agencies for costs incurred in connection with their review pursuant to Section 30(e) of the FPA.

The term "license exemption" is used as such actions are exempt from the licensing provisions of Part 1 of the FPA. This means Sections 10(j) and the mandatory conditions under Sections 4(e) and 18 do not apply. However, as noted above, environmental measures such as fish passage could be required similar to those under a license if such measures are issued as a "recommendation" under Section 30(e).

**APPENDIX B**  
**Summary of Alternative FERC Licensing Processes**

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	<b>Traditional Licensing Process (TLP)</b>	<b>Alternative Licensing Process (ALP)</b>	<b>Integrated Licensing Process (ILP)</b>
<b>Consultation with Resource Agencies and Indian Tribes</b>	Paper driven	Collaborative	Integrated
<b>Deadlines</b>	<ul style="list-style-type: none"> <li>• Pre-filing - some deadlines for participants</li> <li>• Post-filing - defined deadlines for participants</li> </ul>	<ul style="list-style-type: none"> <li>• Pre-filing - deadlines defined by collaborative group</li> <li>• Post-filing - defined deadlines for participants</li> </ul>	<ul style="list-style-type: none"> <li>• Defined deadlines for all participants throughout the FERC</li> </ul>
<b>Study Plan Development</b>	<ul style="list-style-type: none"> <li>• No FERC involvement</li> <li>• Developed by applicant based on early agency, tribal, and public recommendations</li> </ul>	<ul style="list-style-type: none"> <li>• FERC staff advisory assistance</li> <li>• Developed by collaborative group</li> </ul>	<ul style="list-style-type: none"> <li>• Plan approved by FERC</li> <li>• Developed through study plan meetings with FERC staff involvement</li> </ul>
<b>Study Dispute Resolution</b>	<ul style="list-style-type: none"> <li>• OEP Director opinion advisory</li> </ul>	<ul style="list-style-type: none"> <li>• OEP Director opinion advisory</li> </ul>	<ul style="list-style-type: none"> <li>• Informal dispute resolution available to all participants</li> <li>• Formal dispute resolution available to agencies w/ mandatory conditioning authority.</li> <li>• OEP Director opinion binding on applicant</li> </ul>
<b>Application</b>	<ul style="list-style-type: none"> <li>• Draft and final application include Exhibit E</li> </ul>	<ul style="list-style-type: none"> <li>• Draft and final application includes applicant-prepared EA or 3rd party EIS</li> </ul>	<ul style="list-style-type: none"> <li>• Preliminary licensing proposal (or draft application) and final application include Exhibit E that has form and contents of an EA</li> </ul>
<b>Additional Information Requests</b>	<ul style="list-style-type: none"> <li>• Available to participants after of application</li> </ul>	<ul style="list-style-type: none"> <li>• Available to participants before filing of application</li> <li>• Post-filing requests available but should be limited due to collaborative approach</li> </ul>	<ul style="list-style-type: none"> <li>• Available to participants before of application</li> <li>• No formal avenue to request additional info after application filed</li> </ul>
<b>Timing of Resource Agency Terms and Conditions</b>	<ul style="list-style-type: none"> <li>• Terms and conditions filed 60 days after REA notice</li> <li>• Schedule for filing final terms and conditions permitted</li> </ul>	<ul style="list-style-type: none"> <li>• Terms and conditions filed 60 days after REA notice</li> <li>• Schedule for filing final terms and conditions permitted</li> </ul>	<ul style="list-style-type: none"> <li>• Terms and conditions filed 60 days after REA notice</li> <li>• Modified terms and conditions 60 days after comments on the EA or draft NEPA document</li> </ul>

**APPENDIX C**  
**Existing Unit Replacement / Refurbishment Assessment**

## **Unit Replacement Assessment**

As part of the 2011 studies, Wright-Pierce conducted a preliminary assessment of issues and costs associated with replacement of the existing turbine-generators at each of the three powerhouses, as a possible approach to increase power production. The following summarizes the status of the existing equipment. KLPD hydro operating costs and power purchase costs used in these analyses were provided by KLPD.

### **Kesslen**

Kesslen power generating equipment was installed new in 1928, and consists of a single vertical Kaplan turbine manufactured by James Leffel Company. The turbine powers an electric generator manufactured by General Electric, also installed in 1928. The generator nameplate is rated at 150 KW. Based on review of 2009 production and flow data, the equipment is operating inefficiently at approximately 20-25% capacity.

Replacement cost of the current turbine-generator system is estimated to cost between \$400,000-\$500,000, assuming the flow channel can be easily adapted to the retrofit the new equipment, and access could be provided without major investment in modifying the mill structure. At Kesslen an investment of \$500,000 to replace and modernize the turbine and generators, would result in an annual debt service payment of about \$40,000 per year using a 20-year financing period at an interest rate of 5%. This investment would result in improved efficiency and more power generation at each site. If the efficiency at Kesslen could be improved to 50%, this investment could roughly double the current annual benefit of about \$21,100/year over the costs of purchasing wholesale power. Based on the last 9 years of operations records, it would appear that investment in better, more efficient power production does not make sense at Kesslen based on an estimated replacement cost of \$500,000 at the site for a new generator-turbine system.

### **Twine Mill**

The generating equipment at the Twine Mill facility, was completely replaced and overhauled in 1980, and is in relatively good condition. The turbine is an inclined, fixed blade tube turbine with three manually selected fixed runner positions, manufactured by Allis Chalmers. The powerhouse sustained significant damage from flooding in May 2006 and again in the "Mother's Day Storm" on April 16, 2007. This damage has been repaired and the facility is fully operational. The generator nameplate is rated at 300 KW.

The calculated efficiency of the Twine Mill equipment is 37-47% based on review of 2009 production and flow data. Considering the good condition of the equipment, it does not make sense to replace the turbine-generator at this site.

## Dane Perkins

The Dane Perkins Facility is similar to Kesselen in age and condition. The powerhouse equipment consists of a 1935 single, vertical Kaplan turbine rated at 150 kilowatts manufactured by S. Morgan Smith Company. The turbine powers an electric generator manufactured by General Electric and installed in 1936. Following breach of the Dane Perkins dam in 1977, the facility was rebuilt in the 1980's. The equipment is operating inefficiently, at a capacity of approximately 20-25% based on 2009 data.

For Dane Perkins, an investment of \$500,000 to replace and modernize the turbine and generator, would result in an annual debt service payment of about \$40,000 per year using a 20-year financing period at an interest rate of 5%. This investment would result in improved efficiency and more power generation at each site. If the efficiency at Dane Perkins could be improved to 50%, this investment could roughly double the current annual benefit of about \$15,700/year over the costs of purchasing wholesale power. Based on the last 9 years of operations records, it would appear that investment in better, more efficient power production does not make sense at Dane Perkins based on an estimated replacement cost of \$500,000 at the site for a new generator-turbine system.

### **Unit Refurbishment Assessment**

*This section is still under development and will be completed once we have successfully reached the contractors familiar with the KLPD equipment, as well as firms that conduct performance testing that that would allow assessment of the unit condition.*

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**APPENDIX D**  
**Additional Generation Potential Assessment**

## **Additional Generation Potential Assessment**

As part of the overall assessment into the range of alternatives available to the KLPD, Wright-Pierce was asked to review the potential for increasing generation at the three hydro facilities. As with most efforts of this type, the assessment included a review of the extent to which the current equipment takes advantage of the energy inherent in the river's flows, as well as the costs and other impacts associated with installation of new generating equipment at the sites.

Appendix C includes a discussion of the existing generating equipment at each facility and the costs associated with replacement. In most cases, it is likely that meaningful enhancements in operating efficiency could be achieved.

### **Flow Duration Curve**

Key to the assessment of untapped generating potential is a review of the current generating equipment against river flows. At the end of this section is a Flow Duration Curve that has been developed for the lower Mousam River. The curve allows for projecting the percent of time during an average year that river flows will exceed a certain rate.

The three hydro facilities each have a reported hydraulic capacity of approximately 260 cubic feet per second (cfs). Based on a review of the flow duration curve, river flows can be expected to exceed this figure approximately 23 percent of the time. In essence, this can be interpreted to mean that the existing generating equipment is taking advantage of the full river flow for 77 percent of the time and that installation of additional generating capacity would only provide benefit during the 23 percent of the time that the flows exceed the hydraulic capacity of the existing equipment.

### **Competing Demands for Flow**

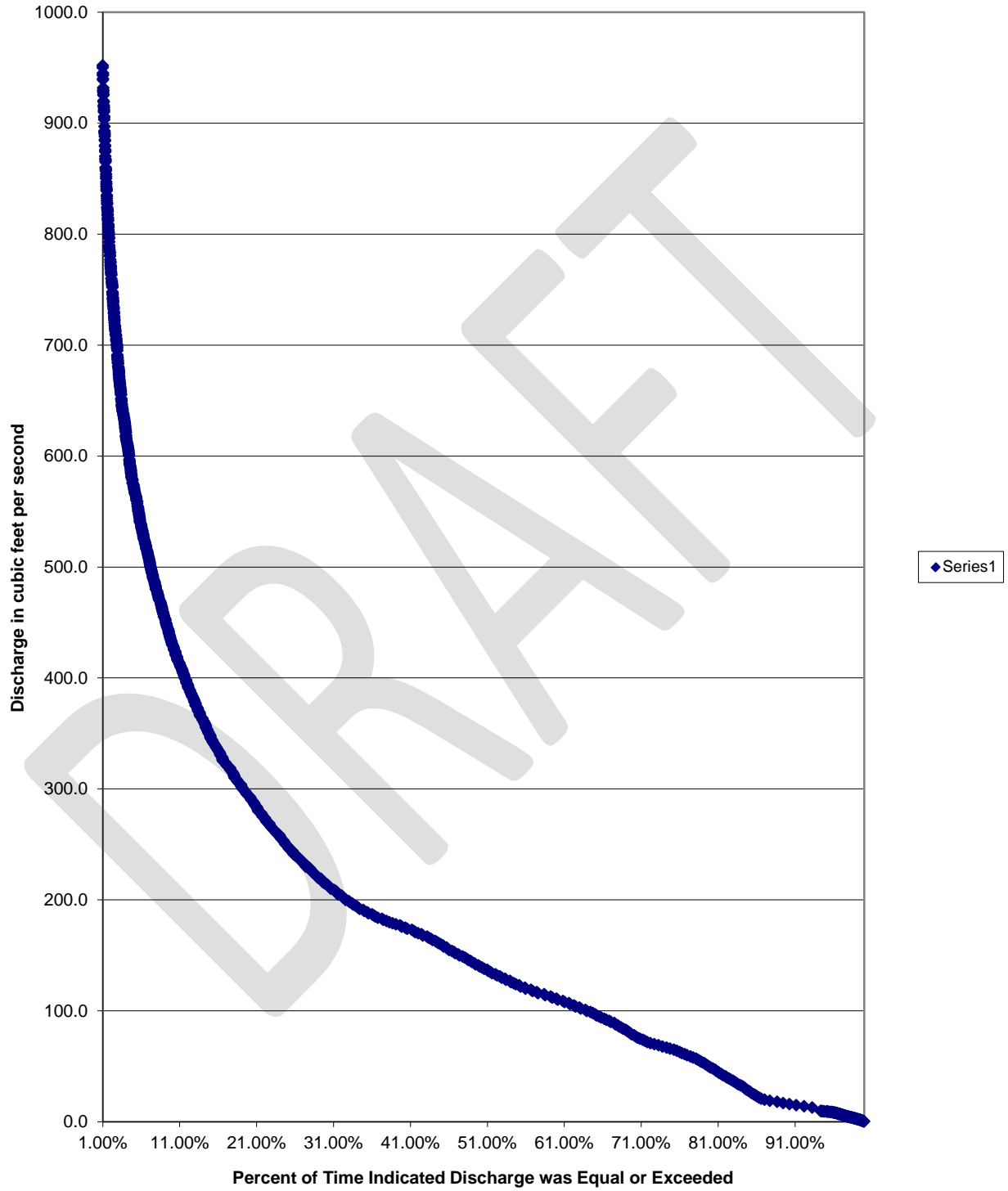
As has been discussed elsewhere in this document, there appears to be some likelihood that those future scenarios that include continued operation of the hydro facilities will be accompanied by a need to construct, operate and maintain upstream fish passage facilities. In that event, it is foreseeable that a portion of the river flows will need to be allocated to fishpass operation. Flows necessary for the operation of a fishpass can be expected to take precedence over the use of flows for generating purposes, hence, the flows available for current or expanded generation may be less than those expected to be available based solely on review of the flow duration curve.

### **Conclusion**

Given the limited amount of flows that would appear available to support increased generation, it is unlikely that the economics would support the capital cost and operation of new generation. For that reason, our assessment of alternatives involving increased generating capacity has been primarily focused on the potential installation of one or microturbines, which could potentially be justified as a prerequisite in support of changed FERC licensure status.



Duration curve of daily flow, Mousam River



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**APPENDIX E**  
**Conditions Established in Recent (2007-2014) New  
England FERC licenses**

**Conditions Established in Recent (2007-2014) New England FERC licenses**

Legend: **X** = required by new license; **E** = passage facility already in place prior to license; **US** = upstream; **DS** = downstream; **NR** = Section 18 prescription authority not filed / reserved

	Bar Mills ME 4.0 MW	Crocker Dam, MA 0.15 MW	Townshend Dam, VT 0.92 MW	Canaan Proj, VT 1.1 MW	Glendale Proj, MA 1.1 MW	Monadnock Proj, NH 1.9 MW	Ball Mtn VT 2.2 MW	Scotland CT 3.0 MW	Stuyvesant Falls, NY 4.3 MW
Upstream fish passage	X			X see note	X see note			X	
Downstream fish passage / protection	E	X see note	X	X see note	X see note		X	X	X
Upstream eel passage	X				X see note			X	X
Downstream eel passage	X								X
Fish passage effectiveness testing	US & DS		DS	US & DS	US & DS		DS	US & DS	DS
Eel passage effectiveness testing	US & DS	NR						US	DS
Section 18 fish passage authority reserved	X	X	X	X	X	X	X	X	X
State agency fish passage authority reserved		X							
Minimum flow required	X	X		X	X	X		X	X
Headpond level restrictions	X	X		X	X	X		X	X
Monitoring of minimum flow	X	X	X see note	X	X	X	X see note	X	X
Monitoring of headpond levels	X	X	X see note	X	X	X	X see note	X	X
Headpond refill restrictions				X	X	X		X	X
Historic Properties Management Plan (HPMP)	X	X see note	X see note	X	X	X	X see note	X	X
Improvements to existing recreational facilities	X		X	X		X	X	X	X
Development of new recreational facilities				X	X see note	X		X	X
Establishment of Shoreline Buffer			X	X see note					X see note
Water quality monitoring		X		X		X see note		X	X
Agency consultation required if onsite construction		X			X				
Development of Soil Erosion Control Plan		X		X				X	X
Debris disposal plan			X	X			X		
Invasive Species Control Plan					X	X		X see note	X
Mussel Relocation								X	
Endangered Species Protection Plan									X

## **Project Descriptions and Notes:**

### Bar Mills Project, ME, P-2194-020.

- 4.0 MW on the Saco River. License issued 8/26/08 for 40 years.
- Cycling operation (2 ft fluctuation); Run-of-River (ROR) April 1 through June 30
- Two dams downstream; 4 others upstream. Downstream dams have upstream fish passage via lifts and trap & truck at most downstream dam.
- Bar Mills dam 7 ft high with 6.75 ft high flashboards
- 2007 Settlement Agreement in place regarding fish passage
- WQC has numerous conditions including fish and eel passage, water level restrictions and recreational facility needs. All adopted by FERC.

### Crocker Dam Project, MA, P-13237-003

- 145 kW on Whitman River. License issued 8/31/12 for 40 years
- Filed for license exemption but denied because of insufficient property rights
- 38.5 ft high dam and 26 in flashboards
- ROR operation; unit operation electronically controlled by headpond level measurement
- All WQC requirements adopted by FERC
- Existing studies show no evidence of anadromous fish or eel in the Whitman River near the project.
- Trashrack screens only required for entrainment prevention
- HPMP required if cultural resources discovered onsite during construction

### Townshend Dam Project, VT, P-13368

- 924 kW on West River. License issued 3/29/12 for 50 years
- Uses existing 133 ft high ACOE dam currently used by Corps for flood protection
- New hydropower powerhouse & equipment all on federal land
- Operation controlled by releases governed by Corps for flood control; generally ROR
- Operations Plan for flow and headpond levels must be established with Corps to ensure compliance with Corps requirements
- Consultation with SHPO if cultural resources discovered onsite during construction

### Canaan Project, VT, P-7528-009

- 1.1 MW on Connecticut River. License issued 1/16/09 for 30 years
- 15 ft high dam with 3.5 ft flashboards
- ROR operation
- All WQC requirements adopted by FERC
- Upstream or downstream passage for wild trout shall be provided within 2 years of request by agencies
- Trashrack replacement subject to agency approval
- License requires plan development and implementation for protection of riparian zone vegetation

### Glendale Project, MA, P-2801-027

- 1.14 MW on Housatonic River. License issued 8/19/09 for 40 years
- 30 ft high dam
- Includes installation of additional unit
- ROR operation
- All WQC requirements adopted by FERC
- Anadromous and eel passage required once five downstream dams have appropriate passage. 1 in spacing trashracks required.
- Powerhouse is on National Register of Historic Places
- Monitoring report on recreational use every six years also required

### Monadnock Project, NH, P-6597-013

- 1.89 MW on Contoocook River. License issued 5/23/14 for 30 years
- Consists of four dams and three powerhouses. Dam heights are 18.6 ft., 22 ft., 28 ft. and 19 ft. Three have 2 ft. flashboards.
- ROR operation; store and release operation of upstream non-generate reservoir
- All WQC requirements adopted by FERC
- Minimum flow limits could be increased if water quality standard not met

### Ball Mountain Project, VT, P-13226-003

- 2.2 MW on West River. License issued 4/12/12 for 50 years.
- Upstream of Townshend Dam Project (see above)
- Uses existing 265 ft high ACOE dam currently used by Corps for flood protection
- New hydropower powerhouse & equipment all on federal land
- Operation controlled by releases governed by Corps for flood control; generally ROR
- Operations Plan must be established with Corps to ensure compliance with Corps requirements
- Consultation with SHPO if cultural resources discovered onsite during construction
- WQC issued late so FERC did not accept the conditions as mandatory but did consider them as recommendations under 10(a)(1). Only a few adopted.

### Scotland Project, CT, P-2662-012 (FirstLight)

- City of Norwich issued competing application for a license but FERC selected FirstLight as licensee.
- 3.0 MW on Shetucket River. License issued 11/21/13 for 40 years.
- 32.5 ft. high earthen dam and 31 ft. high concrete Ambursen Dam
- ROR operation
- All WQC requirements adopted by FERC
- Intent of required Terrestrial Resource Protection Plan is to control invasive species

### Stuyvesant Falls Project, NY, P-2696-033

- 4.3 MW on Kinderhook Creek. License issued 4/5/13 for 30 years.
- 13 ft. high dam
- ROR operation
- Downstream fish passage only for riverine species, not anadromous
- Computational fluid dynamics study of flows needed for passage designs
- Habitat Management Plan in lieu of Shoreline Management Plan
- Plan to protect Indiana Bat and Bald Eagle
- All WQC requirements adopted by FERC

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**Filing Requirements for Declaration of Non-  
APPENDIX F  
Jurisdiction**

The following is an excerpt taken directly from a Memorandum issued by J. Coyle on November 17, 2014 to Sharon Staz, KLPD's General Manager at the time.

**“B. The FERC Declaratory Order Process**

KLPD will need to file a petition for declaratory order with FERC, asking FERC to determine that the Lower Mousam Project is not subject to FERC's licensing jurisdiction under FPA Section 23(b).<sup>1/</sup> As noted above, the sources of FERC's authority to make such a determination in a declaratory order proceeding are Rule 207 of FERC's Rules of Practice and Procedure (18 C.F.R. § 385.207) and 5 U.S.C. § 554(e).

**1. Preparation, Submission and Litigation of Filing**

The filing itself would consist of two parts: (1) an affidavit or declaration by an appropriately qualified historian setting forth the historical evidence with respect to the navigability of the relevant portion of the Mousam River; and (2) the petition for declaratory order itself. Obviously, the most important part of the exercise is to prepare as thorough and accurate as possible a compilation and summary of the historical evidence. These materials are then filed at FERC. This type of filing is exempted from FERC's \$24,260 filing fee for declaratory order petitions (18 C.F.R. 381.302(a)), and KLPD would be exempted from the filing fee as a political subdivision of the State of Maine in any case (18 C.F.R. § 381.108). FERC will issue a notice of filing in the Federal Register, alerting potentially interested parties of their right to intervene and be heard in connection with the application. FERC typically provides about 30 days for interventions in declaratory order cases. KLPD may seek to answer motions to intervene if they raise any substantive issues, or otherwise require a response.

Ordinarily, FERC takes about 120 days to determine a declaratory order petition, and will issue its decision at approximately the end of that period. It may take FERC longer than 120 days, and litigants have no ability to control or influence the duration of the FERC's decisional process. It is sometimes possible to arrange a pre-filing review by the FERC staff administratively responsible for the subject matter of such a petition, in which FERC staff will provide feedback on a draft petition. Such feedback is not binding on the FERC itself, but it can be very helpful as a final check on whether or not to proceed, or how best to proceed, with a declaratory order proceeding. If early indications from FERC staff indicate skepticism on the merits, KLPD may wish to consider whether it wishes to pursue this particular strategy further.

Obtaining a declaratory order from FERC disclaiming jurisdiction would mean that KLPD would not have to relicense the Lower Mousam Project in 2022. This outcome would be highly desirable, as it would cut off KLPD's exposure to the costs of a relicensing proceeding.

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<sup>1/</sup> See *Alaska Power & Telephone Co.*, 97 FERC ¶ 61,229, at 62,040-62,041 (2001).



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**APPENDIX G**  
**License Surrender Filing Requirements**

## **License Surrender Process**

The initial notification that KLPD does not intend to maintain the FERC license will be when KLPD files the Notice of Intent. This NOI must be filed five years in advance of license expiration. Upon such notice, FERC will issue a public notification that this is KLPD's intention. Such notice will give other entities the opportunity to file for a license renewal, as under FERC regulations, the holder of a FERC license does not have to own the facilities. Review of recent license surrenders found that in no situations did another entity attempt to seek a license for a project that was the subject of a license surrender application.

Assuming no other entity files for a license, the following actions would be taken by KLPD no later than two years prior to license expiration:

- filing a schedule for submittal of the surrender application;
- filing the surrender application in compliance with the schedule; and
- providing for disposition of project facilities

The application must state the reason why the license is being surrendered and must be prepared and filed in a format similar to an application for a license renewal. The consultation process used for obtaining input from agencies and others is also required for a license surrender to ensure that the data felt needed to understand the impacts and benefits of such an action is obtained. The review process is often complex as environmental implications arise from the release of the project from FERC jurisdiction. Public notice is made by FERC such that affected parties have an opportunity to raise concerns about the change in licensing status. Once the surrender application is complete, the Commission will issue a public notice with a minimum of 30-day comment period before acting. The Commission will only approve a surrender of license after the licensee has fulfilled its obligations under the license and/or as established by the Commission.

The "disposition" of project facilities refers to both the hydropower equipment and the dam. The power generating equipment can either be removed or be "disabled" from running. For example, generating equipment can be left in place, but disconnected from the electrical grid and the

headgates closed. Technically, the surrender of a FERC license does not automatically necessitate that the dam be removed. However, the KLPD dams are obstacles to passage of anadromous fish species, and such blockage is a concern to both state and federal agencies based on meetings held with these agencies. Given this, FERC, through consultation with applicable state and federal resource agencies, would likely require the construction of fish passage facilities, or partial or complete removal of the dam. FERC could also order the dam to be removed if environmental studies show that leaving the dam in place would result in unacceptable negative impacts.

Maine state regulations allow a dam owner to petition the MEDEP for release of dam ownership, although this process typically only applies to dams not licensed by FERC, as FERC regulates the disposition of a formerly licensed dam. The owner is required to consult with shorefront property owners, the municipality and others to seek out anyone who may want to assume ownership. Such assumption of ownership by another party would make that party responsible for all future liabilities and costs for the dam(s). This could include installation of fish passage. Given this, it is very uncommon that any private party would take ownership of the dam(s). An owner would be allowed to request compensation for the assets, however if such payment prevents transfer to the new owner, then the former owner is not entitled to receive a dam release order from the MEDEP. If no interested party is found, depending on the assessment of public value of the dam, a state agency may take ownership, although this is not very likely to occur.

Based on review of publically available data, a number of unsuccessful attempts were made to sell the Ft. Halifax Dam. Only the owner of the Smelt Hill successfully used this process and sold that dam. The new owner, the State of Maine, then had the dam removed. SAPPI Paper has recently filed a license surrender application for their Saccarrappa Dam, which included plans to partially breach the dam and install a small fishway. Subsequently, in order to better coordinate with the Town and other interested parties in using the area for recreational development, a “stay” was requested and approved so the discussions can continue and the deadline delayed for implementing the requirements of FERC order. SAPPI elected to surrender their license because they determined that costs of construction fish passage, which was required by their fairly new FERC license, made the Saccarrappa Project uneconomical to continue operating.

Should a dam be proposed for removal, environmental studies would be required under the FERC process to examine the possible impacts resulting from such an action, as compared to other site alternatives, including the "no action" option. A permit from the US Army Corps of Engineers would also be required. The MEDEP also requires a dam removal project applicant to obtain a Natural Resource Protection Act permit under the Maine Waterway Development and Conservation Act. This later process has specific public informational meeting requirements to ensure that all potentially affected stakeholders have an opportunity to participate in the process through the public commenting procedures.

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**APPENDIX H**  
**Concerns raised at the March 31, 2015 Public Meeting**

<b>Summary of Comment</b>
Release of sediments, contaminated or not, being washed downstream if dams are breached. Could contaminated sediments be dredged before dams breached. Will cost of removal of contaminated sediments will be the responsibility of the ratepayers? Is KLPD responsible for contaminated sediments that may become property of homeowners? Will contaminated sediments prevent re-vegetation?
Will dam removal affect the ability of the Sewer District to operate? What impact would a 50/100yr drought Sewer District operations
How will lower water levels affect existing fish populations? Will shallow water get heated-up and negatively affect existing fish?
How will dam removal affect waterfowl, herons? Impacts to wetlands?
Will private wells dry out if dams are removed?
Will lower water levels still permit use of canoes and kayaks on the river? Loss of recreational use of river.
Is trap and truck one of the fish passage options being considered?
What is the economic impact of dam removal on residents and commercial businesses?
Will waterfront property values be affected? If water level goes down, does that increase the acreage of waterfront properties? Lowering of impoundments results in bad smells which would impact property values.
Lowering of the water will expose past illegally disposed items.
Sanford Sewerage should test for drugs inappropriately disposed and now in the river.
How will dam removal affect beach dynamics at mouth of river? Will dam removal affect the extent of the tides?
Will KLPD be responsible if dam removal affects the integrity of the foundation of the condos on One Pleasant St?
How will dam removal impact water quality that the clam beds must meet to be open? Currently there is a problem do to “insufficient water” over beds.
How will other sections of the river further from the dams be affected by dam removal?
Has solar power, energy conservation and energy efficiency been studies to replace power generated by the facilities?
Will dam removal affect how the river responds to major storms and floods?

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**APPENDIX I**  
**Cost Analysis of the Alternatives**

DRAFT - Alternative #1 - Seek New License

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
1	Kennebunk Light and Power District														
2	Economic Comparison of Hydro Dam Alternative Scenarios														
3															
4	September 3, 2015														
5	Alternative 1 - Seek New License to Continue Operations (low end of cost ranges)														
6															
7	Costs (2016 dollars)	2016 Present Worth	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
8	Operating Costs (Labor, OH, 30%)	\$ 1,139,092	\$ 24,236	\$ 24,236	\$ 24,236	\$ 24,236	\$ 24,236	\$ 24,236	\$ 24,236	\$ 24,236	\$ 24,236	\$ 24,236	\$ 24,236	\$ 24,236	\$ 24,236
9	Operating Costs (Non-Labor Costs, 70%)	\$ 2,657,897	\$ 56,551	\$ 56,551	\$ 56,551	\$ 56,551	\$ 56,551	\$ 56,551	\$ 56,551	\$ 56,551	\$ 56,551	\$ 56,551	\$ 56,551	\$ 56,551	\$ 56,551
10	Capital Maint. - Dams	\$ 590,000	\$ 65,000		\$ 125,000				\$ 100,000						
11	Capital Maint. - Generating Equip.	\$ 275,000			\$ 25,000				\$ 50,000						
12	Fish Passage (Design, Const and Testing)	\$ 1,141,000							\$ 100,000	\$ 517,000	\$ 500,000	\$ 24,000			
13	Eel Passage (Design, Const and Testing)	\$ 141,500							\$ 17,500	\$ 50,000	\$ 50,000	\$ 24,000			
14	Downstream Fish and Eel Passage	\$ 146,000							\$ 30,000	\$ 40,000	\$ 40,000	\$ 36,000			
15	Op. and Maint. - Fish/Eel Passage	\$ 1,235,000										\$ 32,500	\$ 32,500	\$ 32,500	\$ 32,500
16	Misc. Mitigation Measures	\$ 206,000							\$ 25,000	\$ 25,000	\$ 4,000	\$ 4,000	\$ 4,000	\$ 4,000	\$ 4,000
17	FERC Exhibit Drawings	\$ 75,000			\$ 50,000	\$ 25,000									
18	FERC Annual Reports (new conditions)	\$ 82,000							\$ 2,000	\$ 2,000	\$ 2,000	\$ 2,000	\$ 2,000	\$ 2,000	\$ 2,000
19	FERC Annual Inspections, testing, plans	\$ 446,500	\$ 9,500	\$ 9,500	\$ 9,500	\$ 9,500	\$ 9,500	\$ 9,500	\$ 9,500	\$ 9,500	\$ 9,500	\$ 9,500	\$ 9,500	\$ 9,500	\$ 9,500
20	Relicensing Studies and Application	\$ 710,000		\$ 120,000	\$ 175,000	\$ 175,000	\$ 120,000	\$ 120,000							
21	Subtotal:	\$ 8,844,989	\$ 155,287	\$ 210,287	\$ 465,287	\$ 290,287	\$ 210,287	\$ 210,287	\$ 414,787	\$ 724,287	\$ 686,287	\$ 212,787	\$ 128,787	\$ 128,787	\$ 128,787
22	Equivalent Revenues (2016 dollars)														
23	Projected kWh Generated	65800000	\$ 1,400,000	\$ 1,400,000	\$ 1,400,000	\$ 1,400,000	\$ 1,400,000	\$ 1,400,000	\$ 1,400,000	\$ 1,400,000	\$ 1,400,000	\$ 1,400,000	\$ 1,400,000	\$ 1,400,000	\$ 1,400,000
24	Projected cost per kWh to purchase (\$)		\$ 0.1050	\$ 0.1050	\$ 0.1050	\$ 0.1050	\$ 0.1050	\$ 0.1050	\$ 0.1050	\$ 0.1050	\$ 0.1050	\$ 0.1050	\$ 0.1050	\$ 0.1050	\$ 0.1050
25	Value of generated electricity (\$)	\$ 6,909,000	\$ 147,000	\$ 147,000	\$ 147,000	\$ 147,000	\$ 147,000	\$ 147,000	\$ 147,000	\$ 147,000	\$ 147,000	\$ 147,000	\$ 147,000	\$ 147,000	\$ 147,000
26	Subtotal:	\$ 6,909,000	\$ 147,000	\$ 147,000	\$ 147,000	\$ 147,000	\$ 147,000	\$ 147,000	\$ 147,000	\$ 147,000	\$ 147,000	\$ 147,000	\$ 147,000	\$ 147,000	\$ 147,000
27															
28	Annual kWh generated:	1400000													
29	Cost to purchase, per kWh:	0.105													
30															
31	Net Present Worth	\$ (1,935,989)													
32															
33	interest rate (%)														
34	i=			1	2	3	4	5	6	7	8	9	10	11	12
35	Present Worth Factor		1.00000												
36															
37	Note 1. The figure identified for relicensing studies and application includes an allowance for staff time and legal assistance necessary to support and administer the process.														







DRAFT - Alternative #1b - Seek New License (high end of cost range)

Kennebunk Light and Power District												
Economic Comparison of Hydro Dam Alternative Scenarios												
September 3, 2015												
Alternative 1 - Seek New License to Continue Operations (high end of cost ranges)												
Costs (2016 dollars)	2016 Present Worth	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
Operating Costs (Labor, OH)	\$ 1,139,092	\$ 24,236	\$ 24,236	\$ 24,236	\$ 24,236	\$ 24,236	\$ 24,236	\$ 24,236	\$ 24,236	\$ 24,236	\$ 24,236	\$ 24,236
Operating Costs (Non-Labor Costs)	\$ 2,657,897	\$ 56,551	\$ 56,551	\$ 56,551	\$ 56,551	\$ 56,551	\$ 56,551	\$ 56,551	\$ 56,551	\$ 56,551	\$ 56,551	\$ 56,551
Capital Maint. - Dams	\$ 390,000	\$ 65,000		\$ 125,000				\$ 50,000				
Capital Maint. - Generating Equip.	\$ 200,000							\$ 50,000				
Fish Passage (Design, Const and Testing)	\$ 2,577,000							\$ 250,000	\$ 1,250,000	\$ 1,044,000	\$ 33,000	
Eel Passage (Design, Const and Testing)	\$ 190,500							\$ 17,500	\$ 70,000	\$ 70,000	\$ 33,000	
Downstream Fish and Eel Passage	\$ 240,000							\$ 40,000	\$ 80,000	\$ 80,000	\$ 40,000	
Op. and Maint. - Fish/Eel Passage	\$ 1,805,000										\$ 47,500	\$ 47,500
Misc. Mitigation Measures	\$ 304,000							\$ 35,000	\$ 35,000	\$ 6,000	\$ 6,000	\$ 6,000
FERC Exhibit Drawings	\$ 110,000			\$ 75,000	\$ 35,000							
FERC Annual Reports (new conditions)	\$ 246,000							\$ 6,000	\$ 6,000	\$ 6,000	\$ 6,000	\$ 6,000
FERC Annual Inspections, testing, plans	\$ 446,500	\$ 9,500	\$ 9,500	\$ 9,500	\$ 9,500	\$ 9,500	\$ 9,500	\$ 9,500	\$ 9,500	\$ 9,500	\$ 9,500	\$ 9,500
Relicensing Studies and Application	\$ 1,375,000		\$ 240,000	\$ 340,000	\$ 340,000	\$ 230,000	\$ 225,000					
Subtotal:	\$ 11,680,989	\$ 155,287	\$ 330,287	\$ 630,287	\$ 465,287	\$ 320,287	\$ 315,287	\$ 538,787	\$ 1,531,287	\$ 1,296,287	\$ 255,787	\$ 149,787
Equivalent Revenues (2016 dollars)												
Projected kWh Generated	65800000	1400000	1400000	1400000	1400000	1400000	1400000	1400000	1400000	1400000	1400000	1400000
Projected cost per kWh to purchase (\$)		0.1050	0.1050	0.1050	0.1050	0.1050	0.1050	0.1050	0.1050	0.1050	0.1050	0.1050
Value of generated electricity (\$)	\$ 6,909,000	\$ 147,000	\$ 147,000	\$ 147,000	\$ 147,000	\$ 147,000	\$ 147,000	\$ 147,000	\$ 147,000	\$ 147,000	\$ 147,000	\$ 147,000
Subtotal:	\$ 6,909,000	\$ 147,000	\$ 147,000	\$ 147,000	\$ 147,000	\$ 147,000	\$ 147,000	\$ 147,000	\$ 147,000	\$ 147,000	\$ 147,000	\$ 147,000
Annual kWh generated:	1400000											
Cost to purchase, per kWh:	0.1050											
Net Present Worth	\$ (4,771,989)											
interest rate (%)												
i=			1	2	3	4	5	6	7	8	9	10
Present Worth Factor		1.00000										
Note 1. The figure identified for relicensing studies and application includes an allowance for staff time and legal assistance necessary to support and administer the process.												





DRAFT - Alternative #1b - Seek New License (high end of cost range)

2059	2060	2061	2062
\$ 24,236	\$ 24,236	\$ 24,236	\$ 24,236
\$ 56,551	\$ 56,551	\$ 56,551	\$ 56,551
\$ 47,500	\$ 47,500	\$ 47,500	\$ 47,500
\$ 6,000	\$ 6,000	\$ 6,000	\$ 6,000
\$ 6,000	\$ 6,000	\$ 6,000	\$ 6,000
\$ 9,500	\$ 9,500	\$ 9,500	\$ 9,500
\$ 149,787	\$ 149,787	\$ 149,787	\$ 149,787
1400000	1400000	1400000	1400000
0.1050	0.1050	0.1050	0.1050
\$ 147,000	\$ 147,000	\$ 147,000	\$ 147,000
\$ 147,000	\$ 147,000	\$ 147,000	\$ 147,000
43	44	45	46

DRAFT

DRAFT - Alternative #2 - Seek License Exemption

	A	B	C	D	E	F	G	H	I	J	K	L	M	N
1	Kennebunk Light and Power District													
2	Economic Comparison of Hydro Dam Alternative Scenarios													
3														
4	September 3, 2015													
5	Alternative 2 - Seek License Exemption to Continue Operations (low end of cost ranges)													
6														
7	Costs (2016 dollars)	2016 Present Worth	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
8	Operating Costs (Labor, OH, 30%)	\$ 1,139,092	\$ 24,236	\$ 24,236	\$ 24,236	\$ 24,236	\$ 24,236	\$ 24,236	\$ 24,236	\$ 24,236	\$ 24,236	\$ 24,236	\$ 24,236	\$ 24,236
9	Operating Costs (Non-Labor Costs, 70%)	\$ 2,657,897	\$ 56,551	\$ 56,551	\$ 56,551	\$ 56,551	\$ 56,551	\$ 56,551	\$ 56,551	\$ 56,551	\$ 56,551	\$ 56,551	\$ 56,551	\$ 56,551
10	Capital Maint. - Dams	\$ 590,000	\$ 65,000		\$ 125,000				\$ 100,000					
11	Capital Maint. - Generating Equip.	\$ 225,000			\$ 25,000				\$ 50,000					
12	Capital - New Generating Equip.	\$ 400,000						\$ 200,000	\$ 200,000					
13	Fish Passage (Design, Const and Testing)	\$ 1,141,000							\$ 100,000	\$ 517,000	\$ 500,000	\$ 24,000		
14	Eel Passage (Design, Const and Testing)	\$ 141,500							\$ 17,500	\$ 50,000	\$ 50,000	\$ 24,000		
15	Downstream Fish and Eel Passage	\$ 146,000							\$ 30,000	\$ 40,000	\$ 40,000	\$ 36,000		
16	Op. and Maint. - Fish/Eel Passage	\$ 1,235,000										\$ 32,500	\$ 32,500	\$ 32,500
17	Misc. Mitigation Measures	\$ 206,000							\$ 25,000	\$ 25,000	\$ 4,000	\$ 4,000	\$ 4,000	\$ 4,000
18	FERC Exhibit Drawings	\$ 75,000			\$ 50,000	\$ 25,000								
19	FERC Annual Reports (new conditions)	\$ 82,000							\$ 2,000	\$ 2,000	\$ 2,000	\$ 2,000	\$ 2,000	\$ 2,000
20	FERC Annual Inspections, testing, plans	\$ 446,500	\$ 9,500	\$ 9,500	\$ 9,500	\$ 9,500	\$ 9,500	\$ 9,500	\$ 9,500	\$ 9,500	\$ 9,500	\$ 9,500	\$ 9,500	\$ 9,500
21	FERC Exemption Studies and Application	\$ 710,000		\$ 120,000	\$ 175,000	\$ 175,000	\$ 120,000	\$ 120,000						
22	Subtotal:	\$ 9,194,989	\$ 155,287	\$ 210,287	\$ 465,287	\$ 290,287	\$ 210,287	\$ 410,287	\$ 614,787	\$ 724,287	\$ 686,287	\$ 212,787	\$ 128,787	\$ 128,787
23	Equivalent Revenues (2016 dollars)													
24	Projected kWh Generated	71950000	1400000	1400000	1400000	1400000	1400000	1400000	1550000	1550000	1550000	1550000	1550000	1550000
25	Projected cost per kWh to purchase (\$)		\$ 0.1050	\$ 0.1050	\$ 0.1050	\$ 0.1050	\$ 0.1050	\$ 0.1050	\$ 0.1050	\$ 0.1050	\$ 0.1050	\$ 0.1050	\$ 0.1050	\$ 0.1050
26	Value of generated electricity (\$)	\$ 7,554,750	\$ 147,000	\$ 147,000	\$ 147,000	\$ 147,000	\$ 147,000	\$ 147,000	\$ 162,750	\$ 162,750	\$ 162,750	\$ 162,750	\$ 162,750	\$ 162,750
27	Subtotal:	\$ 7,554,750	\$ 147,000	\$ 147,000	\$ 147,000	\$ 147,000	\$ 147,000	\$ 147,000	\$ 162,750	\$ 162,750	\$ 162,750	\$ 162,750	\$ 162,750	\$ 162,750
28														
29	Annual kWh generated:	1400000												
30	Cost to purchase, per kWh:	\$ 0.1050												
31														
32	Net Present Worth	\$ (1,640,239)												
33														
34	interest rate (%)													
35	i=			1	2	3	4	5	6	7	8	9	10	11
36	Present Worth Factor		1											
37														
38	Note 1. The figure identified for exemption studies and application includes an allowance for staff time and legal assistance necessary to support and administer the process.													







DRAFT - Alternative #3 - Seek FERC Non-Jurisdiction for Kesslen

	A	B	C	D	E	F	G	H	I	J	K	L	M	N
1	Kennebunk Light and Power District													
2	Economic Comparison of Hydro Dam Alternative Scenarios													
3														
4	September 3, 2015													
5	Alternative 3 - Seek FERC License Non-Jurisdiction (Kesslen only)													
6														
7	Costs (2016 dollars)	2016 Present Worth	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
8	Operating Costs (Labor, OH, 30%)	\$ 476,286	\$ 24,236	\$ 24,236	\$ 24,236	\$ 24,236	\$ 24,236	\$ 24,236	\$ 8,070	\$ 8,070	\$ 8,070	\$ 8,070	\$ 8,070	\$ 8,070
9	Operating Costs (Non-Labor Costs, 70%)	\$ 1,111,336	\$ 56,551	\$ 56,551	\$ 56,551	\$ 56,551	\$ 56,551	\$ 56,551	\$ 18,830	\$ 18,830	\$ 18,830	\$ 18,830	\$ 18,830	\$ 18,830
10	Capital Maint. - Dam(s)	\$ 330,000	\$ 65,000		\$ 65,000				\$ 50,000					
11	Capital Maint. - Generating Equip.	\$ 115,000			\$ 15,000				\$ 25,000					
12	Fish Passage (Design & Const)	\$ 405,000							\$ 45,000	\$ 175,000	\$ 175,000	\$ 10,000		
13	Eel Passage (Design & Const)	\$ 54,500							\$ 7,000	\$ 17,500	\$ 20,000	\$ 10,000		
14	Op. and Maint. - Fish/Eel Passage	\$ 456,000										\$ 12,000	\$ 12,000	\$ 12,000
15	Misc. Mitigation Measures	\$ 206,000							\$ 25,000	\$ 25,000	\$ 4,000	\$ 4,000	\$ 4,000	\$ 4,000
16	FERC Exhibit Drawings	\$ 45,000	\$ 20,000		\$ 15,000	\$ 10,000								
17	Inspections (non-FERC)	\$ 123,000							\$ 3,000	\$ 3,000	\$ 3,000	\$ 3,000	\$ 3,000	\$ 3,000
18	FERC Annual Inspections, testing, plans	\$ 57,000	\$ 9,500	\$ 9,500	\$ 9,500	\$ 9,500	\$ 9,500	\$ 9,500						
19	Sediment Testing (TM and DP)	\$ 20,000		\$ 20,000										
20	Sediment Removal (TM and DP)	\$ 125,000						\$ 125,000						
21	Dam Removal (TM and DP)	\$ 500,000							\$ 400,000	\$ 100,000				
22	Infrastructure Protection (TM and DP)	\$ 75,000							\$ 50,000	\$ 25,000				
23	Materials for Surrender Filing (TM and DP)	\$ 223,000		\$ 35,000	\$ 60,000	\$ 60,000	\$ 53,000	\$ 15,000						
24	Materials for Non-Jurisdictional Order (K)	\$ 70,000	\$ 55,000	\$ 15,000	\$ -	\$ -	\$ -							
25	Subtotal:	\$ 4,392,122	\$ 230,287	\$ 160,287	\$ 245,287	\$ 160,287	\$ 143,287	\$ 230,287	\$ 631,900	\$ 372,400	\$ 228,900	\$ 65,900	\$ 45,900	\$ 45,900
26	Equivalent Revenues (2016 dollars)													
27	Projected kWh Generated	26850000	1400000	1400000	1400000	1400000	1400000	1400000	450000	450000	450000	450000	450000	450000
28	Projected cost per kWh to purchase (\$)		\$ 0.1050	\$ 0.1050	\$ 0.1050	\$ 0.1050	\$ 0.1050	\$ 0.1050	\$ 0.1050	\$ 0.1050	\$ 0.1050	\$ 0.1050	\$ 0.1050	\$ 0.1050
29	Value of generated electricity (\$)	\$ 2,819,250	\$ 147,000.00	\$ 147,000.00	\$ 147,000.00	\$ 147,000.00	\$ 147,000.00	\$ 147,000.00	\$ 47,250.00	\$ 47,250.00	\$ 47,250.00	\$ 47,250.00	\$ 47,250.00	\$ 47,250.00
30	Subtotal:	\$ 2,819,250	\$ 147,000.00	\$ 147,000.00	\$ 147,000.00	\$ 147,000.00	\$ 147,000.00	\$ 147,000.00	\$ 47,250.00	\$ 47,250.00	\$ 47,250.00	\$ 47,250.00	\$ 47,250.00	\$ 47,250.00
31														
32	Annual kWh generated:	450000												
33	Cost to purchase, per kWh:	\$ 0.1050												
34														
35	Net Present Worth	\$ (1,572,872)												
36														
37	interest rate (%)													
38	i=			1	2	3	4	5	6	7	8	9	10	11
39	Present Worth Factor		1											
40														
41	Note 1. The figures identified for surrender and non-jurisdictional filings include allowances for staff time and legal assistance necessary to support and administer the process.													
42	Note 2: Funding assistance may be available to aid in offsetting the costs associated with dam removal.													
43														





	AW
1	
2	
3	
4	
5	
6	
7	2062
8	\$ 8,070
9	\$ 18,830
10	
11	
12	
13	
14	\$ 12,000
15	\$ 4,000
16	
17	\$ 3,000
18	
19	
20	
21	
22	
23	
24	
25	\$ 45,900
26	
27	450000
28	\$ 0.1050
29	\$ 47,250.00
30	\$ 47,250.00
31	
32	
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38	46
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DRAFT - Alternative #4 - Cease Operation, Surrender License, Remove Dams

	A	B	C	D	E	F	G	H	I	J	K	L	M	N
1	Kennebunk Light and Power District													
2	Economic Comparison of Hydro Dam Alternative Scenarios													
3														
4	September 3, 2015													
5	Alternative 4 - Cease Operation and Surrender FERC License (all sites)													
6														
7	Costs (2016 dollars)	2016 Present Worth	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
8	Operating Costs (Labor, OH, 30%)	\$ 145,416	\$ 24,236	\$ 24,236	\$ 24,236	\$ 24,236	\$ 24,236	\$ 24,236	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
9	Operating Costs (Non-Labor Costs, 70%)	\$ 339,306	\$ 56,551	\$ 56,551	\$ 56,551	\$ 56,551	\$ 56,551	\$ 56,551						
10	Capital Maint. - Dams	\$ 65,000	\$ 65,000		\$ -									
11	FERC Exhibit Drawings	\$ 35,000		\$ 20,000	\$ 15,000	\$ -								
12	Sediment Testing (All 3 dams)	\$ 30,000		\$ 30,000										
13	Sediment Removal (All 3 dams)	\$ 175,000						\$ 175,000						
14	Dam Removal (All 3 dams)	\$ 1,100,000							\$ 700,000	\$ 400,000				
15	Infrastructure Protection (All 3 dams)	\$ 125,000							\$ 75,000	\$ 50,000				
16	FERC Annual Inspections, testing, plans	\$ 57,000	\$ 9,500	\$ 9,500	\$ 9,500	9500	9500	\$ 9,500						
17	License Surrender Studies and Application	\$ 250,000		\$ 35,000	\$ 75,000	\$ 75,000	\$ 40,000	\$ 25,000						
18	Subtotal:	\$ 2,321,722	\$ 155,287	\$ 175,287	\$ 180,287	\$ 165,287	\$ 130,287	\$ 290,287	\$ 775,000	\$ 450,000	\$ -	\$ -	\$ -	\$ -
19	Equivalent Revenues (2016 dollars)													
20	Projected kWh Generated	8400000	1400000	1400000	1400000	1400000	1400000	1400000	0	0	0	0	0	0
21	Projected cost per kWh to purchase (\$ )		\$ 0.1050	\$ 0.1050	\$ 0.1050	\$ 0.1050	\$ 0.1050	\$ 0.1050	\$ 0.1050	\$ 0.1050	\$ 0.1050	\$ 0.1050	\$ 0.1050	\$ 0.1050
22	Value of generated electricity (\$)	\$ 882,000	\$ 147,000	\$ 147,000	\$ 147,000	\$ 147,000	\$ 147,000	\$ 147,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
23	Subtotal:	\$ 882,000	\$ 147,000	\$ 147,000	\$ 147,000	\$ 147,000	\$ 147,000	\$ 147,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
24														
25	Annual kWh generated:	1400000												
26	Cost to purchase, per kWh:	\$ 0.1050												
27														
28	Net Present Worth	\$ (1,439,722)												
29														
30	interest rate (%)													
31	i=			1	2	3	4	5	6	7	8	9	10	11
32	Present Worth Factor		1											
33														
34	Note 1. The figure identified for surrender studies and application includes an allowance for staff time and legal assistance necessary to support and administer the process.													
35	Note 2: Funding assistance may be available to aid in offsetting the costs associated with dam removal.													







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