STATE OF MAINE
DEPARTMENT OF ENVIRONMENTAL PROTECTION

IN RE PETITIONS FOR REVOCATION, MODIFICATION OR SUSPENSION OF PERMITS AND WATER QUALITY CERTIFICATIONS FOR THE LOCKWOOD, HYDRO KENNEBEC, SHAWMUT AND WESTON HYDRO PROJECTS

Merimil Limited Partnership Lockwood Hydro Project #L-20218-33-C-N	)))	
Hydro Kennebec Limited Partnership Hydro-Kennebec Project #L-11244-35-A-N	)))	**PRE-FILED DIRECT TESTIMONY OF BRANDON H. KULIK ON BEHALF OF FPL ENERGY MAINE HYDRO, LLC AND MERIMIL LIMITED PARTNERSHIP (LOCKWOOD, SHAWMUT AND WESTON PROJECTS)**
FPL Energy Maine Hydro, LLC Shawmut Hydro Project #L-19751-33-A-M	)))	
FPL Energy Maine Hydro, LLC Weston Hydro Project #L-17472-33-C-M	)))	

Kleinschmidt
Energy & Water Resource Consultants

PRE-FILED DIRECT TESTIMONY AND EXHIBITS OF BRANDON H. KULIK

- Upstream anadromous fish passage at the Shawmut and Weston projects.
- Downstream anadromous fish passage at the Weston, Shawmut and Lockwood projects.
- The petition for listing Atlantic salmon under the Endangered Species Act.

January 17, 2007

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PRE-FILED DIRECT TESTIMONY AND EXHIBITS OF
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QUALIFICATIONS OF WITNESS

My name is Brandon H. Kulik. I am employed by Kleinschmidt Associates in Pittsfield, Maine as Senior Fisheries Scientist. Kleinschmidt Associates is a consulting firm with nationally recognized expertise in fish passage, diadromous fish biology and hydroelectric dam design, engineering and environmental licensing. I also have concurrently taught ichthyology at Unity College, served as a recent past-president of the American Fisheries Society, Atlantic International Chapter, and am presently chairing the Sheepscot River Watershed Council.

I graduated from the Colby College with a Bachelors Degree in Environmental Studies and American Studies in 1976 and I received a Masters Degree in Aquatic Zoology from the DePauw University in 1978. I have been employed as a professional fishery biologist continuously for approximately 28 years, and have worked extensively with the effects of water intakes, dams and fish passages in Maine, New England, the mid-Atlantic states, the southeast, Midwest and California. I joined Kleinschmidt Associates in 1986. In this position, I am responsible for conducting studies of fish behavior, population ecology, migration and habitat use in rivers, lakes and estuaries.

I am well known among New England fisheries scientists in particular for my pioneering work on fish passage and fish community studies up and down the Kennebec River, much of which has been peer reviewed and/or presented at scientific conferences or published in scientific journals. Some recent and current Maine-related clients that I have worked for in which I have made important contributions to the science of anadromous fish biology include National Marine Fisheries Service, Maine Atlantic Salmon Commission, U.S. EPA, U.S. Fish and Wildlife Service, Madison Paper Industries, and Trout Unlimited. I have also worked closely for many years with State of Maine and federal fisheries agencies regarding fish passage and habitat issues on behalf of FPL Energy Maine Hydro LLC (FPLE).

PURPOSE AND SCOPE OF TESTIMONY

The two petitions being considered by the Board present, among other things, two allegations related to anadromous fish passage measures at the Lockwood, Shawmut and Weston Hydroelectric Projects. These are, in short, that 1) there is an alleged lack of safe and effective fish passage measures for anadromous species at the projects, and 2) circumstances have changed since issuance of the certifications that requires modification of the fish passage requirements or schedules contained in the certifications.

In considering these allegations, the Board must consider whether there is a "threat to human health or the environment" or whether there has been any "changes in circumstances or conditions" that might warrant modification of the existing certifications at these three hydroelectric projects.

The purpose of my testimony with respect to anadromous fish passage is to provide the Board:

1) a fisheries biologist's perspective on the operation of the Lockwood, Shawmut, and Weston hydroelectric projects and their associated fish passage measures; and,
2) an opinion as to whether there have been any changes in circumstances or conditions that might affect anadromous fish passage considerations at these three hydroelectric projects.

It is my best professional judgment that these three projects do not threaten human health or the environment, nor are there any changes in circumstances or conditions that justify modifying the projects' existing water quality certifications for anadromous fish passage.

DO THE OPERATIONS OF THE PROJECTS, AS THEY RELATE TO ANADROMOUS FISH PASSAGE, POSE A THREAT TO HUMAN HEALTH OR THE ENVIRONMENT?

It is my professional conclusion that operation of the Lockwood, Shawmut and Weston, projects and related fish passage measures do not pose a threat to the restoration of populations of anadromous fish species. To understand why, it is important to understand the migratory behavior of anadromous fish, and how and why fish pass dams.

- **Why do anadromous fish migrate?**

The anadromous fish species of interest in these proceedings include American shad, alewife, blueback herring, and Atlantic salmon. Anadromous fish species require freshwater habitat for reproduction, but grow to maturity in the ocean (Moyle and Cech, 2004). Each fish species migrates as a population upstream, generally from mid-spring through early summer, though the exact timing may vary slightly each year depending on prevailing water temperature and flow. Most anadromous fish tend to return to the same watershed where they were hatched or stocked as juveniles.

In the Kennebec River, the upstream migration distance varies according to species. Atlantic salmon tend to move to headwater and tributary spawning habitats that are cold, clear and have high gradient, gravel bars and riffles (Photo 1) (Baum 1997). Adult salmon usually spawn in November. Salmon eggs incubate until the following April. Young salmon typically reside in riverine habitat for two years until they migrate to the ocean during spring. The timing and duration of this migration varies annually depending on local water temperature and river flow, but typically peaks during mid-May (Baum, 1997).

Herring and shad species tend to spawn in slower, more nutrient rich and warmer, low gradient main stem and pond habitat located in the lower reaches of rivers (Photo 2) (Chittenden 1969, Saila, et al. 1973). River herring and American shad spawn in Maine from late May through early July. Fertilized eggs incubate and hatch rapidly. The young

spend the summer growing in freshwater, and depart for the sea typically no later than early November.

Photo 1. Typical Maine headwater Atlantic salmon spawning and nursery habitat. Note abundance of gravels, riffles and shallows.

Photo 2. Typical American shad habitat in the lower Kennebec River below Waterville. **Note that the river is deep, broad, and slower moving.**

- **What role does fish passage play?**

There are few if any rivers where fish passage conditions are ideal and consistent. Thus, to support restoration of anadromous populations, some form of site-specific fish passage around an obstruction may be required, consistent with population management objectives established by the applicable natural resource agencies. Anadromous fish will use routes around dams, waterfalls and other obstructions that provide the right mix of

hydraulic depth, turbulence and velocity conditions to promote passage. These may be existing facilities, and/or facilities specifically installed for fish passage.

- **What are relevant factors for providing adequate fish passage?**

According to the 1998 KHDG Agreement,

> *"Licensee will continue and where needed, improve existing interim operational measures… to eliminate significant injury or mortality* (emphasis added) *(immediate or delayed) to the out-migrating species ,,, based on qualitative observations … ." (page 9-10; 13 and 15 for Lockwood, Shawmut and Weston respectively.)*

Fish passage measures can vary from simple to complex, and solutions are usually based on site specific conditions coupled to an understanding of fish behavior and ichthyomechanics. The timing, environmental conditions and hydraulics conducive to fish passage are relatively predictable because the behavior and biology of anadromous fish species inhabiting the Kennebec River are well understood. Fishery agencies have been actively restoring these species to rivers throughout the northeastern and mid-Atlantic regions for many decades, so there is also a wealth of study data describing the dynamics of fish passage for these species at dams similar to the mainstem dams on the Kennebec. Anadromous salmon, for example, predictably migrate downstream in the surface flow and mostly at night, and respond to accelerating flow fields; fish such as alewives and American shad usually migrate in large, observable schools.

Thus, any passage condition that provides hydraulics conducive to fish passage is likely to pass these fish. The level of engineering complexity that may be necessary is generally site-specific and dictated on case-by-case basis. Providing passage might be as simple as

opening a gate at a dam, altering a culvert size, or providing a natural-sloping channel into or around a falls or dam. At the other extreme would be providing a highly-engineered fish lift or ladder for upstream passage or creating a behavioral diversion such as lights or louvers to guide fish downstream toward a preferred passage route.

- **What effect do project operations at the Lockwood, Shawmut and Weston dams have on anadromous fish?**

Anadromous fish can pass both upstream and downstream at the Lockwood, Shawmut and Weston hydro-projects with minimal injury or mortality. Fish passage is methodically monitored at these sites by biologists from FPLE and the Maine Department of Marine Resources ("MDMR"). Mr. Richter's testimony describes the monitoring process in detail. These observations are specifically conducted to document and refine downstream fish passage measures, and document and address evidence of injury or mortality resulting from fish passage. Results are formally reported and discussed annually by state and federal agencies and FPLE biologists. This program has been underway since 2000 and, to date, has worked well.

- **Are additional "permanent" upstream and downstream structure installations currently required for successful restoration?**

Operation of fish passage facilities at dams is to ensure that fish can migrate without significant injury or mortality. Often, fish passage measures are characterized as

"interim" or permanent". The distinction between the two can be as simple as verifying that existing passage conditions adequately meet escapement for spawning and population restoration and maintenance goals. There is no basis to infer that "interim" means "inadequate", and it is premature to assert that additional measures or facilities are required beyond existing interim measures.

If an "interim" passage measure ultimately meets fish passage escapement goals set by agencies, no further enhancements may be needed for it to be deemed "permanent". If fish passage goals are not met, then additional measures or modification may be required. The Agreement currently provides a systematic process allowing interim passage facilities currently in place at the Lockwood, Shawmut and Weston hydro projects to become formally assessed as permanent passage facilities pending regulatory and fishery agency review of applicable monitoring or study data. As outlined in Mr. Richter's testimony, these effectiveness studies are ongoing.

- **Upstream anadromous fish passage**

The petitioners assert that existing upstream fish passage measures at the Shawmut and Weston dams are inadequate. In my professional opinion, the existing upstream passage measures for the Shawmut and Weston projects are adequate, do not pose a threat to anadromous fish populations and satisfy the criterion for successful fish passage because passage is provided without significant injury or mortality to the migrating fish.

As I discussed earlier, upstream passage is required for anadromous fish to complete their life cycles so that adult fish migrating upstream gain timely access to spawning grounds. The current phase of anadromous fish restoration as defined in the Agreement employs a strategy of trapping upstream-migrant anadromous fish at the existing fish lift at Lockwood, and then transporting them upstream directly to spawning habitat.[1] Thus, there are no physical upstream passage facilities presently required at either the Shawmut or Weston Projects. Biologists trap, count, measure and truck the fish at Lockwood, then bypass the Shawmut, Hydro-Kennebec and Weston dams and place the fish directly into targeted upriver spawning habitat. As Mr. Wiley's testimony details, the Agreement provides that facilities will be added at Shawmut and Weston dams at a later phase, once anadromous fish abundance increases to a target level.

The most strategic and productive salmon spawning habitat in the Kennebec watershed is in the upper Sandy River and upper reaches of the Kennebec, located well above the Lockwood, Shawmut and Weston dams (Paul Christman, and Joan Trial, Maine ASC, personal communication). The present phase of Atlantic salmon restoration does not depend on fish passage at Shawmut and Weston dams because salmon can be readily trucked to their spawning habitat from Lockwood.

By contrast, American shad spawning is presently focused on the Kennebec River between Waterville and Augusta (KHDG 2001, 2002, 2003, 2004, 2005) (EXHIBIT FPLE-14), with additional historic habitat increments available in the mainstem river

[1] Upstream anadromous fish passage is provided by a $2.7 million lift, trap and sorting facility that became operational in May 2006. The facility is operated by FPL Energy Maine Hydro, MDMR and MASC.

from below Madison to Waterville. The Maine DMR is currently concentrating most American shad stocking and management in the Kennebec River below Waterville (KHDG 2001, 2002, 2003, 2004, and 2005). Thus, the present phase of American shad restoration does not currently depend on fish passage at Shawmut and Weston dams.

Most alewife spawning habitat in the Kennebec River basin is actually located in the Sebasticook River, which joins with the Kennebec downstream from the Lockwood Dam, and is thus unaffected by mainstem Kennebec fish passage conditions. A small amount of alewife habitat is located in Wesserunsett Lake, which is connected to the Kennebec upstream from the Shawmut dam (see EXHIBIT FPLE-14). These fish can be readily trucked to Wesserunsett Lake and thus do not depend on fish passage facilities at Shawmut and Weston dams. Again, there is no reason why this long-standing practice by the agencies should be modified or discontinued.

The current phase of upstream passage past Shawmut and Weston dams provides a state-of-the-art trap and truck program, where anadromous fish are trapped at the new Lockwood Dam fish lift, inspected, counted, and then quickly transferred via tank truck directly to upstream spawning habitat. This process bypasses Shawmut and Weston, removing them from any direct effect on upstream passage. During 2006, the first year of operation, 15 adult Atlantic salmon were successfully passed to the Sandy River during the passage season. The MASC considers this to be a very encouraging start to passing salmon upstream as part of re-establishing a Kennebec River salmon fishery (Paul Christman, MASC, personal communication). All fish were successfully handled and released to the Sandy River with no injury or mortality; follow-up monitoring by

MASC indicates that the fish remained fit and healthy (Paul Christman, MASC, personal communication). This demonstrates that the way in which upstream fish passage has been addressed satisfies the KHDG criterion for successful fish passage.

Trapping and trucking of anadromous fish has been a well-established measure for transporting pre-spawning adult anadromous fish for many decades during early phases of fish restoration. In addition to Atlantic salmon, trap-and-truck has been used successfully in the Kennebec watershed since the 1980's to annual transfer hundreds of thousands of alewives to spawning grounds, and to transfer broodstock American shad to Maine for spawning from as far away as the Connecticut River in Holyoke, Massachusetts, and the Merrimack River in Lawrence, Massachusetts (KHDG 2001, 2002, 2003, 2004, 2005). Every year, hundreds of adult salmon on the Penobscot River are successfully trapped at the Veazie dam above Bangor and trucked to federal hatcheries near Ellsworth. The Saco River also has a long-established trap and truck program that has successfully moved anadromous fish past obstructions with no significant injury or mortality. These programs have consistently demonstrate low mortality and stress, and move fish to spawning grounds with ample time and opportunity to spawn. According to Marshall, et. al. (1994), *"trapping and upstream trucking of wild populations [of salmon] has merit where distance to headponds is significant and where all adults can be released at or below their tributaries of origin …and quickly places a fish closer to cooler headwater tributaries."*

Thus, there is no basis for conclusion that the absence of permanent upstream passage facilities at the Shawmut and Weston hydroelectric projects poses any threat to anadromous fish populations, because passage is provided through the Lockwood trap and transport facilities. The KHDG Agreement provides for the future development of facilities located at Shawmut and Weston based upon the progress of the restoration and the presence of adequate numbers of returning fish below the projects, which have not yet been reached.

- **Downstream anadromous fish passage**

Currently fish are passed downstream at the Weston, Shawmut and Lockwood projects via existing gates, sluices, spillways and turbines. These are designated in the Agreement as "interim" measures. However, as demonstrated below and in Mr. Richter's testimony, there is no evidence that these interim fish passage measures at the projects are in any way hampering anadromous fish restoration on the Kennebec. Conversely, there is ample evidence that anadromous fish populations are in fact increasing. Thus, there is no justification at this time to modify or change what FPLE and Merimil are doing pursuant to the KHDG Agreement.

These projects include provisions for downstream passage that comply with the requirements of the *KHDG Agreement*. The Agreement was designed and approved by all Maine agencies responsible for fish restoration and management on the Kennebec River (including DMR, Atlantic Salmon Commission (now MASC), Maine Department

of Inland Fisheries and Wildlife and the U.S. Fish and Wildlife Service), as well as the Maine State Planning Office, the Kennebec Coalition, and affected dam owners (including FPLE). This is discussed further in the testimony of Mr. Wiley.

As noted earlier, the KHDG Agreement provides a methodical scientific process for restoring runs of anadromous fish that includes monitoring and adjusting fish passage measures based on monitoring feedback. The Agreement anticipated the need to pass anadromous fish downstream toward the ocean without significant injury or mortality. The passage measures include the use of gates, sluices, spillways and turbines as described by Mr. Richter. These methods of passing anadromous fish downstream are also used at hydroelectric sites elsewhere in Maine, and in Vermont, New Hampshire and Massachusetts.

These facilities are operated for fish passage at times and in a manner based on known fish behavior, as specifically recommended by the fisheries agencies. Mr. Richter's testimony has described the timing and operation of fishways in detail. In most cases, the dams have gates and sluices already in place for the original purpose of passing logs and floating debris. These devices have been adapted for passing fish. Furthermore, many anadromous fish migration events coincide with periods of high flow, when significant volumes of water in the river spill over the tops of the dams (spillway), providing abundant and supplemental downstream passage routes. During periods of high flow, many fish are carried downstream via the spillway regardless of the existence of other designated fishway passages or routes (see Photo 3).

Photo 3. View of typical spillway flow at Lockwood Dam during late May, a period of peak downstream migration for Atlantic salmon.

The petitioners incorrectly allege that spillage is insignificant at these sites during the fish passage season. However, Atlantic salmon smolt migrate downstream on Maine rivers during April, May and June, with most fish passing in May (Baum 1997). During these months, flow in the Kennebec River is very high due to seasonal snow melt and rainfall. September, October and November are key months for river herring and shad downstream migration, as well as some adult salmon. During these months, spillage is variable but also occurs; any time that river flow exceeds the hydraulic capacity of the turbines the excess water passes around the powerhouse via the spillways and/or gates and fish are carried with it. During such times the probability of turbine passage is relatively low because many fish would pass via the spillway or other gate openings.

Some anadromous fish may pass via the project turbines. However, the petitioners claim that *all* fish passing downstream are passed through turbines and that all of those that do are killed. This is simply conjecture and is un-supportable, as demonstrated by many years of independent studies of similar fish and similar turbines. These studies have been summarized into peer reviewed references such as for the U.S. Department of Energy (Franke *et. al*, 1997). These analyses show that turbine passage survival is affected by site-specific turbine characteristics such as runner size, speed, head, number of blades, etc. In essence, the data show that there is a spectrum from high-risk to low-risk turbine characteristics. Very high-head (i.e. 150 ft or more), high speed, small turbines tend to have higher risk of mortality, than lower head, slower-speed, larger turbines which have lower risk. The Lockwood, Shawmut and Weston turbines are of the low-risk design.

Based on these characteristics the literature indicates that it is probable that approximately 85-95% of those anadromous fish that happen to pass downstream via turbines would in fact survive. As discussed above, most anadromous fish would not likely pass via turbines. Studies conducted here in Maine during the 1990s at hydro sites with similar turbines to the Lockwood, Shawmut and Weston projects provide similar results. Smolt survival studies conducted on Saco River projects indicate survival through the turbines is 88% at Bar Mills and 85% to 97% for West Buxton.[2]

As noted above, because juvenile anadromous fish migrate in relatively large concentrated schools, their presence is readily detectable. If any large numbers of these

[2] Normandeau Associates, Inc. and FPL Energy Maine Hydro, LLC. May 2002; Normandeau Associates, Inc. January 2000.

fish were in fact being killed and injured by turbine passage at these sites, the evidence would be readily observable and documented, as noted by the petitioners' reference to the Benton Falls Project on the Sebasticook River[3]. The fact that no such occurrences have been documented at Lockwood, Shawmut and Weston despite directed monitoring is indicative that there are no significant problems at these projects.

The scientific literature, as well as well-documented direct observations from routine anadromous fish monitoring on the Kennebec conducted both by FPLE and DMR, provide further support that the downstream fish passage provisions in the Agreement and implemented at the Weston, Shawmut and Lockwood projects are reasonable, and provide adequate fish passage (KHDG 2001, 2002, 2003, 2004, and 2005). For example, scientific monitoring data show that these fish stocks are increasingly abundant under the passage conditions provided by the Agreement. Even though the anadromous restoration program operating under the Agreement is in its early stages, annual DMR and U.S. EPA river surveys (KHDG 2005, Yoder *et al*., 2006) have documented successful breeding and an increasing abundance of anadromous fish, and there is now an established flourishing commercial fishery that exploits alewives and attracts harvesters from around the State.

[3] In 1999 a downstream fishway at the Benton Falls Project on the Sebasticook River that normally passes alewives became clogged. This briefly diverted alewives to a turbine in sufficiently large numbers that injured fish were readily observable by the public using similar surveillance methods to those currently used at Lockwood, Shawmut and Weston.

- **What is the significance and rationale for dates for additional passage facilities in the KHDG Agreement?**

The Agreement specifies a sequential order to the implementation of upstream and downstream passage measures. The schedule is based on the repopulation rates to the Kennebec River of American shad, as well as Atlantic salmon, and river herring expected by fishery agencies. The implementation of sequential permanent upstream fish passage at dams assumes that it would take several years for the anadromous American shad population to increasingly occupy each consecutive reach of river. The specific population triggers and dates for specific fishways were based on the best professional judgment of agency biologists with anadromous species management expertise. Therefore, construction of fishways further upstream will follow at the pace of population expansion and restoration efforts.

It is my professional opinion that the schedule for implementing fish passage measures is reasonable and that there is no need to advance the schedule for provision of additional fish passage measures. This is because the existing program adequately supports the restoration of the fisheries to the waters of the Kennebec River as evidenced by a trend of increasing anadromous fish abundance under existing passage conditions, and because the abundance has not yet reached the triggers that would justify construction of additional facilities upstream.

- **Conclusion**

In conclusion, based upon my experience and training as a fishery biologist, and given the:

- lack of evidence of significant anadromous fish injury or mortality at the Lockwood, Shawmut and Weston hydro projects;
- existence of an effective trap and truck operation at Lockwood;
- high turbine survival rates for downstream migrants passing at projects similar to the subject Kennebec projects;
- existence of downstream fish passage measures at each project;
- existence of downstream fish passage monitoring study plans; and,
- increasing abundance of anadromous fish populations in the Kennebec River;

it is my best professional judgment that the existing upstream trap and truck program and downstream fish passage measures at the Lockwood, Shawmut and Weston hydro projects are adequately and appropriately supporting efforts to restore anadromous fish, and are not posing a threat to human health or the environment.

HAVE THERE BEEN CHANGES IN ANADROMOUS FISH PASSAGE CIRCUMSTANCES OR CONDITIONS WHICH SHOULD REQUIRE MODIFICATION OF THE CERTIFICATIONS?

The petitioners allege that two circumstances or conditions have changed since the issuance of the water quality certifications:

- Federal agencies are considering whether a certain segment of the Atlantic salmon population should be listed under the Endangered Species Act, and
- The installation and operation of the Lockwood fish lift and transport system places fish above the three subject projects where they allegedly have no safe downstream passage routes back to the ocean.

The petitioners, however, offer no specific documentation of changed circumstances other than to provide a copy of a petition to list Kennebec River Atlantic salmon as an endangered species. The implication is that a potential listing somehow justifies a higher standard for downstream fish passage than that required in the KHDG Agreement. This is unsubstantiated and wrong.

- **Endangered Species Listing for Atlantic Salmon**

Currently, Atlantic salmon are <u>not</u> listed as either a threatened or endangered species in Kennebec waters encompassed by the Lockwood, Shawmut and Weston projects. Those

Atlantic salmon populations that are presently listed as endangered are specifically from other Maine watersheds, such as the Sheepscot, Ducktrap, Cove Brook, Narraguagus, Pleasant, Machias, East Machias and Dennys rivers. Salmon in these waters are included in the Gulf of Maine Distinct Population Segment (DPS).

USFWS and NMFS define the Gulf of Maine Distinct DPS as including "*all naturally reproducing remnant populations of Atlantic salmon from the Kennebec River downstream of the former Edwards Dam site* (emphasis added), *northward to the mouth of the St. Croix*". The purpose of this designation is to distinguish this group of fish from those from Long Island Sound and Central New England. (65 Federal Reg. 69459). The DPS listing specifically excludes those Kennebec waters affected by fish passage issues associated with the KHDG Agreement. Atlantic salmon native to the upper Kennebec (*i.e.* those requiring fish passage at Lockwood, Shawmut and Weston dams) were extirpated many decades ago (Paul Christman, MASC personal communication).

The fact that Atlantic salmon in the Kennebec River above Augusta are not presently classified as part of the DPS, or listed as threatened or endangered reflects that there is presently no remnant native population established in these waters (Paul Christman, MASC personal communication).

According to the MASC, those Atlantic salmon inhabiting Bond Brook in Augusta and Togus Stream in Randolph were found by the USFWS genetics laboratory in Lamar, PA to be distinct from other stocks (Paul Christman, Maine ASC, personal communication).

These fish inhabit tributaries 20 miles or more downstream from Lockwood, Shawmut and Weston dams, and thus do not require passage at these dams to migrate to and from their home habitat. They are part of the DPS, but merely under consideration for potential listing at this time. Whether they will eventually be listed as threatened or endangered is a matter of speculation.

Fifteen adult Atlantic salmon entered the new fish lift at the Lockwood dam and were successfully passed upstream in 2006. The MASC determined the origin of each fish from observations of markings and genetics. None of these salmon was related to the Bond Brook or Togus population.

At present there is no actionable change in management or status for Kennebec Atlantic salmon, and thus no change in circumstances that would warrant modification of the existing anadromous fish passage measures outlined in the KHDG Agreement. It is my best professional judgment that fish passage at the Lockwood, Shawmut and Weston dams has no known effect on any listed endangered salmon populations.

- **Safe Downstream Passage after Installation of the Lockwood Fish Lift**

The petitioner alleges that the installation of the Lockwood fish lift and the subsequent transport of adult salmon to spawning habitat above the three projects constitutes a change in circumstances requiring the modification of the certifications. To the contrary, the planned installation of the fish lift was an integral part of the KHDG agreement.

The transport of adult Atlantic salmon from the Lockwood fish lift, and subsequent downstream passage of post-spawned adults and juveniles, was expected as the natural and logical result of commencing operation of the Lockwood fish lift in 2006. The Lockwood fish lift represents a $2.7 million investment that was planned in advance, and built for the express purpose of passing these fish. Additionally, as discussed in Mr. Richter's testimony, safe downstream passage was provided at the Lockwood, Shawmut and Weston projects in advance of the installation of the fish lift and the subsequent transport of adult salmon. The actions surrounding the Lockwood fish lift clearly are not unanticipated changed circumstances requiring an urgent change in fish passage strategy.

In addition, much of the petitioners' argument is falsely predicated on the absolute assumption that existing conditions and measures provide no safe downstream fish passage. However, as I have described above, the Lockwood, Shawmut and Weston dams do not jeopardize the existence of Atlantic salmon because downstream fish passage is already provided. Fish passage provisions have been committed to by all signatories of the Agreement (with Atlantic salmon passage parameters in mind), and a process is in place to methodically evaluate and modify these facilities as necessary through observation and study.

Petitioners also incorrectly state that Atlantic salmon are afforded no downstream passage alternative other than through turbines when water is not spilling over the dam. and also erroneously claim that there is a "*lack of any safe and effective downstream passage facilities at the Weston, Shawmut and Lockwood Dams*" which "*prevents them*

from safely reaching and occupying their requisite marine habitat." To the contrary, as demonstrated in Mr. Richter's testimony, downstream fish passage has been provided for anadromous species at these projects since 2000. This has been in the form of controlled spills through sluice gates and deep gates, providing passage over spillways, and/or providing passage through turbines.

Anadromous fish such as salmon are surface-oriented migrants naturally attracted to surface flow inherent through structures such as gates and sluices. Although these structures were historically built for other purposes at the projects, they are now opened specifically during the times of year required for moving anadromous fish downstream. These fishways are monitored by DMR and FPLE biologists, and results are documented, reviewed and discussed in an annual scientific forum.

As discussed earlier, this type of downstream anadromous fish passage is conventional as it has been successfully adopted at numerous hydroelectric projects with similar features throughout New England and is consistent with the provisions outlined in the KHDG Agreement. It is inappropriate to prematurely dismiss this form of passage as inadequate, in the absence of any data or any site-specific evidence that indicates otherwise. The effectiveness of these facilities has been and will continue to be studied by FPLE under the guidance of the resource agencies, the KHDG Agreement and each applicable FERC license. According to both FERC license terms and the KHDG Agreement, scientific information from these studies will be continue to be evaluated by USFWS, DMR and

MASC to determine if enhanced downstream anadromous fish passage measures are needed at each of these sites.

- **Progress of Fisheries Restoration**

There is growing empirical evidence that Kennebec anadromous fish populations are increasing in abundance (KHDG, 2005) even at this early stage of the restoration program, which is counter to the petitioners' unsupported claim that anadromous fish are being "*deprived of safe access*" and thus unable to "*maintain a self-sustaining population*."

Nor are fish passage circumstances "*the only reason why these species were completely extirpated from their native habitat in the Kennebec River above Augusta*" or "*the only reason self-sustaining populations of these animals have still not been restored"* as claimed by petitioner Watts. Although dams lacking fish passage were one factor, it cannot reasonably be disputed that pollution, climate change, marine mortality factors, poaching, incidental capture by fishermen, invasive species, stocking and aquaculture practices, and habitat degradation have also been identified as critical factors in the decline of anadromous Atlantic salmon in the Gulf of Maine (NMFS and USFWS, 2005). As required by the KHDG Agreement, the Lockwood, Shawmut and Weston dams do in fact have fish passage, and thus are not a contributing factor.

- **Conclusion**

In my professional opinion, the petitioner's argument that circumstances have changed because there is now a fish lift at Lockwood that passes Atlantic salmon is factually flawed.

- The installation of a fish lift at the Lockwood Project was anticipated, and indeed required, by the KHDG Agreement and water quality certifications.
- Downstream fish passage measures are in place to address the downstream passage needs of Atlantic salmon at the Weston, Shawmut and Lockwood projects.
- The KHDG Agreement provides a conventional scientific vehicle by which fish passage effectiveness can be evaluated.
- There is no evidence that additional downstream passage facilities or measures are needed for salmon at any of the projects.

Further, it is my professional opinion that there has been no actionable change in management or status for Atlantic salmon on the Kennebec River, and thus no change in circumstances that would warrant modification of the existing anadromous fish passage measures outlined in the KHDG Agreement.

LITERATURE CITED

Baum, E. 1997. Maine Atlantic salmon: a national treasure. Atlantic Salmon Unlimited, Hermon, Maine.224 pp.

Chittenden, M.E. 1969. Life history and ecology of the American shad, *Alosa sapidisimma*, in the Delaware River, PhD dissertation, Rutgers Univ., New Brunswick, NJ

Franke, G.F., D.R. Webb, R.K. Fisher, D. Mathur, P.N. Hopping, P.A. March, M.R. Headrick, I.T. Laczo, Y. Ventikos, F. Sotiropoulus. 1997. *Development of environmentally advanced hydropower turbine system design concepts.* U.S. Dept. of Energy and Hydropower Research Foundation. July 1997.

KHDG 2001. Kennebec River diadromous fish restoration – Annual Progress Report, 2001. Maine Department of Marine Resources, Augusta, Maine, and Maine Atlantic Salmon Commission. Sidney, Maine. 110 pp.

_____2002, Kennebec River diadromous fish restoration – Annual Progress Report, 2002. Maine Department of Marine Resources, Augusta, Maine, and Maine Atlantic Salmon Commission. Sidney, Maine. 93 pp.

_____2003. Kennebec River anadromous fish restoration – Annual Progress Report, 2003. Maine Department of Marine Resources, Augusta, Maine, and Maine Atlantic Salmon Commission. Sidney, Maine. 92 pp.

_____2004. Kennebec River anadromous fish restoration – Annual Progress Report, 2003. Maine Department of Marine Resources, Augusta, Maine, and Maine Atlantic Salmon Commission. Sidney, Maine. 76 pp.

_____2005 Kennebec River anadromous fish restoration – Annual Progress Report, 2005. Maine Department of Marine Resources, Augusta, Maine, and Maine Atlantic Salmon Commission. Sidney, Maine. 77 pp.

Marshall, T.L., J.W. Mc Askill, and G.J. Farmer. 1994. Trapping and trucking Atlantic salmon on the St. John River. pp 158-169 *in* A Hard Look At Some Tough Issues, proceedings of the New England Atlantic salmon management conference, Danvers, MA April 22-23, 1994. S. Calabi and A. Stout, eds.

Moyle, P.B. and J.J. Cech, 2004. Fishes: an introduction to ichthyology. Prentice Hall, Upper Saddle River, NJ. 726 p.

National Marine Fisheries Service, and U.S. Fish and Wildlife Service. 2005 Final recovery plan for the Gulf of Maine Distinct Population Segment of

Atlantic Salmon (*Salmo salar*) 241 pp. National Marine Fisheries Service, Silver Spring MD.

Normandeau Associates, Inc. and FPL Energy Maine Hydro, LLC. March 2004. Evaluation of Atlantic salmon smolt bypass guidance at the Bar Mills Project, Saco River, Maine. Report prepared for FPL Energy Maine Hydro, LLC, Portland, Maine.

Normandeau Associates, Inc. and FPL Energy Maine Hydro, LLC. May 2002. Atlantic salmon smolt passage route and survival at the Bar Mills Project, Saco River, Maine. Report prepared for FPL Energy Maine Hydro, LLC, Portland, Maine.

Normandeau Associates, Inc. January 2000. Atlantic salmon smolt passage routes and survival at the West Buxton Project, Saco River, Maine. Report prepared for FPL Energy Maine Hydro, LLC, Portland, Maine.

Normandeau Associates, Inc. December 1999. Atlantic salmon smolt passage routes and survival at the West Buxton Project, Saco River, Maine. Report prepared for FPL Energy Maine Hydro, LLC, Portland, Maine.

Saila, S., T.T. Polgar, D.J. Sheehy, and J.M. Flowers. 1972 Correlations between alewife activity and environmental variables at a fishway. Trans. Am. Fish. Soc. 101(4):582-594

Yoder, C.O., B.H. Kulik, J.M. Audet, and J.D. Bagley., 2006. The spatial and relative abundance characteristics of the fish assemblages in three Maine rivers. Center for Applied Bioassessment & Biocriteria Midwest Biodiversity Institute P.O. Box 21561 Columbus, OH

Dated: January 12, 2007

Brandon H. Kulik

STATE OF Maine
COUNTY OF Somerset

Personally appeared before me the above-named Brandon H. Kulik and made oath that the foregoing is true and accurate to the best of his knowledge and belief.

Dated: 01/12/07

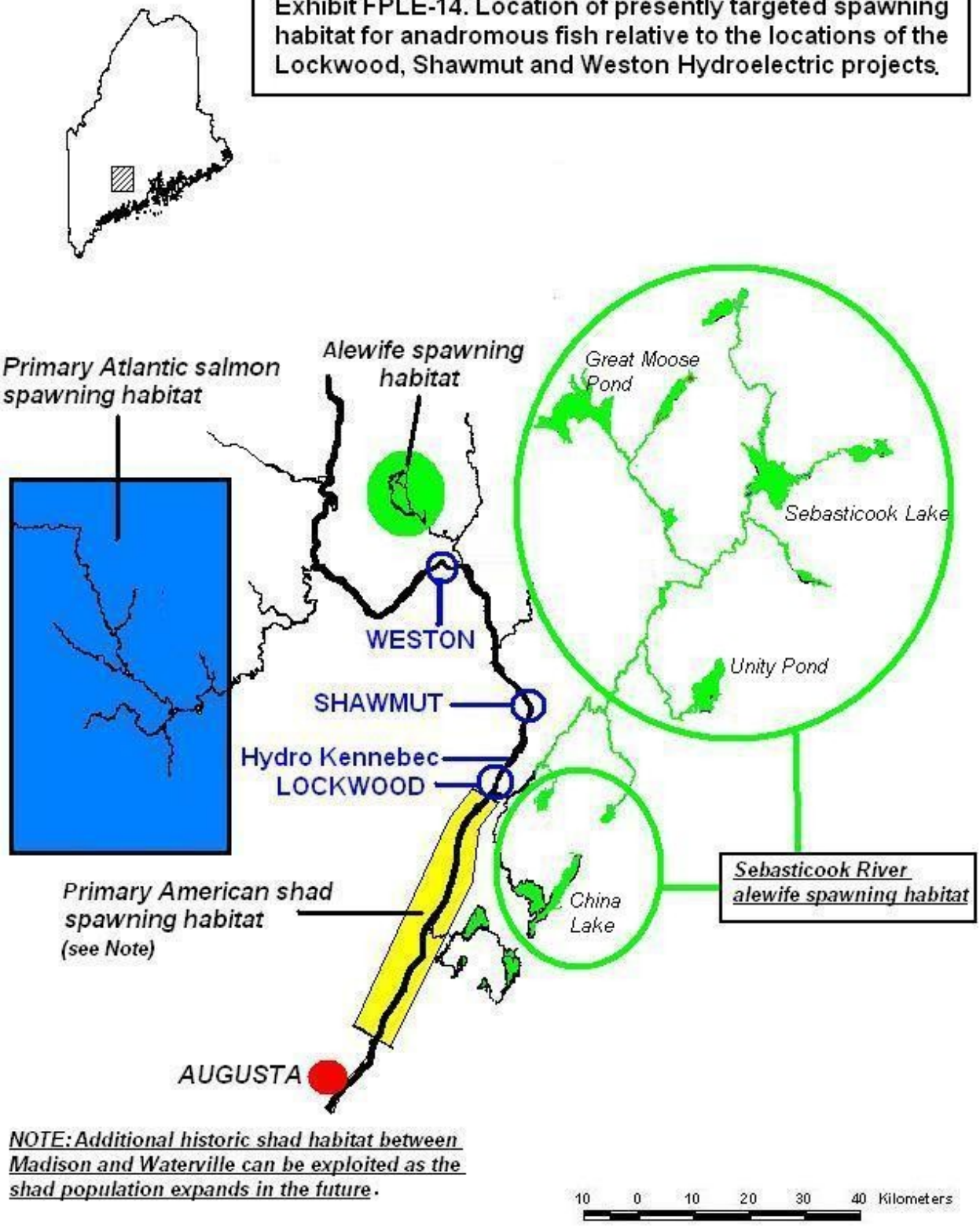
Notary Public
My Commission Expires:

JENNIFER Q. DOW
Notary Public
Maine
My Commission Expires March 12, 2009

EXHIBIT FPLE-14

Location of presently targeted spawning habitat for anadromous fish relative to the locations of the Lockwood, Shawmut and Weston hydroelectric projects.

Exhibit FPLE-14. Location of presently targeted spawning habitat for anadromous fish relative to the locations of the Lockwood, Shawmut and Weston Hydroelectric projects.



NOTE: Additional historic shad habitat between Madison and Waterville can be exploited as the shad population expands in the future.