STATE OF MAINE
BOARD OF ENVIRONMENTAL PROTECTION

IN THE MATTER OF

LOCKWOOD HYDRO PROJECT	)
#L-20218-33-C-N	)
	)
HYDRO-KENNEBEC PROJECT	)
#l-11244-35-A-N	)
	)
SHAWMUT HYDRO PROJECT	)
#L-19751-33-A-M	)
	)
WESTON HYDRO PROJECT	)
#L-17472-C-M	)

REBUTTAL TESTIMONY OF FRIENDS OF MERRYMEETING BAY
CHAIRMAN ED FRIEDMAN

February 7, 2007

STATE OF MAINE
BOARD OF ENVIRONMENTAL PROTECTION

IN THE MATTER OF

LOCKWOOD HYDRO PROJECT	)
#L-20218-33-C-N	)
	)
HYDRO-KENNEBEC PROJECT	)
#l-11244-35-A-N	)
	)
SHAWMUT HYDRO PROJECT	)
#L-19751-33-A-M	)
	)
WESTON HYDRO PROJECT	)
#L-17472-C-M	)

REBUTTAL TESTIMONY OF FRIENDS OF MERRYMEETING BAY
CHAIRMAN ED FRIEDMAN

1. I submit this rebuttal testimony in support of FOMB's and Douglas Watts' Petitions to modify the water quality certifications for the above-captioned dams so that the certifications will protect migrating fish and eels.

THE FUNDAMENTAL PROBLEM WITH
THE DAM OPERATORS' ARGUMENT

2. The fundamental problem with the dam operators' argument is that it wrongly tries to convince the Board that once the FERC licenses were issued, there existed no way to address environmental problems caused by the dams. The dam operators would have this Board believe there are laws which erect barriers to fixing environmental problems, and that the government bureaucracies cannot work together to solve them. This view is incorrect.

3. The overall intent of the applicable laws is that environmental problems caused by dams are to be fixed. The Federal Power Act expressly contemplates that FERC licenses will contain provisions to protect, mitigate and enhance fish and wildlife, and

their spawning grounds and habitat. 16 U.S.C. § 803(j). Section 401 of the Clean Water Act requires that states submit to FERC a set of conditions (water quality certifications) to be attached to the FERC license assuring compliance with state water quality standards and statutes. 16 U.S.C. § 1341. The Clean Water Act also requires that in setting water quality standards, states must protect the designated uses of a waterbody, and consider a waterbody's use and value for propagation of fish and wildlife. 33 U.S.C. §1313(c). Maine's water quality standards do that for the Kennebec and other rivers by requiring that the rivers "shall be of such quality that it is suitable for the designated uses of… recreation in and on the water… and as habitat for fish and other aquatic life," 38 M.R.S.A. § 465(4)(A), and that "the receiving waters must be of sufficient quality to support all species of fish indigenous to the receiving waters and maintain the structure and function of the resident biological community." 38 M.R.S.A. § 465(4)(C). The Maine Law Court and the U.S. Supreme Court affirmed in the S.D. Warren case (as urged by this Board) that Maine has the power to assure that its water quality standards are, in fact, met by dam operations, and that fish and eel passage are integral to meeting these water quality standards.

4. Consistent with this emphasis on protecting fish and their habitat, the licenses and certifications required for dams are flexible, so when problems arise, as is the case in this proceeding, they can be modified to address those problems. FERC can amend its licenses by including a reopener provision in the license or by working directly with the licensee to amend them (also an option here). In addition, water quality certifications can be modified in order to address environmental problems that arise; Maine law 38 MRSA § 341-D(3) expressly provides for this. The Clean Water Act allows states and citizens to

enforce water quality certifications in federal court. 33 U.S.C. 1365(a)(1) ("effluent standards" can be enforced); 1365(f)(5) ("effluent standards" includes 401 water quality certifications).

5. Further, the various agencies involved can cooperate to fix problems caused by dams. This Board can request that DMR or IF&W petition FERC to modify its licenses to incorporate a modified water quality certification. Or, the Board can go directly to FERC and ask to enter into discussions with the licensees about incorporating a modified water quality certification. The bottom line is: the fish and eel passage issue is a problem that can be solved with existing laws and by willing agencies. To suggest that everyone is stuck with dam-caused problems for the length of a FERC license – which can be 50 years – is an absurdly rigid, and erroneous, view.

6. Responses to some of the specific points made by the dam operators follow, below.

UPSTREAM MIGRATING FISH DO NOT SWIM BETWEEN LOCKWOOD AND WESTON. THIS VIOLATES MAINE LAW.

7. The dam operators' upstream fish passage plan is no passage at all. As detailed in the dam operators' testimony, the dam operators' idea is to trap upstream migrating fish at Lockwood (though shad have not actually been trapped), put the fish in a truck, and then drive past Weston where they are dumped back in the river. The Kennebec River in the considerable stretch between Lockwood and Weston is thus deprived of its upstream migrating anadromous fish populations. This violates the requirement in the water quality standard that the Kennebec be both suitable as habitat for indigenous fish and maintains the structure and function of the resident biological community. It also runs counter to the objective of the Clean Water Act, which "is to

restore and maintain the chemical, physical, and biological integrity of the Nation's waters." 33 U.S.C. § 1251(a). This section of river is also considered Essential Fish Habitat for Atlantic salmon. As described by Atlantic Salmon Biological Review Team in the Status Review for Anadromous Atlantic Salmon (Salmo salar) in the United States, 2006 ("Atlantic Salmon Status Review", cited potions of which are attached as Exhibit W/FOMB 28):

> Essential fish habitat for Atlantic salmon is described as all waters currently or historically accessible to Atlantic salmon within the streams, rivers, lakes ponds, wetlands, and other water bodies of Maine, New Hampshire, Vermont, Massachusetts, Rhode Island and Connecticut and that meet conditions for eggs, larvae, juveniles, adults and/or spawning adults.

Status Review, p. 149.

FPLE ADMITS OUT-MIGRATING FISH ARE KILLED

8. According to FPLE (Kulik 15), up to 15% of downstream migrating fish may be subject to turbine mortality. Accepting for the sake of argument that figure (and we don't), killing up to 15% of the fish that go through the turbines is unacceptable.

9. In contrast to Kulik's assertion that the chances of turbine mortality are slim and fall within a narrow window, the Atlantic Salmon Status Review notes that:

> Downstream passage system collection efficiency (percent of fish arriving at forebay/spillway that find and use facility) and total site passage survival (total percent survival past dam, regardless of path chosen) vary widely among sites, within years, and across years at the same study site (USASAC 2005). Each hydroelectric dam equipped with downstream passage is unique in design, location of turbine intakes, turbine types, passage system design, spillway type, forebay hydraulics and physical characteristics, and overall river hydrology. Variations in river flow and turbine discharge at the time of study also significantly affects downstream passage efficiency rates. Combinations of these factors and across year environmental variability during the smolt and kelt migration periods, result in downstream passage success being highly year- and site-specific. These factors make the study of downstream passage especially complex, and results are often open to widely varying interpretation."

(Atlantic Salmon Status Review, p. 95). In addition, according to two studies cited in the Atlantic Salmon Status Review: "Downstream passage efficiency for wild smolts ranged from 28% to 37% (GNP 1995, GNP 1997), and "Downstream passage efficiency for wild smolts was 14% in one year of study (BPHA 1994)." Status Review p. 96. While we agree with the Status Review and dam owners that technical details of efficient fish passage may be highly variable and site specific, it is critical to remember that the principles remain the same: prohibit access to turbines and divert fish to a suitable by-pass.

10. Mr. Kulik suggests that fish can pass over the top of the dams when the water is high. But he admits that during the "key months" for river herring, shad and some adult salmon, "spillage is variable" (Kulik 15). In other words, you cannot count on the fish passing over the top of the dams. The luck of the draw should not be a resource protection policy.

THE ATLANTIC SALMON STATUS REVIEW DETAILS DAM EFFECTS, IMMEDIATE AND DELAYED

11. According to the Atlantic Salmon Status Review:

> Dams equipped with hydroelectric generating facilities entrain and impinge downstream migrating Atlantic salmon. Entrainment occurs when downstream migrants pass through turbines and die or are injured by direct contact with turbine runners, shear forces, cavitation, turbulence, or pressure changes. Impingement occurs when a fish comes in contact with a screen, a trashrack, or debris at the intake. This causes bruising, descaling, and other injuries. Impingement, if prolonged, repeated, or occurring at high velocities also causes mortality. Entrainment mortality for salmonids ranges near 10-30% at hydroelectric dams depending upon fish length (juvenile vs. adult), turbine type, runner speed, and head (EPRI 1992). Passage through Francis turbines results in the greatest mortality (average 20%), followed by Kaplan (12%), and bulb turbines (9%) (Odea 1999). Passage through turbines can also lead to indirect mortality from increased predation and disease (Odea 1999). Where multiple dams exist, such as on the Penobscot River, the losses of downstream migrating

smolts from turbine entrainment are often cumulative and biologically significant. Because of their larger size, with turbine mortality of kelts is expected to be significantly greater than 10 to 30% (FERC 1997).

Atlantic Salmon Status Review, p. 97.

12. With respect to delayed mortality, the Atlantic Salmon Status Review states:

Very few studies have been conducted in Maine to directly assess fish entrainment and mortality on Atlantic salmon at hydroelectric facilities. In the only known study addressing turbine-passage mortality at a Penobscot River hydropower dam, Shepard (1993) estimated acute mortality of hatchery smolt passing through the two horizontal Kaplan turbines at the West Enfield dam at 2.3% (n = approximately 410). Delayed mortality of the control group (smolts exposed to similar conditions except turbine passage) was quite high ranging from 20% in 1993 to 40% in 1992. Delayed mortality of turbine-passed smolts was considerably higher, ranging from 42% in 1993 to 77% in 1992. The high observed delayed mortality in the control group lead Shepard (1993) to conclude that any comparisons of delayed mortality between the control and treatment would be unreliable.

Atlantic Salmon Status Review, p. 98.

13. The Atlantic Salmon Status Review further states:

Studies conducted by the NMFS in 2003 reported a much higher rate of dead smolts in the Penobscot smolt traps (5.2%) compared to parallel studies on the Narraguagus (0.3%) (USASAC 2004). Although some of this difference could be due to the fact that most of the smolts in the Penobscot study were hatchery origin while all of the Narraguagus smolts were wild or naturally reared, the nature of injuries observed for the 22 Penobscot smolt mortalities indicated that more that 60% were the result of entrainment (USASAC 2004). Injuries attributed to turbine entrainment were also noted on smolts collected alive during the studies.

Atlantic Salmon Status Review, p. 98.

14. The cumulative adverse effect of multiple dams is also discussed in the

Atlantic Salmon Status Review:

At present, many hydroelectric dams within the range of the GOM [Gulf of Maine] DPS are impassible due to the lack of fishways. Other hydroelectric dams allow passage; however, upstream passage effectiveness for anadromous fish species never reaches 100% and substantial mortality and migration delays occur during downstream passage events. The cumulative losses of smolts, in particular, incrementally diminish the productive capacity of freshwater rearing habitat

> above hydroelectric dams (see Section 8.1). For example, if a given reach that can produce 100 smolts is above five hydroelectric dams that each have 90% effective downstream fish passage facilities, the total amount of smolts produced by that reach in a given year is effectively reduced to about 59 smolts. The BRT is not aware of any Section 18 prescriptions in Maine that account for such cumulative losses in production capacity.

Atlantic Salmon Status Review, p. 164.

THE DAM OPERATORS AND THE STATE
ARE VIOLATING THE KHDG AGREEMENT

15. We rebut the dam owners assertions made in multiple places that turbines can be a part of the downstream passage array. Exhibit B of the KHDG Agreement states in Section B. 3 (2) on page 10 in the second paragraph: "In the event that adult shad and/or adult Atlantic salmon begin to inhabit the impoundment above the Lockwood project, and to the extent that licensee desires to achieve interim downstream passage of out-migrating adult salmon and/or shad by means of passage through turbine(s), licensee must first demonstrate, through site-specific quantitative studies designed and conducted in consultation with the resource agencies, that passage through turbine(s) will not result in significant injury and/or mortality (immediate or delayed). In no event shall licensee be required to make this quantitative demonstration for adult shad and adult Atlantic salmon before May 1, 2006." The exact same language exists for Hydro-Kennebec, Shamut and Weston projects on subsequent pages. (The KHDG Agreement is in the record as Ex. FPLE-6).

16. Adult salmon were moved above these dams in 2006 after being trapped at Lockwood and released in the Sandy River. Typically, these fish will over-winter before out-migrating. Out-migration in the spring will put them into one or several dam impoundments depending on whether they are able to negotiate downstream passage

successfully. Site-specific quantitative studies on salmon passage have not been undertaken at any of the four dams in question. Dam owners must then, to comply with the agreement, prevent fish access to their turbines until such studies are designed and completed.

FPLE ADMITS ITS DAMS KILL EELS

17. FPLE admits dead eels were found below its dams in 2004, 2005 and 2006. (Richter 14).

18. FPLE's testimony does not include a count or estimate of eel injuries that may result in delayed mortality or sub-lethal effects adversely affecting reproductive success.

19. While FPLE admits to counting 85 eel deaths in its tailrace observation program, it is clear from FPLE's testimony that this number of dead eels is undercounted. FPLE employee Robert Richter admits that "not all areas of the tailraces can be observed safely due to water depth and velocity." (Richter 13). The photographs of the dams attached to both my earlier testimony and Mr. Richter's testimony confirm this.

20. Information from the U.S. Fish and Wildlife Service ("USFWS') states the number of eel kills from the dams is likely much higher. In its February 2, 2007 Notice of 12-Month Petition Finding declining to list the American eel as endangered or threatened ("Notice of Finding"), 72 Fed. Reg. 4,967 (February 2, 2007), USFWS states:

> Based on the data available, we can reasonably assume that where American eels encounter one hydropower dam during outmigration, there is a typical mortality rate in the range of 25 to 50 percent, and when one or more turbines are encountered, the range of mortality rate increases to 40 to 60 percent for that watershed.

72 Fed. Reg. at 4,992. Excerpts of the Notice of Finding are attached as Exhibit W/FOMB 29.

Aside from the fact that USFWS has incorrectly and under-calculated their own figures by not factoring in the number of dams, other data we have previously supplied (W/FOMB-18) supports much higher figures for mortality per dam. Figures cited in Paragraph 14 above and in the Watts petition and rebuttal correctly calculate cumulative losses.

21. Although USFWS does not recommend listing the American eel as endangered or threatened because of range-wide factors, USFWS does say that turbines adversely affect abundance on a regional or local scale:

> In summary, turbines, particularly within a watershed or turbines on terminal dams, can cause substantial mortality within those watersheds. . . We conclude that turbines are responsible for decreases in abundance on a local or regional scale . . .

72 Fed. Reg. at 4,992. That the federal government is unwilling to take on the task of protecting the American eel at the national level points to the pressing need for state agencies and boards such as the BEP to take immediate action to stem the species decline.

FPLE CAN AFFORD TO PROVIDE SAFE PASSAGE

22. Petitioner Friends of Merrymeeting Bay does not believe that expense should be a considered factor in either evaluating the criteria for modification under 38 MRSA § 341-D(3) or in determining whether water quality standards are being satisfied. FPLE, however, suggests that punch plates or similar devices are not worth the expense (though FPLE does not quantify that expense). (Ault 11). FPLE can well afford to put in punch plates as well as other protective measures. According to the latest available annual

report obtainable on FPLE's corporate parent, FPL Group, obtained from the brokerage firm AG Edwards, FPL Group had net adjusted income of 1.2 billion for fiscal year 2006 up from 885 million in 2005. And according to The Corporate Library, total compensation plus stock option grants for Lewis Hay, Chief Executive Officer of FPL Group, was $13,144,894 in 2005 (with nearly $11 million in unexercised options from previous years). Continually throughout their testimony, the dam owners proudly show as an example of their cooperation, the approximate 4.75 million dollar contribution from the hydro industry, as a whole, towards the removal of Edwards Dam and fish restoration in the Kennebec. FPL Group income figures and CEO salary put that deductible restoration contribution/expense into perspective.

23. It does not make any good sense and is a sad commentary that the dam operators are fighting this hard to avoid implementing low-tech, common sense measures that block turbine access and divert downstream migrants to passageways through or around dams. If you go to Wal-Mart and buy a fan, it has protective screening in front of the blades. Why can't the dam operators do the same thing?

CORRECTIONS OF EARLIER TESTIMONY

24. I noticed two minor errors in my earlier testimony. Marshall DeMott took the picture of the severed Alewife that is on the cover of my earlier testimony and included as an exhibit. And in Paragraph 4, I erroneously referred to Ch. 2, § 27(C) when I meant to refer to 38 MRSA § 341-D and Ch. 2, § 27.

BY REFERENCE

25. I incorporate by reference the rebuttal testimony of Douglas Watts, the 2006 Atlantic Salmon Status Review and the 2005 Petition to List the Kennebec Population of

Anadromous Atlantic Salmon as an Endangered Species Pursuant to the United States Endangered Species Act 16 U.S.C §§ 1531-1544, Watts, et al. (available on the NOAA Fisheries Service web site at .http://www.nero.noaa.gov/prot_res/altsalmon/).

I declare this ___ day of February, 2007 under the penalty of perjury that the above is to the best of my knowledge true and correct.

_____
Ed Friedman

STATE OF MAINE
BOARD OF ENVIRONMENTAL PROTECTION

IN THE MATTER OF

LOCKWOOD HYDRO PROJECT	)
#L-20218-33-C-N	)
	)
HYDRO-KENNEBEC PROJECT	)
#l-11244-35-A-N	)
	)
SHAWMUT HYDRO PROJECT	)
#L-19751-33-A-M	)
	)
WESTON HYDRO PROJECT	)
#L-17472-C-M	)

JOINT EXHIBITS OF PETITIONERS-REBUTTAL

W/FOMB:

28. Status Review for Anadromous Atlantic Salmon (Salmo salar) in the U.S. 2006.

29. 12-Month Finding on Petition to List the American Eel as Threatened or Endangered. 72 Fed. Reg. No. 22 (02/02/07).