

November 28, 2006

**VIA ELECTRONIC MAIL**

Laura Sewall, Coordinator  
Sheepscot River Watershed Council  
6 Salt Marsh Point  
Phippsburg, ME 04562

Summary of Coopers Mills Alternatives Study

Dear Laura:

At the request of the Sheepscot River Watershed Council (SRWC), I am hereby providing a summary of the alternatives analyses we prepared for the Coopers Mills dam. As you are aware, the detailed reports for these analyses will be finalized by the time of the public meeting scheduled for November 28, 2006.

The Coopers Mills dam is located on the Sheepscot River in the village of Coopers Mills, which is part of the Town of Whitefield, Maine. The Town of Whitefield is the owner of the dam, which was originally used to provide hydromechanical power for adjacent mills. In recent years, the primary purpose of the dam has been to maintain a headpond that submerges the inlet of a dry hydrant used by the town fire department to pump water for firefighting. Leakage through the concrete and masonry dam is significant, and during low flow periods—especially in the summer—there are times when the pond level falls below the elevation of the dry hydrant inlet, and water cannot be pumped from the dry hydrant.

The Sheepscot River is also home to a federally-endangered population of sea-run Atlantic salmon (*Salmo salar*), which utilizes habitat in the river for spawning and rearing. There is concern about upstream passage for adult Atlantic salmon over the Coopers Mills dam, as well as species such as the alewife (*Alosa pseudoharengus*) and the American eel (*Anguilla rostrata*). Downstream passage is also a concern for alewives. During low flow periods—including periods that also dewater the dry hydrant intake—the pond sometimes falls below the spillway crest and upstream sill of the fish ladder so that there is no open channel flow past the dam, and hence no upstream or downstream fish passage.

The primary purpose of the alternatives analysis was to assess the condition of the Coopers Mills dam and identify options for increasing the reliability of firefighting water supply and fish passage. The study built upon work previously performed by Kleinschmidt, including a survey of the dam and impoundment, a dam inspection, and low flow study. Kleinschmidt's

work to date has been coordinated by the Sheepscot River Watershed Council, whose Coopers Mills dam committee was instrumental in designing studies to address local concerns about the structure and its environs. Members of the group include local residents and representatives of state and federal natural resources agencies, conservation organizations and the Coopers Mills Volunteer Fire Department.

The analysis studied five alternatives for the Coopers Mills dam, including no action (Alternative A), dam and fish ladder repair (Alternative B), dam removal with the dry hydrant moved downstream with a new access road (Alternative C.1), dam removal with a pumphouse downstream (Alternative C.2), and dam removal with a rock ramp and check dam upstream of the existing dam, backwatering a new dry hydrant (Alternative D). Drawings were prepared for each alternative, as well as cost opinions for construction and long-term maintenance. Each alternative was also assessed for its impacts on fish passage, water supply for fire fighting, commercial fisheries (e.g., alewife harvesting), wetlands, river morphology, recreation and aesthetics. Given the primary, existing uses of the dam for fire fighting water supply and fish passage, the analyses of these impacts were especially detailed.

The following table provides a summary of the alternatives analysis.

Alternative	Construction Costs	30-year Maintenance Costs	Fire Water Protection	Fish Passage	Other Impacts
A – No Action	\$0	\$0	Dry hydrant frequently dewatered.	Fish passage not always available.	Dam will continue to deteriorate and may ultimately fail.
B – Dam and Fish Ladder Repair	\$218,000+	\$180,000 (\$6,000/year)	Water supply for fire fighting consistently available.	Fish passage more reliable but not ideal for all species.	Aesthetic and recreational value is very poor.
C.1- Dam Removal w/Hydrant Downstream	\$200,000	\$72,000 (\$2,400/year)	Water supply for fire fighting consistently available, but with less backup storage and more difficult access.	Fish passage restored to natural conditions.	Enhanced recreational value and restoration of instream habitat.
C.2- Dam Removal w/Pumphouse Downstream	\$375,000	\$288,000 (\$9,600/year)	Water supply for fire fighting consistently available, but with less backup storage.	Fish passage restored to natural conditions.	Enhanced recreational value and restoration of instream habitat.
D – Dam Removal w/Hydrant Upstream	\$266,000	\$84,000 (\$2,800/year)	Water supply for fire fighting consistently available, but with more difficult access.	Fish passage restored to nature-like conditions; not ideal for all species.	Some enhancement in recreational value.

The alternatives analysis indicates that unless action is taken, the primary uses of the dam (fire fighting water supply and fish passage) will continue to deteriorate. In July 2006, Whitefield selectmen were advised by the Lincoln County Emergency Management director that the dam should be posted off-limits as the dam was in imminent danger of failure. All of the alternatives are relatively expensive, and require upfront construction costs as well as long term maintenance costs. The cost for Alternative B is considered to be a minimum cost, since the cost of one aspect of the repair—providing upstream passage for American eels—has not been determined in detail. However, based on the experience of other dams in Maine, the eel passage at the site could be as high as \$20,000.

A funding study conducted by Kleinschmidt for Alternative B (dam and fish ladder repair) found that little to no outside public or private resources are available, requiring that the costs for this alternative be borne by the dam owner (Town of Whitefield) through tax revenue and private donations. There are also several physical challenges to improving fish passage at the site, such as the location of the fish ladder entrance and the hydraulics of flow over the dam's spillway.

The minimum water supply capacity requested by the Coopers Mills Volunteer Fire Department for firefighting is the equivalent of three fire trucks pumping 1,250 gpm each for two hours, or 450,000 gallons. All of the alternatives studied can supply the minimum volume under normal river flows. However Alternatives C.1 and C.2—which require pumping from the tailwater pool—may only have two trucks worth of capacity during periods of extreme low flow. This flow would occur less than two days in a typical summer, or up to a week during a drought that occurs once every ten years on average. Additional storage would be needed to meet the firefighting water supply requirements during extreme low flows.

In addition to the alternatives analysis, Kleinschmidt conducted a feasibility study for a storage pond in the village of Coopers Mills. A storage pond would help mitigate the loss of any volume of water for firefighting, such as would occur with Alternative C.1 (dam removal with dry hydrant pumping from tailwater pool on the Sheepscot River). The pond could also provide water supply for firefighting during construction of any of the alternatives. All of the dam alternatives require low river stages during low flow periods (summer) for construction.

After a preliminary reconnaissance, a possible storage pond location was found in a large wetland adjacent to land owned by the Coopers Mills Volunteer Fire Department. The drainage area of the wetland is approximately 12 acres, with inflow consisting of surface water flow (gullies) and groundwater flow through steep, rocky topography underlain by bedrock. The site formerly had an earthen berm backwatering a small pond, and standing water and a cattail marsh is still present in the wetland. An engineered pond could be constructed with new earthen berms, synthetic pond liner and access road. Even though the storage pond was investigated as a backup water supply to the Sheepscot River, a full pond could have the minimum volume requested by local fire departments. During periods when inflow is very low (e.g., summer), the pond could be refilled with water pumped from the Sheepscot River after withdrawals for firefighting.

The cost opinion for a storage pond is \$140,000, including boundary and topographic survey, engineering, permitting and contingency. Costs for a smaller pond would be less, but

were not studied in detail. The maintenance costs for a 30-year period would be approximately \$36,000 in present day dollars, or \$1,200 per year. These costs are in addition to the costs for the dam alternatives discussed earlier. The wetland is located on private land, and investigations of the site were conducted with landowner cooperation. Kleinschmidt did not investigate how permission for pond construction would be obtained—such as the purchase or lease of land, easement or right-of-way—and also did not investigate any costs associated with these arrangements.

Kleinschmidt has presented information from the dam alternatives study at public meetings. Based on feedback from several stakeholders, including the local fire departments, there is interest in keeping the Sheepscot River as the primary water supply for firefighting. Alternative A (“no action”) is not considered as a viable alternative, given that Kleinschmidt’s studies and an independent dam inspection conducted by the Maine Emergency Management Agency (MEMA) concluded that the dam is in very poor condition and is unsafe, with a high probability of eventual failure. Alternative A is also not capable of meeting goals for water supply for firefighting and fish passage.

Alternatives C.1 (dam removal with dry hydrant downstream) and C.2 (dam removal with pumphouse downstream) require drawing water from the tailwater pool below the dam, which results in a slight reduction in the water supply available for firefighting during dry periods (up to two days in a typical year). The water supply could be mitigated with a storage pond, but this has not been publicly discussed in detail. Access to the dry hydrant for Alternative C.1—which requires backing fire trucks down an access road with a 6% slope—is not preferred by local fire departments, and there are concerns about the maintenance requirements of the pumphouse in Alternative C.2, both in the time and cost required, as well as the initial construction cost. The feasibility study for a storage pond has only been recently developed, but if a storage pond becomes the primary water supply then Alternative C.1 may be more highly regarded by stakeholders, since the access (i.e., backing in) would not have to occur during every fire event.

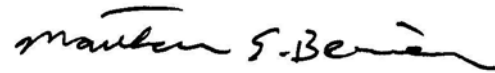
Alternative D includes a removal of the dam and the construction of a new dry hydrant upstream of the dam. The river would be backwatered by a low, nature-like riffle upstream of the dam to impound the volume of water required for firefighting, while providing upstream fish passage. Fire trucks would drive up to the hydrant on a newly constructed access road. Based on stakeholder feedback, this alternative appears to meet minimum fish passage goals as well as water supply and access requirements for firefighting.

In summary, there appears to be more than one feasible alternative for improving fish passage and water supply on the Sheepscot River at the Coopers Mills dam site. Cost opinions are in line with similar projects that have been designed, permitted and constructed in Maine, and the probability of a successful project is very high.

I hope this brief summary of our findings to date is helpful. As always, we look forward to working with you and the community further on this project.

Sincerely,

KLEINSCHMIDT ASSOCIATES

A handwritten signature in black ink that reads "Matthew E. Bernier". The signature is written in a cursive style with a prominent horizontal line above the first name.

Matthew E. Bernier, P.E.  
Project Engineer

MEB:fhw

cc: Brandon Kulik, SRWC  
Jeff Reardon, Trout Unlimited  
Jed Wright, USFWS