

Economics Research on the Relicensing of the Brunswick Dam

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This research project examines the economic impacts of improving the fish passage at, or removal of, the Brunswick Dam. The findings may be relevant in the ongoing Federal Energy Regulatory Commission relicensing process which concludes in 2029 with a decision on any changes needed at the dam site. The fish passage is ineffective in passing sustainable and historically abundant levels of river herring, American shad, American eel, and more. Improving the abundance of fish and flow of the river has the potential for increasing commercial fishery profits, generating decentralized gains to recreational anglers, increased property value, and other recreational and climate benefits. This research outlines these economic benefits for consideration when balancing them with the dam's revenue and energy output.

Since 2013, Brookfield White Pine LLC have owned and operated the Brunswick Dam. The head of the tide dam spanning the Androscoggin River has a 19 MW capacity, on average producing enough energy to power 13,000 homes and 3% of Maine's hydropower. The fish passage at the Brunswick Dam is a vertical slot fishway ladder composed of concrete pools and is the first barrier of access to the Androscoggin watershed. To access the passage going upstream, fish must navigate underwater turbines and bubble walls. Downstream passage results in high fish mortality rate from turbine interference.

I have examined projected economic benefits from improved passage of river herring (and this effect on cod), shad, and American eel. First, the dam currently passes an average of 71,087 river herring, fish primarily sold as bait to lobster and groundfish fisheries. Considering the watersheds capacity of 2.7 million herring, an escapement rate at 35 fish/acre, and the 2024 valuation of \$0.46/lb., a herring fishery on the Andro could produce \$550,059.26 per year. Next, cod prey on juvenile river herring and would likely return to the Gulf of Maine near shore waters in greater numbers if the river herring population rebounded. A 10% prey consumption of herring leaving the Andro and 10% catch of cod could lead to \$1,500,000 in revenue. Furthermore, the American eel brought in \$20 million to the Maine economy in 2022 and are worth at \$2000/lb., making their return to the Andro a profitable one. As shown in hedonic travel cost studies, fish such as shad provide a recreational economic benefit as anglers are willing to pay for a larger catch each trip.

Other economic benefits of fish passage improvement include property values, recreation, and economic community and climate benefits. Hedonic property value studies indicate an increase in property value after dam removals and fish passage restoration. Birdwatching would also improve as birdwatchers are willing to pay more to see the birds of prey that would return in larger numbers with greater fish abundance. Additionally, diverse ecosystems are more resilient to climate change and better ensure the continuation of a thriving fishing industry in the future as demand for sea food increases. Lastly, although difficult to quantify, people are generally willing to contribute financially to maintain ecosystems and endangered species even if they do not directly benefit.

In all, this economic research on the relicensing of the Brunswick Dam aims to understand how improving fish passage, or dam removal, on the Androscoggin will affect the local and Maine economy. Although it is very difficult to put of numeric value on the betterment of a complex ecosystem, these quantitative lower bounds and qualitative considerations are valuable when considering regulatory decision making. In the future, I hope to think more about the balance of renewable energy sources such as hydropower with environmental sustainability and protection.

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