



STAFF SUMMARY

TO: Board of Directors
FROM: Frederick A. Laskey, Executive Director 
DATE: April 13, 2022
SUBJECT: Update on the William A. Brutsch Hydroelectric Facility and the McLaughlin Fish Hatchery Pipeline

COMMITTEE: Water Policy & Oversight

X INFORMATION
 VOTE

Valerie Moran, P.E., Director, Waterworks
Rebecca Weidman, Director, Env. & Reg. Affairs
Preparer/Title


David W. Coppes, P.E.
Chief Operating Officer

Since its inception, MWRA has sought opportunities to minimize its environmental footprint while maximizing value to its ratepayers. The development of clean energy projects brings together these principles in a way that provides lasting value to the citizens of the Commonwealth of Massachusetts. An important part of MWRA’s renewable energy projects is the operation of hydro turbines at five locations. MWRA moves large quantities of water on a daily basis, making hydropower an abundant resource to use to our advantage. Two hydro facilities, Oakdale and Cosgrove, brought on line by MWRA’s and DCR’s predecessor, the Metropolitan District Commission, are still in operation today. The MWRA has developed three additional hydropower sites: at Deer Island Treatment Plant, Loring Road, and the Brutsch Treatment Facility. The Brutsch Treatment Facility hydro turbine, the smallest of our hydro turbines, was constructed in 2016/2017. The project was designed and constructed because it provides important benefits to the McLaughlin Fish Hatchery, is a source of clean energy to the grid in western Massachusetts, and results in monetary payments to MWRA to offset operational costs.

RECOMMENDATION:

For information only.

DISCUSSION:

The 60-kilowatt hydroelectric turbine at the Brutsch Treatment Facility and the pipeline to the Division of Fisheries and Wildlife’s (DFW) McLaughlin Fish Hatchery have been in service for over four years. The project was jointly sponsored by MWRA, the Executive Office of Energy and Environmental Affairs, the Division of Fisheries and Wildlife, the Department of Fish and Game, the Leading-By-Example Program, and the Massachusetts Clean Energy Center. In 2015, the Board authorized the design and installation of the hydroelectric turbine and pipeline to the McLaughlin Hatchery due to the multiple environmental benefits it would provide, including reducing MWRA’s carbon footprint by generating renewable hydroelectric power; reducing the hatchery’s carbon footprint by eliminating electrical demand associated with pumping water from the Swift River; and delivering cold, well oxygenated water to the fish hatchery without pumping and benefiting the health and growth of the fish.



The project consisted of construction of a raw water tap off of MWRA’s Chicopee Valley Aqueduct (CVA), just prior to the Brutsch Water Treatment Facility transferring about six million gallons per day (mgd) of untreated water through the hydro turbine and then to the hatchery approximately 4,400 feet away. (A bypass line was also constructed for times when the turbine is not operating.) The project design won the 2020 Silver Award, Honoring Outstanding Professional Design Excellence from the American Council of Engineering Companies of Massachusetts.

The McLaughlin Fish Hatchery is the largest of DFW’s hatcheries and accounts for half of the brook, brown, rainbow, and tiger trout that are produced in its hatcheries annually (on average 250,000 pounds). The fish are stocked in approximately 500 lakes, rivers, streams, and reservoirs in Massachusetts. It is located less than a mile from MWRA’s Brutsch Water Treatment Facility and borders the Swift River. Prior to the installation of the pipeline, the hatchery used a combination of water from onsite wells and water withdrawn directly from the Swift River.

Trout eggs need a constant supply of cold, clean, well-oxygenated water to survive. Beginning in December of 2016, MWRA began the delivery of six million gallons per day to the hatchery directly from the Quabbin Reservoir. Since the completion of the pipeline, water at the hatchery is several degrees warmer in the winter (6°F), several degrees colder in the summer (2-8°F), dissolved oxygen has improved, and total nitrogen concentrations have decreased. In addition, the new Quabbin source water has saved the hatchery \$60,000 per year in pumping costs. This spring, DFW will stock 500,000 trout in waterbodies throughout Massachusetts.



The hydroelectric turbine began operating in September of 2017, although it did not start running consistently until August of 2018 when all the initial installation and programming matters were resolved. Staff have optimized the flow through the hydro turbine and beginning in FY20, the turbine has been in operation over 95% of the time, with very little flow bypassing the turbine.

The hydro turbine generation data and revenue is shown in the table below:

Brutsch Hydro Turbine Generation and Revenue

Fiscal Yr.	Net Revenue from sale of power to NGRID	Total kWh	Renewable Energy Credit Revenue	Total Annual Revenue
FY19	\$33,757	426086	\$1,470	\$35,227
FY20	\$50,157	471289	\$13,625	\$63,782
FY21	\$42,258	443703	\$17,718	\$59,976
FY22	\$27,280	262797	\$12,492	\$39,772
Total to Date	\$153,452	1603875	\$45,305	\$198,757

FY19-FY21 represent complete fiscal years; FY22 data is through January 2022

It should be noted that the hydro turbine started operation in FY18; however, the data are not included in the chart above due to operational inconsistency during the initial startup period.

Staff have applied for an incentive payment, totaling about \$8,000 per year (based on the total annual generation) through the Hydroelectric Incentive Program under the Energy Policy Act of 2005 (EPAAct), as recently amended by both the Energy Act of 2020 and the Infrastructure, Investment and Jobs Act of 2021. The hydro payment under EPAAct was developed to provide additional federal incentives to operators to maximize generation from small hydro facilities developed after 2005. The payments can be applied for ten calendar years from the first year of operation. (For Brutsch, that means through calendar year 2027.)



The total cost for the project including construction, design, permitting and ESDC was \$4,372,254. The DFW contributed \$2,700,000 for the design and construction of the pipeline to the hatchery and the MWRA received \$714,235 in grant money. Therefore, MWRA’s capital contribution to the project was \$958,019. Based on operational data, the LCCA of the hydroelectric turbine shows a positive return on investment after 8 years based on operational data. The turbine has been in operation since FY19 and by FY26 should show a positive return.

In summary, the project has delivered the expected benefits, both MWRA and the hatchery have reduced their carbon footprint and the fish are thriving.