Holtwood 2021 Fishways Operations Report

History:
The Holtwood Project was built in 1910 and is located at River Mile 24 on the Susquehanna River. It is the second upstream hydroelectric facility on the river, with Conowingo Dam being located below and Safe Harbor Dam and York Haven Dam being located above.

In 1993, the Susquehanna River Fish Passage Settlement Agreement was signed, requiring the licensee of the Holtwood Project to provide migratory fish passage at their facility. The licensee began construction in 1995 and the fishway was placed into operation in April of 1997. The Holtwood fish lift has operated each spring since 1997, as well as fall of 2014, 2015, 2017, 2018 and 2019. 2021 marks the 25th year of operation.

Fishway Design:
The Holtwood fish lift design incorporates numerous criteria established by the USFWS and state resource agencies. Physical design parameters for the fishway are given in the 1998 Fishway Report (Normandeau Associates, Inc. 1998. Summary of the operation at the Holtwood Fish Passage Facility in 1997. Report prepared for PPL, Inc., Allentown, PA.) The fishway is designed to pass a population of 2.7 million American Shad and 10 million River Herring.

There are 2 lifts on the fishway, tailrace and spillway (see figure in Normandeau Associates, Inc. 1998). The tailrace lift has two entrances (gates A and B) and the spillway lift has one entrance (gate C). Each lift contains a mechanically operated crowder, picket screen(s), hopper, and hopper trough gate. Fish captured in the lifts are sluiced into one trough, which then leads into Lake Aldred. Attraction flows to the two fish lifts at Holtwood Dam are supplied via an attraction water piping system leading to five separate flow diffusers, with the flow distribution controlled by eight motor operated valves (MOVs). Generally, flows are introduced upstream of crowder in each lift and upstream of the three entrance gates. Entrance gates at the three lift entrances control the depth of flow within the lift channels. Fish that enter the tailrace and/or spillway entrances are attracted by water flow into the mechanically operated crowder chambers. Once inside, fish are crowded into the hoppers, lifted, and then sluiced into the trough. Fish swim upstream through the trough, past a counting window, and into the forebay through a 14 ft wide fish lift exit gate.

For more information on the design and operation of the lift, please reference the Fishways Operations Plan. This plan includes operating protocols and guidelines that are flexible and utilize experience gained during previous years of fish lift operation.

Regulatory Dates:
Resident spring fish passage season at the Holtwood fish lift is from April 1 through June 30. Migratory fish passage season timing is based on the passage of fish at the Conowingo Dam, located downstream. Resident fall fish passage season is from September 1 to October 15.

2021 Fish Passage:
By letter dated November 17, 2020, Brookfield requested to suspend fish passage and the Tier II radio telemetry study for the 2021 fish passage season at the Holtwood fish lifts. Brookfield was prepared to operate the lift in 2021. However, in discussions with resource agencies on October 20, 2020, Brookfield was informed that agencies did not want the hydroelectric projects on the lower Susquehanna River to operate the fish lifts in 2021 due to the potential spread of invasive species like the Northern Snakehead and Blue Catfish. PADEP and USFWS responded with letters of support on December 15 and December 4, respectively. Brookfield filed a request with FERC on January 5, 2021 to request the suspension of fish passage and the Tier II radio telemetry study for the 2021 fish passage season. On February 26, 2021, FERC filed an Order Granting Temporary Variance from Upstream Fish Passage Requirements. The variance was approved but noted that if Brookfield or resource agencies determine that permanent modifications are needed to reduce the spread of invasive species, a request for amendment will be required to be submission to the FERC prior to the 2022 spring fish passage season.

Upstream Shad Passage – Tier II Radio Telemetry:
2020 would have been year 3 of the study but it was deferred due to COVID-19. Brookfield was prepared to conduct year 3 of the study in 2021. On the October 20 call with resource agencies, a discussion was had regarding conducting the study without volitionally passing the fish through the Holtwood fish lift. Brookfield believes that conducting the study without lifting fish, with only a small sample size, and/or stocking the tagged fish in alternate locations would influence the study, resulting in questionable data and biases. Agencies seemed to share these concerns.

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Maintenance/Upgrades:

- Pre-season maintenance completed.
- Ongoing hopper hoist maintenance including wheel alignment and greasing.
- Re-engineered MOV4's actuator to give better flow control within the lift. All upgrades completed and tested in 2021.
- MOV5's new actuator was installed. The new actuator is significantly larger and required modifications. Electrical upgrades to support the load of the new actuator were completed.
- During flow testing, B entrance gate became stuck open. It is being investigated.

Fishways Operating Plan:
At the request of resource agencies, Brookfield updated the Holtwood Fishways Operating Plan (FOP) and after extensive agency consultation, filed it with FERC on February 19, 2021.

Invasive Species:
In 2020, PADEP recommended that Brookfield evaluate the ability and/or mechanisms to manage invasive species in preparation for the 2022 fish passage season. A site visit to Conowingo Dam was conducted to see how the East Fish Lift (EFL), the West Fish Lift (WFL), and trap and transport operate at Conowingo. The Holtwood fish lift is engineered differently than the Conowingo EFL, WFL, and is designed as a true passage facility with no current method or means of sorting. With no safe or viable scope to guide invasive removal or regulatory requirement, Brookfield has not pursued this topic further.

CFD Model Update:
Brookfield contracted with Gomez & Sullivan to complete a CFD model of the Holtwood fish lift, develop a new operating matrix, and field test for verification in 2021. The draft report was just received on December 6, 2021. When the report is fully reviewed, Brookfield will review the recommendations with the agencies. Once the operating matrix is updated, the Fishways Operating Plan will be updated. Brookfield considers this an operational change, therefore pursuant to approved study plan, Tier II radio telemetry data prior to the next operating season will not be included in our catch average moving forward.