Appendix A: Dams

Ayer Ice House (now Grady Research) on the Nashua River in Harvard, MA.

Falls at Ayer Ice House Dam.

Two historic run-of-river hydropower dams are located on the reach of the Nashua River proposed for designation: Ice House Dam in Ayer, owned by Ice House Partners, Inc. and Pepperell Dam in Pepperell, MA, owned by Pepperell Hydro Co. (a subsidiary of Eagle Creek Renewable Energy).

On the Squannacook River, there is one working run-of-river dam owned by Hollingsworth and Vose in West Groton, and four non-working historic run-of-river dams, including: the Squannacook Dam in West Groton and the Townsend Dam, Adams Dam and Mason Road Dam in Townsend.

The Turner Dam on the Nissitissit River was removed in 2015 with federal, state, local and private funding and partnerships. The only other dam on the Nissitissit, the Guarnottas Dam, is breached; only remnants remain below the waterline.

All of the existing dams have important historical and cultural values deeply rooted in the history of the communities and their early development.

Working Dams

Pepperell Dam

The first paper mill was established at the site near the current Pepperell Dam in either 1834 or 1835.[1] Historical documents indicate the first dam was built at Babbitasset Falls (on the Nashua River) in the early 1860s. The location and layout of the dam changed over the years, and the current dam and powerhouse were built in 1920 by the Pepperell Paper Company.[2] The Pepperell Paper Company closed in the early 2000s, and Pepperell Hydro Company, LLC (PHC) purchased the property in 2004. The power plant was grandfathered for operation under the Federal Energy Regulatory Commission (FERC) until upgrades were begun in 2007 by PHC, triggering the need for a FERC license.

At the request of the NPS, the PHC project area was excluded from the Nashua River Wild and Scenic Rivers Study Act, so as not to have the Wild and Scenic River Study efforts interfere with PHC obtaining a FERC license. Subsequently, the NPS confirmed to FERC by letter dated July 17, 2015 that the licensing of the Pepperell Project would

1 Pepperell "History of the Town," *http://www.town.pepperell.ma.us/131/History-of-the-Town.*

2 Pepperell Hydro Company, LLC; FERC Order Issuing Original License Project, P-12721-006, Sept. 8, 2015.

not be in conflict with the Wild and Scenic River Study. PHC received a FERC license in 2015 (FERC Project Number P-12721), and in 2016 PHC was sold to Eagle Creek Renewable Energy (retaining the PHC name for the project).

The dam operates as run-of-river (outflow from the project equals inflow at all times) and is 23.5-feet high, with 3-foot-high flashboards, and is 251-feet long. Flow from the Nashua River flows through a gated intake structure to a 565.5-foot long penstock. Pepperell Hydro releases a minimum flow of 15 cubic feet per second (cfs) or inflow (whichever is less) into the bypassed reach over the spillway year round. The project includes a partially constructed permanent downstream passage facility for river herring.[3]

A Recreational Plan for the dam project area has been accepted by the FERC, and will include canoe and kayak portage areas around the dam as well as new parking facilities for paddlers. The FERC licensing requires eel passage and fish passage facilities, once enough anadromous fish have reached the dam from downriver.

There are numerous cultural, recreational, and scenic values associated with the river above and below the Pepperell Dam. These include the Nashua River Rail Trail, which follows the river on the east side; J. Harry Rich State Forest, which also abuts the river on the east; the historic Covered Bridge downriver from the dam; and the Petapawag Conservation Area and boat launch in Groton. Each year, approximately 1,200 students and adult chaperones paddle the Nashua River in the dam project area as part of the Nashua River Watershed Association's River Classroom® activities. The river is the site of numerous yearly bass fishing tournaments, and is a popular destination for hunting waterfowl. Thousands of canoeists and kayakers take to the river to enjoy the quiet and scenery, and it is a destination for birders to witness osprey and bald eagles fishing the river.

Challenges upriver from the dam include the nearly one hundred acres of invasive water chestnut plants and four other invasive aquatic plants that have taken hold there. As part of the FERC licensing for the dam, PHC reached a Settlement Agreement with Stakeholders and is providing funding to address the invasive plants through the established Nashua River Regional Aquatic Invasives Alliance.

The Study Committee and the National Park Service (consistent with the NPS letter of 7-2015) deem the facility to be compatible with a Wild and Scenic River designation as currently licensed and operating. The NPS Report to Congress will further document this finding. As such, the Pepperell Project will effectively be "grandfathered" as concerns the Wild and Scenic River designation, and the NPS will recommend a technical "exclusion" area be incorporated into the designation legislation to further codify this. This will in no way hinder the post-designation Stewardship Council from working cooperatively with Pepperell Hydro Company to protect and enhance river values consistent with the intent of the Stewardship Plan, including maintaining and improving river access, controlling invasive plants in the area above the dam, preventing migration of invasive plants below the dam, and otherwise enhancing the already remarkable values associated with the river into the future for the benefit of public use.

Ice House Dam

The first dam at the current site of Ice House Dam dates back to the 1790s. The dam was used as a reference marker in laying out the towns, probably due to the rock outcrop in the riverbed, which served to anchor the dam.[4] In 1907, a powerhouse was built to power trolley cars, and ice production began in the 1920s. Power production for ice manufacturing was stopped mid-century when refrigerators became popular.[5]

3 ibid

4 Low Impact Hydropower Institute Certificate #44–Ice House Hydropower Project, Massachusetts, *http://lowimpacthydro.org/lihi-certificate-44-ice-house-hydropower-project-massachusetts-ferc-12769/.*

5 ibid

Ice House Partners, Inc. restored the hydropower facility in the early 2000s, and received a FERC license exemption in 2008 (FERC Project Number P-12769). The facility is operated as run-of-river and consists of a 190-foot long, 12-foot high dam topped with 24-inch stoplogs. The Nashua River reach that is bypassed by operating the project (measured from the dam to the tailrace outlet) is about 300 feet long. A million gallon per day flow to the Nashua River is maintained in the bypassed reach year-round. [6]

The Ice House project lies fully within the Oxbow National Wildlife Refuge. The river immediately up and down from the dam is riverine in nature, and affords paddlers and anglers every opportunity to enjoy the serene benefits of the Nashua River within the ONWR. Ice House Partners maintains a canoe put-in and take-out and fishing access on the opposite side of the river from the project works. Eel passage is maintained for elvers traveling upriver, but fish passage has not been required at the facility due to the existence of downstream fish blockages at other dam projects. The NRWA has hosted canoe and kayak-guided hand-pulls of small patches of invasive water chestnut plant upriver from the dam the past three years, which has nearly eliminated the plant from the reach.

The Study Committee and the National Park Service deem the facility to be compatible with a Wild and Scenic River designation as currently licensed and operating. The NPS Report to Congress will further document this finding. As such, the Ice House Project will effectively be "grandfathered" as concerns the Wild and Scenic River designation, and the NPS will recommend a technical "exclusion" area be incorporated into the designation legislation to further codify this. The exclusion area begins 700 feet upriver of the dam (latitude 42.55185; longitude -71.62135) and concludes 500 feet downriver of the dam (latitude 42.55325; longitude -71.61735). This will in no way hinder the post-designation Stewardship Council from working cooperatively with Ice House Partners to protect and enhance river values consistent with the intent of the Stewardship Plan, including maintaining and improving river access, controlling invasive plants in the area above the dam, and otherwise enhancing the already remarkable values associated with the river into the future for the benefit of public use. The dam is deeded to Ice House Partners, Inc. and includes historical water rights, which will not be extinguished, impaired or interfered with by this designation.

Hollingsworth and Vose Dam

The West Groton village, known as the Hollingsworth and Vose area mill village, was originally the site of a Federal Period starch mill. Paper manufacturing began at the site before the original mill burned in 1846, and continues today.[7] The village, consisting of the mill and approximately 20 houses, grew up around this industry.

H&V is now a specialty filter paper manufacturing company. The company maintains a small impoundment for process water. The dam was first constructed in the 1840s for the previous starch factory, but no original construction records are available. The dam's hydraulic height is 15 feet, and is 225 feet long, with the impounded volume of 350 acre-feet. Each year, 15-inch flashboards are installed in May and removed again in November. Water is withdrawn from the impounded area, and returned to the river downstream through a water treatment facility. H&V holds a National Pollutant Discharge Elimination System (NPDES) permit for this discharge.

Upriver of the dam, the H&V impoundment provides access to the Squannacook River for the NRWA's River Classroom® activities. Over 1,100 students and adult chaperones each year paddle north from the impoundment to learn about the

6 Federal Energy Regulatory Commission, 122 FERC 62,262, Order Granting Exemption From Licensing, *https://lowimpacthydro.org/assets/files/lihi-cert-app-files/APPENDIX-OrderGrantingExemption.*

7 Groton Historical Commission, *http://books.gpl.org/GPLDL3/HollingsworthVoseAreaFormA.pdf.*

natural environment of the Squannacook River and its environs.

The Study Committee and the National Park Service deem the facility to be compatible with a Wild and Scenic River designation. The NPS Report to Congress will further document this finding, and although this project is not licensed by FERC, it does have a federal permit in the form of its NPDES discharge permit. As such, the H&V dam, together with its NPDES permit, will effectively be "grandfathered" as concerns the Wild and Scenic River designation, and the NPS will recommend a similar technical "exclusion" area be incorporated into the designation to further codify this. The exclusion area for the H&V dam is proposed to be approximately 2,665 feet downriver from the dam (latitude 42.60791; longitude -71.63240) and approximately 1,200 feet upriver to the shore of the impounded area (latitude 42.61421; longitude -71.63899). This will in no way hinder the post-designation Stewardship Council from working cooperatively with H&V to protect and enhance river values consistent with the intent of the Stewardship Plan into the future for the benefit of the public.

Non-Working Dams

All the dams described below are run-of-river dams with no active current use.

Townsend Dam

Dams have been recorded on this site back to the 1730s. The adjacent building called the Cooperage was built in 1733 as a mill for sawing boards.[8] An historic gristmill is located at the site. The current dam, owned by Hollingsworth and Vose, was constructed in the 1870s and has no current active use. The dam's hydraulic height is 8.3 feet and its length is 93 feet.

The impoundment created by the dam is Harbor Pond, which is the end-point for the Squannacook River Canoe Race held each year by the Townsend Lions Club. Paddlers can maneuver up the Squannacook River above the dam, or put in below the dam and paddle down to Bertozzi Wildlife Management Area. The Squannacook River is a popular coldwater fishery. Groundbreaking for the Squannacook River Rail Trail will be held in late 2018, and will run alongside the river for three miles.

Squannacook River Dam

Straddling the Groton-Shirley line in West Groton, this dam powered the former Groton Leatherboard Company. Currently having no active use, the dam is maintained by the Town of Groton. The dam is approximately 150 feet long and 18 feet high. It includes a concrete spillway on the left side that leads to a concrete outlet works.[9] A low-level wooden outlet structure about 40 inches square is operated once each year, and is generally kept open a couple of inches. River Court Residences, a senior housing facility, abuts the dam on the eastern downriver side.

8 Townsend Historical Society Properties, *http://www.townsendhistoricalsociety.org/properties.html*.

9 Haley & Aldrich, "Squannacook River Dam Phase I Inspection/Evaluation," for the Town of Groton (October 17, 2017).

Adams Dam

The run-of-river Adams dam was built in the early 1800s, and was used by Adams Mill. A mill building was present on the site until the 1970s, when it was torn down. The dam is currently owned by the Town of Townsend.

Mason Road Dam

The Mason Road run-of-river dam was built in the early 1800s or earlier, and has no current active use. The stone dam is approximately 7.5 high. A 1915 Report to the Board of Water Commissioners of the City of Fitchburg, Massachusetts mentions this dam was no longer in active use at that time.[10]

Non-working Dams Recommendation

These non-working run-of-river dams need not be excluded from the proposed designation because they have little impact on the free-flowing character of the river and have important historical character that contributes to the proposed Wild and Scenic River designation. No federal permits or licenses exist related to these facilities. The Wild and Scenic River designation would not inhibit the maintenance and/or repair of these structures, nor would it inhibit dam removal in the event that a dam owner chose to pursue such removal. Any dam removal consideration must be consistent with state dam removal guidance and local interests.

10 Fitchburg, Massachusetts, "Report to the Board of Water Commissioners of the City of Fitchburg upon Water Power Privileges affected by the diversion of the waters of Ashby Reservoir" (August 12, 1915).