

Willamette Falls Heritage Foundation

“Preserving and sharing stories of human enterprise and the power of the great Falls of the Willamette

Spring Newsletter — 2022

The Falls Dam: Hiding in Plain Sight



It’s over 3000-feet long, sits in plain sight, and is viewed by hundreds of people every day – yet, it is one of Oregon’s most obscure structures. While most residents know of Willamette Falls, many are unaware there has been a dam beneath those rushing waters for 130 years.

More Dam History

Plunging nearly 50-feet over basalt cliffs, Willamette Falls provided a natural source of power for the early lumber, woolen and flour mills. While many dams were built for flood control or improving river transport, this nearly unseen dam is primarily for power generation. Hydroelectric power was first produced here by Willamette Falls Electric Co.’s Station A on June 3, 1889. The Oregon City plant became the nation’s first to transmit long-distance electrical power, a mere 14 miles to Portland.

In 1873, Willamette Falls Locks were built. This structure later became part of the dam and is its oldest segment. Other segments were added over the years, including Hawley Paper’s Mill A addition, West Linn’s Station B, and Willamette Pulp and Paper’s buildings on Moore’s Island.

A new dam was built in 1892 to raise pool level by one foot during low summer flows. That same year local investors, with funding from General Electric, formed Portland General Electric Co., which purchased Willamette Falls Electric. PGE has operated the dam since then.

Despite its cutting-edge technology, it wasn’t long before Station A became obsolete and unable to meet Portland’s growing demand for electricity. Faced with destructive seasonal flooding at its rather precarious perch on Abernethy Island, a new facility was sorely needed.

PGE hydraulic engineer Thomas W. Sullivan designed and supervised the construction of a larger, more advanced plant on the West Linn side of the river.

Originally named Station B, the plant took two years to build and produced its first power in December 1895. Station A was abandoned two years later and its turbines converted to power pulping operations as Hawley Paper Co.’s Mill A, which lasted until the Christmas flood of 1964.

In 1907, the original timber crib dam was replaced with concrete. Although the falls are about 1,500 feet across at the widest point, the new dam wound around the entire horseshoe-shaped basin for about 2,950 feet. It varied in height between six and twenty feet.

A flood in 1942 washed out some wooden portions on the Oregon City side. These were replaced in 1943 with a 600-foot-long concrete section that included spillways.

(continued on page 2)



Tim Shibahara, PGE Natural Resources Manager, stands next to the dam’s fishway structures 2 and 3. The lower end of the original ladder is in the center, just on front of Tim. The newer flow control spillways are on the left.

(continued from page 1)

After many years of service, Station B had become outdated and was in serious need of repair. The plant was shut down in 1952 for a complete rebuilding and modernization. It reopened in the summer of 1953 and was renamed the T.W. Sullivan plant. The powerhouse is now automated and controlled at PGE's Faraday Complex above Estacada. The Newberg Pool has a storage capacity of 17,000 acre-feet of water that extends about six miles upstream, covering some 2,304 acres.

Present Day Operations

Amazingly, this historic dam and power plant continues to operate while setting the standard for generating clean, renewable power. Its 13 generating units not only produce 16,000 kilowatts – enough to power 11,000 homes – but is the third-oldest hydroelectric plant in the country and is also one of the most 'fish-friendly'. Nearly 99% of the migrating fish safely pass through the plant – the highest rate in the US. In 2008 it was certified, and renewed in 2012, as a low impact hydro project; a designation that only 5% of the US plants have achieved.

Over the years, PGE has made many improvements to enhance the passage of salmon, steelhead, and lamprey over the falls and past the powerhouse. Prior building the Willamette Fall's newer fish ladders, migration above the falls was only possible during high water periods; now fish have access to the upper Willamette year round access.

As water enters the power plant from the forebay, a tapered training wall maintains a uniform flow and hurries ocean-bound smolt past the ten-foot diameter penstocks. Louvered racks set at an angle also help to direct them past the turbines. As fish arrive at the end of the fore bay, they enter a high flow bypass chute that returns them to the tailrace below the plant. Any fish entering the last penstock are diverted around Turbine 13 by an Eicher screen and through a 'fish evaluator' where their physical condition can be determined before continuing on.

In 2007, flow control structures were installed at the center of the falls to safely divert ocean-bound juvenile fish into the deepest, least rocky portions. These automatically controlled spillway 'gates' are actually inflatable rubber bladders made by B.F. Goodrich Co. The center weir is usually open to provide a constant flow for fish passage. The other two are raised or lowered based on parameters that maintain river flow, pool level, and generating needs.

As PGE's Westside Hydro Natural Resources Manager **Tim Shibahara** points out, "These improvements have actually improved the survivability rate of fish during low water periods by 'softening' the plunge, compared to the fall's natural drop."

Returning fish can continue up river by way of Oregon Department of Fish and Wildlife's fishways. The original fish ladder was blasted out of the basalt cliff in 1882 by the State of Oregon. Three other legs were added later and rebuilt in 1966 and 1971. ODFW owns and operates these fishways and a fish counting station located on the dam. In 2020, they counted over 35,000 Spring Chinook, 3,000 Fall Chinook, 15,000 Coho, and 5,500 winter and summer Steelhead returned to the upper river through these passageways.



(above) This is how the apex of the falls used to look in late summer — completely dry! The fabric behind the flash boards effectively sealed off the flow, reducing it to a mere trickle. The only water passing the falls was through the power plant or down the fish ladders.

(below) After the installation of the new flow control spillways, the apex is now filled with a robust cascade that safely directs fish to the deepest water. In this scene, only the middle spillway is open and the other two on each side are raised. Fabric is no longer placed behind the flashboards which allows seepage around the entire horseshoe.



As seasonal low water approaches, the pool level is dropped to allow the installation of 'flash boards' to compensate for reduced flows and to maintain generating capacity. Flows are managed during the summer and fall to direct water through T.W. Sullivan and the fish ladder. Any extra water that is not leaking through the flashboards, is directed through the Flow Control Structure at the apex of the falls. The pool elevation is maintained from going over the flashboards due to a FERC license commitment to facilitate Pacific Lamprey passage that often will try to climb the falls.

To avoid confusing migrating lamprey, some these sections are equipped with 'lamprey ramps', which allow extra flow to encourage their passage. About 1,000 lamprey use these structures annually. Most of these anadromous, eel-like fish continue to use the original fish ladder.

Willamette Falls Locks Update

By Sandy Carter

Metro Councilor **Christine Lewis**, Former Mayor **Russ Axelrod**, and PGE's **Mini Sharma-Ogle** volunteered to be the new Willamette Falls Locks Authority's 'interim' leadership team at the March 30 initial virtual meeting of the Authority. They'll work with dedicated staff, guiding agendas, and advising on administrative groundwork as the Authority builds bylaws, operating policies and procedures this spring. The Authority currently benefits from facilitation by the National Policy Consensus Center, Oregon Solutions, at Portland State University, which also facilitates the WF Locks Commission.

A subgroup of the Authority's eleven, Governor-appointed members will immediately begin confirmation of 2020 commitments of monetary support for the start-up Public Corporation, created by the Oregon Legislature's 2021 session. The establishing legislation directs that an Executive Director who is not a member of the Authority will be hired to pursue the aims of the group, which encompass all aspects of designing a new future for the navigation canal in the years after the Corps of Engineers transfers the property to the Authority.

Meanwhile, plans to repair and seismically upgrade the section of the canal south of Willamette Falls Paper Company's loading docks on the canal basin are moving ahead. The Corps' District Office is working simultaneously to restart the Section 106 process that recommended transfer, to complete title research on the property and its easements, and to ready Access Easements and a bid process for this summer. Contractor selection should be complete in October, with actual repairs slated for summer, 2023—the year the Locks turns 150 years old.



Sandy Carter

WFHF Board member and Co-Vice Chair of the Willamette Falls Locks State Commission.

Late Breaking News! I was just briefed on the news out of the Locks Section 106 Zoom 'revisit' by the Corps. I'm excited to report that the COE facilitator of the meeting says that although the District's Disposition Study on the Locks doesn't expire until September 2026, the Corps is aiming to complete the transfer of the property to the Authority in 2024! At last we have an actual date!



Troy Bowers,
President WFHF

Our Mission Continues!

For the past twenty-plus years, the Willamette Falls Heritage Foundation has worked persistently to identify unique and historically significant treasures to document, preserve, and protect.

The Locks Authority held their first meeting on March 30th marking a milestone for transferring the ownership of the locks and progressing toward their refurbishment and reopening.

Historic City Hall continues to navigate final hurdles toward approvals for the refurbishment and reopening as a cultural center at the west end of the century old Arch Bridge and magnificent Willamette Falls.

The tireless efforts of WFHF board members and their leadership has been vital to identifying and pursuing these pending successes.

Thank you for your support as we endeavor to save the future of our past!

Troy Bowers
President

Free to a Good Home: One Vintage Tugboat!



(photo courtesy of Tom McCauley)

The **Bernert** family and **Wilsonville Concrete Products** has offered to donate their tugboat **LADY B** to the WFHF! This 1947-built steel-hulled boat was used on the upper Willamette River for many years to tow log rafts to the paper mill, along with rock barges, dredges, and other work barges. At just under 40-feet in length, it is one of the only remaining smaller work boats that were once very common when the river was busy with commerce.

The WFHF has formed a committee develop a plan to save and preserve this historic tug. Our most immediate goal is to secure an appropriate home to not only display but to allow public viewing of this wonderful icon of an earlier era.



The Willamette Falls Heritage Foundation depends on the support of people like you to drive our mission!

Help WFHF Keep History Alive:
Donate Now!

*The Willamette Falls Heritage Foundation is a 501(c) (3) charitable organization. Please send your **tax deductible** contributions to the address below!*



WFHF Board members visited the LADY B in February along with representatives from Wilsonville Concrete.

P.O. Box 635
West Linn, OR 97068
email: willamettefalls@msn.com
phone: 503-650-9570
Newsletter editor: Dan Butler
dtb17@me.com

(All photos by the editor unless otherwise noted)

You may request to receive our Newsletter's expanded digital version via email or check out our webpage at: www.willamettefalls.org