Oregon Heritage Fish Hatcheries
Historic Resources Study

2017 Oregon Heritage Fellowship Report

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SUMMARY

I am conducting an Oregon statewide historical resources survey, inventory, and evaluation of historical fish hatchery facilities. The proposed Statewide Heritage Fish Hatcheries Historic Resources Study and Reconnaissance Survey will identify and prioritize historical resources associated with fish hatchery complexes. The ultimate goal is a baseline document to aid future researchers and managing agencies in assessing historical resources of fish hatchery sites for their National Register of Historic Places (NRHP) eligibility. The NHPA seeks to preserve the historical and cultural foundations of the nation as a living part of community life and development. A key step in the preservation process is determining the eligibility of properties for the NRHP under Criteria A, B, C, and D. In general terms, this project addresses whether a hatchery building, object, or structure is “significant” and worth preserving through the lens of the research theme context—early Oregon salmon and trout conservation efforts. To this end, the research methodology pulls from National Park Service guidelines for conducting a historic resource study (HRS). The project will address an important gap in Oregon history studies regarding fish hatcheries by (1) establishing a statewide historical context for fish hatchery activity beginning with initial hatchery construction (1876) through 1947; (2) conducting a selective reconnaissance-level survey of all operational and extant State-operated facilities (15 sites); and finally, (3) providing a foundation document prioritizing future preservation actions regarding fish hatchery sites utilizing the analysis and evaluation of survey results.
PURPOSE AND NEED

The significance of the project lies in the fact that fish hatcheries have been, and in many ways still are, an important component of Oregon’s history regarding its residents’ relationship with natural resources. Research for this thesis started with basic questions: What are fish hatcheries? How were they built and used? What is their historical significance? Unfortunately, it is a history that does not get told nearly as often as more common resource extraction and agriculture counterparts such as traditional farmsteads, mining, or timber.

Significance

Hatcheries may have potential significance are important at local and state levels as outlined by the NRHP. Hatcheries were generally located in rural areas, often in proximity to small towns through which supplies and labor were acquired. At the same time, hatcheries attracted much local interest in addition to serving as early tourist attractions. On a larger scale, hatcheries are also components of a statewide conservation effort, signifying a regional effort to offset losses tied to the depletion of natural resources. Oregon’s fish hatcheries stand as physical reminders of early conservation activity and their relationship to industrial food production while their preservation provides a more complete picture of Oregon’s relationship with natural resources.

In view of their significance in relation to Oregon’s commerce, conservation, recreation, agriculture, as well as potentially architecture, in addition to the fact that many are already, or are nearing, 50 years of age, the need to evaluate these fish hatcheries as historic resources has reached certain imperativeness. Furthermore, the ownership and management structure of
many hatcheries currently faces drastic overhaul and changes due to budget constraints at both the state and federal levels. State operated hatchery facilities are currently being slated for transition to private operation or total decommission as a result of fiscal changes.

**Research Goals**

The goal of this project is to provide both the Oregon State Historic Preservation Office and Oregon Department of Fish and Wildlife (ODFW) with an accurate and comprehensive list of extant historical fish hatcheries in Oregon, including descriptions of each hatchery’s site composition and a preliminary assessment of National Register eligibility. To meet this goal, this reconnaissance-level survey will follow Oregon SHPO guidelines and recordation formatting.

In addition to surveying and inventorying fish hatchery resources, this study will analyze the social, economic, cultural, and environmental conditions under which these fish hatcheries were organized and commissioned. In other words, the do these historical hatchery sites continue to reflect—through integrity—the historical contexts in which they were constructed? Ultimately, this survey will not only serve as a baseline for future, more intensive surveys, but will also provide a foundation for a National Register Multiple Property Submission covering eligible fish hatcheries throughout the state.

**METHODS**

In order to meet the goals described above, this study will roughly follow the prescriptions of a National Park Service Historic Resource Study (HRS); a synthesis of documentary research and field investigation intending to determine and evaluate integrity, authenticity, associative values, and significance of resources for resource management and
Archival research informs the framework of the field survey and historical-comparative phases of this project. The historical context and reconnaissance-level survey will be completed in accordance with relevant federal and state guidelines for registering historic properties and developing historic contexts, including:

- National Park Service: National Register Bulletin No. 15 How to Apply the National Register Criteria for Evaluation
- National Register Bulletin No. 16A How to Complete the National Register Registration Form
- National Register Bulletin No. 16B How to Complete the National Register Multiple Property Documentation Form
- National Register Bulletin No. 24 Guidelines for Local Surveys: A Basis for Preservation Planning
- National Register Bulletin No. 30 Guidelines for Evaluating and Documenting Rural Historic Landscapes
- *Guidelines for Historic Resource Surveys in Oregon*

**Historical and Archival Research (Qualitative)**

Establishing the broad historic context of the state’s fish hatchery system will begin with literature review and archival history of the development of aquaculture and specific trends in the Pacific Northwest. Background research into methods and facility designs will better illuminate early hatchery initiatives.

In addition to understanding the development of fish hatcheries in the region, early Oregon hatchery history will rely on primary source documents discovered through archival research. Archival research will include investigations into government documents, studies, and reports. Additional archival sources include Oregon newspapers, historical maps and photographs, city directories, and potentially Census records. The Oregon Historical Society has a

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small collection of documents and photographs related to fish hatcheries.

Another important aspect of background research is the siting, design, construction, and modifications of early facilities. In this regard, manuals, government protocols, and general aquaculture literature will be useful in understanding the considerations and design elements essential to Oregon hatcheries intended for trout and salmon production.

Resulting research will guide field observations and recording. Specifically, those elements and considerations identified as critical to hatchery design will provide the framework by which to record and evaluate current hatchery facilities. This framework will assist in identifying individual elements in the fish hatchery complex worthy of preservation.

**Reconnaissance-Level Field Surveys**

The goal of the survey is to determine the range of hatchery conditions, establish the extent of alterations to historical features, and to gauge the overall number of individually significant and contributing historical resources. In order to understand the condition of the state’s hatcheries condition and integrity factors, the reconnaissance-level historic resource survey will document all public hatcheries constructed before 1947 and either still in operation or publically owned as of February 2017. As already indicated, the survey will follow guidelines of the Oregon SHPO. In addition to the recommended SHPO survey form, previous surveys of farmsteads will supplement the SHPO form and allow for more rigorous data analysis.² These historic farmstead surveys better address large, rural sites composed of a mix of building types.

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Analysis of hatchery resources will begin by coding landscapes in a database similar to the farmstead surveys. Given the number of hatcheries and the size of the properties, efficiency in inventorying features is paramount. A pilot study will help determine the feasibility of reconnaissance-surveys and any shortcomings with survey form design.

**Data Analysis: Historic Resource Study**

The reconnaissance-level survey and historical context provide the necessary data to substantiate a meaningful evaluation of public hatcheries historical resources including determining and describing preliminary integrity, authenticity, associative values, and significance. The resulting determinations are not intended to serve as the final consideration for hatchery historical resources, but as a baseline evaluation, prioritization and conclusion.

**FINDINGS**

Although the broad history of fisheries management in Oregon is relatively well researched and published, the architectural physiognomies is practically unknown. Fish Hatcheries play a vital and pivotal role in attempts by state and federal agencies to supplement fisheries. The development of the hatchery industry was accompanied by a number of advancements in technology and changes in the hatchery sites. In order to evaluate the historical value, it is necessary to identify the significance of hatcheries within the historical context linked with technological development and changing approaches to resource management.
Aquaculture Development

The earliest documented husbandry of aquatic organisms traces back to ancient carp farming in to the fifth century B.C. in China and potentially as early as 4,000 B.C. Egypt. Earthen ponds were used to contain carp primarily for symbolic purposes. The practices were carried and refined throughout Europe and the Mediterranean, expanding to new fish and shellfish species. France became a particular epicenter of fish culture during the 19th century. Victor Coste, a physician by training, rose to prominence in 1853 through his research and publication of Instructions praticques sur la pisciculture. The following year, much of Coste’s work was translated and published in A Complete Treatise of Artificial Fish Breeding – a compendium of all the major writings of French fish culture. The advancements included within quickly made the passage across the Atlantic and spread through the United States. Much of the early fish culture on either side of the Atlantic during the early-19th Century concerned fish culture for the sake of scientific study and closely tied to public displays of fish in aquariums and gardens.

Scientific inquiry into aquaculture in the U.S. began in the early 19th century and by 1853, Theodatus Garlick was fertilizing eggs of brook trout. Garlick published a preliminary manual on propagation in 1857, thus setting off the development a fish culture in the U.S. After the Civil War, the use of fish culture to supplement and even replace stocks of declining or extinct New England fisheries seemed a potential reality.

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Oregon’s Pioneer Fish Culturists

Two figures most represent the beginning of fish culture in Oregon – Robert Hume and Livingston Stone. Both started the first fish hatcheries around 1877. Robert Hume represents private interests in the development of fish propagation while Livingston Stone represented government interest in the field as representative of the U.S. Fish Commission.

Stone’s role in Oregon began through the influence of Columbia River salmon packers. Salmon canneries along the Columbia relied on significant catches of annual salmon returns. Canned salmon helped feed westward expansion and by the 1860’s were already witnessing declines in the annual salmon runs. In 1866, Stone commenced a survey of the Columbia to locate an appropriate site for the future hatchery. With little knowledge of the distinct species of salmon and little regard for settlements upstream, he decided on a site along the Clackamas River near its confluence with the Columbia River. The hatchery began operations in 1877 and after ten years it wasn’t until ten years later that the State of Oregon took an active role in the development of salmon hatcheries through the establishment of its own hatcheries through the authorization of the Board of Fish Commissioners in 1887.

Robert Hume, often referred to as the “Salmon King” of Oregon, constructed a salmon complex near the mouth of the Rouge River. His vertically integrated system included early attempts at hatchery development in addition to harvesting and canning operations. Hume experimented with egg collection at various sites along the Rouge River in addition to various hatchery methods and rearing locations. Eventually Hume partnered with the State and the sites of his early exploits served as State-run hatcheries in later years.
1877 Through 1919
In 1911, the State’s interest in natural resource management expanded by forming a combined State Board of Game and Fish Commissioners. In addition to game birds and animals, this new board also introduced the idea of trout hatcheries which, up until this point, had been pushed aside in favor of efforts solely focused on salmon.

1920 Through 1939
The combined Boards lasted a decade and in 1921, the single body was split into separate commissions for Fish and Game. The Game Commission was allocated five hatcheries for their trout propagation including nearby McKenzie. Oakridge as added to the Game Commissions hatchery efforts the following year. In 1939, the Game Commission recorded operating their own Willamette Hatchery—the name changing at some point during the segregated operations at Willamette up until the merger in 1983.5

Dam building in the Columbia Basin entered a new era during the 1930s, during which time hatcheries gained new significance.6 The mitigation for losses to native fisheries caused by hydropower, flood control, and irrigation benefits of dams became realized through increased hatchery supplementation. Damn builders could employ hatcheries to offset any suggestion of harm to native fish runs. When, in 1937 Congress enacted the Bonneville Project Act, the Commissioner of Fisheries suggested the use of “adaptive management” approach, federal influence renewed the call for investment to fish-culture. Congress responded, enacting the

5 “Willamette Hatchery,” ODFW Visitor’s Guide, Oregon Department of Fish and Wildlife (Feb, 2015) and Frank Wire, “A Brief History of the Oregon State Game Commission, Oregon Department of Fish and Wildlife (1938), accessed at www.dfw.state.or.us
Mitchell Act in 1938. The Mitchell Act authorized funding for salmon recuperation through hatcheries fish ladders, irrigation screens, habitat restoration, and scientific studies. However, with a limit of $500,000, action was limited to watershed surveys.\(^7\)

*Contemporary Hatchery System*

The conclusion of World War II entered the U.S. into period of postwar economic growth and prosperity. Congress followed up the construction of Bonneville and Grand Coulee dams with the Rivers and Harbors Act of 1945 authorizing new dams in the Columbia River Basin, particularly around the Lower Snake River. The next year, in 1946, Congress amended the Mitchell Act of 1938. This action removed the $500,000 authorization cap and setting off bold plans for hatchery construction in order to mitigate losses from the newly authorized dam projects.\(^8\)

\(^7\) Blumm, 112.

\(^8\) Blumm, 113-115.
Hatchery Components

Hatcheries consist of a number of built components. Similar to a traditional farmstead, ‘growing fish’ requires a variety of building types which support the hatchery process as well as constant input of resources which mean access to transportation. Individual structures are difficult to separate from the larger complex as their relationships are so intertwined.

Siting

According to the American Fisheries Society, “fish culture consists of a group of methods intended to fulfill the life cycle requirements of the fish in order to produce the species, number and size desired.” Of the requirements, water is of upmost importance.\(^9\) Early hatcheries generally relied on streams for water while later designs, recognizing the susceptibility of streams to disease, located near natural springs.

Hatchery Building

One of the most important advancements in fish culture was the development of efficient and affective egg fertilization. Early hatchery efforts struggled with fertilizing and hatching fish eggs. Often, hatchery personnel would devise means to collect naturally fertilized eggs from river bottoms.\(^10\) The earliest form of an egg hatching equipment which remains relatively unimproved was the egg tray, invented by Marcellus Holton in Rochester, New York. These egg trays required a constant flow of fresh water. Early hatcheries were also challenged with preventing bacteria and fungus growth which was exasperated within the wooden troughs which were difficult to keep clean.


The hatched fish were then moved into slightly larger troughs within the main hatchery building. To accommodate the work of incubating and rearing small fingerlings, hatchery building design needed to provide large, open work and storage spaces. The Hatchery Building will generally display early hatchery design considerations such as large floor area, numerous and open fenestration, large double doors, and location within close proximity to water sources as well as draining areas.

**Rearing ponds**

Raceways and rearing ponds serve to take the place of small streams where, in their natural lifecycle, juvenile fish would have matured to the point where they could migrate downstream to the ocean. As such, raceways provide constant freshwater. Early raceways were earthen channels or simply streams fitted with containment equipment such as screening and weirs. Early earthen raceways relied on gravity flow of water.

Earthen raceways gave way to more standardized, usually poured concrete units. Raceways are generally composed of multiple sections to house fish of particular maturation stages. Individual sections are arranged in either a series or line referred to as a tier. The arrangement of raceways is usually followed by a settling pond used for pollution and detrital material abatement. Water enters raceways over a drop in order to help oxygenate the water.

**Outbuildings**

Hatchery operations require the use of large equipment to move significant numbers of juvenile fish between the hatchery buildings and the rearing ponds and from the ponds to the release sites. To house trucks and tractors, a common feature on hatcheries in a vehicle garage.
Residences

Hatchery operation requires around-the-clock supervision to ensure a quick response should a blockage to the water supply occur. Furthermore, the fish require daily feeding, frequent check-ups and testing, as well as general maintenance of machinery and the facility in general. To accommodate this need for on-site staff, hatchery design generally includes residential units.

Comparative Analysis – Willamette Fish Hatchery

The three eras of fish hatchery development in Oregon help to provide a framework by which to organize and compare hatchery resources. For example, the Willamette Fish Hatchery near Oakridge, Oregon provides a single site demonstrating all three periods of development. Displaying high resources from three periods of fish hatchery history makes the Oakridge Salmon Hatchery District unique amongst other public hatcheries. Furthermore, the 1951 portion of the hatchery provides an excellent study of changing design practices as the hatchery system entered its contemporary period of development. A survey of other public hatcheries, both state and federal, from 1908 through 1952 revealed significant alterations to nearly every hatchery complex. System-wide improvements include replacement windows and exterior cladding to nearly all complex buildings. Furthermore, these other hatcheries represent a single period of statewide hatchery development.
Hatchery related activity in the vicinity of Oakridge dates back to 1911, when the state established a dual purpose egg collection and “eyeing station” near Lowell.\textsuperscript{11} Although much of the Oregon Department of Fish and Wildlife (ODFW) publications date the construction of the Oakridge/Willamette facility to 1911, research indicates that the majority of 1911 hatchery operations currently lie beneath the Lookout Point Reservoir near the now flooded remains of Reserve and Landax, Oregon.\textsuperscript{12} The exception was the construction and use of open, earthen rearing ponds adjacent to the current hatchery site.

In 1920, the Fish and Game Commission was moving forward with plans for the now adjacent trout hatchery.\textsuperscript{13} Little mention is made of the extant rearing ponds throughout planning correspondence. Often referred to as the original hatchery building, the Old Hatchery Building was most likely constructed in 1934—the first building on the salmon hatchery site.\textsuperscript{14} Between 1934 and 1983, the two adjacent hatcheries—Willamette Trout Hatchery and Oakridge Salmon Hatchery—continued to operate independently. Today, operations have merged.

In 1951, the most significant impact to the site occurred through the considerable construction of one new hatchery/incubation building, four residences, and 3-bay garage, and improved water intake across Salmon Creek. This massive undertaking was the result of funds authorized by U.S. Congress in order to offset losses to native fisheries cause by regional dam construction. The purpose of these dams was to generate hydroelectric power and control

\textsuperscript{12} Hatchery correspondence between 1912-1915 reference deliveries to Reserve, Oregon and Landax, Oregon in the signature lines. The 1913 Biennial Report of the Department of Fisheries also makes reference to a location near Lowell. See also Morning Register (Eugene, OR), 31 Oct, 1915 reference to Reserve.
\textsuperscript{13} Eugene Morning Register, “Clanton Tell of Plans for New Fish Hatchery,” Jan 30, 1920. Retrieved at newspapers.com
\textsuperscript{14} Eugene Register Guard, “New Buildings for Hatchery Finished”, Aug 8, 1934. Retrieved at newspapers.com
seasonal flooding events downstream—the rapidly growing Willamette Valley. In order to offset the permanent blockage of returning salmon traveling upstream to spawn in addition to the loss of spawning habitat, the Corps chose to mitigate through hatchery compensation. The prevalent thinking at the time was that increased release of hatchery fish would compensate for the loss of naturally spawning salmon.

The Oakridge Salmon Hatchery is located along Salmon Creek, just under one mile east of Oakridge, Oregon. Salmon Creek is a tributary of the Willamette River which joins the Middle Fork of the Willamette approximately three miles downstream. The Oakridge Salmon Hatchery is one component of the current-day Willamette Fish Hatchery. The other component: a once a separately operated State Game Commission trout hatchery. The U.S. Army Corps of Engineers improved and expanded upon older Willamette Trout Hatchery infrastructure in 1952 in order to mitigate for the subsequent damage of the Corps’ Hills Creek, Lookout Point, and Dexter dam projects.

On the north side of the 1952 hatchery core, an abrupt, downward slope connects the manmade elevation to the original. Here, about 10 feet below the grade of the core hatchery, are the resources from the 1911-1922 hatchery operations including the Original Hatchery Building, earthen rearing ponds and raceways.

The contributing buildings and structure serve functional purposes needed at mid-20th century hatcheries. The location of the hatchery in close proximity to the river provides the necessary, constant flow of water. Furthermore, its location above developed, industrial areas helps ensure clean water. Early in the site’s development, water from the Salmon Creek was diverted from upstream near the dramatic bow in the river. Diverted water was directed down
earthen, partially stone-lined canals towards the rearing ponds at the hatchery’s core. These earthen canals remain, however they have been damaged due to floods, erosion, and forest growth. The 1952 renovation replaced the open canal with an enclosed, buried pipeline.

The water intake structure was also improved in the 1952 construction. What was most likely a combination of stone and wood weirs and dams gave way to a substantial overhead dam with concrete intake and piping. Water could also be directed into the primary hatchery building where, inside shallow trays, fertilized eggs could incubate and eventually hatch.

The 1952 hatchery building improves upon the older hatchery building design by providing additional storage area in the half-story second-floor. The hatchery also provides ample light through numerous, large windows. The poured concrete foundation includes floor troughs and abundant drains. Lastly, the building is located in close proximity to the rearing ponds and abatement pond.

Oakridge contains 40 rearing ponds of the Burrow’s design. Instead of older earthen ponds or even more recently popularized rectangular concrete ponds, Oakridge uniquely seized upon the new hybrid design which intended to combine the design of rectangular ponds with the self-cleaning capabilities of round ponds. Round ponds allowed a constant current of water around the tank which prevented the build-up of debris and fecal matter. The new hatchery continues to also use one of the earthen rearing ponds to hold large, adult fish. The downstream portion of the old rearing ponds has been converted to an abatement pond which allows contaminants to settle out of the water before returning to Salmon Creek.

The 1952 residences are located adjacent to the hatchery building and rearing ponds. All four residences are copies of the same construction pattern and are aligned in a perfect line
along the north-south axis. A log-construction manager’s house, built c 1922 was lost, most likely as part of the 1952 construction. Two residences near the hatchery entrance make up the bulk of the non-contributing resources in the district. One is a double-wide mobile home and the other a ranch-style construction from the 1970’s.

Buildings display good integrity as an example of a hatchery complex. Individually, the “Old Hatchery Building” and the 1952 Incubation Building demonstrate the best cases of historic integrity. Other contributing buildings include a garage and four residences. Concrete raceways, older earthen holding ponds, and the water intake constitute the structures. Lastly, the grounds north of the core hatchery, abutting Salmon Creek, and the area which connects the core hatchery to the intake to the east contain evidence of early earthen ponds and raceways and comprise the two contributing sites. Due in part to the fact that the fish hatchery remains in operation under ownership and administration by the State, all of the contributing resources remain in fair to good condition.

CONCLUSION

Oregon’s oldest publically owned hatcheries show varying potential for individual NRHP listing. Widespread changes to historic materials have occurred during periods of expansion and through modern improvements. The best potential for listing is recognizing the system of hatcheries as one statewide organization. As such, a Multiple Property Document Form would best serve to both compare and recognize those resources with greatest significance. Furthermore, the hatchery building at each site presents the best example of fish culture architecture as it serves as the core component of the fish rearing process. Furthermore, hatchery buildings display the greatest historical integrity across this inventory. Lastly, hatcheries
widely meet Criteria A,C, and D. At this point, research has uncovered limited examples include association with significant persons.

Oregon’s public hatcheries worked in a network system, where one hatchery provided substantial releases of juvenile salmon as well as salmon eggs for other state and federal hatcheries. Many sites also display changes including expansion in number and volume of ponds, relating to the increase in available funding, both state and federal, epitomizing the prevalent use of fish hatcheries to mitigate native fish losses.

**Next Steps**

To date, this project has involved driving over 2100 miles to visit all 15 hatcheries constructed before 1950. The reconnaissance survey is complete and its results are steering further archival research both at the state archives in Salem as well as archives at the U.S. Fish Commission in Portland and at the Nation Archives in Seattle. Without a doubt, this research would not have been possible without the assistance of the Oregon Heritage Fellowship.

Further data analysis should uncover trends and relationships throughout the state’s history of hatchery construction. The additional archival research will provide a rich narrative regarding the build-out of hatcheries. Hatcheries also played a socio-economic role in Oregon’s history. As such, special attention is given to suppliers, builders, and workers of these early hatcheries in hopes of identifying primary people or companies associated with this history.

The final thesis is due at the end of August 2017. Additionally, a Multiple Property Document Form and survey entries will all be sent to the State Historic Preservation Office.
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