How a Fish Hatchery Works: The Little White Salmon National Fish Hatchery

Introduction (video of hatchery operations)

https://youtu.be/2rP_1g6NJU0

- Since the inception of the U.S. Fish and Wildlife Service in 1871, fisheries conservation has been an important part of the agency's mission. In the Pacific Northwest, salmon fisheries are a critical part of the region's history, culture, and economy.
- Fish hatcheries are facilities where Tribes, local, state, and the federal governments breed, grow, study, and protect fish. Hatcheries contribute to sustainable fisheries, improve fish health, and provide sustenance to the people and animals that depend on them. Fish hatcheries also support local communities by providing recreational fishing opportunities.
- This story map describes how a fish hatchery works. Join us as we explore the Little White Salmon National Fish Hatchery in Cook, Washington, a little more than 50 miles east of Portland, Oregon. We have also provided a transcript of this story map on our website.

Fish Hatcheries in the Pacific Northwest (a map that shows hatcheries in the Columbia River Basin)

- There are dozens of hatcheries in the Pacific Northwest, including those run by state, local, and Tribal entities. Each of these hatcheries makes a contribution to maintaining sustainable populations of salmon and other fish.
- This map layer, published by the Bonneville Power Administration, shows the locations of many of the fish hatcheries in the Columbia River Basin.
- The hatcheries are strategically located in areas where fish can grow, swim out to the ocean, and then return home to spawn. The fish hatcheries pictured on this map are located along the Columbia River in Oregon and Washington.
- There are several fish hatcheries within the Columbia River Gorge (about 50 miles east of Portland, OR). These facilities help sustain fish populations affected by the hydropower system (Columbia River Systems Operations).
- Little White Salmon Hatchery, a U.S. Fish and Wildlife Service facility, was a pioneer in the fledgling science of salmon propagation when it began rearing salmon in 1896.
- In 2015, the hatchery collected more than 16.5 million fall chinook eggs, including 7.5 million eggs for state and tribal facilities. More than 9.4 million young salmon are released into the river or transferred to other sites for release each year.

Coming Home (Shows footage of Little White Salmon River)

https://youtu.be/UR7vDf7NxOw

- The river in this video is the Little White Salmon River, which flows past the Little White Salmon National Fish Hatchery. You can hear the faint sounds of birds and a slow-moving river.

- After spending a few years in the ocean, adult salmon return to the stream or hatchery where they were born to spawn. Salmon overcome many obstacles, including dams, waterfalls, predators, and increasing river temperatures.
- Adult salmon change considerably when they get close to their spawning site. They stop eating, change color, and male salmon develop a hooked jaw (kype).

Spawning marks the end of the salmon lifecycle. Some salmon are kept at the hatchery for reproduction; others are given to Tribes for ceremonial and subsistence purposes. Extra salmon are given to local food banks. In the case of salmon that are not appropriate for human consumption, some hatcheries also donate fish to the Oregon Zoo for supporting condors and polar bears.

Salmon Fish Ladder (video of fish ladder at hatchery)

https://youtu.be/y8p8cAxJxV0

- This video shows the fish ladder at the Little White Salmon National Fish Hatchery. You can hear the rushing water as it flows over the ladder steps.
- A fish ladder is a series of graded steps that salmon climb, much like a person would climb a ladder. The salmon jump over each step until they reach the top of the ladder. Fish ladders are critical tools for salmon--they help them get up and over dams, through obstacles, into hatcheries, and onto the spawning grounds.
- Once the salmon climb the fish ladder, they are held in large indoor ponds before processing.

The End of a Salmon's Lifecycle (video of salmon processing)

https://youtu.be/tsociau5X9o

- This video shows Dave Frost, an employee with the Fish and Wildlife Service, cutting through the main arteries of the fish to ensure a quick death. Dave will send female salmon in one direction, and male salmon in another direction.
- The Fish and Wildlife Service works closely with Tribal partners to sort, process, and propagate salmon. If a salmon's belly is soft, it means that the salmon is "ripe" and ready to spawn. The salmon are anesthetized, and quickly and humanely killed. Salmon that are not ready to spawn are returned to a separate holding tank.
- All Pacific salmon die shortly after spawning. Hatcheries are important in ensuring continuation of the salmon's lifecycle.

Eggs and Milt: Creating Life (video of taking roe and milt from salmon)

https://youtu.be/PE2mlgmf-u4

https://youtu.be/DwtEycryQ4g

- Once the fish have been sorted, Service and Tribal employees work to quickly remove roe (eggs) from females and milt (sperm) from males. This slow-motion video shows a tribal employee removing roe from a female salmon. You can hear the sounds of the hatchery in the background.
- The roe is collected in buckets and mixed with the milt. Some fertilized eggs are given to tribes for propagation at their hatcheries. The Service also keep most of the eggs to raise at federal hatcheries.
- To remove milt from the salmon, one person holds a male salmon, and squeezes on the salmon's belly. Another person collects the milt in small bags. This video shows two hatchery workers collecting milt from a male salmon. These bags are paired with roe for fertilization.
- The Fish and Wildlife Service keeps track of all salmon processed at federal hatcheries by collecting small samples of DNA from each fish. "Parental-based tagging" allows hatchery managers to better understand the movements of hatchery fish. Eventually, it will allow managers to differentiate hatchery fish from wild fish.

Salmon Embryos (picture of eggs and facility with trays)

- Fertilized eggs are kept in hatchery trays for a few months to incubate. During that time, they develop into embryos. This picture shows a tray of fertilized salmon eggs. The vast majority of these eggs will grow up to be healthy salmon. The few white eggs sprinkled throughout the tray are dead eggs and will be removed.
- The Little White Salmon National Fish Hatchery has thousands of trays, each with approximately 5,000 fertilized eggs. Each year, the Hatchery raises millions of spring and fall Chinook. When released, they will become the next generation of Pacific salmon in the Columbia Basin.

Sac Fry: Salmon Infants (video of sac fry swimming around in a tray)

https://youtu.be/63_QNNSV-_Y

- After fertilized eggs hatch, "sac fry," are raised in trays at the hatchery. The sac fry in this video are fall Chinook, and will be released to swim to the ocean in spring 2017. You can hear the sound of the fry swimming in the tray and employees working in the background.
- Salmon will stay in the sac fry stage for about one month. They will continue to feed on their yolk sacs until their digestive systems are fully developed. The hatchery will maintain water flow at a constant temperature during incubation.

Smolts: Raising Young Salmon (video of feeding fish in raceways)

https://youtu.be/XT5Avi1reB8

- In this video, fish hatchery employee Peter Long feeds young salmon in the raceways, which are holding pens with water flowing through them. The fish are fed several times a day with a specially formulated fishmeal to optimize fish health and well-being.
- The Little White Salmon National Fish Hatchery uses about 150-800 pounds of fishmeal a day to feed the salmon, and approximately 118,000 pounds a year. The hatchery spends $150,000 just for food.

Leaving Home (map of Columbia River basin, rivers, dams)

- Depending on the species, salmon may spend six months to a year and a half at Little White Salmon National Fish Hatchery. When they're ready to leave, the strong river currents carry the young salmon hundreds of miles to the Pacific Ocean.
- This map shows the journey for salmon in the Columbia River Basin to reach the Pacific Ocean. The yellow star shows where the Little White Salmon hatchery is. The green circles are other fish hatcheries, the purple diamonds are dams, and the red squares indicate where fish passage is blocked.
- The Service works closely with other state and federal agencies on conservation measures in the Columbia Basin so that salmon can reach the Pacific Ocean. Once the fish are in the ocean, they're carried for thousands of miles by currents, and will travel as far as Alaska and Japan.

Conclusion (video of water outside hatchery)

https://youtu.be/9ma6Bd54kLQ

- Fish hatcheries like Little White Salmon National Fish Hatchery are a critical part of the region’s economy, culture, and environment. Commercial and sport fishing accounts for millions of dollars in the Pacific Northwest's economy. Native American tribes depend on salmon for ceremonial, subsistence, and commercial purposes.
- Hatcheries also continue to play a critical role in managing and restoring fisheries, and complement habitat conservation. Little White Salmon National Fish Hatchery will continue to work closely with other state and federal agencies, tribes, and the public to ensure that salmon and steelhead continue to be a part of the economy and ecology of the Pacific Northwest.