



FRIENDS OF THE ISSAQUAH SALMON HATCHERY

STAFF CONTACT INFORMATION

Executive Director

Robin Kelley

Phone: 425-392-1118

E-mail: execdir@issaquahfish.org

Program Coordinator

Pepper Hambrick

Phone 425-392-1118

E-mail: education@issaquahfish.org

Volunteer & Communications Coordinator

Chanda Gogna

Phone: 425-392-1118

E-mail: volunteer@issaquahfish.org

Hatchery Manager

Washington State Department of Fish and Wildlife

Darin Combs

Phone: 425-392-9094

Friends of the Issaquah Salmon Hatchery

125 West Sunset Way

Issaquah, WA 98027

Revised 09/07/2016

Volunteer Manual Contents

This manual will cover the information you will find most helpful in both acting as a volunteer and leading tours at the Issaquah Salmon Hatchery as well. It is organized into the sections listed below. The “Tour Station Que Cards” and the “Fish ID Gloves” are essential elements you can take with you when leading tours; they are available at the Volunteer Office and can be kept in your FISH vest. This reference manual is available on-line, and contains in-depth coverage of the salmonid life cycle, Washington State educational standards and goals, and much more.

[Section 1:](#) Contact Information, Staff List

[Section 2:](#) Volunteer Code of Conduct

[Section 3:](#) Volunteer Job Descriptions

[Section 4:](#) Volunteer, Docent, and Master Docent Status

[Section 5:](#) Tour Station Information

[Section 6:](#) Introduction to Salmon Lifecycle and Phases

[Section 7:](#) Issaquah Salmon Hatchery and FISH History and Information

[Section 8:](#) Introduction to Issaquah Creek Watershed and Information on Ballard Locks

[Section 9:](#) Frequently Asked Questions

[Section 10:](#) Tour Objectives and Teaching Tips

SECTION 1

Welcome!

We are so glad you have joined us as a volunteer. Our organization runs on volunteers and your presence at our trainings and the hatchery is vital to our continued success. It will take time to absorb all there is to learn about salmon, about the hatchery, and about our organization. We are all still learning as the science of salmon continues to grow. There is always something new to learn and we are excited to be a part of the annual miracle of salmon in our fragile environment.

Thanks for volunteering. We're looking forward to working with you.

Best Fishes,

Robin Kelley, Executive Director

Chanda Gogna, Volunteer & Communications Coordinator

Pepper Hambrick, Program Coordinator

MISSION: "FISH *champions the annual miracle of salmon in our fragile environment.*"

KEY MESSAGES

- Returning salmon are an annual miracle and we're all a part of it. The more we understand the more we can help.
- The salmon wouldn't be here without the hatchery and the partnerships (you) that make it happen
- FISH membership is your opportunity to support this annual miracle and become a partner helping make it happen.

Additional contact information:

- Website: www.issaquahfish.org
- Facebook: Search for "Friends of the Issaquah Salmon Hatchery" or "FISH"
- Twitter – Search for "IssaquahFISH"

SECTION 2

FISH Volunteer Code of Conduct

“FISH champions the annual miracle of salmon in our fragile environment.”

- Mission Statement

We promote watershed stewardship so that the public will take care of the water they share with the salmon. The Issaquah hatchery is the most-visited state hatchery. With some 350,000 visitors a year, it is the only urban location in Washington State where visitors can get nose-to-nose with a salmon that has returned home to spawn. FISH trains guides who amaze visitors with their depth of knowledge about the Northwest salmon life cycle, the importance of watershed stewardship, and the operations of the historic hatchery. Being a FISH volunteer, we ask you to follow this code of conduct to help better serve our mission and our visitors as well as help you be a successful and knowledgeable volunteer!

As a FISH volunteer, I’m committed to:

Personal responsibility

- Be dependable, recognizing the commitment and responsibility to my volunteer assignment(s)
- Accept assignment(s) consistent with my interest, abilities, and available time
- Accept assignment(s) with an open mind and a willingness to learn
- Accept feedback from my supervisor in order to do the best job possible
- Avoid conflict of interest situations and refrain from actions that may be perceived as such. Volunteers should reveal any potential or actual conflicts of interest as they arise
- Address ethical concerns by speaking directly with the colleague/responder with whom I have the concern; and when necessary, report such to my supervisor

Respect

- Treat all individuals with a sense of dignity, respect, and worth. Make a personal commitment to be nonjudgmental about cultural differences, living conditions, and the life-style of each person with whom I work.
- Avoid profane and abusive language and disruptive behavior that is dangerous to self and others.
- Abstain from the use of photo, audio, or video recording equipment unless authorized
- Respect all confidential information. Volunteers are responsible for maintaining the confidentiality of all proprietary or privileged information to which they are exposed while serving as a volunteer, whether this information involves a single staff, volunteer, client, or other person
- Not preach to anyone or pressure anyone to accept my political, cultural, or religious beliefs
- Respect equipment and props appropriately as required for my assignment.

Safety

- Not use, possess, or be under the influence of alcohol or illegal drugs at any time while serving as a volunteer
- Wear required identification and clothing.
- Follow safe workplace practices, including participation in applicable education sessions, using appropriate personal safety equipment and reporting accidents, injuries, and unsafe situations.
- Report suspicious activities to my supervisor.
- Recognize that I have a responsibility to adhere to the rules and procedures of the organization. Failure to do so or failure to satisfactorily perform my volunteer assignment may cause me to be subject to dismissal.

Volunteer Signature

Date

SECTION 3

FISH Volunteer Descriptions and Requirements

FISH VOLUNTEER JOB DESCRIPTION

Responsibilities:

- Complete fall tour guide training and any equivalent training sessions necessary
- Provide pertinent and interesting information to hatchery visitors, general public, and interested people at outreach events.
- Encourage educational exchanges while onsite
- Apply personal skills and interests as appropriate
- Stay current on watershed, salmon, and hatchery issues
- Be open to learning, teaching, and friendship
- Arrive on time and ready to go for shift
- Give fair notice of absences (at least 72 hours in advance) and try to find a replacement
- Interact with the public in a polite, positive manner
 - Refrain from smoking, being under the influence of and/or consuming alcohol and/or illegal substances while volunteering

Benefits:

- Educational opportunities and training about salmon (including a comprehensive training manual), hatchery operations, watershed concepts, and environmental issues affecting salmon
- Various enrichment activities, workshops, and field trips specifically designed for FISH volunteers
- Numerous opportunities for interactions with teachers, students, parents, and interested members of the public
- A sense of community and fellowship with other volunteers, FISH staff, and hatchery visitors
- Being at the center of the action for Salmon Days, Issaquah's award-winning annual fall festival commemorating the return of the salmon to Issaquah Creek
- An annual Volunteer Appreciation Dinner to commemorate your hard work and celebrate FISH's achievements
- Discounts for rentals of the Watershed Science Center [and a discount at the FISH Gift Shop]

- Opportunities to participate in special events, such as the annual Kokanee Release, local festivals, and more!

Qualifications:

- Interest in salmon and watershed stewardship
- Interest to teach people of all ages, especially children
- Previous educational or related experience helpful

Note: Assignments will begin after the volunteer application and volunteer disclosure form have been completed and a Washington State Patrol background check has been processed. An arrest or conviction does not necessarily preclude you from volunteering, but it may generate a review by the FISH Board of Directors for additional determination.

FISH DOCENT JOB DESCRIPTION

The FISH docent/tour guide is an integral part of our public education here at the hatchery! Docents lead educational tours throughout the fall to school groups and scheduled groups. You provide a unique experience for guests coming to the hatchery to get in-depth knowledge about our hatchery, the salmon returning, and sustainable environmental education.

Requirements:

- Complete one full day of annual tour guide training
- Complete 5 tours in order to become Docent status
- FISH Member in good standing. (Scholarship opportunities available)
- Conduct at least 1 tour a week throughout the spawning season (Mid-September to Mid-November)
- Must be 18 years or older to lead tours solo; 16-17 years old to lead supervised tours and evening/weekend tours
- Must be on time and responsible for signed-up shift
- Able to keep track of hours via volunteer binder in volunteer office

Dates / Times:

- September through early November, and periodically throughout the balance of the year
- Weekdays for guided tours at 10 AM, 11 AM, and 12 PM
- Selected Saturdays for guided tours at 11AM and 1 PM
- Some afternoons between 2 PM and 5 PM for guided tours
- Weekday evenings (until dusk) to answer questions for hatchery visitors

- Weekends between 9 AM and 6PM to answer questions from hatchery visitors
- Salmon Days – First Weekend in October

ADMINISTRATIVE VOLUNTEER JOB DESCRIPTION

The administrative volunteer helps with various tasks in an office setting with one or more of the staff members. Duties can include data entry, prepping educational materials, researching accurate salmon data, and assisting in office organization.

Requirements:

- Be accountable to shift times and on time for shift
- Conduct oneself professionally and responsibly while working in the FISH office
- Define your responsibilities clearly with shift lead
- Keep sensitive information/materials confidential

Dates / Times:

- Various or as needed throughout the season

FISH PRESENTS: PRESENTER JOB DESCRIPTION

The FISH Presents: Presenter will work the PR committee to find and schedule a presentation to an interested audience at a set date and time. The volunteer will be on time, engaging, and enthusiastic, while providing accurate information from the presentation to the public. Materials for this presentation will be provided.

Requirements:

- Must be part of the Master Docent program
- Coordinate with PR lead to shadow presenter first
- Coordinate with PR lead to schedule a group to present to

Dates / Times:

- Presentations can vary on time of day and day of week
- Must coordinate with PR lead on time of presentations
- Various times throughout the year

COMMUNITY OUTREACH VOLUNTEER JOB DESCRIPTION

Community outreach volunteers attend outreach events throughout the year, including but not limited to: Issaquah Volunteer Expo, Downhome 4th of July Event, Frogs N' Dogs at Issaquah Brewhouse, Issaquah Highland Days, Parkadilly at Sammamish State Park, and various college career/volunteer fairs. The volunteer will help with booth set up and/or

takedown and transport to and from the volunteer office. At outreach events, volunteers engage with the public and participating audiences about the mission of FISH, our volunteer opportunities, education programs, and hatchery programs.

Requirements:

- Complete Outreach training held in early spring (highly recommended to attend the fall docent training as well)
- Deliver accurate knowledge of our educational programs, hatchery tours/times and volunteer opportunities we offer at the hatchery
- Be present, active and engaging while tabling at various outreach events
- Able to lift 50 pounds and have a vehicle to transport a number of large items such as folding table, chairs and a canopy (or have arrangements with another volunteer who has a vehicle)
- Commit to assigned shift times

Dates / Times:

- Various throughout the year; most are held on weekends with some events in the evening or weekdays

MASTER DOCENT JOB DESCRIPTION

FISH is proud to offer a Master FISH Docent program to recognize those dedicated volunteers committed to our educational program. Our goal is to enhance our already exceptional program and to provide an incentive for new volunteers to reach a higher level of knowledge and to be able to share that knowledge with the school children that come to the Hatchery for tours, the general public, and new FISH Docents!

Master Docent: Signed Commitment Form, button received once they complete each of their requirements listed below and respective trainings:

- 20 Tours
- 2 Science Fairs
- 1 Outreach Event
- 1 Volunteer Information session
- Observe the Program Coordinator in a classroom/school presentation (co-lead before presenting on own)
- Observe FISH Presents for adults (co-lead before presenting)

Maintaining Master Docent Status: in order to be honored at Volunteer Appreciation Dinner and be considered an "Active Master Docent" you must:

- Attend at least 2 FISH talks annually
- Sign up for at least 5 volunteer opportunities a year
- Come to the annual fall tour training as a participant and attend 1 additional training as a participant or helper

Perks: Free Luncheon, pin for each year Master Docents stay active, special FISH Talk just for Master Docents, and opportunities to present to classrooms and other audiences.

- FISH reserves the right to assess guide qualifications on a case-by-case basis, or to substitute additional qualifications *that supersede these requirements*.

Responsibilities:

Master FISH Docents will be asked to assist in the training of new guides to prepare them for leading tours; in addition some Master Docents may be asked to assist with the training classes for new and returning volunteers.

Master Docents will have a higher level of knowledge about salmon, water quality, wildlife, and have greater familiarity with the facility or a desire to learn. They should share this knowledge with new volunteers and the public.

Master Docents may be asked to lead tours for special groups, media, or other groups that are interested in a more “in-depth” tour of the hatchery.

Recognition:

Candidates that meet all requirements on their commitment form will receive a new name badge with “Master Docent” engraved with the person’s name. This badge will replace their current badge.

SCIENCE FAIR VOLUNTEER JOB DESCRIPTION

Requirements:

- Complete Science Fair training, generally held one evening November-December.
- Be comfortable leading a dissection of a salmon or being near another person doing the actual dissection
- Be comfortable talking with the public about all aspects of the salmon lifecycle from birth to death, what we do at the hatchery as well as the spawning process
- Available evenings to staff science fairs at schools throughout King County
- Have experience or a desire to work with people of all ages in a setting where people come and go to your booth

Dates / Times:

- Typically on weekday evenings, and occasional Saturdays, February through May.

- Generally a three to four hour commitment including pick up and drop off of supplies
- Opportunities will be posted in www.signupgenius.com – check it frequently.

GIFT SHOP VOLUNTEER JOB DESCRIPTION

Requirements:

- Complete FISH Gift Shop (FISHop) training held in late August (highly recommended to attend annual fall docent training as well)
- Commit to a weekend schedule, sign up for shifts, and be present for each signed up shift
- Saturdays and Sundays, Labor Day weekend through mid-November.

Dates / Times:

- Three and a half hour shifts: 9:30 AM to 1 PM and 1PM to 4:30 PM (includes opening and closing procedures).

CLASSROOM VOLUNTEER JOB DESCRIPTION

Requirements:

- Complete one day of annual docent training
- Complete classroom presentation training, arranged on request

Dates / Times:

- During school hours, one to four hours per school plus travel time.
- Weekdays.

CAMP AND YMCA SUPPORT

Requirements:

- Complete training for summer camp and YMCA, usually held in late June
- Commit to supporting at least one full week of camp AM, PM, or all day
- Commit to at least 2 days of YMCA camp support per week

Dates / Times

- Camps typically take place in July from 9:30 AM to 3 PM
- YMCA campers typically visit in early August from 11 AM to 1:30 PM

VOLUNTEER IDENTIFICATION

Vests: We keep a limited number of shared vests in the office. These are for any Guide to use when they are volunteering. Several local stores have offered a discount if Guides wish to purchase their own. If you wish to purchase your own vest and want to receive the discount tell them you are a volunteer for FISH. The only requirement is that the vest be beige or khaki colored. Try these local sporting goods businesses:

Creekside Angling: 1410 NW Gilman Blvd.; (425) 392-3800; 20 percent off any regular priced vest

Big 5 Sporting Goods: 1810 12th Ave. N.W.; (425) 837-8185

Name Badges: FISH will provide an official badge with your name after you have volunteered for a minimum of 5 tours. A badge must be worn at all times when working as a FISH volunteer. Please notify the Volunteer Coordinator when 5 tours are completed.

Patches: FISH patches will be given to those who purchase their own vest.

SECTION 4

Volunteer, Docent, and Master Docent Status

You may be wondering what the difference is between a Volunteer, Docent, or a Master Docent. Below is an outline of the key differences, including what you need to do in order to gain Docent and Master Docent Status as well as how to maintain your status as a Master Docent if you enroll in this unique and special program.

Volunteer: Can help out with everything FISH and WDFW related except FISH Presents and in-classroom presentations.

Docent: One needs to complete at least 5 tours to gain this status of which you will keep track of and communicate to the Volunteer and Communications Coordinator.

Master Docent: Signed Commitment Form, button received once they complete each of their requirements listed below and respective trainings

- 20 Tours
- 2 Science Fairs
- 1 Outreach Event
- 1 Volunteer Information session
- Observe the Program Coordinator in a classroom/school presentation (co-lead before presenting on own)
- Observe FISH Presents for adults (co-lead before presenting)

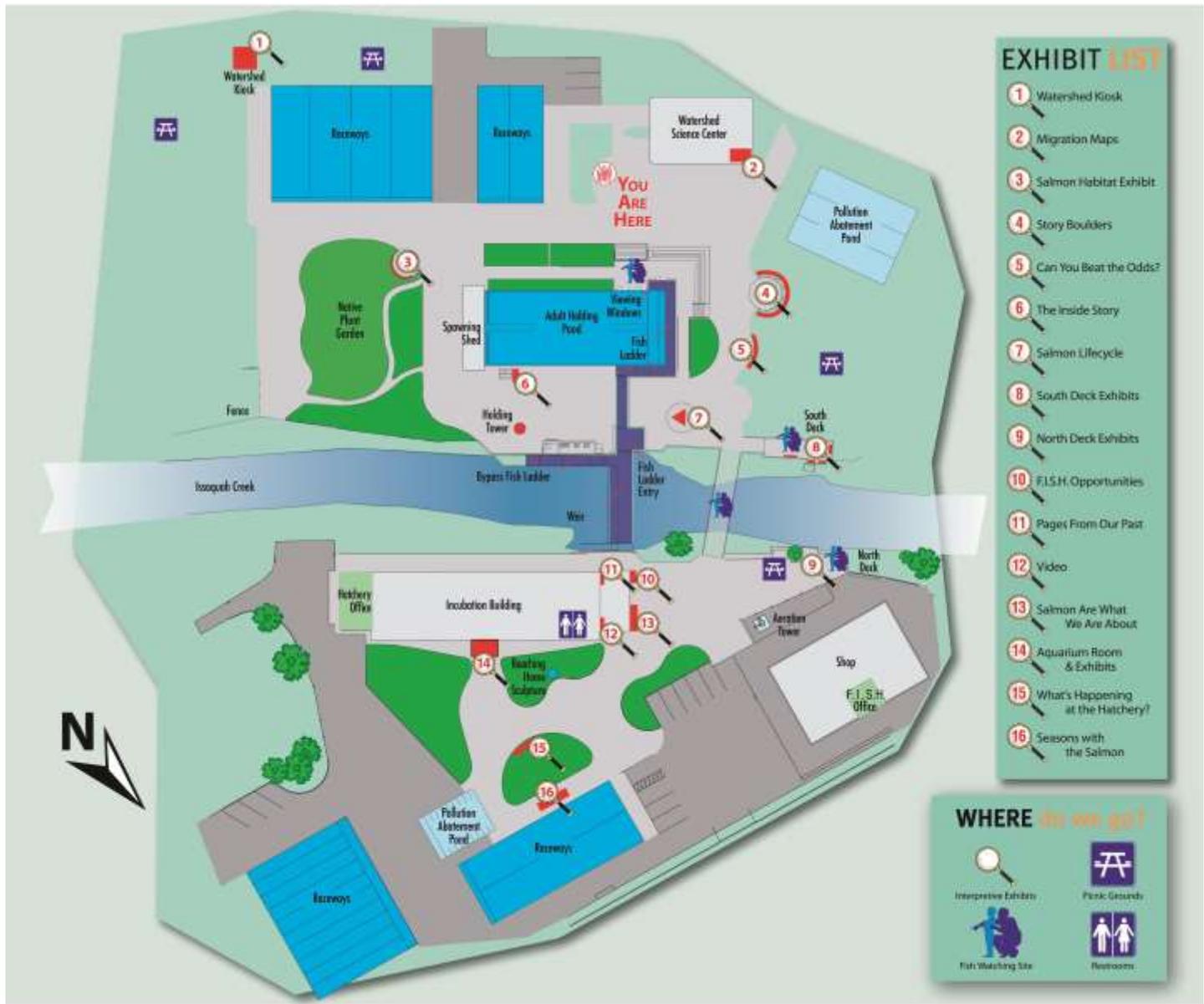
Maintaining Master Docent Status: in order to be honored at FISH's Volunteer Appreciation Dinner and be considered an "Active Master Docent" you must

- Attend at least 2 FISH talks annually
- Sign up for at least 5 volunteer opportunities a year
- Come to the annual fall tour training as a participant and attend 1 additional training as a participant or helper

Perks: Free Luncheon, pin for each year Master Docents stay active, special FISH Talk just for Master Docents, and opportunities to present to classrooms and other audiences.

SECTION 5

Tour Station Information



Basic Tour Information

Start: Flagpole

- The Volunteer and Communications Coordinator will address large groups upon arrival, and break up the crowd into individual teams with a Docent to lead each team.
- In your small group, introduce yourself; ask group where they are from, what brought them here, if they received the in-class presentation, etc.

Tour Best Practices

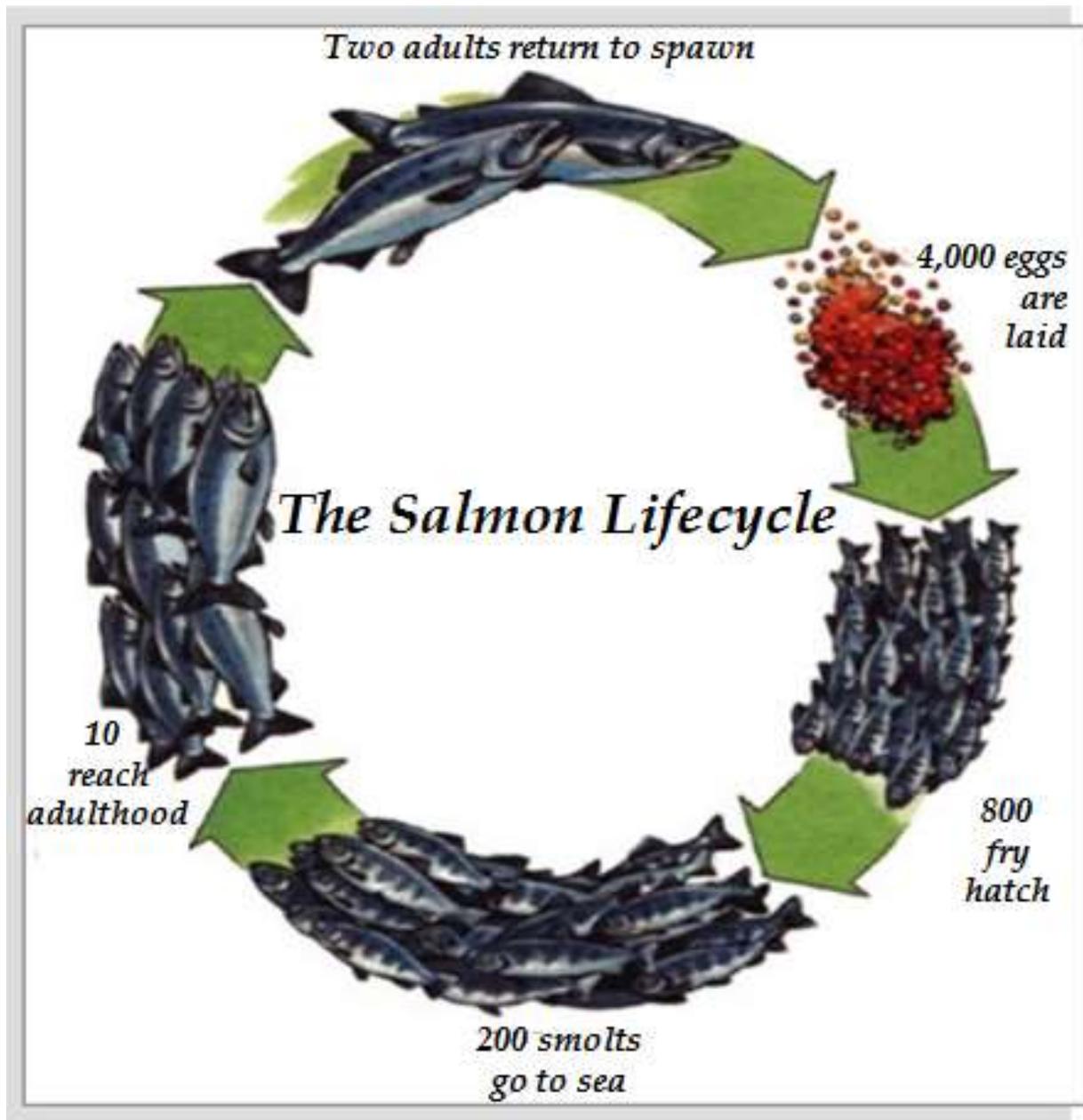
- c. Set expectations, especially with young students, that the tour is an extension of their classroom – the same rules apply: raising hands with questions, etc. Find out from the teachers or chaperones what the kids are used to, such as “1, 2, 3! Eyes on me!” or come up with your own like "When I say Coho, you say silver!".
- d. Remind chaperones that they are also participants on the tour as well, and that they are here to help. Minimize adult talk and use cell phones for emergencies or pictures only.
- e. Identify a chaperone as a “sweeper”; making sure all participants get to the next stop
- f. Preview what they will see and learn (adults, eggs, trout to feed, etc.)
- g. Teach by asking simple questions; use repetition; get down to the eye level of any kids; learn their names.

Tour Guide ID and Vest

- a. Tour guides wear a beige or khaki vest as our official marker as tour leaders.
- b. If you identify yourself as a member of FISH, Creekside Angling at 1410 NW Gilman Blvd.; (425) 392-3800; will apply a discount 20% off any regular priced vest
- c. Have in the vest: (all found in the Volunteer Office)
 - a. Egg vials (please return after tours)
 - b. Fish ID cards from WDFW
 - c. Food for trout
 - d. Polarized glasses to view salmon from the bridge and trout in the raceway
 - e. Salmon species glove
 - f. Invoice forms for schools paying with cash for them to fill out

SECTION 6

Intro to Salmonid Life Cycle



1. Eggs are laid and fertilized in “redds” in streams **OR** eggs are manually fertilized and incubated in Heath trays in hatcheries to protect them from predation and negative environmental impact
2. At approximately 30 days, eggs reach the “eyed” stage
3. At 80 days, the eggs “hatch” and are now at the “alevin” stage. (The yolk sac sustains them and provides all their nutrients as they grow.)

4. At 120 days (4 months) “fry” emerge from the gravel **OR** are moved to the raceways at the hatcheries
5. The length of time they stay in fresh water varies:
 - a. Coho: 18 months
 - b. Chinook: 6 months
 - c. Chum: A few days
 - d. Kokanee: 2-4 years (their entire lives)
 - e. Pink: A few days
 - f. Sockeye: 12-36 months, mostly in lakes
 - g. Steelhead: 12-36 months
6. Salmon smoltification in estuaries varies greatly between environmental cues, species, and location. It can last anywhere from a few weeks to 6+ months.
7. After smoltification, they continue their journey to the open ocean. Their stay in salt water varies:
 - a. Coho: 4-18 ---- months
 - b. Chinook: 1-5 ---- years
 - c. Chum: 2-5 --- years
 - d. Kokanee:--- 0 (landlocked, genetically very similar to sockeye)
 - e. Pink:- 18 --- months
 - f. Sockeye: 1-4 --- years
 - g. Steelhead: 1-3 --- years
8. Means of return to their natal/birth stream
 - a. High seas navigation: magnetic fields? Ocean currents? Shoreline? Sun? Scientists are still investigating this
 - b. Short range navigation once they are in the Salish Sea/Puget Sound: olfactory (they smell their way home)
9. What drives them to do this? Why anadromous?
There are so many answers to this but the answer in short: MORE FOOD in the Ocean! Cold salt water is more productive than cold fresh water.

Ocean Phase Salmonid Identification:

- **Sockeye:** small pupils, “glassy” eyes, no clear spots on the tail
- **Chum:** large pupils (1/2 of the eye), a slender tail, bars on both side of the body
- **Chinook:** black mouth and gums, spots on both halves of the tail, small spots on the body
- **Coho:** black mouth but white gums; spots only on the top half of the tail, spots half the size of the eye
- **Pink:** mouth is not black, large spots on body
- **Rainbow/Steelhead trout:** small head, jawbone not past the eye, toothless tongue, and anal fin has 13 rays
- **Cutthroat trout:** a large mouth, red slashes under the jaw, anal fin has 13 rays. Cutthroat trout are salmonids, but not true salmon.

SECTION 7

Issaquah Salmon Hatchery and FISH Histories and Info

The Issaquah Salmon Hatchery was completed in 1937 as a Works Progress Administration (WPA) project, Franklin Delano Roosevelt's "New Deal" to get American's back to work after the Great Depression. Issaquah Creek was barren after decades of logging and coal mining in the watershed, so there were no native fish to compete with. Mitigation of adverse impacts of development in general is a primary goal of hatcheries in Washington State as well as being used to restore native salmon runs, such as the Lake Sammamish kokanee. A diversion dam and primitive fish ladder were installed ¼ mile above the hatchery to provide the gravity-fed water that runs the hatchery.

Eggs from chinook native to the Green River were brought in, as well as sockeye fry from the Baker River. The sockeye did not thrive, and were later replaced by coho, which have done very well here.

In 1992, the hatchery was threatened with closure due to state budget cuts. The aging facility was inefficient and had high maintenance costs and water quality challenges. In response, the citizens of Issaquah organized an effort to restore funding and maintain the hatchery. The effort convinced the state Legislature to keep the hatchery open and to rebuild it as an education facility. FISH was formed as a not-for-profit organization in December 1993 to support the hatchery. We are the most visited hatchery in Washington State and currently are being used as a model for education programs at other hatcheries.

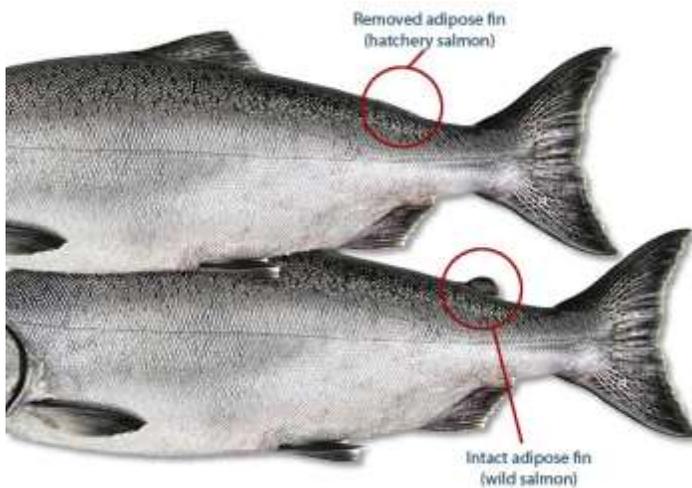
Above the hatchery there are 10-15 miles of good habitat that can accommodate fish that are allowed to bypass the hatchery and spawn naturally in Issaquah Creek. In 2013, the intake dam was replaced with a redesigned water diversion and more gradual fish ladder. A series of rock weirs were also installed in the creek. The pools created below each 9" step-up give fish a place to rest and enough room to gain momentum and jump the next step of the stream bed.

Hatchery Program Goals and Salmon Rearing Details 2016 (WDFW)

EGGS	<u>Chinook</u>	<u>Coho</u>	<u>Kokanee</u>
Egg takes	2.6 million	1 million	45,000
Egg take times	Sep - Oct	Oct - Nov	Nov - Jan
Release Date	May 1	May	April-May
Release age (from time they get put in ponds as fry)	3 months	14 months	2 weeks
Number released (outplant)	2 million	0.5 million	45,000
Eggs going to classrooms and co-op projects*	TBD	TBD	TBD
ADULTS	<u>Chinook</u>	<u>Coho</u>	<u>Kokanee</u>
Ocean years	1-5	1.5	none
Handled previous year (2015)	3,373	1,993	424
Spawned previous year (2015)	1,028	1,261	374

A loss of around 10-20 percent is expected from hatch to release caused by predation, disease, and other factors, compared to up 95% losses in nature during its lifecycle.

Mass Marking Fact Sheet (WDFW)



Mass marking is a technique used to distinguish hatchery-produced chinook and coho salmon from naturally spawned fish.

Marking offers people that fish an obvious way to tell if their catch is a hatchery fish, which may be kept, or a naturally spawned salmon, which must be returned to the water in many

fisheries. Marking allows fishing to continue on hatchery stocks, while protecting naturally spawned fish in waters where the two stocks intermingle.

Hatchery fish are marked by removal of their adipose fin, a small fin on the fish's back near the tail, shortly before they are released to the creek. Mass marking has been used by the Washington State Department of Fish and Wildlife since 1996.

Wild vs. Hatchery Facts

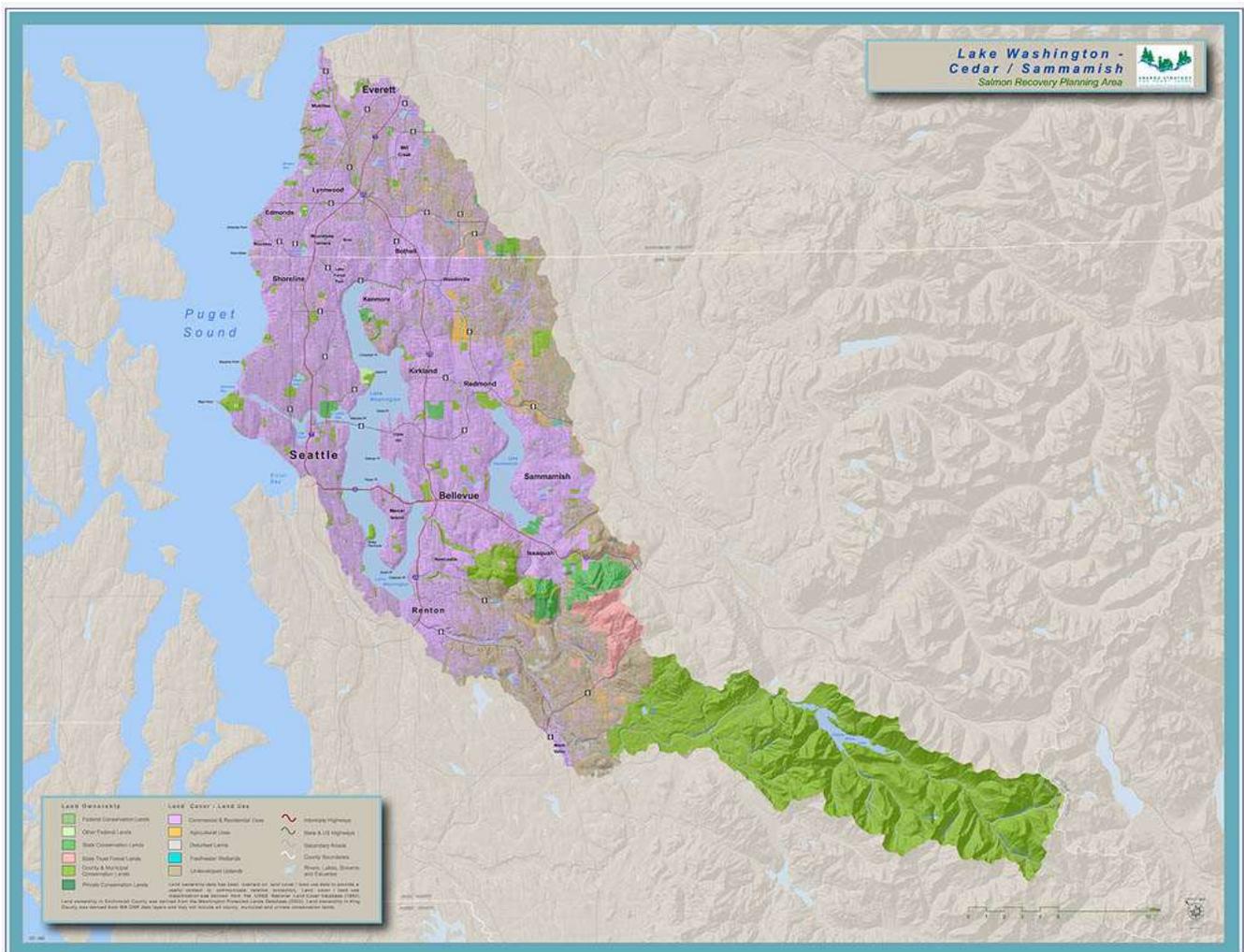
- a) There is good science that supports the fact that hatchery operations can impact wild salmon and steelhead populations.
- b) These impacts range from simple competition in either the fresh or salt water environments, to cross-breeding of hatchery and wild fish leading to lower fecundity (quantity and quality of eggs and milt) or survivability.
- c) There is a popular myth to the effect that wild fish fight harder than hatchery fish, but we know of no science to support that claim.
- d) To mitigate those impacts, the Washington Department of Fish and Wildlife (WDFW) designs "integrated plans", which manage smolt release sizes, timing, placement, and other variables.
- e) These integrated plans are referred to as Hatchery Genetic Management Plans, or HGMPs.
- f) If there are native salmonid populations that are defined as "endangered" under the Endangered Species Act (ESA), hatcheries operating in the endangered population areas must have an HGMP approved by the National Oceanic and Atmospheric Association (NOAA) the Federal agency charged with enforcing the ESA. This approval process may take up to 3 years.
- g) There have been a number of legal cases in Washington State where conservation organizations have sued the State if a hatchery does not have a NOAA-approved HGMP, which resulted in the closing of certain hatcheries.
- h) The WDFW does not know if the Issaquah Salmon Hatchery is at significant risk of this sort of lawsuit at this time. Preparation of the Issaquah Hatchery's HGMP is currently in progress.
- i) Bear in mind that 80% of the salmon and steelhead caught in Washington State are of hatchery origin, and if hatchery operations were to be significantly cut back, the impact to the annual \$3 billion sport and commercial fisheries could be enormous.

SECTION 8

Introduction to Issaquah Creek Watershed

A watershed is an area of land that drains into a common body of water. When rain falls or snow melts, the water it drains down mountains and hills, gathering in creeks, creating wetland buffers, draining into aquifers, and eventually making it to larger creeks and rivers, out to lakes, and eventually to the Salish Sea/Puget Sound, the 2nd largest marine estuary in the U.S., next to Chesapeake Bay. What happens in one part of a watershed can affect other parts of the watershed, including downstream watersheds. Salmon link watersheds together as they travel between the Salish Sea /Puget Sound, Lake Washington and Issaquah Creek.

The Issaquah Creek watershed contains three forks: (North, East, and South); Tibbetts Creek; McDonald Creek; Holder Creek; Kerry Creek; and Fifteen-Mile Creek.



Geography:

Located between Tiger, Squak, and Cougar Mountains, and the Sammamish Plateau. Elevations range from about 3,000 feet at the top of Tiger Mountain to near sea level at Lake Sammamish. Slopes are steep in the upper part of the basin, with larger rocks and boulders and high water energy. Further down in the basin, slopes are gentler, with smaller rocks and less water energy. The soil in the Issaquah Valley floodplain is largely silt and sand, including loose materials dumped by the leading edges of glaciers.

Characteristics:

The basin encompasses 61 square miles. About 75 percent of the basin remains forested. Seventy percent of the water flowing into Lake Sammamish comes from the Issaquah Creek Basin. Kerry and Fifteen-Mile Creeks still have good salmon habitat. I-90 construction in the 1970's confined the creek. The habitat is still good, however, with steep slopes and lots of water energy.

Flooding:

The valley is prone to flooding because of the steep slopes and higher rainfall in the foothills of the Cascades. The annual rainfall averages 36 inches in Seattle, but 80 inches in North Bend. Flooding is exacerbated by development. Paving prevents surface water from percolating into the ground. What were once 100-year floods now occur much more frequently. The City of Issaquah has invested in several projects to alleviate flooding, including widening the floodplain, digging the Pickering Reach overflow channel, dredging, and buying and removing homes that flood frequently. Severe storms and flooding can damage salmon habitat, burying gravel spawning beds with eroded silt, scouring eggs out of redds.

Habitat Challenges:

Pollution damages the habitat through pesticide and fertilizer use, when rain washes the chemicals into the surface water. Pet waste and septic system failures are another large cause of water quality degradation. Car washing contributes to some of the phosphates that cause toxic algae blooms in Lake Sammamish and more. Loss of leafy cover near salmon spawning streams heats the water and removes shelter and food from salmon habitat. Invasive weeds are a big problem; they crowd out the native plants, have weak root systems causing erosion, and don't allow a diversity of wildlife. Japanese knotweed, Himalayan blackberries, and ivy are big offenders on the noxious weeds list. Bass in Lake Sammamish are non-native fish and like cutthroat they congregate at the mouth of Issaquah Creek for a feast when smolts or juveniles are out-migrating to the Salish Sea/Puget Sound.

Habitat Preservation

According to King County, Issaquah is one of the three most significant basins in the county because of water quality, habitat, and surviving wildlife. The Sammamish River (Slough) is a

severe fish blockage location because of the 11-mile length with very little leafy cover. The county is working towards creating shady pockets at intervals and planting woody debris along the banks where fish can rest. This woody debris has been added to the stream to improve fish habitat and shelter, and logs have been used to stabilize banks.

Introduction to Ballard Locks

- Finished in 1917, an 8-year project (counting political dramas)
- When a connection was constructed between Lake Washington and Portage Bay/Lake Union, the water level in Lake Washington was lowered 9 feet, creating 800 acres of “new” land, mostly at the South end of the lake (now the Renton air field and the Renton Boeing plant) and also along the northwest side of Union Bay.
- The locks provide the transition between the lowered level of Lake Washington and another 22 feet (on average) to mean sea level. Lake level is maintained closely to keep the floating bridges and existing shorelines stable.
- Prior to the Locks, the Cedar River did not discharge into Lake Washington, but instead discharged into the Black River, which was a tributary to the Duwamish River. The Cedar River was diverted into Lake Washington in large part because of the need for greater amounts of water to operate the locks.
- Also known as the Ballard Locks, they carry more boat traffic than any other locks in the US, and, along with the fish ladder and the surrounding Carl S. English Jr. Botanical Gardens, attract more than one million visitors annually, making it one of Seattle's top tourist attractions.
- Lake Washington historically had a large kokanee population, now greatly diminished.
- Unknown but noted quantities of chinook, coho, and steelhead historically traversed the Black River into the Lake Washington watershed. Once the Locks were constructed, the migration of all salmonids into and out of the Lake Washington watershed had to occur through the new connection at the Locks to Puget Sound. Currently, salmon species known to spawn within the Lake Washington watershed include chinook, coho, and sockeye (all three of which may be represented by both native and hatchery-raised individuals), although strays of the other salmon species could occasionally enter the watershed. Steelhead had historically returned to Issaquah Creek, but not in recent years.
- Sockeye were thought to be absent from the Lake Washington watershed prior to the completion of the Locks.
- Sockeye were introduced to the Cedar River in 1935 from the Baker River.
- The introduced sockeye populations in the Cedar River may now spawn naturally, but they are also currently supplemented by the hatchery at the Landsburg Dam
- To protect drinking water quality, sockeye are not allowed to pass the Landsburg Dam.
- Counts of the salmon migrating through the locks are accessible [online](#).

SECTION 9

Frequently Asked Questions

What is FISH?

The Friends of the Issaquah Salmon Hatchery (FISH) is a private non-profit organization that cooperates and partners with public and private agencies and individuals to provide educational opportunities that cultivate a sense of wonder about salmon. FISH uses the remarkable story of the salmon to teach students and hatchery visitors about a broader environmental lesson. Through in-class presentations, hatchery tours, summer science camps, and outreach activities, FISH teaches youth and the public about hatchery operations, salmon life cycle & habitat needs, and how to protect and restore our Northwest icon.

What is the Hatchery Mission?

The hatchery now has two missions: First, to produce enough salmon for sport fishing to continue, and second, to produce enough extra fish to restore the naturally spawning salmon runs in local streams. Because of overfishing and damage to habitat, local salmon runs are far below historical levels, and the Puget Sound chinook are in danger of extinction.

What does the hatchery do?

The hatchery traps adult salmon during spawning season, collects eggs and fertilizes them, incubates and hatches eggs, and rears juvenile salmon until they are ready to migrate to the Salish Sea/Puget Sound to continue with smoltification. Chinook and coho salmon, as well as kokanee and rainbow trout, are also raised at the hatchery.

How do FISH and the hatchery work together?

FISH enjoys a unique public-private partnership with the Washington State Department of Fish and Wildlife (WDFW), which operates the salmon production process at the hatchery. WDFW provides space at the facility for FISH to operate salmon education and outreach programs. FISH staff and docents act as interpreters and education ambassadors for the hatchery, WDFW, and the survival of salmon in the Lake Washington Watershed.

Why is the hatchery needed?

In an urbanized habitat such as the Greater Lake Washington Watershed, salmon are unable to survive without supplementation from a hatchery because of habitat degradation and human impact. Human impact changes habitat by causing:

- Greater storm water runoff and floods during major rains events, leading to more polluted water in our waterways
- Depleted aquifers/ground water supply and lower water volumes in summer
- Warmer water temperatures (Salmon will die in water above 68 degrees F.)
- Erosion and water turbidity
- Siltation of gravel spawning beds

- Interruption of food web
- Introduction of non-native, invasive species of plants and animals that crowd out natives
- Removal of plant cover, resulting in warmer water and increased predation
- Urbanization in rural and "natural" areas

What do you feed the fish?

When the young fish are at the hatchery they are fed vitamin-rich, high-protein blends of plant and animal meal made from fish, crustaceans, animal meat excess, and other vital ingredients. As the fish grow bigger, the size of the food they are fed is proportionately larger as well.

Do you feed the adult fish that have returned to spawn?

No, the salmon stop feeding once they reach freshwater. They begin breaking down the proteins and fats that have been stored in their muscle tissue during this final phase of life. Their bodies become very soft, which is why you will see parts of their noses missing (or jaws), due to crashing into rocks, logs, fish ladders, fighting, etc.

What is all that white stuff on their skin?

The white stuff (sometimes fuzzy) is a fungus that grows on their skin. When the salmon come back to the freshwater, their immune systems shut down and their scales fall off, inhibiting their ability to fight off disease and fungal growth.

Why do you have sprinklers spraying water on the adult holding ponds?

The sprinklers along the edge of the holding ponds help to calm the fish, hopefully reducing the chances of them jumping out of the water and onto the concrete or the grass.

How do salmon find their way back to their home stream?

Incredibly, salmon can smell the unique scent of their spawning grounds: a combination of rotting algae, insects and fish, and dust leached from rocks. However, the role of olfaction (smelling) in the ocean is still debated. Compass orientation based on magnetic or celestial cues, which have been demonstrated for juvenile salmonids in fresh water, could explain most but not all of the migratory behavior at sea.

Why do you kill the fish to get the eggs?

They are at the end of their life cycle and would soon die naturally in the creek. Taking the eggs while they were alive would be challenging and painful to the fish.

What do you do with the fish carcasses after the egg and milt are taken?

Some are sold to a food processor where they are made into pet food (cat and dog), fish food, and also organic fertilizers. A few that are still "ocean bright" may be taken to food banks. Other carcasses are planted along forest floors to bring ocean nutrients into the ecosystem. FISH is permitted by WDFW to freeze 75 carcasses for educational dissections. The Washington Department of Health regulates what the surplus salmon can be used for.

How long do salmon live after they have spawned?

Typically it can range from a few days to a couple of weeks. The average time from start of spawning (building the redd) and death is 9-10 days.

How many eggs does each female carry?

The chinook female has approximately 4,000 eggs. Some Chinook can have up to 10,000. The coho female has approximately 2,500 eggs.

Is the Issaquah Hatchery the oldest hatchery in Washington State?

No. The Klamath Hatchery opened in 1895. The Issaquah Salmon Hatchery opened in 1937.

Does someone remove the dead fish from the creek at the end of the spawning season?

No. The dead fish are allowed to become nutrients for the water system and part of the food chain. As the salmon bodies begin to decompose, they provide a natural fertilizer for the soil, which in turn helps healthy plants and trees grow along the banks of the creek. Also, the salmon fry will feed on the tiny pieces of flesh that will remain in the water after the salmon have decomposed.

Is a steelhead a salmon?

A steelhead is an ocean-going rainbow trout. The steelhead was re-classified to be in the same genus as salmon, *Oncorhynchus*, in 1989.

What is the difference between farm-raised salmon and hatchery-raised salmon?

The farm raised fish are kept in net pens and fed until they are big enough (adult size) to go to market. All hatchery fish are released as juveniles to migrate to the ocean, to return in 1 to 5 years as adults, having fed the whole time in nature.

If salmon are listed on the Endangered Species Act, how come people can still fish for them?

Puget Sound wild chinooks were listed as a “Threatened” species under the Endangered Species Act (ESA) in 1999. Coho salmon are a candidate for listing on the ES. However, hatchery salmon are not included in this listing. Therefore, people who fish are able to keep hatchery chinook and coho. If a wild salmon (with an intact adipose fin) is caught, they are required by law to be released. PLEASE NOTE: This is a general “rule of thumb” however; the regulations often change and differ depending on fishing location, what time of year, etc. Please advise people to check the current regulations by visiting the Washington Department of Fish and Wildlife website at www.wdfw.wgov.

How can you tell the difference from a male and a female salmon?

Males develop a hooked snout and jaw (called a kype) and have larger teeth (used for fighting off other males during spawning). The males may develop a hump on their backs, which is especially prominent in the pink salmon and sockeye. Females do not develop the kype or the humped back. Females are bigger around the middle because they are full of thousands of eggs. Males also tend to be more colorful than the females. Another way to tell a female from the male is by their behavioral traits. When looking in the creek, you will see females building redds using their caudal fin to clean our debris from nest. Males tend to be nearby, positioned behind the female, warding off other males by darting forcefully towards opponents. You may see males fight other males for mating rights and females fighting over nesting spots

How come they can't jump over the weir easily?

Salmon can jump high, especially the coho. The coho can jump as high as 10 feet. However,

just like we need a running start for the long jump, the salmon needs deeper water to jump high. The water in Issaquah Creek is not deep enough to allow for that “running start” and there is a wall under the water so they cannot jump using momentum.

What is the purpose of the pipe that sticks up in the creek just below the weir?

The pipe that sticks up is a discharge pipe used to release water and sediments that accumulate in the lowest part of the underground pipes. The other pipe drains the water from the ponds and raceways back in to the stream.

What is the percentage of “wild” fish returning to Issaquah Creek? * Updated annually*

Issaquah Creek was barren when the hatchery started operations, so technically speaking, there are no “wild” salmon to start with. There are “naturally spawned” fish that used the creek below the weir, or from the select few fish that are released above the weir. In addition, there is a 5 percent error margin with fin clipping.

Why are some of the salmon carcasses along the creek bank missing their tails?

WDFW biologists walk the stream counting numbers of redds and carcasses. Sometimes hatchery crew places salmon carcasses into the creek for nutrient enhancement. These fish have their tails removed so they do not get counted by the biologists.

Why do the fish open their mouths when spawning?

According to Manu Esteve, a graduate research student with UW, some authors have said that the “gape” during spawning helps the fish to remain stationary over the nest while emitting eggs or sperm. He thinks it is probably a physiological response caused by the excitement/climax that occurs during the release of eggs/sperm. Additionally, in the female’s case, it probably acts as a signal for other males in the vicinity that she is laying eggs. They do a “dance” that looks a lot like synchronized swimming to indicate that both genders are ready to spawn.

Do hatchery salmon compete with the wild salmon for food?

Yes, they do. Modern hatchery management is designed to minimize that possibility. The release during the smolting stage is timed so that the hatchery fish will migrate rapidly to the Locks, sometimes as fast as 41 miles in two days, to minimize competition with wild fish for food.

Can hatchery salmon spawn successfully in the wild?

Yes. Hatchery salmon can and do spawn successfully in the wild.

Are hatchery salmon inferior to wild salmon?

In the Issaquah Creek watershed, hatchery and naturally spawned salmon are genetically very similar based on recent research, although additional genetic studies are ongoing to determine if any stocks show significant genetic differences. This is because hatchery and naturally spawned fish breed together in the four-mile stretch of stream between Lake Sammamish and the hatchery. They are spawned together at the hatchery to ensure that the broadest genetic diversity and strength is maintained, and those fish released above the hatchery breed together in the upper watershed. Hatcheries are scrupulous about making sure the fish raised in the safety of a rearing pond reflect the whole population of the stream, with the broadest possible genetic representation. Eggs and milt are harvested

each week during the salmon run to ensure a good sample of genetics from early, middle, and late fish, and from large, medium, and small size fish.

Are the salmon statues located at the front of the hatchery representative of “dinosaur” salmon?

Most dinosaurs went extinct 65 million years ago. These statues depict the actual size of prehistoric salmon from 5-6 million years ago. Back then, some salmon were 8-10 feet long and were estimated to have weighed up to 500 pounds. They had large fangs and hunted the North Pacific waters. These statues are actually replicas of a modern-day coho salmon but are the size of salmon from 5-6 million years ago.

Does the hatchery use Darigold water in the incubation trays?

The hatchery used to use Darigold water to supplement water from the creek to pass over the incubation trays. The Darigold water comes from a deep underground well and is used to cool the butter vats at the Darigold plant on Front Street. Darigold then discharges this water directly into Issaquah Creek. (The water does not become contaminated by this process). The hatchery began collecting this water and mixing it with Issaquah Creek water to incubate the eggs when creek water was not abundant. Due to increased costs to use the water from Darigold and with the effective new filtration system that was installed in 2002, the hatchery only uses the Darigold water as a backup.

When happens to their scales when salmon enter the freshwater?

When a salmon begins its upstream migration in the freshwater, they begin to excrete a protective layer of mucus and actually resorb their scales. This mucus helps them glide over rocks and woody debris.

Are the rainbow trout here at the Issaquah Hatchery triploids?

(Triploids are fish whose eggs are exposed to high temperatures that cause the fish to become sterile, resulting in accelerated growth). The rainbow trout that are reared at the Issaquah Salmon Hatchery are not triploids and are not sterile. They are big because they eat a lot of food!

Do salmon always return to their home stream?

Although most salmon navigate to their home stream with amazing accuracy, occasionally salmon will stray from their natal streams to spawn. This could be caused by various factors, including a change in the smell of the water due to pollution or development, blockage, or sometimes, they just get lost! Sockeye are some of the best navigators with about 1 percent “strays”, while chinook are less accurate, with some Columbia River stocks straying over 40 percent of the time. “Strays” are nature’s way of restocking lost runs, such as when the eruption of Mount St. Helens wiped out all the anadromous fish in the Toutle River.

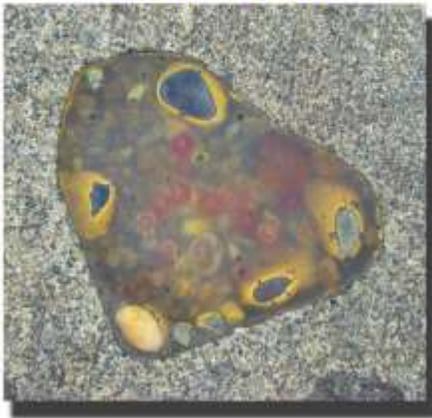
What is a kokanee?

A kokanee is a landlocked sockeye salmon. The adults spawn in streams and rivers emptying into a lake, and the hatching fry stay in the lake and never migrate to the ocean. Lakes Sammamish and Washington historically had large numbers of kokanee, since their

connection to salt water has been interrupted by glacial advances in the past. Those numbers have been diminished by habitat degradation, and their recovery is the subject of a great deal of effort in the last few years, notably by the Kokanee Work Group.

What's on the Issaquah Creek Bridge?

Salmon Redd



Great Blue Heron



Salmon Skeleton



Leaf Prints



River Otter



Not all tracks on the bridge are 100% clear and accurate

Photo credit: Beverly Lee 2011

Raccoon



(front foot)

Mink



Beaver



(hind foot)

White-Tailed Deer



(Some do not have bottom marks, which are dewclaws)

Not all tracks on the bridge are 100% clear and accurate

Photo credit: Beverly Lee 2011

SECTION 10

Tour Objectives and Teaching Tips

Students will be able to:

- Name the 5 species of Pacific Northwest salmon
- Understand and know the different stages of the salmon life cycle
- Identify the habitat needs of salmon (trees; clean, clear, cool water; food; place to spawn)
- Explain some of the ways humans impact watersheds
- Understand how and why the salmon hatchery operates

Emotional Objectives

The majority of visitors will:

- Feel good about and be interested in salmon and watersheds in general
- Feel good about the work going on at the hatchery
- Feel that protecting salmon and watersheds does indeed benefit them, their community, and the environment; that it is important

Behavioral Objectives

The majority of visitors will:

- Want to learn more about salmon
- Want to return to the salmon hatchery
- Contribute to help salmon (either monetarily to FISH or by volunteering or participating in activities that keep watersheds healthy)
- Participate in actions that help protect watershed health (e.g., picking up pet waste)

During the tour, the docent's job is to: **Welcome, Engage, Educate, and Motivate.**

Teaching Tips for Preschool through Kindergarten

- Keep interactions and statements short
- Ask simple questions, like "what kind of an animal is a salmon?"
- Keep vocabulary very basic
- Use their energy/make things kinesthetic (for example, have them "jump or swim like a salmon" or use their "tail to make a redd", etc.)
- Help them "notice" and point things out to them
- Use repetition
- Get down to eye level when possible
- Make use of props such as egg vials, salmon species glove, stuffed salmon, etc.

For preschool students, their hatchery experience is more about looking and touching than it is about listening. Talk to them with enthusiasm and excitement and ask lots of questions. See what they know. Keep them excited! Encourage them to raise their hands but don't worry if they don't. Try to learn their names. You'll have better control of the group and will keep them more engaged if you learn their names. Tell them to stay together "like a school of salmon and to swim together" so you don't get eaten by bears, orcas, herons, kingfishers, etc. **Tour should be about 30 minutes long.**

Again, remember to ask lots of basic questions to keep them engaged and tell them about what is coming up next. "Are you ready to go see some baby salmon?" "Do you want to go feed the fish?" "Do you know what an animal track is? Let's go find some!" You will lose their interest right away if you start lecturing to them or use vocabulary that is above their level. Be very animated and have fun!

Teaching Tips for 1st through 6th Grade

1st grade – 3rd grade

- Make use of props such as egg vials, salmon species glove, stuffed salmon, etc.
- All of the above suggestions for preschoolers works with this age group too!
- Encourage critical thinking through asking open-ended questions:
 - Ask questions like "what would happen if..." or "why do you think..."
 - Compare and contrast
 - Have them discuss with partners about what they observe

4th – 5th grade

- Introduce “more” scientific vocabulary such as anadromous, predation, erosion, invasive vs. native
- Make use of props such as egg vials, salmon species glove, stuffed salmon, etc.
- Encourage critical thinking through asking open ended questions:
 - Ask questions like “what would happen if...” or “why do you think...”
 - Have them discuss with partners about what they observe
- Share jokes with the participants (can use as a call and response to get attention)
 - Q: "What do you call a fish with no eye?"
 - A: "FSH"

1. Make sure you have the attention of the group. Here are some ways to get the attention of your participants:

- Find out from the teacher if they have an attention-getting signal (like “One two three, eyes on me”) or create your own and tell them before you start the tour.
- Ask a question, try whispering it
- Point to a feature and ask what they see
- If you lose the group’s attention, move to the next station
- Ask an adult chaperone for help (can be a 1:1 for a particular participant)

2. Teach by asking questions which encourages critical thinking for ALL ages

- If the group has had the in-class presentation already, they will know many of the terms, species, and stages of the life cycle. Help them review and remember by asking questions to which they might know the answers
- If the group has not had an in-class presentation, they probably will not know as much, but you can ask leading questions instead of just lecturing, such as, “Is this male or a female salmon? How can you tell?”

3. Keep participants updated on where they are going next

- You might say “Now that we’ve seen the salmon fry, let’s see how they get to the ocean” or “ The adult salmon you see here are the very few who beat the odds of survival. Who thinks they can beat the odds?”

4. Get help when you need it

- For any problems you can't solve, don't get into a confrontation. Refer people with problems to the Executive Director or the Volunteer/Communications Coordinator; business cards are in the volunteer office. Put some in your pocket to hand out if needed.
- Remember to make this a positive experience for the tour participants.

5. Promote FISH with Youth

- You can invite all students to visit again with their parents and siblings so they can teach their families all they have learned.
- Invite tour participants to “feed the fish” by dropping coins (or bills) into Finley, the bronze salmon statue next to Gilda
- Hand out brochures to teachers and parents about FISH at the end of your tour.
- Ask the students to write us letters telling what they have learned here at the hatchery.
- Ask questions to help kids make their own discoveries and feel good about it — DON'T just tell them what you know
- Let curiosity guide your interactions with participants
- Have kids tell you what they know, what they've seen, what they've done before
- Think about how to answer questions; sometimes you might want to give the answer right off, other times it's better to challenge kids to figure the answer out on their own or with some help
- Don't be afraid to say “I don't know.”
- Get everyone involved — from the kid in the stroller to the grandparent or “underwhelmed” teenager. One way to do this is to use different levels of vocabulary and different levels of questions.

Questioning and Extended Thinking

Types of questions to ask:

- Recalling (especially great if they've been before or had the in-class presentation): Who, what, where, when, why, how ...?
- Identifying Attributes and Components: What are the characteristics/parts of ...?
- Predicting (especially for 4th grade and up): What might happen if ...?

Tips on questioning:

- Remember to wait at least 5 seconds for students to think; don't be afraid to wait 10 seconds or more even. Sometimes the quiet students need more time to get the courage to speak up.
- Ask follow-ups: For example, Why? How do you know? Can you give me an example? Can you tell me more? Do you agree?
- Call on students randomly and avoid the pattern of only calling on the few students with their hands up, or the first to raise their hand. Wait a few seconds and see who else raises their hand or shares
- Play devil's advocate.
- Encourage students to generate their own questions.