

Salmonids of Washington

A) Native Species

1) Pacific Salmon-Genus *Oncorhynchus**

a) **Chinook**--king, tyee, spring; Skagit River (Spring, Summer and Fall stocks**), Samish River (Fall stock**)

b) **coho**--silver; Skagit River, Samish River, Colony Creek

c) **chum**--dog, keta, silverbrite; Skagit River, Samish River, Colony Creek

d) **pink**--humpy or humpback; Skagit River; mainly in odd years

e) **sockeye**--red; small numbers in Skagit River (riverine stock); usually associated with rivers having lakes (for juvenile rearing, lacustrine stocks) in watershed as in Baker Lake of the Baker River of the Skagit River Watershed. *all are anadromous (migratory with freshwater and marine stages of life cycle) and semelparous (die after spawning); includes resident stocks (kokanee is a non-migratory sockeye of Lake Whatcom, Baker Lake and Lake Samish).

**based on time of migration of adults into fresh water; Spring stocks spawn in middle to late summer; Summer stocks spawn in late summer; Fall stocks in early to middle fall.

2) Trout-Genus *Oncorhynchus****

a) **rainbow**--includes anadromous steelhead; Skagit River, Samish River

b) **cutthroat** --includes anadromous sea-run cutthroat; Skagit River, Samish River, Colony Creek

3) **Char-Genus *Salvelinus* *** Dolly Varden and bull char**--includes anadromous populations; Skagit River

4) **Whitefish-Genus *Coregonus**** mountain whitefish**--none anadromous; Skagit River Watershed headwaters

B) Non-Native Species (Exotic)

1) Trout-Genus *Salmo****

a) **Atlantic salmon**--anadromous; common in marine aquaculture (net pens); native to eastern Canada, New England, Greenland and western Europe

b) **brown trout** --native to Europe and western Asia where it may be anadromous; introduced to freshwaters throughout North America.

2) Char-Genus *Salvelinus****

a) **brook trout**--native to northeastern North America where it may be anadromous; introduced to freshwaters in western North America.

***not semelparous, but iteroparous (may spawn more than once)

Characteristics of Pacific Salmon, Rainbow Trout (Steelhead), Cutthroat Trout (Sea-Run), Dolly Varden Char and Bull Char

Scientific Name: *Oncorhynchus tshawytscha* **Common Name:** Chinook salmon; aka king, tyee, blackmouth

Size 4 kg-30kg **Life Cycle:** Three to seven years; juvenile Chinook (depending on the population) remain in freshwater for varying lengths of time (a few months to a year) before migrating to the ocean, most return to spawn in their fourth or fifth years.

Physical Description:

Marine Phase

Bright silver, lightly spotted, black gums and mouth, V-shaped, fully spotted tail (dorsally and ventrally).

Spawning Phase

Dark in color, some dark reddish, others almost black.

Scientific Name: *Oncorhynchus kisutch* **Common Name** coho salmon; aka silver salmon

Size: 2.5kg-8kg **Life Cycle:** Three years, prefer small streams for spawning; juveniles remain in streams for at least a year before migrating to the ocean; most spend two years in the ocean.

Physical Description:

Marine Phase

Bright silver, lightly spotted; white gums and mouth, black tongue; spots only on the upper portion of square tail.

Spawning Phase

Very Red on the sides, especially males, often dark on belly; females are less strongly colored; males have hooked upper jaw.

Scientific Name: *Oncorhynchus keta* **Common Name** chum salmon; aka dog salmon, keta, silverbrite, calico salmon

Size: 3 kg-10kg **Life Cycle:** Three to five years; fry migrate to estuary soon after emergence from gravel, remain along nearshore for the first summer

Physical Description:

Marine Phase

Silvery sides faintly spotted; a white tip on the anal fin; tail has a narrow base (caudal peduncle) where it joins body.

Spawning Phase

Mature fish have reddish purple streaks and large pale blotches on a pale background; White on tips of pelvic and anal fins; males have large, hooked jaws with large "canine" teeth.

2.

Scientific Name: *Oncorhynchus gorbuscha* **Common Name** pink salmon; aka humpy or humpback

Size: 2.2kg **Life Cycle:** Two years; fry migrate to ocean soon after emergence; more abundant in northern streams in even-numbered years and in southern waters in odd-numbered years. Only salmon with precise two year life cycle.

Physical Description:

Marine Phase

Large oval spots on body, tiny scales; V-shaped tail has large oval spots.

Spawning Phase

Mature males are yellowish gray on sides, blotched with brown and dark along back; pronounced dorsal hump (humpy); females have little or no humped back; both are dirty white below the lateral line; tails have large oval spots.

Scientific Name: *Oncorhynchus nerka* **Common Name** sockeye salmon; aka red salmon; kokanee is a sockeye that remains in a lake throughout its life cycle.

Size: 2.2kg-3.5kg **Life Cycle:** Three to four years; juvenile sockeye remain in a lake (lacustrine) for one year or more before migrating to ocean; some populations spawn in rivers (riverine) and juveniles migrate within a few months to the ocean.

Physical Description:

Marine Phase

Almost toothless; slim, silver-blue, streamlined body; no spots on tail.

Spawning Phase

Bright scarlet with a green head as they reach the spawning grounds; female usually are less brightly colored.

Scientific Name: *Oncorhynchus mykiss irideus* **Common Name:** coastal rainbow and steelhead (anadromous type); **Size:** 3kg-10kg (anadromous type) **Life Cycle:** Several years before first spawning (spring); steelhead remain in fresh-water for one to three years and then migrate far into the Pacific and spend one to three years in saltwater. May spawn more than once (iteroparous)

Physical Description (Steelhead):

Marine Phase

Metallic blue on back, silvery on sides, small black spots on the upper body; wide tail base, square tail with uniform spots

Spawning Phase Spawning males have a pink or red band on side; females are more subdued in color

Scientific Name *Oncorhynchus clarki clarki* **Common Name** coastal cutthroat and sea-run cutthroat (anadromous) **Size:** 1 kg-2 kg(anadromous)

Life Cycle: Several years before first spawning (spring); exist as resident (stream and lake) and anadromous populations; sea-run cutthroat migrate back

3.

and forth between freshwater (overwinter) and nearshore for feeding; never venture far from natal stream; may spawn more than once (iteroparous)

Physical Description (Sea-run): Bright silver coloration on entering freshwater resemble a small steelhead but more heavily spotted including head and ventral body; orange-red mark under lower jaw not as pronounced as in resident cutthroat

Until the late 1980s, rainbow trout and cutthroat trout were in the genus *Salmo*, now the genus only for other trout (Atlantic salmon and brown trout). Close examination of a number of characteristics revealed that they were more similar to the Pacific salmon of the genus, *Oncorhynchus*; *O. mykiss gairdneri* is the redband rainbow of the Columbia Basin. *O. clarki lewisi* is the westslope cutthroat of the western Rocky Mountains. Common for planted rainbow to hybridize with native cutthroat

Scientific Name: *Salvelinus malma* **Common Name:** Dolly Varden char or Dolly Varden trout **Size:** 2 kg-5 kg

Life Cycle: exist as stream resident (high in watershed) and anadromous populations; anadromous type migrates to nearshore for a few months, returns to spawn in the fall and overwinters in freshwater; may spawn more than once (iteroparous)

Physical Description: No black spots; brightly colored when spawning (Dolly Varden is a brightly clothed character in a Charles Dickens' novel); small red or orange spots over greenish to grayish blue body; ventral fins orange with a white anterior border; Silvery color when in ocean obscures spotting

Scientific Name: *Salvelinus confluentus* **Common Name:** bull char or bull trout **Size:** 2 kg-8 kg

Life Cycle: exist as stream and lake resident (high in watershed) populations and anadromous populations; anadromous type migrates to nearshore for a few months, returns to spawn in the fall and overwinter in freshwater; may spawn more than once (iteroparous).

Physical description: No black spots; color is highly variable but body grayish green; body covered by white or pale yellowish spots and some pink and red spots; silvery in ocean; relatively large head is flattened

Until 1978, Dolly Varden and bull char were considered one species but meristics (countable anatomical characters) and genetics revealed each is a valid species. Likewise, in Alaska, Dolly Varden have been misidentified as Arctic char and the reverse.

Pacific Salmon Spawning Characteristics (compiled by Lori Kyle, Skagit Conservation District)

Species	Spawning Water Velocity	Substrate	Depth	Part of River	Rearing Site	Incubation Time (days)	Emergence	Time in Fresh	Time in Salt	Return to Fresh
Chinook	High	Silt-coarse	7.5-15"	Main stem	Main stem	Fall: 90-150 Spring: 90-150	March-April	Fall: 60-120 days Spring: 1-2 years April, July-May	2-4 years	Spring: April Summer: July Fall: November
Coho	Variable	Coarse sand to cobble	1 ½-12"	Tribs	Small side channels/slack water	80-150	April-May	1-2 years (12-14 months) May-June	1-2 years	Late fall
Sockeye	Calm to moderate	Gravel/sand	3-12"	Inlet/outlet of lakes	Lakes	90-150	April-May	1-3 years	1-4 years	Mid summer
Pink	Moderate to brisk	1 ½-3" gravel	12-39"	Small side channels	Estuaries/ Saltwater	90-150 odd years only	Late January April-May	0 go directly to salt	2 years	Early fall
Chum	Moderate	¼-1" gravel	5-19"	Main stem Tribs Lower reaches	Saltwater	90-150	Late February April-May	0 go directly to salt	2-3 years	Early to late fall
Steelhead	Moderate variable		-----	Tribs and small rivers	Tribs	50-150	June-July	1-4 years	1-4 years	Early summer and early winter
Cutthroat	riffle		7"	Tribs and small rivers	Tribs	90-150	June-July	1-4 years	1 year	Fall and winter

Major predators:

Juveniles- Artic char, dolly varden, larger salmon, sculpins, squawfish, crows, mergansers, osprey terns, gulls

Adults- Pacific halibut, Pacific whitesided dolphin, orca, humpbacks, belugas, bears, eagles, gulls, harbor seals, northern fur seal, sea lions, humans

Feed on:

General- Young: larvae of crabs, barnacles and other invertebrates, dislodged eggs

Adults: sand lace, herring, other salmon, rockfish, squid

Chinook: aquatic insects, small invertebrates, small fish, juvenile salmon

Coho: aquatic insects, worms, crayfish, midges, flies (this spp very competitive)

Sockeye: plankton – school-often intermix with chums and/or pinks **Pink:** aquatic insects, small invertebrates school-coastal

Chum: small invertebrates **Steelhead:** small fish, invertebrates – voracious eater **Cutthroat:** invertebrates and small fish

Adapted form *Adopting a Stream: A Northwest Handbook* by Steve Yates. (Seattle: Adapt-A-Stream Foundation, 1988)



FACT SHEET

WASHINGTON DEPARTMENT OF FISH AND WILDLIFE
600 Capitol Way North, Olympia, WA 98501-1091

June, 1998

Why Puget Sound Chinook Face "Threatened" Listings

Three factors are responsible for the decline of Puget Sound's once robust chinook salmon runs:

- Freshwater degradation
- Excessive harvests
- Ocean conditions

In the late 1970s, nine of 25 Puget Sound chinook stocks were in poor condition. Currently, 22 of the 25 stocks fail to meet spawning goals.

In more detail, here is how each of the factors has caused the rapid decline of Puget Sound chinook:

Freshwater degradation

The degradation and manipulation of rivers and streams flowing into Puget Sound may be the most important cause of the decline of the region's chinook runs. That is because chinook spawn in the main channels and large tributaries of the state's large rivers. These are the places heavily degraded by floods as well as dams, levies and other flood control devices.

Floods can destroy chinook eggs in several ways:

Natural causes

Chinook eggs incubate in river bed gravel for several months. Strong flood waters sweeping over the nests can bury, suffocate with sediment or wash away the eggs.

Man-made causes

While flooding is natural, its effects have been made worse by human developments on the rivers. Those developments include dikes, riprap on banks and bridge crossings which constrict rivers' natural flows. These constrictions prevent rivers from expanding over their natural flood plains. The constrictions force the flooding rivers' energy downward into the gravel. The straightening of rivers also makes flood waters

more powerful. The powerful downward pressure of the water scours the salmon nests.

Stream bank trees and bushes play an important role in flood control. The vegetation stabilizes stream banks, prevents erosion, filters debris and helps control and energy of floods. Riprapping banks or constructing levies removes this important vegetation.

The loss of forests along rivers and streams and some logging practices can make flooding worse. For example, logging roads cut on steep slopes or on flood plains can release debris that fills nearby rivers with sediment and gravel. Dams and withdrawals of water from rivers for agricultural, industrial or municipal uses can change their natural flows, creating mounds of gravel which worsen the effects of floods by raising the level of the stream bed.

After hatching, young chinook face other potentially deadly hazards in rivers for up to a year before going to sea. They include: loss of wetlands, pollution, high water temperatures, low water levels, altered flows due to dam operations and loss of estuaries.

Adult chinook returning from the sea face many of the same hazards, especially since the salmon generally migrate inland when rivers are flowing at their lowest levels of the year. Dams also can block adult salmon from prime spawning areas in state rivers.

Logging practices that remove trees from river banks affect adult and young chinook. Chinook rely on logs and branches to form pools that provide protection from predators.

The overall loss of freshwater habitat in the Puget Sound region is significant, cumulative and widespread. It cannot be restored easily, quickly or cheaply. More land will be urbanized as the state's population grows, causing the pressures on chinook and other salmon and wildlife species to increase.

Ocean survival

Chinook are not thriving in the saltwater stage of their lives. It may be because of unusually warm water, lack of food or other factors. Improvement in ocean conditions alone is not likely to improve the health of these chinook stocks.

Overharvest

Past chinook harvest rates have been too high. Reduced harvest rates in recent years have failed to return more wild chinook to the spawning gravel.

The chinook stocks in the worst shape are from the Nooksack (north and south forks), Dungeness and Stillaguamish (south fork) rivers. Other runs failing to meet spawning goals for several consecutive years are from the Skagit (spring), Skagit (summer/fall), Stillaguamish (north fork), Snohomish, White, Elwha and Hood Canal rivers plus Lake Washington chinook.

Salmon Trivia

From:

<http://www.northstar.k12.ak.us/schools/upk/chena/salmon/trivia.html>

Did you know that...

1. Salmon as alevin must be quick and careful because big fish, like trout and char, would like to eat them.
2. People would long ago make boots of salmon skin.
3. For thousands of years, the cycle of salmon has worked very well. They have filled the rivers full.
4. All salmon are different colors.
5. Salmon are animals.
6. Salmon lay 2,000-4,000 eggs (these can be used for bait)
7. There are different kinds of salmon: chinook, sockeye, coho, chum and pink.
8. Baby salmon swim in groups, and feed on tiny plants and animals.
9. Baby salmon change by temperature in water.
10. Salmon have a great sense of smell, hearing and taste. These help them find food and sense danger.
11. Salmon also feel waves on their body to sense danger.
12. The northern Pacific Ocean is home to five different kinds of salmon.
13. The humpy or pink weighs an average to 4 lbs; the chum or dog salmon weighs about 9 lbs.
14. Fish in one run may have different weights and sizes; a three year old may weigh 4 lbs, while a seven year old might weigh 50 lbs.
15. Jacks are small kings, usually males, that mature after spending only one winter in the ocean.
16. Salmon from many rivers swim together in the same areas through much of their ocean going life.

By: Jessica, Kambrea, and Leah

Glossary of Terms

From: <http://www2.northstar.k12.ak.us/schools/upk/chena/salmon/glossary.htm>

alevin	newly hatched salmon; the yolk sacks are still attached (see Salmon Life Cycle and Protecting Salmon)
anadromous	A fish that spends part of its life in fresh water and part of its life in salt water (see Salmon Life Cycle)
anterior	The front part of the fish - contains the head and the gills (see Exterior Anatomy)
caudal fin	The fin located at the hind end of the fish (see Exterior Anatomy)
chinook	The largest species of the Pacific salmon, also commonly called "King." Adults weigh about 22 pounds (10 kg) and are generally 36 inches (91 cm) long. Some chinook can exceed 100 pounds. (see Salmon Trivia)
chum	Also called Dog Salmon since they are commonly dried and used for feeding dog teams during winter. Chum salmon are common in the Chena. (see Salmon Trivia)
coho	A species of Pacific salmon. In the Yukon River drainage, coho are found mostly in the Porcupine River system, although they are found occasionally in the Dawson City area (see Salmon Trivia)
dog salmon	Nickname for the Chum Salmon, above (see Salmon Trivia)
dorsal fin	The fin or finlike parts on the back of the salmon (see Exterior Anatomy)
estuary	The inlet of the sea (the place where the ocean and the river meet; see Salmon Life Cycle)
fry	Young salmon who can swim and catch their own food (see Salmon Life Cycle and Protecting Salmon)
fish wheel	A trap-like basket made to sit along the edge of a river, and as the current turns the baskets, they scoop up migrating salmon and dump them through a shoot into a basket (see Fish Wheels)
gill	The part of the body of a fish by which it breathes in water. Oxygen passes in and carbon dioxide passes out through the thin membranous walls of the gill (see Exterior Anatomy)
gill netting	The process of catching fish by a net which catches the gills of the fish, trapping them inside (see Fishing for Salmon)
hatchery	A place for hatching eggs of fish and allowing them a place to grow until they are better able to survive on their own in the ocean (see Protecting Salmon)
humpback	The "nickname" for a pink salmon. The male pink salmon develops a pronounced hump on his back as he ages (see Salmon Trivia)
imprinting	The process through which young fry "memorize" details about their home streams. As adult spawners, they use this knowledge to find their way back
king	The name given to the chinook salmon because it is the largest species of salmon

in the world. King salmon are found in the Chena. (see [Salmon Trivia](#))

- milt** The milky sperm the male salmon releases to fertilize the eggs (see [Salmon Life Cycle](#))
- mooching** A method of fishing in which you leave your bait on the bottom and jerk it upwards periodically to attract fish (see [Protecting Salmon](#))
- parr** A baby salmon with large dark spots on their sides for camouflage. Salmon parr usually live in freshwater for 1 to 2 years (see [Salmon Life Cycle](#))
- pink** A species of salmon with very large spots on their backs with large, oval black blotches on both lobes of their tails. Their scales are very small. The spawning adults take on a dull gray coloration on the back and upper sides with a creamy-white color below. The males develop a pronounced hump on their backs and are sometimes called "humpbacks." (see [Salmon Trivia](#))
- posterior** The back part of the fish, mainly the tail which allows it to swim (see [Exterior Anatomy](#))
- redd** A salmon nest, dug out of the gravel in the stream bed by the adult female (see [Salmon Life Cycle](#))
- scales** Thin, small, overlapping plates which protect the salmon's body. Scales grow in regular concentric patterns and can be used to determine the age and life history of a salmon (see [Exterior Anatomy](#))
- smolt** Young salmon, migrating downstream from freshwater to saltwater. When parr become smolts, they lose their spots and turn silvery (see [Salmon Life Cycle](#) and [Protecting Salmon](#))
- sockeye** A species of salmon also known as the "red" salmon. They have a dark blue-black back with silvery sides. There are no distinct spots on their backs, dorsal fins, or tails. The spawning adults develop dull, green colored heads with brick red to scarlet bodies. The male develops a hooked nose (see [Salmon Trivia](#))
- spawn** To bring forth a new generation of salmon by digging nests in the stream bed and depositing fertilized eggs into them (see [Salmon Life Cycle](#))
- subsistence** The process of catching fish for the purpose of survival. There are special rules and methods which are allowed when a person is subsistence fishing vs. sport fishing (see [Fishing for Salmon](#))
- swim bladder** A sac inside the salmon's body by which the fish can control buoyancy (see [Internal Features](#))
- ventral** Having to do with the belly part of the fish's body (see [Exterior Anatomy](#))
- weir** A fence-like fish trap placed across a stream or outlet forces fish to swim into waiting traps (see [Fishing for Salmon](#))
- yolk sac** An external pouch containing nutrients for the growing alevin. When the yolk sac is used up, the alevin is said to be "buttoned-up" and enters the fry stage (see [Salmon Life Cycle](#) and [Protecting Salmon](#))

Glossary for Stream Ecology

Benthic

Occurring at the bottom of a body of water. A stream's benthic macroinvertebrates.

Community

All the organism occupying a particular area; an assemblage of populations living close enough together to potentially interact; also see population.

Ecosystem

An ecological unit consisting of both the biotic (living) communities and the abiotic (nonliving) environment. The two components interact to produce a system in a form of dynamic equilibrium involving two fundamental processes, energy flow and chemical cycling.

Glide

Area of slow moving water but faster than in a pool.

Food Chain

A sequential series of organisms in which each is dependent on the next in the series as a source of food. Each sequential series representing a trophic level of organisms that have the same function in the food chain.

Food Web

An interacting system of food chains in an ecological community.

Hydrology

The branch of science concerned with the properties of the earth's water; especially its movement in relation to land.

Hydrologic Cycle

The continual movement of water above, on and below the surface of the earth in a cycle. The water existing in one of its three forms as a liquid, a vapor or a solid (ice) at particular places in the cycle.

Index of Biological (or Biotic) Integrity (IBI)

A determination of a stream's biological health or condition based on a multimetric analysis of the assemblage of its organisms (species richness) having particular water quality requirements. An IBI is often based on the assemblage of fish or benthic macroinvertebrates. It is an alternate to a determination of a stream's biological condition or health based on the stream's chemical and physical parameters such as dissolved oxygen, pH, temperature and turbidity.

Large Woody Debris (LWD)

The large, organic material (limbs, trunks and root wads) deposited in streams by natural processes. LWD provides for stream complexity; functions to provide shelter for fish, retention of spawning gravel, creation of pools for hiding and resting, stream bank protection, creation of side channels, sites for macroinvertebrates. LWD accumulates to form log jams in rivers. Stream restoration often involves the placement of LWD that may be anchored to the bank or stream bed but the LWD does not dam the flow. Coniferous species (cedar, fir, hemlock and spruce) are the preferred LWD because of their slower rate of decay compared to deciduous species (alder and poplar).

2.

Limiting Factors

Features of the ecosystem that limit the production of fully sustainable populations of a particular species; e.g., water quality, water quantity, food source, predators, amount of suitable or optimum habitat.

Lentic

Habitats or organisms in still, freshwater such as lakes, ponds and marshes.

Lotic

Habitats or organisms in flowing freshwater such as rivers and creeks.

Macroinvertebrate

A broad category of the larger invertebrates; commonly with reference to aquatic arthropods (insects, crustaceans), mollusks (snails), annelids (leeches). May be restricted to aquatic insects where the EPT (richness of members of three orders of insects, the Ephemeroptera (mayflies), Plecoptera (stoneflies) and Trichoptera (caddisflies)) is indicative of high water quality.

Native Species

A species of animal or plant indigenous to the local area.

Natural Landscape Processes/Functions

Those processes/functions existing prior to human disturbance(s). Processes and functions are typically measured as rates and characterize what an ecosystem or its components does. The processes and functions in a forested mountain river basin of the temperate climatic zone primarily center around vegetation, water and sediment. For example, in a riparian zone ecosystem, this might include large woody debris recruitment, stream temperature control through shading, detention of surface water, retention of subsurface water, control of stream bank erosion, carbon and inorganic nutrient cycling, and others.

Nonnative or Exotic Species

A species not native to the local area. Local plant examples are Japanese Knotweed, Reed Canary Grass, Himalayan Blackberry, Purple Loosestrife, Spartina (cordgrass).

Pool

Deeper water of lower velocity and with a stream bottom of gravel and sand. Important role is as resting and hiding place for fish. For salmonids, a riffle to pool ratio of 1 to 1 is often ideal.

Population

A group of organisms of the same species occupying a specific geographic area and likely to share a common gene pool (interbreed).

Riffle

Shallow areas of high velocity, well oxygenated water with a stream bottom of gravel and cobble that provides the optimal conditions for stream macroinvertebrates and spawning salmonids. A riffle is often just upstream of LWD and a pool is just downstream.

Riparian Planting or Revegetation

The planting of a mixture of native shrubs (willow, red osier dogwood, elderberry, salmonberry, snowberry, ninebark, twinberry, ocean spray, vine maple) and trees (cedar, fir, spruce, hemlock, alder) to restore the riparian zone function.

3.

Riparian Zone

The terrestrial area adjacent to a river, creek, lake, pond, marsh, bog or estuary (the wetland complex) and in which rooted plants can grow. These plants may be dependent on the water table provided by such waters.

Riparian Zone Functions

Provides large woody debris and organic detritus (especially from deciduous plants), stabilizes the stream bank to minimize bank erosion, provides shading to reduce solar warming of water, wildlife habitat and migration corridor, biofiltration of surface and groundwater, prolongs release of groundwater into stream to maintain flow.

Run

Fast flowing area that is too deep to create white water riffles. Stream bottom consists of gravel, cobble and large rock.

Salmonid

Fish belonging to the family Salmonidae. Pacific salmon (Chinook, coho, chum, pink, sockeye); trout (steelhead and resident rainbow, sea-run and resident cutthroat); char (Dolly Varden, bull trout); and whitefish (mountain whitefish) are native salmonids of Skagit County.

Sinuosity

The extent to which a stream channel meanders from a straight pattern.

Species

A group or population of anatomically similar organisms that interbreeds or have the potential to interbreed (can share a common gene pool), share a common ancestry and are reproductively isolated from all other such groups.

Stream Reach

A section of a river or stream. A reach can be monitored for physical and chemical characteristics (abiotic) and animal and plant species (biotic) and compared to other reaches in the same or in another stream. Monitoring provides information on the types of restoration activities that are necessary to improve the ecological function. Features along a reach that provides important habitat for stream organisms are riffles, pools, runs and glides.

Thalweg

The lowest continuous points along a stream bed and represents the path of maximum water depth.

Trophic Groups or Levels

The autotrophs (organisms capable of producing nutritional organic substances from simple inorganic substances such as carbon dioxide) such as algae and rooted plants upon which feed the heterotrophs (organisms receiving their nutrition from complex organic substances) such as the shredders, collector-gatherers, filter-collectors, scrapers, predators and decomposers as the food chain is ascended.

Watershed

The entire area of land that drains water, sediment and dissolved materials to a common outlet such as a stream, river, lake, ocean or other body of water.

Glossary for Salmon and Trout Biology

ADAPTATION

A physiological, behavioral, ecological or anatomical modification or trait in an organism that makes it more likely to survive under the conditions of the environment.

ALEVIN (SAC FRY)

The stage of a salmonid's life cycle between egg and fry. The alevin remains in gravel until the yolk sac is completely used as the source of the alevin's nutrition. The button up fry (emergent fry or swim up fry) then enters the open stream water to feed on stream nutrients.

ANADROMOUS FISH

A migratory fish whose life cycle involves spawning and a period of juvenile rearing in fresh water followed by a period of salt water residence for growth and sexual maturation prior to spawning in fresh water; e.g., Pacific salmon, steelhead, sea-run cutthroat.

BROODSTOCKING

Supplemental production of a salmonid stock by taking eggs and milt from wild fish (produced by natural production). These adults represent the parent broodstock generation. The genetic profile of each broodstock parent is determined prior to taking eggs or milt to ensure that each parent represents the stock to be enhanced. Their offspring are hatchery reared for subsequent release or are held in a closed containment facility to complete their life cycle. These adults then become the next parental broodstock generation. Another method now employed for recovery of Nooksack South Fork early Chinook is the collection of wild juveniles (natural production) in the South Fork; establish by the genetic profile that each juvenile is a South Fork early Chinook and not a North Fork early Chinook or a hybrid; then rear each true South Fork juvenile in freshwater or a sequence of freshwater followed by salt water until each fish is reproductively mature (2-3 years); then collect eggs and milt from this broodstock to produce the next generation which can be used to repeat the process or released for the natural life cycle. Broodstocking is done to accelerate production of endangered or threatened stocks because natural production is too low to have a self sustaining population.

CANDIDATE SPECIES

A species whose status under the federal Endangered Species Act is being monitored because it has the potential to be threatened or endangered. Also see endangered species and threatened species. Example, Puget Sound coho

COMPOSITE STOCK

A stock sustained by wild (natural spawning and rearing) and cultured (artificial) production; e.g., Skagit River coho; also see cultured stock and wild stock.

CULTURED STOCK

A stock sustained by production in a hatchery or other artificial production facility; e.g., Samish River Fall Chinook; also see wild stock and composite stock.

COMMUNITY

All the organism occupying a particular area; an assemblage of populations living close enough together to potentially interact; also see population.

ECOSYSTEM

An ecological unit consisting of both the biotic (living) communities and the abiotic (nonliving) environment. The two components interact to produce a system in a form of dynamic equilibrium involving two fundamental processes, energy flow and chemical cycling.

ENDANGERED SPECIES

Under the federal Endangered Species Act, "in danger of extinction throughout all or a significant portion of its range". Section 9 of the ESA prohibits the "take" of an endangered species. "Take" includes to "harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect or attempt to engage in such conduct". It is also illegal to "posses, sell, deliver, carry, transport, or ship any species that has been taken illegally". Also see candidate species and threatened species. Examples are Snake River sockeye, Upper Columbia River spring Chinook.

EVOLUTIONARY SIGNIFICANT UNIT (ESU)

"A population of salmonids that; 1) is substantially reproductively isolated from other populations of that species and 2) represents an important component of the evolutionary legacy of that species." As defined by National Oceanic and Atmospheric Administration (NOAA) Fisheries, aka National Marine Fisheries Service.

EXOTIC SPECIES (NON-NATIVE SPECIES)

A species not native to Washington State; e.g., Atlantic salmon, brown trout, brook trout.

FECUNDITY

The number of eggs produced by a spawner.

A juvenile salmonid that has emerged from the gravel and is living in the stream. The stage of the life cycle between alevin and parr; also see alevin, parr and smolt.

KEYSTONE SPECIES

A species that is a major contributor to maintaining the richness in the number of other species (biodiversity) in a community. Sometimes called an "Indicator Species" because of requirement for high quality habitat. Salmonids are considered keystone or indicator species.

LIMITING FACTORS

Features of the ecosystem that limit the production of fully sustainable populations of a particular species; e.g., water quality, water quantity, food source, predators, amount of suitable or optimum habitat.

MACROINVERTEBRATE

A broad category of the larger invertebrates; commonly with reference to aquatic arthropods (insects, crustaceans), mollusks (snails), annelids (leeches). May be restricted to aquatic insects where the EPT (richness of members of three orders of insects, the Ephemeroptera (mayflies), Plecoptera (stoneflies) and Trichoptera (caddisflies)) is indicative of high water quality.

MIXED STOCK

A stock whose individuals (e.g., Samish River coho and chum) originated from interbreeding of fish from native and non-native stocks. Also see native stock and non-native stock.

NATURAL LANDSCAPE PROCESSES/FUNCTIONS

Those processes/functions existing prior to human disturbance(s). Processes and functions are typically measured as rates and characterize what an ecosystem or its components does. The processes and functions in a forested mountain river basin of the temperate climatic zone primarily center around vegetation, water and sediment. For example, in a riparian zone ecosystem, this might include large woody debris recruitment, stream temperature control through shading, detention of surface water, retention of subsurface water, control of stream bank erosion, carbon and inorganic nutrient cycling, and others.

NATIVE SPECIES

A species indigenous to Washington State; e. g., Chinook, chum, coho, pink and sockeye salmon, cutthroat trout, steelhead, bull trout, Dolly Varden. Also see exotic species.

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NATIVE STOCK

An indigenous stock (e.g., Skagit River Chinook, coho, chum, pink, sockeye, steelhead, sea-run cutthroat, bull trout, Dolly Varden) whose genetic composition has not been significantly affected by interbreeding with non-native stocks. Also see mixed stock and non-native stock.

NON-NATIVE STOCK

A stock (e.g., Samish River fall Chinook) that has become established outside its original range. Also see mixed stock and native stock.

PARR (FINGERLING)

A juvenile salmonid larger than the fry stage of the life cycle and between the fry and smolt stages. In most species, characterized by parr marks (dark vertical bands) on sides of body; also see fry and smolt.

POPULATION

A group of organisms of the same species occupying a specific geographic area and likely to share a common gene pool (interbreed).

REDD

Site in the stream gravel where a female digs a series of nests where the eggs are deposited, fertilized and covered with gravel prior to the incubation.

RIPARIAN ZONE

The terrestrial area adjacent to a river, creek, lake, pond, marsh or bog and in which rooted plants can grow and these plants may be dependent on the water table provided by such waters.

SALMONID

Freshwater and anadromous fishes belonging to the Family Salmonidae; Northern Hemisphere. Pacific salmon, trout, char, whitefish, grayling. Common genera are *Oncorhynchus* (Pacific salmon, steelhead and cutthroat), *Salmo* (Atlantic salmon and brown trout), *Salvelinus* (chars; Dolly Varden, bull trout and lake trout), *Coregonus* (whitefish) and *Thymallus* (grayling).

SEMELPAROUS

Dies after spawning once; e.g., all five species of eastern Pacific Ocean salmon. Steelhead, coastal cutthroat, bull trout and Dolly Varden are **Iteroparous** and may spawn more than once.

SMOLTA juvenile salmonid undergoing physiological, anatomical, behavioral and ecological changes in the transition from living in freshwater to living in seawater;

5.

also see Parr. The process is smoltification in which there is the loss of parr marks, adaptations for salt and water balance in sea water and the increased silvering of the body, especially ventral.

SPECIES

A group or population of anatomically similar organisms that interbreeds or have the potential to interbreed (can share a common gene pool), share a common ancestry and are reproductively isolated from all other such groups.

STOCK

Those fish of a single species spawning in a particular stream or lake at a particular time and which do not interbreed to a significant extent with any other population of the same species spawning in another location (spatial segregation) or in the same location at a different time (temporal segregation); e.g., Skagit River spring Chinook and Skagit River fall Chinook (temporal and spatial segregation), Skagit River coho and Samish River coho (spatial segregation).

THREATENED SPECIES

Under the federal Endangered Species Act, "likely to become endangered within the foreseeable future throughout all or a significant portion of its range". In the ESA, the 4(d) Rule can be applied to a threatened species to provide limits on Section 9 take prohibitions providing the activities or programs adequately protect the threatened species. Also see endangered species and candidate species. Example, Puget Sound Chinook , an ESU; Puget Sound Steelhead, an ESU. Puget Sound bull trout , an ESU.

WILD STOCK

A stock (e.g., Skagit River Chinook, chum, pink , riverine sockeye, sea-run cutthroat, bull trout, Dolly Varden) sustained by natural spawning and rearing in the natural habitat and regardless of the stock's origin (native, mixed or non-native). Also see composite stock and cultured stock.