



Chapter 10

Glossary



10. Glossary

A-race/B-race—Terms related to timing and distribution of adult steelhead in the Columbia River System. A-race refers to those summer steelhead that enter the Columbia River in early August and are destined for tributaries throughout the Columbia. B-race refers to those that enter in late August through October and are destined primarily for tributaries of the Snake River.

Adaptive migration strategy—An approach that balances the passage of fish between in-river and transport methods. This strategy addresses concerns about risks and effectiveness associated with bypass-only and transport-only approaches. It allows flexibility for implementing operational changes within a migration season, if necessary.

Aesthetics—Of or pertaining to the sense of beautiful.

Agricultural land tenure—Land owned, used, or held for agricultural purposes.

Algae—Photosynthetic organisms lacking multicellular sex organs.

Alternative 1—Existing Conditions—The existing hydrosystem operations under the National Marine Fisheries Service’s 1995 and 1998 Biological Opinions. The Corps would continue to increase spill and manipulate spring and summer river flows as much as possible to assist juvenile salmon and steelhead migration. Juvenile salmon and steelhead would continue to pass the dams through the turbines, over spillways, or through the fish bypass systems. Transportation of juvenile fish via barge or truck would continue at its current level.

Alternative 2—Maximum Transport of Juvenile Salmon—The existing hydrosystem operations plus maximum transport of juvenile salmon, without surface bypass collectors. The number of juvenile fish transported via barge or truck would be increased to the maximum extent possible.

Alternative 3—Major System Improvements—The existing hydrosystem operations and adaptive migration measures for juvenile salmon and steelhead, but with additional major system improvements (such as surface bypass collectors) that could be accomplished without dam breaching.

Alternative 4—Dam Breaching—Near-natural river drawdown of the four lower Snake River reservoirs.

Ambient air quality standards (AAQSs)—Standards required by the Federal Clean Air Act and enforced by the U.S. Environmental Protection Agency that protect public health, provide for the most sensitive individuals, and allow a margin of safety by setting an acceptable level for measured pollutant concentrations. AAQSs cannot take into account the cost of achieving the standards.

Anadromous fish—Fish, such as salmon or steelhead trout, that hatch in fresh water, migrate to and mature in the ocean, and return to fresh water as adults to spawn.

Assumption sets—When running the lifecycle model to generate future salmon population levels, several choices must be made regarding the magnitude of particular sources of mortality, routes of fish passage, flow rates, and so on. A complete set of these assumptions, used to generate 4,000 replicate Monte Carlo simulations of the effect of an alternative hydrosystem management action, is called an assumption set.

Average megawatt (aMW)—The average amount of energy (in megawatts) supplied or demanded over a specified period of time; equivalent to the energy produced by the continuous operation of one megawatt of capacity over the specified period.

Bacterial Kidney Disease (BKD)—A disease of salmonids caused by the bacterium *Renibacterium salmoninarum*. The bacterium can be passed between juvenile fish where they are concentrated in hatcheries and in transportation systems and can be passed to the next generation by an infected female.

Behavioral guidance structure (BGS)—A long, steel, floating structure designed to simulate the natural shoreline and guide fish toward the surface bypass collection system by taking advantage of their natural tendency to follow the shore.

Benthic community—Aquatic organisms and plants that live on the bottom of lakes or rivers, such as algae, insects, worms, snails, and crayfish. Benthic plants and organisms contribute significantly to the diets of many reservoir fish species.

Bulkhead channel—Channel through which fish are carried upward through the turbines via a bulkhead slot if they are not diverted by turbine intake screens.

Bypass channel—Fish diverted from turbine passage are directed through a bypass channel to a holding area for release or loading onto juvenile fish transportation barges or trucks.

Class 1 River—The largest rivers of the state (e.g., Skagit, Columbia, Snake, Nooksack, Chehalis, or Willamette).

Collection channel—Holding area within the powerhouse that fish enter after exiting the bulkhead slot.

Columbia-Snake Inland Waterway—456-mile long water highway formed by the eight mainstem dams and lock facilities on the lower Columbia and Snake Rivers.

Commodity—A transportable article of trade or commerce, especially an agricultural or mining product.

Community resiliency—A town's ability to successfully deal with multiple social and economic changes; a primary indicator of a community's health and vitality.

Comp Plan—Refers to the Lower Snake River Fish and Wildlife Compensation Plan, a plan to fulfill the Corps' mitigation obligations under the Fish and Wildlife Coordination Act (1958). The plan was authorized under the Water Resources Development Act of 1976.

Conversion rates—The estimated survival of adults during upstream migration is expressed as a “conversion rate.” Conversion rates are calculated by dividing the count of a particular group of adult fish at the uppermost dam by the count of that group at the lowest dam, subtracting out estimates of harvest and tributary harvest between the dams.

CRI—Acronym for Cumulative Risk Initiative, which is a network of NMFS scientists working to synthesize information and provide a clear, consistent, and scientifically rigorous decision support for salmonid conservation. The CRI has used matrix modeling of salmonid population dynamics to evaluate extinction risks and the sensitivity of population growth for each ESU to changes in survival as a result of management actions.

CRiSP—Acronym for Columbia River Salmon Passage, the passage model developed by the Center for Quantitative Studies at the University of Washington under contract to the Bonneville Power Administration.

CRITFC Tribes—Members of the Columbia River Inter-tribal Fish Commission include the Nez Perce Tribe, the Confederated Tribes of the Umatilla Indian Tribes, the Yakama Indian Nation, and the Confederated Tribes of the Warm Springs of Oregon.

Cultural resources—Archaeological and historical sites, historic architecture and engineering, and traditional cultural properties.

Dam breaching—In the context of this FR/EIS, dam breaching involves removal of the earthen embankment section at Lower Granite and Little Goose, and formation of a channel around Lower Monumental and Ice Harbor.

Decommission—To take the dams and associated facilities out of service such that they are not in use or working condition.

Deflation—The removal of the archaeological soils by water, leaving heavier items and artifacts in place, but dispersing lighter artifacts.

Differential delayed transportation mortality—Additional mortality suffered by transported fish after their release from the transport vehicle into the Columbia River below Bonneville Dam—hypothesized to be caused by stresses associated with the transportation system. Differential mortality is measured as the ratio of the post-Bonneville-Dam survival of transported fish to that of nontransported fish. Delayed transportation mortality is differentiated from any direct mortality of fish that occurs during transportation.

Direct service industries (DSIs)—Some of the region's largest industries (e.g., aluminum companies) who buy their power directly from the Bonneville Power Administration.

Dissolved gas supersaturation—Caused when water passing through a dam’s spillway carries trapped air deep into the waters of the plunge pool, increasing pressure and causing the air to dissolve into the water. Deep in the pool, the water is “supersaturated” with dissolved gas compared to the conditions at the water’s surface.

Drawdown—In the context of this FR/EIS, drawdown means returning the lower Snake River to its near-natural condition via dam breaching.

Drawdown Regional Economic Workgroup (DREW)—A group of regional economists studying the economic issues associated with alternative actions on the lower Snake River.

D-values—Measure used to quantify differential delayed transportation mortality. A D-value of 1.0 would mean that there was no differential delayed transportation mortality (there could be mortality; it is just no different between transported and non-transported fish). The lower the value of D (relative to 1.0), the larger the differential delayed transportation mortality. It is possible for D to be greater than 1 (in which case transported fish would have survived at a higher rate than non-transported fish).

Economic diversity index—Provides a relative indication of the economic opportunities present in a community.

Endangered species—A native species found by the Secretary of the Interior to be threatened with extinction.

Endemic—A term used to describe a species whose population is limited to one area.

Environmental justice—The fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income within the development, implementation, and enforcement of environmental laws.

Evapotranspiration—Discharge of water from the earth’s surface to the atmosphere by evaporation from lakes, streams, and soil surfaces and by transpiration from plants. Also known as total evaporation, water loss.

Evolutionary Significant Unit (ESU)—A population that 1) is substantially reproductively isolated from conspecific populations and 2) represents an important component of the evolutionary legacy of the species.

Extra mortality—Any mortality occurring outside the migration corridor (i.e., below Bonneville Dam) that is not accounted for by in-common climate effects or by differential delayed transportation mortality.

Fallback—Adult fish that successfully pass upstream of a dam, but are either swept or swim through the spillway, turbines, or navigation locks to below the dam.

Fauna—A general term for animal life.

Federal Columbia River Power System (FCRPS)—Official term for the 14 Federal dams on the Columbia and Snake Rivers.

Firm energy—The amount of energy that can be generated given the region’s worst historical water conditions. It is energy produced on a guaranteed basis.

Firm energy load-carrying capability (FELCC)—The amount of energy the region’s generating system, or an individual utility or project, can be called on to produce on a firm basis during actual operations. FELCC is made up of both hydro and non-hydro resources, including power purchases.

Fish collection/handling facility—Holding area where juvenile salmon and steelhead are separated from adult fish and debris by a separator and then passed to holding ponds or raceways until they are loaded onto juvenile fish transportation barges or trucks.

Fish guidance efficiency (FGE)—Percent of juvenile salmon and steelhead diverted away from the turbines by submersed screens or other structures.

Fish passage efficiency (FPE)—Portion of all juvenile salmon and steelhead passing a facility that do not pass through the turbines.

Flow augmentation—Increasing river flows above levels that would occur under normal operation by releasing more water from storage reservoirs upstream.

FLUSH—Acronym for Fish Leaving Under Several Hypotheses, the passage model developed by the states of Oregon, Washington, and Idaho and the Columbia River Intertribal Fish Commission.

Foraging habitat—Areas where wildlife search for food.

Fugitive emissions—Material released into the air from sources other than industrial vents and stacks (e.g., windblown dust).

Gas bubble disease (GBD) or trauma (GBT)—Condition caused when dissolved gas in supersaturated water comes out of solution and equilibrates with atmospheric conditions, forming bubbles within the tissues of aquatic organisms. This condition can kill or harm fish.

Habitat—An area that provides some portion of the requirements for the life history of a given species.

Habitat management units (HMUs)—62 parcels of land scattered along the river and reservoirs that the Corps purchased and manages as mitigation for the land that was inundated as a result of the dams and reservoirs. These HMUs are managed to replace hunting, fishing, and recreation opportunities lost as a result of inundation as well as to benefit and provide for wildlife that lost habitat to inundation.

Habitat units (HUs)—A numerical value used to quantify wildlife habitat. HUs are developed using the U.S. Fish and Wildlife Services Habitat Evaluation Procedures (HEP).

Headburn—A condition where open wounds are found on heads of adult fish.

Hunter use-day—Unit of measurement used in recreation section that refers to one day of hunting by one person.

Hydrographs—A graphic representation of stage, flow, velocity, or other characteristics of water at a given point and time.

Hydrology—The science dealing with the continuous cycle of evapotranspiration, precipitation, and runoff.

Inundation—The covering of pre-existing land and structures by water.

Irrigation—Artificial application of water to usually dry land for agricultural use.

Jack salmon—A precocious or early maturing salmonid fish; most are males.

Juvenile fish transportation system (JFT)—System of barges and trucks used to transport juvenile salmon and steelhead from the lower Snake River or McNary Dam to below Bonneville Dam for release back into the river; alternative to in-river migration.

Kilowatt—1 kilowatt is 1,000 watts of energy.

Littoral zone—The shore area along a body of water, usually a lake, down to the depth of 10 meters.

Lock—A chambered structure on a waterway closed off with gates for the purpose of raising or lowering the water level within the lock chamber so ships can move from one elevation to another along the waterway.

Lower Snake River Hydropower Project (Lower Snake River Project)—The four hydropower facilities operated by the Corps on the lower Snake River: Lower Granite, Little Goose, Lower Monumental, and Ice Harbor.

Macroinvertebrates—A broad term used to refer to invertebrates large enough to be seen with the naked eye.

Macrophytes—large, vascular aquatic plants that grow in shallow water along the shorelines of lakes or in the slow-moving reaches of rivers.

Megawatt (MW)—One million watts, a measure of electrical power or generating capacity. A megawatt will typically serve about 1,000 people. The Dalles Dam produces an average of about 1,000 megawatts.

Mesic shrubland—Wetlands usually found in side canyons and seasonal springs and seeps, characterized by species such as netleaf hackberry, Douglas hawthorn, smooth sumac, blackberry, and rose.

Mils—One tenth of a penny.

Minimum operating pool (MOP)—The bottom one foot of the operating range for each reservoir. The reservoirs normally have a 3-foot to 5-foot operating range.

Mitigation—To moderate or compensate for an impact or effect.

Natal stream—Stream of origin.

Navigation—Method of transporting commodities via waterways; usually refers to transportation on regulated waterways via a system of dams and locks.

Nonattainment areas—Geographic areas with measured pollutant concentrations greater than the AAQs.

Ocean regime shift—Cycle of oceanographic conditions that alters patterns of circulation, the distribution of predators and prey, and productivity. Cycles have been observed on the timescale of years (El Niño), decades (Pacific interdecadal oscillations), and thousands of years (ice ages). The current ocean regime, and a shift on the timescale of years or decades, may affect the likelihood of recovery under any hydrosystem management alternative.

Palustrine emergent—Wetland type characterized by cattail, bulrushes, and sedges.

Palustrine forest—Wetlands found adjacent to the reservoirs and major tributaries characterized by cottonwood, alder, and black locust.

Palustrine open water—Wetland type characterized by open water such as ponds.

Palustrine scrub-shrub—Wetlands found adjacent to river and on islands characterized by shrubs such as willow.

Passage model—Mathematical simulation of the effect of downstream passage (through eight Federal mainstem hydro projects) on the survival of juvenile salmonids. PATH used two passage models, CRiSP and FLUSH (see above). The models differ both in their mathematical structure and in assumptions about survival through various parts of the hydrosystem (see page 25 in Marmorek and Peters [1998] [*March 1998 report*] for a brief comparison).

Pelagic food sources—Food sources for aquatic organisms that live in the water column.

Per capita income—Average income per person.

pH—An index of the hydrogen ion concentration in water, measured on a scale of 0 to 14. A value of 7 indicates a neutral condition, values less than 7 indicate acidic conditions, and values greater than 7 indicate alkaline conditions.

Photic—Relating to light.

Photoperiod—Length of the period of daylight each day.

Photosynthesis—Biochemical process by which plants use the energy of sunlight to combine carbon dioxide and water into sugars.

Phytoplankton—Drifting plants such as microscopic algae that nourish themselves from the energy of the sun; they are at the base of the food chain and provide a food source for bacteria, water molds, and zooplankton. Plankton that demonstrate characteristics of the plant kingdom (i.e., they derive energy from inorganic substances).

Piping—Soil erosion process in which the pore pressure increases cause a vertical type fracture in the soil; this process can be a precursor to larger mass wasting failures.

Plan for Analyzing and Testing Hypotheses (PATH)—A work group of regional fisheries biologists that measure projected salmon and steelhead survival rates associated with alternative actions.

Plankton—The passively floating animal and plant life of a body of water.

Pumping stations—Facilities that draw water through intake screens in the reservoir and pump the water uphill to corresponding distribution systems for irrigation and other purposes.

Reasonable and Prudent Alternatives (RPA)—Alternatives to a proposed or continuing action when that action is likely to jeopardize the continued existence of a listed species or destroy or adversely modify its critical habitat.

Recovery—The process by which the ecosystem is restored so it can support self-sustaining and self-regulating populations of listed species as persistent members of the native biotic community. This process results in improvement in the status of a species to the point at which listing is no longer appropriate under the ESA.

Redd—A salmon or steelhead spawning nest in gravel in which eggs are deposited.

Removable spillway weir (RSW)—A removable steel structure that is attached to the forebay of an existing spill bay, creating a raised overflow weir above and upstream of the existing spillway crest.

Reservoir fluctuation area—Area between the minimum and maximum pool levels of a reservoir which includes the littoral, wave-action, and inundation zones.

Resident fish—Fish species that reside in fresh water throughout their lifecycle.

Riparian—Ecosystem that lies adjacent to streams or rivers and is influenced by the stream and its associated groundwater.

Riparian area—Area including a stream channel, a lake, a pond, or wetland, and the adjacent land where the vegetation complex and microclimate conditions are products of the combined presence and influence of perennial and/or intermittent water, associated high water tables, and soils that exhibit some wetness characteristics.

Risk averse—In the context of PATH analyses, “risk averse” corresponds to a management action that minimizes the risk of not meeting recovery and survival criteria, an action that succeeds in satisfying performance criteria over the widest range of assumptions.

Rookery—A concentration of nesting birds, usually herons or pelicans.

Rule curves—Water levels, represented graphically as curves, that guide reservoir operations. See critical rule curves, energy content curves, and flood control rule curves.

Run-of-river—This describes hydropower facilities that do not have storage or the associated flood control capacity; run-of-river facilities essentially pass through as much water as they have coming in, either through the turbines or over the spillways.

Scouring—Concentrated erosive action, especially by stream or river water, as on the outside curve of a bend.

Simulated Wells Intake (SWI)—Modified turbine intake that draws water from below the surface so that the surface is calmer and juvenile fish are less influenced by turbine flows. This allows juvenile fish more opportunity to discover and enter the surface bypass collection system.

Slumping—A landslide; the separation of a land or soil mass from a land surface and its movement downslope.

Spawning—The reproductive process for aquatic organisms which involves producing or depositing eggs or discharging sperm.

Spill—Water released through the dam spillways, rather than through the turbines. Involuntary spill occurs when reservoirs are full and flows exceed the capacity of the powerhouse or power output needs. Voluntary spill is one method used to pass juvenile fish without danger of turbine passage.

Spillway flow deflectors (flip lips)—Structures that limit the plunge depth of water over the dam spillway, producing a less forceful, more horizontal spill. These structures reduce the amount of dissolved gas trapped in the spilled water.

Surface bypass collection (SBC) system—System designed to divert fish at the surface before they have to dive and encounter the existing turbine intake screens. SBCs direct the juvenile fish into the forebay, where they are passed downstream either through the dam spillway or via the juvenile fish transportation system of barges and trucks.

Surface erosion—Movement of soil particles down or across a slope, as a result of gravity and a moving medium such as rain or wind. The transport of sediment depends on the steepness of the slope, the texture and cohesion of the soil particles, the activity of rainsplash, sheetwash, gullying, dry ravel processes, and the presence of buffers.

Surficial deposits—Unconsolidated alluvial, residual, or glacial deposits overlying bedrock or occurring on or near the surface of the earth.

Survival—The species' persistence beyond the conditions leading to its endangerment, with sufficient resilience to allow for potential recovery from endangerment. The condition in which a species continues to exist into the future while retaining the potential for recovery.

Terracing—Creation of a relatively level bench or step-like surface, breaking the continuity of a slope.

Threatened species—A native species likely to become endangered within the foreseeable future.

Total suspended solids (TSS)—The portion of the sediment load suspended in the water column. The grain size of suspended sediment is usually less than one millimeter in diameter (clays and silts). High TSS concentrations can adversely affect primary food production and fish feeding efficiency. Extremely high TSS concentrations can impair other biological functions such as respiration and reproduction.

Transponder—A transmitter-receiver used to track fish passage.

Transport to In-river Ratio (TIR)—The ratio of the number of adults returning to a given location from a transport group of marked juveniles to the number of adults returning to the same location from the “in-river” group of marked juveniles released to migrate downstream in-river.

Trophic level—Position in the food chain determined by the number of energy-transfer steps to that level.

Tules—Fall chinook salmon that are confined mainly to the lower Columbia River tributaries (below Bonneville pool).

Turbidity—An indicator of the amount of sediment suspended in water. It refers to the amount of light scattered or absorbed by a fluid. In streams or rivers, turbidity is affected by suspended particles of silts and clays, and also by organic compounds like plankton and microorganisms. Turbidity is measured in nephelometric turbidity units.

Turbine intake screens—Standard-length traveling fish screens or extended-length submerged bar screens that are lowered into the turbine bulkhead slots to divert fish from the turbine intake.

Turbine intakes—Water intakes for each generating unit at a hydropower facility.

Upriver brights—Fall chinook salmon that mainly spawn in the mainstem Columbia River in the Hanford Reach (downstream of Priest Rapids Dam) and in the Snake River System.

Wetland—An ecosystem in which groundwater saturates the surface layer of soil during a portion of the growing season, often in the absence of surface water. This water remains at or near the surface of the soil layer long enough to induce the development of characteristic vegetative, physical, and chemical conditions. Lands where saturation with water is the major factor in determining soil development and the types of plants that grow there.

Zooplankton—Tiny, floating animals that provide a food source for larger aquatic organisms such as snails and small fish. Plankton that demonstrate characteristics of the animal kingdom (i.e., they derive energy from organic matter).