



Glossary

Abundance: Number of fish, as in a stock or fishery

AFS: Aboriginal Fisheries Strategy

Adaptability: The capability of an organism to adapt to changing or future environmental conditions, the capability depends on adequate genetic variation remaining in the population

Adaptation: A genetically determined trait that increases the relative fitness of an individual in its environment (an adaptation refers to a current trait and results from the integration of past genetic and environmental interactions)

Adipose fin: A small fleshy fin lacking rays or spines, posterior to the soft dorsal fins

Age-class: The brood year (year the fish was born) or the salt-water entry year that defines a cohort of fish (same as year class)

Alevin: A hatched, but not-yet-free-swimming or foraging, salmon or steelhead that is still in the spawning gravel of a stream and feeding off of its yolk sac

Allocation: Sharing; dividing the fishing opportunities, catch, risks, costs, etc.

Allochthonous: Organic material that falls into a stream from the surrounding land

Anadromous: Fish that spawn in freshwater and rear to adults in the ocean

Assessment: An evaluation of the productivity in a population of fish used as a basis for deciding the number of reproducing fish desirable and the recommended rate of harvest on this population

At risk stocks: Weak stocks, which are at risk of becoming endangered (legal terminology, SARA), or stocks that have been identified as being in need of rescue or in need of specific management practices because of low or declining populations

Avulsion: The sudden movement of soil from one property to another as the result of a flood or a shift in the course of a boundary stream

Berm: A mound or bank of earth, used especially as a barrier or to provide insulation

Bioenergetic modelling: Computer modelling to estimate the energetic cost of swimming activity for the fish

Biomagnification: The increase of organisms through biological processes

Blood water: An untreated mixture of blood and fish debris from harvested or slaughtered fish

Broodstock: The pool of captured adult salmon a hatchery has available for artificial spawning. This pool can be made up of wild and/or returning hatchery salmon

By-catch: Unintended catch of a species; interception of a species or stock that the fishery is not intended to catch

Captive broodstock program: Collection of individuals (or gametes) from a natural population and the rearing of these individuals to maturity in captivity

Carrying capacity: A measure of the amount of a population that can be supported by a particular ecosystem. Carrying capacity changes over time with the abundance of predators and resources like food and habitat

Catch: The act of trapping or ensnaring fish

Catch Estimation: A process used to estimate the fish catch

Catch monitors: Individuals who enumerate the catch of fish for the purpose of catch reporting.

Catch per unit effort (CPU'S): The average number of fish caught per unit of time fishing

Catch Year: The calendar year in which a catch occurs

Causative (etiological) agent: The cause of a clinically diagnosed disease, which sometimes has the same name as the disease itself

Channelize: To make, form, or cut channels in a stream or floodplain

Chemotherapeutants: Chemical compounds used to treat and control diseases (e.g., antibiotics, pesticides)

Clockwork Management: "Formula" or "Clockwork" management lays out management options by time period for different stock abundances, timing and mixes, fleet sizes and mixes and environmental conditions in relation to

key indicators so that in-season management can proceed like “clockwork” through the plan which was agreed to pre-season

Coded Wire Tags (CWT): Microscopic metal tag with a code etched into it. The tags are inserted into the nose cartilage of salmon smolts, the fish are then fin clipped and those fish that are caught as adults can be identified as to their origins via reading of the CWT

Co-management: Sharing of management responsibilities among two or more agencies or parties

Density dependence: The dependence of a factor influencing population dynamics (such as survival rate or reproductive success) on population density. The effect is usually in the direction that contributes to the regulative capacity of a stock

Depensatory: Mortality is depensatory when its rate (i.e. the proportion of population affected) increases as the size of the population decreases. Reproduction is less successful at low population densities, e.g. caused by the difficulty in finding mates, and this too is called depensation. Compares with compensatory mortality where the mortality rate decreases as the population size decreases

Depressed Stock: Stock with an abundance or production rate that is significantly below its expected or average capability

DFO: Department of Fisheries and Oceans, also referred to as Fisheries & Oceans Canada, federal agency responsible for managing Pacific salmon and their habitats

Directed Fishery: Fishery to catch a particular species or stock of fish

Disease: A condition of the body, or some part or organ of the body, in which its functions are disturbed or deranged. In fish, indicated by discoloration, mortality, behavioural changes (fish do not swim, or remain near surface), poor growth, changes in the quality of the flesh

Distributary: A branch of a river that flows away from the main stream

Diversion: Act of the fish moving away from a course or purpose

Echo sounder: Electronic equipment which uses sound waves to detect fish in water

Ecosystem: An ecological community

Ecotone: A transitional zone between two ecological communities containing the characteristic species of each, with its environment, functioning as a unit

Embryo: A fertilized egg in development

Enhanced salmon: Salmon assisted by humans to get increased numbers, usually by increasing survival in the freshwater life stage and sometimes for a short time in the early ocean life stage

Enhancement: Man-made alterations to natural habitats or application of artificial culture techniques that are intended to lead to increased abundance of juvenile salmon

Enumeration: Ascertaining or counting the number of fish

Entraine: To carry (suspended particles, for example) along in a current

Enumeration fence: Structure placed across a river through which migrating fish must pass. Fish are counted as they pass the fence

Enzootic: Disease endemic to a particular region—naturally occurring, indigenous

Epizootic: Disease temporarily present in a population of animals, attacking many animals in a population simultaneously (like epidemic)—also called "an outbreak."

Escapement: The number of fish escaping from a fishery. The escapement from all fisheries is the spawning escapement (i.e., the fish reaching their natal spawning stream)

Escapement Goal: A management target, the number of fish desired on the spawning ground. The goal may be established based on maximizing yield, habitat capacity, or historical precedent

Estuary: Area consisting of the mouth or the lower course of a river in which the river's current meets the sea's tide

Etiology: The study of the cause of a disease

Evolutionarily significant unit (ESU): A set of populations that is morphologically and genetically distinct from other similar populations, or a set of populations with a distinct evolutionary history

Excess Salmon to Spawning Requirements: A form of license granted by DFO to harvest salmon that are surplus to broodstock needs of an enhancement facility

Expansion Factor Methods: Factors used by fisheries managers to expand a partial count of a spawning population into an estimate of the total population

Exploitation Rate: The percent of the production from a population of fish that is killed by fishing. (The total fishing mortality, over all ages and fisheries, divided by the total production from one spawning year in a population). Usually determined for a spawning or brood year in order to account for mortalities over all ages

Fallowing: The process of leaving an aquaculture site unused for a period of time, in order to facilitate seabed recovery and rehabilitation (cf. abandonment)

Fecundity: The number of eggs per female

Fed fry: Fry that are fed for a limited time and released before they have smolted (cf. unfed fry, which are fish that are artificially raised until their yolk sac is absorbed and the fry are ready to feed on their own)

Feral: Animals belonging to or forming a wild population ultimately descended from individuals which escaped from captivity or domestication

Fingerling: A small, young salmon or steelhead that is larger and older than a fry and is usually about the length of a human finger

Fish culture: Cultivation of fish from broodstock. In salmonid enhancement and ocean ranching, the fish are released from the hatchery. In salmon farming, the fish remain in captivity through their whole life cycle

Fishers: An expression commonly used on the West Coast that refers to both fishermen and women

Fishery: Used in many contexts as a result of wording in the Fisheries Act; the act of catching; the presence of fish

Fitness: The relative ability of a genotype (an individual) in its environment to successfully contribute offspring to the next generation. In salmon, fitness is frequently equated to the number of progeny produced per spawn

Fluvial: Relating to, or inhabiting, a river or stream

FOC: Fisheries & Oceans Canada, previously known as the Department of Fisheries and Oceans, the federal government agency responsible for managing most Pacific salmon and their habitats

Food web: A complex of interrelated food chains in an ecological community

Footprint: An area affected or covered by a phenomenon

Foraging arena: The area in which a juvenile fish feeds

Founder Effect: In genetic terms, the creation of a new population based on a very small number of parents. These “founders” may be a very limited portion of the genetic material in the source population. A “founder” event may have a similar effect but is caused within a population by a severe crash in population size

Freshet: High run-off flows in a stream, as in during snowmelt periods in the interior part of the province

Fry: A very small free-swimming young salmon or steelhead, usually less than one year old

ft³/s—or cfs: Cubic feet per second

Genetic: Relating to genes

Genotype: 1) The primary type of the type species of a genus; the specimen on which a genus-group taxon is based, no longer used in zoological nomenclature, 2) The genetic constitution of an individual, or all the individuals sharing the same genetic constitution

Georgia Basin: The Georgia Basin is an inland sea between Vancouver Island and mainland B.C. and the lands drained by the Fraser River and coastal rivers flowing into this sea from the Mainland (Coast Ranges) and Vancouver Island

Greenway: A corridor of undeveloped land, as along a river or between urban centres that is reserved for recreational use or environmental preservation

Habitat capacity: The number of organisms that can make maximum use of the available habitat (may refer to spawning capacity for adults or rearing capacity of juveniles)

Habitat: Area in which an organism would naturally be found; the place that is natural for the life and growth of an organism

Hail: The act of calling in an estimate of fish caught by a vessel or individual

Harvest Rate: The percent of the abundance of fish in a fishing area (defined by gear, location, and timing) that are killed in that fishery. Also used to describe the percent of a single age class harvested by all fisheries, e.g., catch of Age-3 Coho salmon

Homing: The ability of salmon to undertake long distant migrations to sea and return to the stream where they were produced (i.e., their natal stream)

Hybrid vigor: An increase in the fitness in a population due to the masking of recessive deleterious genes due to the mating of unrelated animals, usually from different populations

Hydraulic: Of, involving, moved by, or operated by a fluid, especially water, under pressure

Hydrological: The scientific study of the properties, distribution, and effects of water on the earth's surface, in the soil and underlying rocks, and in the atmosphere

Hyporheic: Relating to subsurface water flows

Immunocompetent: A state in an organism describing its ability to mount an immune response

Inbreeding depression: A loss of fitness in a population due to increasing relatedness of individuals within the population, and through the expression of deleterious recessive genes due to mating of related individuals

Inbreeding: The mating together of individuals that are related to each other by ancestry; increased levels of inbreeding results in a loss of genetic variation within the population

Incubation: The development of a salmon or steelhead embryo or alevin in the spawning gravel of a stream

Index Stock: A spawning population of fish that is monitored as representative of other populations of the same species in a proximal geographic area or habitat

Index Streams: Those with stocks that are monitored as representative of other streams/stocks in an area, includes monitoring the stream itself

Interception: Catching of fish from an area or stock other than where the fishery is targeted

Introgression: Gene flow between populations that hybridize, i.e., the introduction of genes from a non-local population via the inter-mating of the two populations. The extent of gene flow depends on hybridization effects. Enhanced productivity may increase the rate of exchange (e.g. hybrid vigor), but reduced productivity over time (e.g. out breeding depression) would reduce it

IPSTC: International Pacific Salmon Fisheries Commission, predecessor the Pacific Salmon Commission

Jacks: Sockeye returning to the spawning grounds after one winter in the ocean, a year earlier than other sockeye hatched in the same year

Japanese-style hatcheries: Hatcheries in which the eggs are incubated in gravel-filled troughs

Juvenile salmon: Salmon in their early life stages: fry, smolt. The period of these stages differs between salmon species

Large woody debris: The definition of large woody debris has evolved in the scientific, regulatory and political arenas to include wood as small as four inches in diameter and six feet in length. However, the preferred sizes are 18-36 inches in diameter and 12 – 32 feet in length

Laundering: A transaction in a legal commercial fishery involving fish caught outside of a legal commercial fishery

Life stage: For wild salmon the life stages are: alevins emerge from eggs and reside in the gravel, fry emerge from the gravel and reside in freshwater or migrate to the sea, parr (pre-smolt) reside and grow in freshwater, smolts are a transition phase from freshwater parr to seaward migrants, adults live at sea until migrating back to their natal streams to spawn. The period of these stages differs between salmon species. (Stages from fry to smolt also known as juveniles)

Line: Used as in a line of descent or lineage; in pink salmon and sometimes for coho salmon since production in a year comes from one year of spawning; e.g., the odd-year line of pink salmon can be defined since spawning only occurs every other year due to their fixed two-year life cycle. A line in coho salmon is determined by their three-year life cycle

m³/s—or cms: Cubic meters per second

Mark recapture techniques: Process used to estimate the number of fish on a spawning ground. Involves marking some fish and then re-sampling all fish on a spawning ground to determine the marked: to unmarked ratio

Marking: An identification system involving various methods (fin clipping, colouring, biotelemetry, radioactive markers, tattooing, branding, tagging, etc.), used for individual identification and for studies on movement, growth and other biological studies

Mark-only fishery or, mark-selective fishery: A fishery (often a sport fishery) in which most or all of the fish allowed to be retained are marked fish, indicating their hatchery origin

Mass marking: Marking all individuals in a population of fish so that individuals can be identified later in their life history. Mass marking technology utilizes chemical or thermal equipment which automatically removes adipose fins, so that coded-wire tags (CWTs) may be inserted

Mean annual discharge: Instantaneous flow volume of water in a stream averaged over the period of a year, usually in cubic meters per second (cms), or cubic feet per second (cfs)

Migration: Movement of fish from one region or climate to another

Mixed stock fishery: A fishery which harvests two or more stocks or populations together. Often such fisheries exploit the stocks present to their combined average abundance, thereby over-harvesting less productive stocks and under-harvesting more productive stocks

Monitoring: Sampling of a stream or salmon population on a continuing basis; tracking and reporting on conditions of the environment and salmon

Morbidity: The prevalence and severity of impacts of disease

Morts: ... Or mortalities: deaths, specifically, farmed fish that have died prior to harvest

Natal: Of, or associated, with the place of one's birth

Negative Bias: Inaccuracy in an estimation technique or calculation that causes under-estimation of the number of fish

Oligotrophic: Lacking in plant nutrients and having a large amount of dissolved oxygen throughout. Used with reference to a pond or lake

Opening: Formal or official beginning of a period of legal fishing

Otolith marked: Marks on fish ear bones, by which stocked fish are differentiated from wild fish

Outbreeding depression: The loss of fitness in a population due to "swamping" the locally adapted genes by straying from a different population, and/or the breakdown of biochemical or physiological capabilities due to the mixing of populations with different genetic backgrounds

Overfishing: Excessive fishing, fishing to depletion

Pacific Salmon Treaty: A treaty established between Canada and the United States of America on March 17th 1985

Pacific Scientific Advice Review Committee (PSARC): Scientific peer review process for stock assessment and scientific information to be used by Fisheries and Oceans Canada

Pathogen: Agent of disease/infectious agent. Those of concern here are viruses, bacteria and parasites. While the term is often used to include only the first two of these, usage in this report includes parasites

Pathogenicity: Whether or not the normal functioning of the fish is affected and the chances of survival of the fish are reduced; the ability to cause a disease

PBS: Pacific Biological Station, Nanaimo

Phenotype: The observable structural and functional properties of an organism, produced by the interaction between the genotype and the environment

Plasmid: A linear or circular molecule of DNA which can replicate independently from the chromosomal DNA of an organism. If a proportion of DNA is added to that of a plasmid, the sequence can be added to a cell where it can replicate and alter the host genome

Population: A localized spawning group of fish that is largely isolated from other such groups. In Pacific salmon, these groups may be adapted to their local environment due to the high fidelity of homing to their natal streams

Positive Bias: Inaccuracy in an estimation technique or calculation that causes an overestimation in the number of fish

Practical recovery time or "PRT": The interval from cessation of aquaculture operations to the time when diversity cannot be distinguished reliably from the reference value

Precautionary management: Erring on the side of caution and conservation; the greater the uncertainties are the more that harvests and other impacts should be reduced to diminish conservation risks to the stock

Production: The total number of fish surviving to the adult life stage from enhanced or wild sources. Generally synonymous with "returns." In the enhancement context, sometimes used to mean juvenile salmon produced by a hatchery

Productivity ratios: Ratio between the parent and the number of adult progeny they produce

Productivity: The rate of production per parent in a population. Productivity is frequently expressed as a ratio between the parent and the number of adult progeny they produce

PSC: Pacific Salmon Commission - formed March 17th 1985 as a result of the Pacific Salmon Treaty established between Canada and the United States

Radio-tracking: Using electronic transmitters implanted in fish and receivers to follow fish movement

Rate of adult return: Is used as a measure of productivity, and determined by the number of mature progeny produced from the number of spawning salmon in the parent generation. Mature progeny are fish returning to their natal streams, i.e., next generation of adults

Recruit: An individual fish that has moved into a certain class, such as the spawning class or fishing-size class

Recruitment: The new members by immigration and/or numbers of fishes born in a given year, or entering a certain class, such as the spawning class or a fishing-size class

Recruit-to-spawner ratio: An estimate of the number of recruits (fish that are available for harvest in addition to those that escape the fishery to spawn) produced by the previous generation of spawners. The spawner-to-spawner ratio estimates the number of spawners (those fish that reproduced or were expected to reproduce) in one generation produced by the previous generation of spawners. A spawner-to-spawner ratio of 1.0 indicates that, on average, each spawner produced one offspring that survived to spawn; the size of such a population would remain unchanged over that generation

Redds: Depression in the gravel of a spawning stream where a female lays her eggs

Regime shift: A pronounced and prolonged change in the characteristic atmosphere-ocean climate of a region, especially one which impacts the productivity of a fish stock

Releases: The juvenile fish resulting from enhancement

Residualize: The process in which salmon stay in the stream rather than out-migrate

Return Year: The year that the fish returns to freshwater for spawning

Returns: Number of mature progeny returning from the ocean to their natal streams, i.e., catch plus escapement, the next generation of adults (prior to coming under fishing pressure, after which they are "escapes")

Riparian: Of, on, or relating to the banks of a natural course of water

Risk aversion management: Management system weighted to conservation of a stock

Run/stock: Genetically similar group of fish having a shared source and destination place or time. In the wild, the group of fish that return to the same geographic area (natal watershed), or that return at the same time period. On a salmon farm, the group of fish at a farm site

Runs: One or more stocks of the same species that return to a river over a particular time period

Salmon life stages: Alevins emerge from eggs and reside in the gravel; fry emerge from the gravel and maybe reside in freshwater or migrate to the sea; parr are juveniles that reside and grow in freshwater; smolts are a transition phase from freshwater parr to seaward migrants and early the period of these stages differs between salmon species

Salmon ranching: Raising salmon in hatcheries (at a large scale), releasing them as smolts to rear in the sea, and harvesting the returns in a terminal fishery (near where they were released)

Salmonid: A category of fish that includes salmon, steelhead, trout and char

Schooling behaviour: The tendency of fish to form organized groups

Selective harvesting: Harvesting that allows the unharmed release of non-target fish stocks/runs. Selection criteria may include size, stock, species and/or marks

Slough: A stagnant swamp, marsh, bog, or pond comprised of non- or slowly-moving water

Smolt: A young steelhead or salmon at the life cycle stage after the parr when it becomes covered with silvery scales and first migrates from fresh water to the sea

Smoltification: Life stage/process that is the transition from freshwater parr to seaward migrants, consisting of physiological changes that allow the fish to survive in salt water

Spatial distribution: Describes how fish are located and dispersed over an area

Spawners: Fish which lay (and fertilize) eggs in the process of reproduction

Spawning escapement: The total number of adult fish returning to a hatchery or stream to spawn

Spawning Year: The year in which eggs were fertilized, may also be referred to as the brood year

Spawning: Act of producing or fertilizing eggs

Statistical Area: DFO has delineated the coast of BC into 30 regions for the purposes of accounting for catch by area and/or general locations of fisheries, streams, etc.

Stochastic: Involving chance or probability

Stock: A genetically similar group of fish, usually returning to a specific geographic area and/or time period

Stock Assessment: Evaluation of the productivity of a stock as a basis for deciding escapement goals and sustainable exploitation rates. These analyses provide the basis for conservation, management, and restoration strategies

Stock Enumeration: Ascertaining the number of fish in each of the stocks

Stock Rebuilding: Increasing the size of a fish stock, usually through increasing spawning escapement

Stock-recruitment relationship: The relationship between the level of parental biomass, e.g. spawning stock size, and subsequent recruitment level. Difficult to determine accurately – abbreviated as SRR

Straying: When salmon do not return to their stream or hatchery of birth

Stream order: The smallest permanent streams are called “1st order streams”. Two first order streams join to form a larger, second order stream. Subsequently, two second order streams join to form a third order, etc. Smaller streams discharging into a higher-ordered stream do not change its order number

Stress: A response to a situation that is beyond the scope of what the animal normally encounters, although stressors may be frequent and numerous. Health may be looked at as the capacity to deal with stress without succumbing to disease

Survival Rate: Number of fish alive after a specified time interval, divided by the initial number, usually on a yearly basis

Survival ratio: Ratio of recruits to spawners or parental biomass in a stock-recruitment analysis. Changes in survival ratios indicate that the productivity of a stock is changing

Sustainable exploitation rate: The percent of the production that can be harvested at an escapement level and provide sufficient spawners to replace that level of production in the next generation

Tagging: Process used for placing a mark on a fish so it can be uniquely identified at a later time

Terminal fishing: Fishing of returning stocks at the mouth of the river or in the river system to which they are returning for spawning

Terminal harvest rate: The portion of a population's returning adults that are killed in fisheries that largely affect just on that population

Test fishing: Fishing activity designed to provide data from which an estimate of run size can be generated

Thalweg: The line defining the lowest points along the length of a river bed

Total stock: The sum of catches and spawners (all returning fish) for a stock and spawning year

Under-reporting: Fish caught during an official fishery that are not reported in the official catch reporting system

User Groups: A term encompassing the commercial, Aboriginal and recreational interest groups

Virulence: The ability of a microorganism to cause disease

Visual surveys: Process of estimating the number of fish on the spawning grounds based on visual observations from land or air

Watershed: Area or region drained by a river and its streams and tributaries. Also known as a drainage area

Wetland: A lowland area, such as a marsh or swamp, which is saturated with moisture, especially when regarded as the natural habitat of fish or wildlife

Wild salmon: Salmon are considered "wild" if they have spent their entire life cycle in the wild and originate from parents that were also produced by natural spawning and continuously lived in the wild

Year class: The brood year (year the fish was born) or the salt-water entry year that defines a cohort of fish

Yield: At a specified level of production, yield is the number of fish that can be harvested that are in excess of the number of fish required, on average, to replace the production in the next generation

Zooplankton: Comprised of the aggregation of animal or animal like organisms in plankton