Appendix L

Glossary of Terms

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A

Abundance—Abundance is the average number of adult fishes of natural origin (NOR) present in the population at the time of spawning (i.e., natural origin spawners, or NOS). Higher abundance implies higher viability. The National Oceanic and Atmospheric Administration's definition of abundance is: "The average number of adults on the spawning grounds per year." Estimation method may vary based on the assessment method. The All-H Analyzer tool's definition is: "The projected average number of adult spawners of natural origin in the population." AHA reports the average number of natural origin spawners (NOS).

Adjusted productivity—The reduced productivity of a natural population after fitness (due to hatchery influence) and harvest impacts are taken into consideration.

Aggregation—Concentration of fish for unknown or known reasons (such as gathering around food); behavioral grouping.

Air planting—The practice of stocking fish via aircraft.

Alevins—Newly hatched salmon or trout with visible yolk sac.

Anadromous—Characterizes the life cycle of a fish that spawns in fresh water and spends a significant portion of its adult life in the ocean. Salmon and steelhead are anadromous.

Anadromous waters—Water bodies typically accessible to fish migrating from the ocean.

Aquaculturist—Someone who raises/cultivates aquatic plants, aquatic animals, or shellfish in a controlled or semi-controlled setting.

Augmentation—The use of artificial production to increase harvestable numbers of fish in areas where the natural freshwater production capacity is limited but where the capacity of other salmonid habitat areas will support increased production. Also referred to as "fishery enhancement."

B

Bio barrels—Products used for biofiltration (i.e., removing gases from and aerating water).

Biodiversity—Biological diversity. the natural variety of plants and animals that includes: genetic diversity; species diversity; ecosystem diversity; and landscape diversity.

Brood stock—Sexually mature individuals used within a hatchery or other controlled environment for breeding purposes.

C

Catchable trout—Refers to a size category of hatchery-produced trout. Although the *Fish and Game Operations Manual* defines "catchable" trout as six per pound or larger, current policy dictates that catchable trout weigh 0.5 pound each, on average (about 10 to 12 inches in length). Catchable trout are used in put-and-take managed fisheries and are expected to be harvested by anglers soon after planting.

Catch-and-release—A management strategy and fishing technique in which anglers are encouraged, through a zero- to two-fish bag limit, to immediately release all captured fish back into the water. Effective catch-and-release angling requires fishing gear consisting of barbless hooks and artificial lures only (i.e., no bait). Catch-and-release allows anglers the opportunity to enjoy trout fishing in waters that cannot support significant harvest and where large numbers or sizes of trout provide high quality angling.

Cold-water ecosystem (see "Ecosystem," below)—An aquatic system that, for at least part of the year, has a pattern of temperatures that will sustain trout. Most cold-water systems sustain trout year-round, but others, usually located at lower elevations, may support trout only during colder months. Such "seasonal" trout habitat may require stocking with hatchery trout.

Competition—Complex interactions exist between the various trophic levels within the aquatic environment. Exploitation of resources such as habitat and food by one individual or species may affect other individuals or species negatively. This is called competition. The degree of interspecific competition varies with size differences among competing individuals, environmental factors (e.g., temperature, stream flow, and physical habitat), and species interactions

Conservation easement—A legal agreement negotiated with a landowner to maintain fish and wildlife habitat values, existing land uses that are beneficial to wildlife, and public access. Typically, the landowner receives payment of a percentage of the land's value, and the easement restricts development of the property through legal terms in the land's title.

Consistent—If the "proportionate of natural influence" (PNI) for an integrated program is between 0.5 and 0.67, it is considered to be "consistent" with stock rebuilding. Similarly, segregated programs with percentage of hatchery-origin spawners (pHOS) that spawn in the wild values between 5% and 10% are considered to be "consistent" with stock rebuilding. Programs for which the PNI is less than 0.5 or pHOS is more than 10% are considered to be "not consistent" with stock rebuilding.

Creel census—A method of estimating anglers' catches and thus monitoring hatchery-reared fish at planting locations, to inform DFG about catch rates and whether planting numbers should be adjusted.

Critical population threshold—An abundance level for an independent Pacific salmonid population below which: depensatory processes are likely to reduce it below replacement; short-term effects of inbreeding depression or loss of rare alleles (alternative forms of a specific gene) are likely to occur; and productivity variation due to demographic stochasticity becomes a substantial source of risk. (Mortality is *depensatory* when its rate increases as the population size decreases. *Stochastic* refers to models, processes, or procedures based on elements of chance or probability.)

D

Die-off—Mortality that affects a large number of animals, possibly as a result of stressors that decrease disease resistance, such as water/air temperature changes, weather events, spawning stress, and high population abundance.

Direct take—The intentional take of a listed species. Direct takes may be authorized under the Endangered Species Act for the purpose of propagation to enhance the species or research.

Distinct population segment—The smallest division of a taxonomic species that can be protected under the U.S. Endangered Species Act.

Diversity—The National Oceanic and Atmospheric Administration's definition of diversity is: "Preservation of local variability in such life history parameters as run timing, age structure, fecundity, etc. to the maintenance of the environmental conditions that support such life history variability and to the nature and degree of interbreeding between populations." The All-H Analyzer tool's definition is: "The proportion of hatchery-origin spawners (pHOS) and the proportionate of natural influence (PNI). Although not a measure of diversity within a population or ESU, these are a measure of interbreeding between natural and hatchery origin fish. Diversity among population presumably decreases with higher pHOS or lower PNI because the common hatchery environment is driving population fitness compared to the more diverse natural environment."

Domesticated trout—Strains of hatchery-produced trout that have been reproduced and reared in the hatchery environment for several generations. These strains generally exhibit qualities that are suitable within the fish culture environment and can withstand the rigors of handling and planting.

E

Ecosystem—A broad-scale landscape that includes all biological, chemical, and physical elements and their dynamic interactions with one another. An example of an ecosystem is an entire watershed, ridge top to ridge top. Examples of sub-ecosystems within the greater watershed ecosystem include stream, riparian, and forest ecosystems. These systems are interconnected, and "upslope" systems generally influence systems "downslope." Because the stream ecosystem is the most "downslope" system, the condition of the stream ecosystem generally indicates if other sub-systems and processes within the entire ecosystem are functioning properly.

Environmental impact report/environmental impact statement (EIR/EIS)—A report done to analyze project or program impacts on a variety of resources under both the California Environmental Quality Act and the National Environmental Policy Act.

Epilimnion—The top-most layer of a thermally stratified lake.

Estuary—A region of interaction between rivers and near-shore ocean waters, where river flow and tidal action mix fresh and salt water.

Evolutionarily significant unit (ESU)—The National Marine Fisheries Service definition of a distinct population segment (the smallest biological unit that will be considered to be a species under the Endangered Species Act). A population is considered to be an ESU if: (1) it is substantially reproductively isolated from other conspecific (of the same species) population units, and (2) it represents an important component in the evolutionary legacy of the species.

Exclosure—A barrier used to protect wildlife or vegetation from predators.

Extant—Still in existance; not extinct or destroyed or lost.

Eyed egg—Refers to an egg in which the embryo is developed to the point that its eyes are visible.

F

F1—Refers to the progeny of a given parental cross; F2 refers to the offspring of those progeny.

F2—Refers to the second generation removed from the parental generation.

Federal Energy Regulatory Commission (FERC) relicensing—A regulatory process which results in the awarding of a multi-year license to operate a hydroelectric generating project. Typically, DFG is involved with other parties in the process to negotiate terms in the license which mitigate for impacts to aquatic (and other) resources caused by the hydroelectric project.

Fin-clipping—Snipping off the fin (e.g., adipose or maxillary) to distinguish hatchery fish from wild fish.

Fingerling—A trout approximately 2.5 to 4 inches in length and weighing 16 per pound or smaller. This size category is stocked by truck or airplane in put-and-grow trout fisheries where trout growth potential is high. Only fingerlings are used in the aerial planting program.

Fish ladder—A human-constructed series of steps, with flowing water and pools, to assist fish in swimming upstream.

Fitness—Genetic fitness refers to the extent that an individual is adapted to, or is able to produce offspring in, its local environment.

Fry—Small fish that have absorbed their yolk sacs and can emerge from a redd and into deeper water to find food on their own.

Fyke trap—A fish trap (often cylindrical or cone-shaped, mounted on rings, and fixed by stakes or anchors) that directs fish into multiple compartments.

G

Global warming—A change in Earth's average surface temperature attributable to human activities.

Gravid—Pregnant; the body distended with ripe eggs.

Grizzly—A device used over pipeline intakes to allow the removal of vegetation and other matter before it reaches hatchery raceways and thus ensure continual flow.

H

Habitat conservation planning—A process for mitigating or minimizing impacts on listed (federal Endangered Species Act) species within a specified area.

Harvest project—Projects designed for the production of fish that are primarily intended to be caught in fisheries.

Hatchery fish—A fish that has spent some part of its life-cycle in an artificial environment and whose parents spawned in an artificial environment.

Hatchery population—A population that depends on spawning, incubation, hatching or rearing in a hatchery or other artificial propagation facility.

Hatchery trout—Any trout hatched and reared in a hatchery environment. Anglers often use this term for domesticated strains of trout reared to a catchable size and stocked in put-and-take fisheries.

Hatch-out—When fish larvae free themselves from the egg membrane.

Hazard—Hazards are undesirable events that a hatchery program is attempting to avoid.

Hydroperiod—Cyclical changes in the depth or flow of water in an aquatic habitat.

I

Incidental take—The unintentional take of a listed species as a result of the conduct of an otherwise lawful activity.

Indigenous—Occurring naturally in a particular region; not introduced.

Inland trout—Non-anadromous trout or trout that do not migrate to the ocean. Same as resident trout.

Inland waters—Water bodies typically not accessible to fish migrating from the ocean.

Integrated—Hatchery programs are classified as integrated if a principal goal is to manage the broodstock as an artificially propagated component of a naturally spawning population to minimize genetic divergence of hatchery broodstock from a naturally spawning population in areas where fish are released or collected for broodstock. The long-term goal of an integrated program is to maintain genetic characteristics of a local, natural population among hatchery-origin fish by minimizing the genetic effects of potential domestication. Another goal is to reduce the genetic risks that hatchery-origin fish may pose to naturally spawning populations. In an idealized integrated program, natural origin and hatchery-origin fish represent two genetically equal components of a single gene pool.

Interspecific—Interactions, such as competition or predation, between different species.

Intraspecific—Interactions, such as competition or predation, between individuals of a single species.

Introduced—Species or populations that are not native to an area but which have been established there with human assistance. Most trout in high mountain lakes, for instance, represent introduced populations.

K

Key-ways—Partitions within hatchery raceways.

M

Mechanical crowder—An electric or hydraulic device used within a tank or pond to push fish into a gathering place, such as for tank-cleaning purposes.

Milt—Seminal fluid from a male fish.

N

Native trout—Trout species present in streams and watersheds within California prior to European settlement and that have a defined natural range without human intervention.

Natural community conservation planning (NCCP)—A process that promotes multi-species and multi-habitat management and conservation through cooperative efforts among public agencies, private landowners, and other interests within a plan area. It provides a framework for minimizing impacts on wildlife from proposed development projects.

Natural origin recruit (NOR)—See "Wild fish."

Nonnative trout—Trout species that have been introduced into waters of California from original sources outside of California or outside of their historic range.

Not consistent—See "Consistent."

O

Oligotrophic—Refers to environments with low nutrient levels or biological productivity.

Oviposition—The depositing of an egg during spawning.

P

Parr—Salmonid freshwater rearing stage between alevin and smolt that is distinguished by vertical bars or spots (parr marks) on side of fish.

Piscivorous—Feeding on fishes.

Planktivorous—Feeding on plankton.

Planting—Releasing fish raised in a hatchery into another water body for the purposes of supplementing existing populations or creating new ones for fishing or to increase a species population. Same as stocking.

Poikilothermic—Organisms that control body temperature through external means (in layman's terms, cold-blooded) and depend on environmental heat sources and have relatively low metabolic rates.

Population—A group of historically interbreeding animals that have developed a unique gene pool and that breed in approximately the same place and time.

Preservation (Conservation)—The use of artificial propagation to conserve genetic resources of a fish population at extremely low population abundance, and potential for extinction, using methods such as captive propagation and cryopreservation.

Productivity—The National Oceanic and Atmospheric Administration's definition of productivity is: "Population growth rate (i.e., productivity over the entire life cycle)." The All-H Analyzer tool's definition is: "The inherent rate of increase a population will exhibit at low abundance levels. Specifically a measure of the rate at which a population will grow in the absence of density dependent effects." AHA reports adjusted productivity which includes harvest and fitness effects.

Program—The California Department of Fish and Game's hatchery and stocking program.

Proportionate of natural influence—Proportionate of natural influence (PNI) represents the degree to which natural selection drives the evolution of integrated stock; a PNI value of 0.5 indicates equal wild and hatchery influence while a value of 1.0 indicates all members of the stock are wild.

Put-and-grow management—A management technique used in waters where reproduction capability is limited but habitat conditions support good growth and survival of juveniles and adults. Trout usually smaller than catchables are planted in waters where they will grow to a larger size. Hatchery-produced fingerlings are used in put-and-grow managed waters.

Put-and-take management—This management technique is used in waters that are easily accessible to the general public, where angling demand is high, and where habitat conditions are not suitable to support a satisfactory fishery. Catchable-sized trout are planted in selected waters, and at least half of the trout released are expected to be harvested.

R

Raceways—Concrete-, brick-, tile-, or plastic-lined fish-rearing units with a large volume of flowing water, used at hatcheries to sustain great fish densities within a clean environment.

Redd—A shallow gravel depression excavated by a salmonid for depositing eggs.

Redundancy—Abundance of self sustaining populations within a diversity group such as a stock or evolutionarily significant unit (ESU).

Refugia—Aquatic habitat areas where fish can avoid predation or environmental stressors such as high temperatures or flood flows. Refugia often include habitat structures such as rocks, logs, mud,

submerged vegetation, and undercut areas along banks. Terrestrial refugia often consist of burrows in leaf litter or soil.

Representation—The distribution of natural production over historical production areas and particularly over areas that differ in environmentally significant ways.

Resident trout—Trout that do not migrate from fresh water; non-anadromous trout. Resident trout typically remain within the stream or lake system in which they originated.

Restoration—The use of artificial propagation to hasten rebuilding or reintroduction of a fish population to harvestable levels in areas where sufficient habitat for sustainable natural production exists or is being restored.

S

Salmonids—Bony, soft-finned fish of the family Salmonidae that includes salmon, trout, whitefish, and char.

Segregated—Hatchery programs are classified as segregated if the management goal is to propagate the hatchery broodstock as a discrete or genetically segregated population, relative to naturally spawning populations.

Smolt—A young salmon or ocean trout (about 2 years old) that has assumed the silvery color of the adult and is ready to migrate to the sea.

Spatial diversity—Spatial structure and diversity relate to the capacity of a population to cope with environmental variability. Spatial diversity refers to the preservation of local variability in such life history parameters as run timing, age structure, and fecundity to the maintenance of the environmental conditions that support such life history variability and to the nature and degree of interbreeding between populations.

Spatial structure—The National Oceanic and Atmospheric Administration's definition of spatial structure is: "The number, size and geographic distribution of spawning aggregations." The All-H Analyzer tool's definition is: "The number, size and geographic distribution of spawning aggregations/populations within an MPG [major population group]." Spatial structure and diversity relate to the capacity of a population to cope with environmental variability. Spatial structure refers to the number, size, and geographic distribution (relative to the historical distribution) of spawning aggregations. Populations with many large spawning aggregations distributed over different watersheds are less vulnerable to local catastrophes and are thus more viable.

Steelhead—Coastal rainbow trout (*Oncorhynchus mykiss irideus*) that exhibit an anadromous life history.

Stock—See "Population."

Subcatchable trout—A hatchery-produced trout less than 6 inches in length and weighing between 6.1 and 16 fish per pound. This size category of trout is used in put-and-grow managed fisheries where planted trout are expected to survive and grow to a larger size before being harvested by anglers.

Supporting—The term "supporting" is used when the "proportionate of natural influence" (PNI) is greater than 0.67 (integrated programs) or percentage of hatchery-origin spawners (pHOS) is less than 5% (segregated programs). In such programs hatchery operations may support stock rebuilding.

T

Take—When used in reference to individuals of listed threatened, endangered, proposed, candidate, or fully protected species, to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct.

Tagging—Attaching tags to stocked or wild fish in order to collect scientific data used in managing the fish populations.

Therapeutants—Chemicals, drugs, disinfectants, or other substances used at a hatchery to promote fish health.

Troll—Trailing bait or lure behind a boat, often an ocean-going commercial fishing vessel, for the purposes of catching fish.

Trophic—A organism's position in the food chain: what it eats and what feeds on it.

V

Viable population threshold—An abundance level above which an independent Pacific salmonid population has a negligible risk of extinction due to threats from demographic variation (random or directional), local environmental variation, and genetic diversity changes (random or directional) over a 100-year timeframe.

Volitional release—Release of hatchery-reared salmon or steelhead directly from hatchery ponds or raceways to the river or creek adjacent to the hatchery.

W

Warm-water species—Certain non-salmonid fish usually suited for water that consistently exceeds 70°F. Catfish and a variety of sunfish such as bass, bluegill and crappie are typical warm water fish.

Wild trout—A native or nonnative trout that is progeny of parents that spawned in habitat and has spent its entire life in habitat. Wild trout may include the offspring of hatchery trout that reproduced in a natural environment.

Y

Yearling—Refers to a fish about 1 year old or in its second calendar year.

Young-of-the-year—Fish that are less than 1 year old.