

Appendix A. Glossary of Terms and Abbreviations

Absolute Abundance - The total number of a kind of fish in the population. This is rarely known, but usually estimated from relative abundance, although other methods may be used.

Abundance - See **Relative Abundance** or **Absolute Abundance**

Adaptive Management - In regard to a marine fishery, means a scientific policy that seeks to improve management of biological resources, particularly in areas of scientific uncertainty, by viewing program actions as tools for learning. Actions are designed so that even if they fail, they will provide useful information for future actions. Monitoring and evaluation shall be emphasized so that the interaction of different elements within the system can be better understood.

Age Class - A group of individual organisms of the same age range in a population. "Year-Class" or "cohort" are terms generally synonymous with age class, but are identified by the actual year in which the cohort was produced (e.g., 1991 year-class or sardines resulted from the 1991 spawning season).

Age Composition - Identifies the proportions of a population of fishes by age or age group.

Allocation - The opportunity to fish is distributed among user groups or individuals. The share which a user group gets is sometimes based on historic harvest amounts.

Allowable Biological Catch (ABC) - A term used by a management agency which refers to the range of allowable catch for a species or species group. It is set each year by a scientific group created by the management agency. The agency then takes the ABC estimate and sets the annual Total Allowable Catch (TAC).

Assessment - A judgment made by a scientist or scientific body on the state of a resource (e.g., size, health, pollution impacts) usually for passing advice to management authority.

Availability - In a general sense, used to describe periods of poor (low availability) or good (high availability) catches, regardless of the size or health of a fish population. In a strict sense, it refers to the fraction of a population which is susceptible to fishing during a given fishing season.

Biomass - The total weight or numbers of a stock or population of fish at a given point in time. Spawning Biomass - That portion of total biomass that is mature and spawning.

Bycatch - Catches of non-targeted species in a fishery that is directed primarily at another species. Also, referred to as incidental catch; the bycatch usually results from the use of commercial fishing gear (e.g., trawls, gill nets).

CalCOFI - California Cooperative Oceanic Fisheries Investigations

Catch - Refers sometimes to the total amount (numbers or weight) caught, and sometimes only to the amount landed or kept. Catches which are not landed are called discards.

Catchability - A value that modifies a unit of fishing effort in the calculation of fishing mortality which usually will depend on the habits of the fish, its abundance, and the type and deployment of fishing gear.

Catch Per Unit Effort (CPUE) - The catch obtained by a vessel, gear or fisherman per unit of fishing effort (e.g., number of fish caught per hour of trawling).

CCR - California Code of Regulations

CDFG - California Department of Fish and Game

CEQA - California Environmental Quality Act

Cohort - A group of fish spawned during a given period, usually within a year. See also: **age class**.

Commission - California Department of Fish and Game Commission

Compensatory Mechanism - A process by which the effect of one factor on a population tends to be compensated for by a change in another factor. For example, a reduction in the egg production (spawning) may be compensated for by an increase in the survival rate of eggs.

Competition - Active demand between organisms for a common resource that is in limited supply.

Condition Factor - Used to compare weight and length in a particular sample or individual. The heavier a fish is at a given length, the larger the factor and (by implication) the better "condition" it is in.

CPFV - Commercial Passenger Fishing Vessel

Density Dependence - When the density of a population of organisms directly affects

other processes which can then affect the abundance of that population. For example, a reduction in the numbers of a population might lead to increased growth per individual (because of earlier maturity).

Department - California Department of Fish and Game

Depletion Methods - These methods are based on the principle that a decrease in CPUE over time and for finite periods of time (usually years or seasons) bears a direct relationship to the extent of the decrease of the population. If this assumption is true, and a substantial proportion of the population is being removed over time, then this method can be used to estimate the population present at the beginning of that time.

Depressed - With regard to a marine fishery, means the condition of a fishery for which the best available scientific information, and other relevant information indicates a declining population trend has occurred over a period of time appropriate to that fishery. With regard to fisheries for which management is based on maximum sustainable yield, or in which a natural mortality rate is available, "depressed" means the condition of a fishery that exhibits declining fish population abundance levels below those consistent with maximum sustainable yield.

Direct Enumeration - The counting of individuals in a population through direct visual observations, or through the use of such aids as sonar or video. Typically involves estimating species density along sampling transects, and applying the result to an entire survey area in order to estimate abundance. These methods have only limited value for the marine resource manager. Their usefulness has generally been limited to enclosed (freshwater) or anadromous (e.g., salmon) resources, where direct observations and subsequent counts can result in estimates of abundance.

Discards - Fish that are taken in a fishery but are not retained because they are of an undesirable species, size, sex, or quality, or because they are required by law not to be retained.

Drift Net - A negatively buoyant, single walled gill net suspended at or near the surface by lines extending from a series of floats attached along its length. Not anchored; the net remains secured to the vessel and floats with the current.

Ecosystem - The relationships between the sum total biological and non-biological factors present in the area.

Effort - The amount of time and fishing power used to harvest fish. Fishing power includes gear size, boat size, and horsepower.

Egg and Larval Surveys - Involves the collection of larvae, usually with a tow net, within a predefined geographic area. These surveys are typically carried out in

conjunction with other studies in order to determine fishery information such as abundance and recruitment. They can also be used to define the geographic extent and peak time of spawning activity.

Egg Production Method - While this method is very expensive, it can provide a real-time, fishery-independent estimate of spawning biomass, that is directly calculated from population reproductive values that are measured by extensive at-sea sampling of eggs and adults on the spawning grounds.

Equilibrium Yield - The yield in weight taken from a fish stock when it is in equilibrium with fishing at a given intensity, and its abundance is not changing from year-to-year. Also called: **sustainable yield**.

Escapement - That part of the stock which survives at the end of a fishing period (e.g., season, year).

Essential Fishery Information - With regard to a marine fishery, means information about fish life history and habitat requirements; the status and trends of fish populations, fishing effort, and catch levels; fishery effects on fish age structure and on other marine living resources and users, and any other information related to the biology of a fish species or to taking in the fishery that is necessary to permit fisheries to be managed according to the requirements of §7060 FGC.

Ex-vessel - Refers to activities that occur when a commercial fishing boat lands or unloads a catch. For example, the price received by a captain for the catch is an ex-vessel price.

Fecundity - The production of eggs per individual or per unit weight of an individual.

FGC - Fish and Game Code

Fishery - Population of marine species that is treated as a unit for the purpose of conservation and management. It is comprised of the species or group of species being managed, the environment and geographic area in which the species lives, ecological interactions, scientific and technological aspects, and the people that catch, process and market the fish.

Fishing Effort - The amount of effort expended by a gear which is usually standardized (e.g., number of net hauls per unit of time per size of net) and summed before being used as an index of total effort. Also see **Effort**.

Fishing Mortality (F) - A measurement of the rate of removal of fish from a population by fishing. Fishing mortality can be reported as either annual or instantaneous. Annual mortality is the percentage of fish dying in one year. Instantaneous is that percentage of fish dying at any one time. The acceptable rates of fishing mortality may

vary from species to species.

Float Net - A positively buoyant (surface fishing) set net.

FMP - Fishery Management Plan

Fork Length - The length of a fish as measured from the tip of its snout to the fork in the tail.

Gill Net - A passive capture gear constructed of vertical panels of netting set in a straight line in which fish can become entangled.

Growth Overfishing - A reduction in the proportion of fish caught would be more than compensated for by an increase in their average size. This is more likely to occur when a fishery is taking too many younger individuals;

Growth Rate - Usually refers to the average growth of individuals, in length or weight by successive ages over the life span of the particular species.

Habitat - The physical, chemical, and biological features of the environment where an organism lives.

Habitat Enhancement - Refers to improving habitat usually for the benefit of a select number of species which depend on that habitat. Wetlands restoration, artificial reefs, and kelp reforestation are examples of habitat enhancement.

Harvest Control - A management measure having a numerical harvest objective, differing from a quota in that closure of a fishery is not automatically required when the harvest goal is reached.

Hook and Line - Includes trolling , jigging, and longline gear types.

Incidental Catch - See **Bycatch**

Incidentally-Taken Species - See **Bycatch**

Indices of Abundance - These measures usually do not translate to an estimate of actual biomass of a population, and are usually collected over time (years) to reflect trends in a population. The indices can be compiled from a number of sources, usually reported annually (e.g., CPUE, aerial spotter, and acoustic, egg, larval, or adult research survey data). Indices of abundance, because of their simplicity, are seriously evaluated regarding the assumptions in their calculation. When they can be closely matched to more direct and precise estimates of abundance, they can be cost-effective tools of tracking the trends of a population.

Landings - The number or weights of fish unloaded at a dock by commercial fishermen or brought to shore by recreational fishermen for personal use. Landings are reported at the points at which fish are brought to shore. Note that landings, catch, and harvest define different things.

Limited Entry - Restriction of the right to participate in a fishery, by the use of permits or other means.

Longline - A form of hook and line fishing involving multiple baited hooks. A horizontal main line supports numerous short vertical fishing lines; each having a baited hook.

Marine Living Resources - Includes all wild mammals, birds, reptiles, fish, and plants that normally occur in or are associated with salt water, and the marine habitats upon which these animals and plants depend for their continued viability.

Marine Mammals - Animals that live in marine waters and breathe air directly. Females give live birth and can produce milk. These include whales, dolphins, seals, walruses, manatees, sea otters, and polar bears.

Mark-Recapture Methods - These methods are most well adapted for use on small, discrete freshwater stocks, and have been applied to wildlife and insect studies. They are not generally suited for estimating the abundance of marine organisms, but can provide valued information on the growth and migration of stocks.

Maximum Sustainable Yield - The largest average catch or yield that can continuously be taken from a stock. Theoretically, it is a level of catch that occurs at some intermediate level of fishing effort, such that to harvest at a lower level of effort would be to waste fish (that are not really needed to ensure continuing high levels of recruitment) and to harvest at a higher level of effort would be wasteful of effort (because annual catches would decline).

Mesh Size - The size of openings in a fishing net. Minimum mesh sizes are often prescribed in an attempt to avoid the capture of young fish before they reach their optimal size for capture.

MLMA - Marine Life Management Act

Mortality (Total) - The sum total of individual deaths within a population. Usually, it is stated as an annual rate and calculated as the sum of fishing mortality - deaths due to fishing and natural mortality - deaths due to natural causes (e.g., predation, disease) and nonfishing, artificial causes (e.g., pollution, seismic surveys).

MRFSS - Marine Recreational Fishery Statistics Survey

NMFS - National Marine Fisheries Service

Optimal Sustainable Yield - A sustainable yield that takes into account biological, social, and political values, and the effect of harvesting on dependent or associated species, in an attempt to produce the maximum benefit to society from a stock of fish.

Overfished - With regard to a marine fishery, means both of the following:

- (a) A depressed fishery.
- (b) A reduction of take in the fishery is the principal means for rebuilding the population.

Overfishing - In a general sense, any level of fishing greater than some defined, optimal level. In a classical sense, a level of fishing such that a reduction of this level would eventually lead to an increase in the total catch. Two distinct types of classical overfishing are recognized: **Growth Overfishing** and **Recruitment Overfishing**.

Participants - In regard to a fishery means the sport fishing, commercial fishing, and fish receiving and processing sectors of the fishery.

Party Boat - All boats regardless of size that carry passengers (anglers) for a fee. Usually operated by a skipper knowledgeable in marine sportfishing methods and practices. Also known as a commercial passenger fishing vessel (CPFV).

Pelagic - Pertaining to the water column, or referring to organisms living in the water column.

Performance Standard - A qualitative and/or quantitative standard used to judge whether the performance of a particular individual, tool or process is functioning properly. The standard used must be objective and readily detectable. In fisheries biology, a performance standard used to gauge a specific management process could be the long-term recruitment success of a particular species as measured through a standard biological survey method.

PFMC - Pacific Fishery Management Council

Population - A distinct group of individuals of a species which are reproductively isolated from other populations (see **Stock**).

Predator - A species that feeds on other species. The species being eaten is the prey.

Prey - A species being fed upon by other species. The species eating the other is the predator.

Productivity - Generally used loosely to refer to the capacity of a stock to provide a yield.

PSMFC - Pacific States Marine Fisheries Commission

Purse Seine - A net used to encircle aggregations of fish by closing the bottom of the net. The net is continuous, with corks along the top and leads along the bottom. Purse seines have a drawstring running the length of the lead line, which is pulled tight after the set.

Quota - A limit on the amount of fish which may be landed in any one fishing season or year. May apply to the total fishery or to an individual share.

Recreational Fishery - Harvesting fish for personal use, fun, and challenge. Recreational fishing does not include sale of catch. Refers to and includes the fishery resources, fisherman, and businesses providing needed goods and services.

Recruit - A relatively young fish entering the exploitable stage of its life cycle.

Prerecruit - A fish which has not yet reached the recruitment stage for the fishery.

Recruitment - It can mean either the rate of entry of recruits into the fishery or the process by which such recruits are generated. It is usually associated with attainment of a particular age or size, but can also be dependent on such factors as the fishes' appearance on a particular fishing ground, or how they grow to a size large enough to be captured by a certain mesh gear.

Recruitment Overfishing - A reduction in the proportion of fish caught would be more than compensated for by the increased number of recruits. It results in a total mortality that seriously reduces the reproductive potential of the stock.

Relative Abundance - Usually measured by indices over time that track trends of a population biomass (i.e., CPUE), but it is not a direct or usually precise estimate of biomass.

Restricted Access - With regard to a marine fishery, means a fishery in which the number of persons who may participate, or the number of vessels that may be used in taking a specified species of fish, or the catch allocated to each fishery participant, is limited by statute or regulation.

Selectivity - Refers to selective nature of fishing gear; in that, almost all kinds of gear catch fish of some sizes more readily than other sizes.

Set Net - A single walled, negatively buoyant (bottom resting) gill net anchored at both

ends.

Size at Age Composition Analysis - Closely associated with indices of abundance, this is one of the basic tools used by fishery biologists to detect population trends, particularly in a new and developing fishery. An inordinate or substantial change in the composition of the catch from older/larger to younger/smaller individuals is often a signal for concern.

Spawning Biomass - See **Biomass**

Stock (see **Population**) - In a strict sense, a distinct, reproductively isolated population. In practice, the members of a species inhabiting any conveniently defined area, which can be discreetly managed.

Stock Enhancement - Usually refers to increasing the stock by artificial methods, such as hatchery rearing, improving spawning facilities, or habitat.

Stock-Recruitment Relationship - This defines the dependence of recruitment on the size of the breeding stock.

Surplus Production - Production of new weight (i.e., growth) by a fish stock, plus recruitment, minus what is removed by natural mortality. In theory, a harvest increases production per unit stock and so creates this surplus.

Surplus Production Models - These models are useful in calculating yields where exact aging of fishes, estimates of growth, mortality or reproduction rates are not available. In the simplest terms they rely on catch and effort information collected over a number of years.

Survival Rate - Number of fish alive after a specified time interval (usually a year) divided by the initial number.

Sustainable, Sustainable Use, and Sustainability - with regard to a marine fishery, mean both of the following:

- (a) Continuous replacement of resources, taking into account fluctuations in abundance and environmental variability.
- (b) Securing the fullest possible range of present and long-term economic, social, and ecological benefits, maintaining biological diversity, and, in the case of fishery management based on maximum sustainable yield, taking in a fishery that does not exceed optimum yield.

Total Allowable Catch (TAC) - The annual recommended catch for a species or species group. The regional council sets the TAC from the range of the Allowable Biological Catch (ABC).

Total Length - The length of a fish as measured from the tip of the snout to the tip of the tail.

Trammel Net - A two or three walled set net consisting of large meshed outer wall(s) and a small meshed inner wall. Fish become entangled as their forward swimming movement creates a bag of small mesh pushed through the large meshed outer wall.

Trawl - A large bag net that is tapered and forms a flattened cone. The mouth of the net is kept open while it is towed or dragged over the sea bottom.

USC - United States Code

Virtual Population (Cohort) Analyses (VPA) - These methods of analysis result in estimates of abundance derived from long series of age composition data. They are particularly appropriate for historical analyses and for calibrating other indices of abundance. They are more precise at estimating the abundance in previous years and, as such, are of little use as a real-time monitoring tool, especially for highly variable fish stocks.

WSSCAP - White Seabass Scientific and Constituent Advisory Panel.

Yield - Sometimes this term is synonymous with catch, but it more often implies a degree of sustainability over a number of years.

Yield-Per-Recruit - The yield (usually expressed in weight) for each recruit. For a given species with a specific growth curve, and constant natural mortality, the yield-per-recruit will vary as a function of age at first capture and fishing mortality.

Yield-Per-Recruit Model - This model can be used to predict the yield from any given level of recruitment if just the natural mortality, present fishing mortality and growth rates can be estimated. Furthermore, this model can be manipulated to estimate yields for any combination of natural mortality, fishing mortality and age-at-first-capture. This information could then allow management to adjust mesh sizes and, thus age-at-first-capture, to provide for maximum or optimal yield-per-recruit, regardless of population size.