

## GLOSSARY

**Absorption** The movement of a dissolved substance (e.g. pollution) into cells by osmosis or diffusion.

**Adsorption** The accumulation of a dissolved substance on the sediment or on the surface of an organism (e.g. a flatfish).

**Ambicoloration** A term specific to flatfish that describes the presence of pigmentation on both the eyed and the blind sides. Normally in flatfish, only the eyed side is pigmented.

**Anthropogenic** Made and introduced into the environment by humans, especially pertaining to pollutants.

**Assemblage** An association of interacting populations in a given habitat. For example, an assemblage of benthic invertebrates on the ocean floor.

**BACIP(Before-After-Control-Impact-Paired)** An analytical tool used to assess environmental changes caused by the effects of pollution. A statistical test is applied to data from matching pairs of control and impacted sites before and after an event (i.e., initiation of wastewater discharge) to test for significant change. Significant differences are generally interpreted as being the result of the environmental change attributed to the event (i.e., initiation of wastewater discharge). Variation that is not significant reflects natural variation.

**Benthic** Pertaining to the environment inhabited by organisms living on or in the ocean bottom.

**Benthos** Living organisms (e.g. algae and animals) associated with the sea bottom.

**Bioaccumulation** The process by which a chemical in animal tissue becomes accumulated over time through direct intake of contaminated

water, the consumption of contaminated prey, or absorption through the skin.

**BOD (Biochemical Oxygen Demand)** The amount of oxygen consumed (through biological or chemical processes) during the decomposition of organic material contained in a water or sediment sample. It is a measure for certain types of organic pollution, such that high BOD levels suggest elevated levels of organic pollution.

**Biota** The living organisms within a habitat or region.

**BRI (Benthic Response Index)** An index that measures levels of environmental disturbance by assessing the condition of a benthic assemblage. The index was based on organisms found in the soft sediments of the Southern California Bight.

**California Ocean Plan (COP)** California's ocean water quality control plan. It limits wastewater discharge and implements ocean monitoring. Federal law requires the plan to be reviewed every three years.

**CFU (colony-forming unit)** A unit (measurement) of density used to estimate bacteria concentrations in ocean water. The number of bacterial cells that grow to form entire colonies, which can then be quantified visually.

**Congeners** The EPA defines a congener as, "one of the 209 different PCB compounds. A congener may have between 1 and 10 chlorine atoms, which may be located at various positions on the PCB molecule."

**Control site** A geographic location that is far enough from a known pollution source (e.g., ocean outfall) to be considered representative of an undisturbed environment. Information collected within control sites is used as a reference and compared to impacted sites.

**Crustacea** A group (subphylum) of marine invertebrates characterized by jointed legs and an exoskeleton. Crabs, shrimps, and lobsters are examples.

**CTD (conductivity, temperature, and depth)** A device consisting of a group of sensors that continually measure various physical and chemical properties such as conductivity (a proxy for salinity), temperature, and pressure (a proxy for depth) as it is lowered through the water. These parameters are used to assess the physical ocean environment.

**Demersal** Organisms living on or near the bottom of the ocean and capable of active swimming. For example, flatfish.

**Dendrogram** A treelike diagram used to represent hierarchical relationships from a multivariate analysis where results from several monitoring parameters are compared among sites.

**Detritus** Particles of organic material from decomposing organisms. Used as an important source of nutrients in a food web.

**Diversity (Shannon diversity index, H')** A measurement of community structure that describes the abundances of different species within a community, taking into account their relative rarity or commonness.

**Dominance (Swartz)** A measurement of community structure that describes the minimum number of species accounting for 75% of the abundance in each grab.

**Echinodermata** A group (phylum) of marine invertebrates characterized by the presence of spines, a radially symmetrical body, and tube feet. For example, sea stars, sea urchins, and sea cucumbers

**Ectoparasite** A parasite that lives on the outside of its host, and not within the host's body. Isopods and leeches attached to flatfish are examples.

**Effluent** Wastewater that flows out of a sewer, treatment plant outfall, or other point source and is discharged into a water body (e.g. ocean, river).

**Epibenthic** Referring to organisms that live on or near, not within, the sediments. See demersal.

**Epifauna** Animals living on the surface of sea bottom sediments.

**Halocline** A vertical zone of water in which the salinity changes rapidly with depth.

**Impact site** A geographic location that has been altered by the effects of a pollution source, such as a wastewater outfall.

**Indicator Species** Marine invertebrates whose presence in the community reflects the health of the environment. The loss of pollution-sensitive species or the introduction of pollution-tolerant species can indicate anthropogenic impact.

**Infauna** Animals living in the soft bottom sediments usually burrowing or building tubes within.

**Invertebrate** An animal without a backbone. For example, a seastar, crab, or worm.

**ITI (Infaunal Trophic Index)** An environmental disturbance index based on the feeding structure of marine soft-bottom benthic communities and the rationale that a change in sediment quality will restructure the invertebrate community to one best suited to feed in the altered sediment type. Generally, ITI values less than 60 indicate a pollution impacted benthic community.

**Kurtosis** A measure that describes the shape (i.e., peakedness or flatness) of distribution relative to a normal distribution (bell shape) curve. Kurtosis can indicate the range of a data set, and is used herein to describe the distribution of particle sizes within sediment samples.

**Macrobenthic invertebrate (Macrofauna)** Epifaunal or infaunal benthic invertebrates that are

visible with the naked eye. Larger than meiofauna and smaller than megafauna, this group typically includes those animals collected in grab samples from soft-bottom marine habitats and retained on a 1 mm mesh screen.

**MDL (method detection limit)** The EPA defines MDL as “the minimum concentration that can be determined with 99% confidence that the true concentration is greater than zero.”

**Megabenthic invertebrate (Megafauna)** A larger, usually epibenthic and motile, bottom-dwelling animal such as a sea urchin, crab, or snail. Typically collected by otter trawls with a minimum mesh size of 1 cm.

**Mollusca** A taxonomic group (phylum) of invertebrates characterized as having a muscular foot, visceral mass, and a shell. Examples include snails, clams, and octopuses.

**Motile** Self-propelled or actively moving.

**NPDES (National Pollutant Discharge Elimination System)** A federal permit program that controls water pollution by regulating point sources that discharge pollutants into waters of the United States.

**Niskin Bottle** A long plastic tube with caps open at both ends allowing water to pass through until the caps are triggered to close from the surface. They often are arrayed with several others in a rosette sampler to collect water at various depths.

**Non-point source** Pollution sources from numerous points, not a specific outlet, generally carried into the ocean by storm water runoff.

**Ophiuroidea** A taxonomic group (class) of echinoderms that comprises the brittle stars. Brittle stars usually have five long, flexible arms and a central disk-shaped body.

**PAHs (Polynuclear aromatic hydrocarbons)** The USGS defines PAHs as, “hydrocarbon

compounds with multiple benzene rings. PAHs are typical components of asphalts, fuels, oils, and greases. They are also called Polycyclic Aromatic Hydrocarbons.”

**PCBs (Polychlorinated biphenyls)** The EPA defines PCBs as, “a category, or family, of chemical compounds formed by the addition of Chlorine ( $C_{12}$ ) to Biphenyl ( $C_{12}H_{10}$ ), which is a dual-ring structure comprising two 6-carbon Benzene rings linked by a single carbon-carbon bond.”

**Phi (size)** The conventional unit of sediment size based on the log of sediment grain diameter. The larger the Phi number, the smaller the grain size.

**Plankton** Animal and plant-like organisms, usually microscopic, that are passively carried by the ocean currents.

**PLOO (Point Loma Ocean Outfall)** The PLOO is the underwater pipe originating at the Point Loma Wastewater Treatment Plant and used to discharge treated wastewater. It extends 7.2 km (4.5 miles) offshore and discharges into about 96 m (320 ft) of water.

**Point source** Pollution discharged from a single source (e.g. municipal wastewater treatment plant, storm drain) to a specific location through a pipe or outfall.

**Polychaeta** A taxonomic group (class) of invertebrates characterized as having worm-like features, segments, and bristles or tiny hairs. Examples include bristle worms

**Pycnocline** A depth zone in the ocean where density increases (associated with a decline in temperature and increase in salinity) rapidly with depth.

**Recruitment** In an open ocean environment, the retention of young individuals into the adult population.

**Red relict sand** Coarse reddish-brown sand

that is a remnant of a pre-existing formation after other parts have disappeared. Typically originating from land and transported to the ocean bottom through erosional processes.

**Rosette sampler**

A device consisting of a round metal frame housing a CTD in the center and multiple bottles (see Niskin bottle) arrayed about the perimeter. As the instrument is lowered through the water column, continuous measurements of various physical and chemical parameters are recorded by the CTD, and discrete water samples can be captured at desired depths by the bottles.

**Shell hash** Sediment composed of shell fragments with the size and consistency of very coarse sand.

**Skewness** A measure of the lack of symmetry in a distribution or data set. Skewness can indicate where within a distribution most of the data lies. It is used herein to describe the distribution of particle sizes within sediment grain size samples.

**Sorting** The range of grain sizes comprising marine sediments, and may also refer to the process by which sediments of similar size are naturally segregated during transport and deposition according to the velocity and transporting medium. Well-sorted sediments are of similar size (such as desert sand), while poorly-sorted sediments have a wide range of grain sizes (as in a glacial till).

**SBOO (South Bay Ocean Outfall)** The SBOO is the underwater pipe originating at the International Wastewater Treatment Plant and used to discharge treated wastewater. It extends 5.6 km (4.5 miles) offshore and discharges into about 27 m (90 ft) of water.

**South Bay Water Reclamation Plant** Provides local wastewater treatment services and reclaimed water to the South Bay. The plant began operation in 2002 and has a wastewater treatment capacity of 15 million gallons a day

**SCB (Southern California Bight)** The geographic region that stretches from Point Conception, U.S.A. to the Cabo Colnett, Mexico, and encompasses nearly 80,000 km<sup>2</sup> of coastal land and sea

**Species Richness** The number of species per unit area. A metric used to evaluate the health of macrobenthic communities.

**Standard length** The measurement of a fish from the most forward tip of the body to the base of the tail but excluding the tail fin rays. Fin rays can sometimes be eroded by pollution or preservation so a measurement that includes them (i.e., total length) is considered less reliable.

**Terrigenous** Referring to suspended oceanic sediments derived from land-based material.

**Thermocline** The zone in a thermally stratified body of water that separates warmer surface water from colder deep water. At a thermocline, temperature decreases rapidly over a short depth.

**Tissue burden** Refers to the total amount of measured chemicals that are present in the tissue (e.g. fish muscle) at a given point in time.

**Transmissivity** A measure of water clarity based upon the ability of water to transmit light along a straight path. Light that is scattered or absorbed by particulates (e.g., plankton, suspended solid materials) decreases the transmissivity (or clarity) of the water.

**Upwelling** The movement of nutrient-rich, and typically cold, water from the depths of the ocean to the surface waters.

**USGS (United States Geological Survey)** The USGS provides geologic, topographic, and hydrologic information on water, biological, energy, and mineral resources.

**Van Dorn bottle** A water-sampling device made of a plastic tube open at both ends that allows water

to flow through. Rubber caps at the tube ends can be triggered to close underwater to collect water at a specified depth.

**Van Veen Grab** A mechanical device designed to collect bottom sediment samples. The device consists of a pair of hinged jaws and a release mechanism that allows the opened jaws to close and entrap a 0.1 m<sup>2</sup> sediment sample once they touch bottom.

**Wastewater** A mixture of water and waste materials originating from homes, businesses, and industries.

**ZID (zone of initial dilution)** The region of initial mixing of the surrounding receiving waters with wastewater from the diffuser ports of the outfall. This area includes the underlying seabed. In the ZID, the environment is chronically exposed to pollutants and often is the most impacted.

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