

Glossary

A

Ag: The chemical symbol for silver, a trace metal measured by the RMP.

Al: The chemical symbol for aluminum, a trace metal measured by the RMP.

aliquot: A subsample taken from a field sample (e.g., of sediment).

ambient: Refers to the overall conditions surrounding a place or thing. In the case of the RMP, ambient monitoring is used to determine existing pollutant levels in the San Francisco Estuary. **ambient sediment concentrations--sandy (ASC*)** are the upper threshold values for distinguishing between sediment concentrations representing "ambient" versus contaminated conditions. ASC values are different for sandy (< 40% fines) and muddy (> 40% fines) sediments. **ambient sediment concentrations--muddy (ASC)** are the upper threshold values for distinguishing between sediment concentrations representing "ambient" versus contaminated conditions. ASC values are different for sandy (< 40% fines) and muddy (> 40% fines) sediments.

ammonia: A colorless gas which is less dense than air and has a penetrating odor. It is the fourth largest industrial chemical produced, with over 80% used in the manufacturing of agricultural fertilizers.

amphipods: An order of small shrimp-like crustaceans, such as sand fleas. Many live on the bottom of the Estuary (i.e., are benthic) and feed on algae and detritus.

analyte: A targeted compound that is analyzed in a test.

anthropogenic: Effects or processes that are derived from human activities, as opposed to natural effects or processes that occur in the environment without human influences.

arenaceous: Resembling, derived from, or containing sand.

arthropod: Any member of a large phylum of invertebrate animals with jointed legs and a segmented body, such as insects, crustaceans, arachnids, myriapods, and trilobites.

As: The chemical symbol for arsenic, a trace element measured by the RMP.

assemblage: A group of persons, animals, plants, or things gathered together.

(automated) Winkler titration: The process of determining the amount of a certain substance contained in a known volume of a solution by measuring volumetrically how much of a standard solution is required to produce a given reaction.

axial transect: A line which follows the deep channel along the length or "axis" of the Estuary. Most RMP stations are on this axial transect, also known as the "spine".

B

Base Program: Standard RMP monitoring conducted primarily for the purposes of characterization and trends, i.e. water, sediment, and tissue cruise sampling and analyses at the stations normally sampled, excluding special and pilot studies.

Basin Plan: The SFBRWQCB's plan for the Estuary basin.

This includes the land and waters within the boundaries of the immediate San Francisco Bay watershed, Suisun Marsh, and the western part of the Sacramento-San Joaquin Delta.

benthos, benthic: Bottom dwelling; non-planktonic; attached to or resting on the substrate.

bioaccumulation: The buildup of contaminants in an organism's tissues (usually fatty tissue) through ingestion, or contact with the skin or respiratory tissue. Contaminants that bioaccumulate may also biomagnify in the food web, resulting in higher tissue concentrations in predators relative to ambient environmental concentrations.

bioassay: A laboratory test using live organisms to measure biological effects of a substance, factor, or condition. The effect measured may be growth, reproduction, or survival.

bioavailability: The extent to which a compound is available for intake by organisms. Bioavailable compounds have the potential to cause biological effects, such as increased mortality.

biogeochemical cycle: The cycle in which nitrogen, carbon, and other inorganic elements of the soil, atmosphere, etc. of a region are converted into the organic substances of animals and plants of the region and released back into the environment.

biological condition index: A measure of the biological condition of RMP transplanted bivalves expressed as the ratio of tissue dry weight to shell cavity volume.

biomagnification: The net effect of bioconcentration (accumulation of pollutants via dermal or respiratory tissue exposure), bioaccumulation (accumulation via ingestion), and depuration (excretion or loss of pollutants via metabolic processes).

biomass: Total weight of all organisms in a particular habitat or area.

biomonitoring: Monitoring conducted to determine existing environmental conditions, pollutant levels, rates, or species in the environment.

biota: The animals, plants, and microbes that live in a particular location or region.

bivalves: Any mollusk, such as an oyster or clam, that has a shell with two hinged "valves" or shell halves.

blooms (algal): A population burst that remains within a defined part of the water column.

brackish: Somewhat salty water that is less salty than seawater.

C

calcareous: Being made of calcium carbonate.

Cd: The chemical symbol for cadmium, a trace metal measured by the RMP.

chironomids: Small, two-winged flies in the adult stage, closely related to mosquitoes and Chaoborus (Phantom Midge or Glassworm). Most lay eggs singularly or in strings while skimming over the water surface. The eggs hatch into larvae and form mud tubes from bottom material and mucus. A few species have free swimming larva.

chlordanes: A contact insecticide used in agriculture until 1978 to control soil pests, particularly termites. It belongs to a group of closely related organochlorines, which includes aldrin, dieldrin, endosulfan, and heptachlor.

chlorinated hydrocarbons: A group of organic compounds which includes PCBs, DDTs, chlordanes, and dieldrin.

chlorophyll a: A key substance in the process of photosynthesis. It is found with photosynthesizing organisms and is used in the RMP as a measure of the abundance of photosynthetic organisms in the water column (phytoplankton).

community: The organisms inhabiting a common environment and interacting with one another.

congener: A compound of the same kind. conventional pollutant: As specified under the federal Clean Water Act, conventional pollutants are total suspended solids, fecal coliform bacteria, biochemical oxygen demand, pH, oil, and grease. In addition, there are a large number of nonconventional and toxic pollutants that are of concern.

copepod: A type of herbivorous microscopic crustacean. They are important in the food chain because they are eaten by many fish or by other organisms that are eventually eaten by fish.

Cr: The chemical symbol for chromium, a trace metal measured by the RMP.

criterion: A standard rule or test on which a judgment or decision can be based.

crustacean: Any of a class of arthropods, including shrimps, crabs, barnacles, and lobsters, that usually live in the water and breathe through gills; they have a hard outer shell and jointed appendages.

Cu: The chemical symbol for copper, a trace metal measured by the RMP.

D

DDD (dichlorodiphenyldichlorethane): DDD was a commonly used pesticide in the past, but is now banned in the United States.

DDE (dichlorodiphenyldichloroethylene): DDE is found in the environment as a result of the breakdown of the insecticide DDT. DDE has been listed as a pollutant of concern to the U.S. EPA's Great Waters Program due to its persistence in the environment, potential to bioaccumulate, and toxicity to humans and the environment. See also DDTs.

DDT (dichlorodiphenyltrichloroethane): The combination of DDT and its degradation products, DDD and DDE. A chlorinated hydrocarbon that was a highly effective, but extremely persistent organic pesticide. DDT was extensively used in the past for the control of insects (crop protection and disease control). In 1972 its use was banned in the United States, except in the case of a public health emergency.

Delta Outflow Index (DOI): Freshwater flows from the Delta into San Francisco Bay. The DOI is calculated as total Delta inflow plus precipitation, minus in-Delta uses and exports.

depuration: The loss of contaminants from an animal's gut or tissue.

"detectable difference" criterion: A significance test which is based on the minimum significant difference (MSD) values.

dinoflagellate: Any of numerous minute, chiefly marine protozoans or algae of the order Dinoflagellata, having two flagella and a cellose-covering. They are a main constituent of plankton.

dischargers: Public and private organizations that discharge treated wastewater, cooling water, or urban runoff, or are involved in dredging activities.

dissolved compounds: Compounds that are present (dissolved) in the water and, therefore, are available for fish and other aquatic animals.

dry-season sampling period: RMP sampling carried out between July and September.

E

Effects Range-Low (ERL): Part of the Effects Range sediment quality guidelines, established by the National Oceanic and Atmospheric Administration. The guidelines were developed to identify concentrations of contaminants associated with biological effects in laboratory, field, or modeling studies. The ERL value is the concentration equivalent to the lower 10th percentile of the compiled study data. Sediment concentrations below the ERL are interpreted as being "rarely" associated with adverse effects. See also ERM.

Effects Range-Median (ERM): Part of the Effects Range sediment quality guidelines established by the National Oceanic and Atmospheric Administration. The guidelines were developed to identify concentrations of contaminants associated with biological effects in laboratory, field, or modeling studies. The ERM is the concentration equivalent to the 50th percentile of the compiled study data. Sediment concentrations above the ERM are "frequently" associated with adverse effects. See also ERL.

effluent: An outflow from a sewer or sewage system.

ELISA analysis: Enzyme-linked immunosorbent assay that tries to determine the nature, proportions, and function of the examined parts.

El Niño: El Niño is a disruption of the ocean-atmosphere system in the tropical Pacific and have important consequences for weather around the globe.

elutriate: To purify, separate, or remove by washing, decanting, and settling.

embayment: Forming into a bay or a formation resembling a bay.

equilibrium predictions: A theoretical model or experimental determination of reactions, that describes the ratio of concentrations of the product to the reactant. It expresses chemical activity in terms of related concentration.

estuary: A body of water at the lower end of a river which is connected to the ocean and semi-enclosed by land. In an estuary, sea water is measurably diluted by freshwater from the land.

F

Fe: The chemical symbol for iron, a trace metal measured by the RMP.

fluorometer: An instrument to detect and measure the emission of fluorescence.

food web: The rather linear food chains (from plants through herbivores and carnivores) tend to be woven into a complex food web, where energy is transferred to all different levels.

foraminifera: Protozoan group (usually) secreting a calcareous shell; both planktonic and benthic representatives exist.

G

genus: A classification of plants or animals with common distinguishable characteristics. It is the main subdivision of a family and is made up of a small group of closely related species or of a single species.

grab: Benthic sampling device with two or more curved metal plates designed to converge when the sampler hits the bottom and grab a specific volume of sediment.

gravimetric method: Measurements by weight or of the pull of gravity.

guidelines: Comparisons to guidelines were made to provide a context for evaluating the condition of the Estuary in terms of contamination, and not for any regulatory purpose.

Guidelines were selected based on guidance from the San Francisco Bay Regional Water Quality Control Board.

H

HCH (hexachlorocyclohexane): A manufactured chemical that exists in eight forms, or isomers.

Hg: The chemical symbol for mercury, a trace metal measured by the RMP.

hydrocarbons: Organic compounds containing carbon and hydrogen.

L

ligand: An ion, a molecule, or a molecular group that binds to another chemical entity to form a larger complex.

linear regressions: A common practice in science to try to explain natural phenomena by models. The true regression of Y on X consisting of the means of populations of Y values, where a population is determined by X values. The regression line needs to be straight to develop a computation procedure.

LC50: The concentration of a contaminant that is lethal to half the organisms in a bioassay.

loadings: The total amount of material entering a system from all sources.

M

marshes: A wetland where the dominant vegetation is non-woody plants, such as grasses and sedges, as opposed to a

swamp where the dominant vegetation is woody plants, such as trees.

matrix: Any non-living, intercellular substance, in which living cells are embedded, as in bone, cartilage, etc.

mean Effects Range-Median quotient: Reflects the increasing contaminant concentrations in sediment from many contaminants and appears to provide a useful way to express the degree of overall sediment contamination. It was shown to have a highly significant correlation with amphipod survival.

method detection limit (MDL): The minimum concentration of a substance that can be measured and reported with 99% confidence that the analyte concentration is greater than zero. It is determined by analysis of a sample in a given matrix containing the analyte.

microfauna: Animals whose shortest dimension is less than 0.1 mm.

minimum significant difference (MSD): The lowest distinguishable difference that is statistically meaningful.

morphology: The study of form and structure, at any level or organization.

mysid: Small, shrimp-like, chiefly marine crustaceans of the order Mysidacea.

N

National Pollutant Discharge Elimination System (NPDES): A provision of the Clean Water Act that prohibits discharge of pollutants into waters of the United States unless a special permit is issued by the U.S. EPA, a state, or other delegated agency.

neap tide: Tides with the smallest height difference between high tide and low tide, usually occurring during the moon's quarters. Compare with spring tide.

nematode: Any of a phylum of worms, often parasites of animals and plants, with long, cylindrical, unsegmented bodies and a heavy cuticle (e.g., hookworm, pinworm).

Ni: The chemical symbol for nickel, a trace metal measured by the RMP.

Niskin bottle: An oceanographic water sampling device.

O

oligochaete: Any of a class of segmented worms, such as the earthworm, lacking a definite head and having relatively few body bristles. They are mostly found in moist soil and freshwater.

oligotrophic: Water bodies or habitats with low concentrations of nutrients.

optical backscatter sensor: An instrument that measures total suspended solids (TSS), organic and inorganic particles of all sizes, in a certain volume of water.

organochlorine: A group of organic chemicals to which varying amounts of chlorine have been added. Organochlorine or chlorinated hydrocarbons (insecticides) are part of a broader class of halogenated hydrocarbons.

oxygen electrode: A terminal that conducts an electric current into or away from various conducting substances and collects and controls the flow of oxygen electrons.

P

"p" value: A confidence coefficient or a statistical value used in the multiple comparison procedure for comparing several treatments with a control.

PAHs (Polycyclic or Polynuclear Aromatic Hydrocarbons): A class of complex organic compounds, some of which are persistent and carcinogenic. PAHs are formed from the combustion of organic material and are ubiquitous in the environment.

particulate: A small, solid piece of matter that is easily lifted into the air, such as dust or ash. Smaller, fine particulates are more hazardous than larger, coarse ones because they are more easily inhaled deep into the lungs.

Pb: The chemical symbol for lead, a trace metal measured by the RMP.

PCBs (Polychlorinated Biphenyls): A group of manufactured chemicals including 209 different, but closely related, compounds made up of carbon, hydrogen, and chlorine. If released to the environment, they persist for long periods of time and can biomagnify in the food web. They are an organic toxicant suspected of causing cancer, endocrine disruption, and other adverse impacts on organisms.

pH: The acidity of water. A water quality parameter analyzed by the RMP.

peristaltic: Rhythmic, wavelike motion of the walls of the alimentary canal and certain other hollow organs. Alternating contraction and dilation of transverse and longitudinal muscles move the contents of the tube through the system.

pesticide: A general term to describe chemical substances used to destroy or control pest organisms, including herbicides, insecticides, algicides, and fungicides.

phaeophytin: A gray accessory plant pigment in green leaves. Accessory pigments help the plant to make more efficient use of sunlight because, unlike chlorophyll, they can trap energy from the wavelengths of light.

phytoplankton: Microscopic photosynthesizing organisms that drift with the currents.

pilot study: A study which employs methods that are under evaluation for potential incorporation into the RMP.

pollutant: A substance that adversely alters the physical, chemical, or biological properties of the environment.

pollution-index species: Species that are sensitive to a certain pollutant and that are monitored in terms of abundance and death in unpolluted and polluted areas. Measured in deaths per unit of pollution.

polychaete: ("with much hair") Any of a class of primarily marine, annelid worms that have a pair of fleshy, leg-like appendages covered with bristles on most segments.

principal components analyses

(PCA): A method that gives ecologists their first ordination technique in which ordination scores are derived from the

data matrix alone. It involves the simultaneous production of species and sample ordination scores in one integrated analysis. PCAs are used for the indication and indirect measurement of environmental complexes.

protozoan: Any of a large group of single-celled, usually microscopic eukaryotic organisms, such as amoebas.

pseudopod: A temporary cytoplasmic protrusion from an ameobid cell which functions in locomotion or in feeding by phagocytosis.

R

red tide: A dense outburst of phytoplankton (usually dinoflagellates) often coloring the water reddish brown.

resuspension: The condition of a substance whose particles are dispersed through a fluid but not dissolved in it.

runoff: An overflow of fluid not absorbed by soil, such as rainfall.

S

salinity: The number of grams of dissolved salts in 1,000 grams of sea water. In the RMP it is expressed as (parts per thousand).

screening value (SV): tissue screening values (SVs) for use in State fish/shellfish consumption advisory programs for the general adult population* from table 5-2 of EPA document #823-R-95-007 (Methods for Sampling and Analyzing Contaminants in Fish and Shellfish Tissue)

Se: The chemical symbol for selenium, a trace element measured by the RMP.

sediment pore water: The parts of water that are in channels or passages in the suspended material on the bottom of a fluid through which it may be absorbed or discharged.

sediment quality guidelines (SQG): The National Oceanic and Atmospheric Administration (NOAA) provided these guidelines, which are based on data compiled from numerous studies in the United States that linked sediment contamination and biological effects information. They were developed to identify concentrations of contaminants associated with biological effects in laboratory, field, or modeling studies.

sediment quality triad: A sediment assessment technique that incorporates information about sediment chemistry, toxicity, and benthos. The RMP is monitoring all three components and uses this information to evaluate the condition of the estuarine sediment.

sediment water interface (SWI): An exposure system that mimics situations that may occur in nature when negatively buoyant bivalve embryos contact sediment before hatching. Comparison of test results with other manipulating tests allows for the evaluation of possible effects related to the elutriate preparation process.

semidiurnal tide cycle: The two high and two low tides per lunar day (24.84 hours). In the San Francisco Bay-Delta, the cycle is known as a mixed semidiurnal cycle, since the two

high and the two low tides are of unequal height.
 shoals (broad and lateral): Shallows or sandbars in a body of water.
 special study: A study initiated by the RMP in order to help improve interpretation or collection of RMP data.
 speciation: The process of formation of a new species.
 species: A fundamental biological classification, comprising a subdivision of a genus and consisting of a number of plants or animals all of which have a high degree of similarity, can generally interbreed only among themselves, and show persistent differences from members of allied species.
 spectrophotometric method: A method used for comparing the color intensities of different spectra.
 spring tide: Tides with the greatest range between highs and lows, usually occurring during the full or new moons.
 Compare with neap tide.
 sulfides: A compound of sulfur with another element or a radical.
 suspended-solids concentration (SSC): Organic or inorganic particles that are suspended in and carried by water. The term includes sand, mud, and clay particles, as well as solids in wastewater.

T

taxon: A group of organisms that has been formally named (e.g., species, genus, family, order, etc.).
 tolerance limits: It is the maximum amount of a contaminant residue legally permitted by U.S. EPA, for example in drinking water.
 total maximum daily load (TMDL): The TMDL process provides a flexible assessment and planning framework for identifying load reductions or other actions needed to attain water quality standards (i.e., water quality goals to protect aquatic life, drinking water, and other water uses). The Clean Water Act §303(d) established the TMDL process to guide application of state standards to individual water bodies and watersheds.
 total organic carbon (TOC): This is the sum of organic carbon and is a monitoring parameter analyzed in environmental water programs. It is a physical sediment factor which can influence the concentration of other compounds. Represented variations in concentration can be attributable to spatial and temporal variations in sediment type.
 toxic: Poisonous, carcinogenic, mutagenic, teratogenic, or otherwise directly harmful to life.
 toxic equivalent: The combined potency of complex mixtures of compounds as an equivalent in toxicity.
 toxic hot spots: Locations in enclosed bays, estuaries, or the ocean where pollutants have accumulated in the water or sediment to levels which (1) may pose a hazard to aquatic life, wildlife, fisheries, or human health, (2) may impact beneficial uses, or (3) exceed State Water Resources Control Board or Regional Water Quality Control Board-adopted water quality or sediment quality objectives.
 toxicity: A measure of characteristics which are poisonous,

carcinogenic, or otherwise harmful to life.
 toxicity identification evaluation (TIE): A process used to determine the compound(s) responsible for toxicity in ambient waters, effluents, and sediments.
 trace contaminants: Substances that pollute another substance, air, or water, and are found in low concentrations.
 trace element: One of a group of naturally occurring elements found in low ("trace") concentrations in the water, sediment, and tissue measured by the RMP.
 trace organic: An organic compound found in low ("trace") concentrations in the water, sediment, and tissue measured by the RMP.
 transport: To carry from one place to another, especially over long distances.
 trophic level: Representing one step in the food web with number of individuals, energy, or biomass.
 trophic transfer: The energy transfer from one trophic level to another.
 Total Suspended Solids (TSS): Organic and inorganic particles of all sizes suspended in a measured volume of water.
 t-test: Statistical method for testing differences between two samples.

U

upstream: In the direction against the current of a stream.
 upwelling: Vertical or upward movement of water. This usually occurs near the coasts and is driven by onshore winds that bring nutrients from the depths of the ocean to the surface layer.

W

water column: The water in a lake, estuary, or ocean which extends from the bottom sediments to the water surface. The water column contains dissolved and particulate matter and is the habitat for fish, plankton, and marine mammals.
 water quality criteria: Specific levels of water quality which, if exceeded, are expected to render a body of water unsuitable for its designated beneficial use.
 water quality guidelines: Specific levels of water quality which, if reached, may adversely affect human health or aquatic life. These are non-enforceable guidelines issued by a governmental agency or other institution.
 wet-season sampling period: RMP sampling carried out between January and April.

Z

Zn: The chemical symbol for zinc, a trace metal measured by the RMP.