



# THE CLEAN WATER TEAM GLOSSARY

A Vocabulary for Water Quality Monitors  
and Watershed Stewards



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# **The Clean Water Team Glossary: A Vocabulary for Water Quality Monitors and Watershed Stewards**

## **February 2021**

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“The limits of my language are the limits of my universe.”  
— Goethe.

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This glossary is a compilation of terms related to water quality, environmental monitoring, hydrology, quality assurance practices and watershed management. It was especially created to bring together technical words often used when talking about water, science and stewardship terms which often have very precise meanings. The definitions are compiled from many sources with the goal of helping individuals navigate and understand the terminology used in water quality monitoring and watershed management.

Notes: (D#) denotes multiple definitions for the word or term.

These definitions are for the purposes of this document only and do not affect the use of the terms for other purposes.

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**Abatement** - Reducing the degree or intensity of, or eliminating, pollution.

**Absorption** -The uptake of water, other fluids, or dissolved chemicals by a cell or an organism (as tree roots absorb dissolved nutrients in soil).

**Acceptance criteria** - Addresses the adequacy of existing information proposed for inclusion into the project. These criteria often apply to data drawn from existing sources (“secondary” data).

**Accuracy** - Accuracy is the closeness of a measured result to an accepted reference value. Accuracy is usually measured as a percent recovery. QC analyses used to measure accuracy include standard recoveries, laboratory control samples, spiked samples, and surrogates.

**Accuracy check** - Comparison of the reading, or output, of a measurement device with a value believed to be the “true” value, without adjustments of the reading. The “true” value may be represented by natural conditions (e.g., freezing point) or by an accepted Standard.

**Acid** - A substance that has a pH of less than 7, which is neutral. Specifically, an acid has more free hydrogen ions (H<sup>+</sup>) than hydroxyl ions (OH<sup>-</sup>) (See also pH).

**Acidity** - A measure of the number of free hydrogen ions (H<sup>+</sup>) in a solution that can chemically react with other substances. Also see pH.

**Acre foot** - The amount of water needed to cover one acre of land one foot deep (equal to 325,851 gallons). An acre foot can support the annual indoor and outdoor needs of one to two urban households.

**Action** - Specific task or grouping of tasks that lead to incremental progress toward achieving objectives (outputs: products or services) and, ultimately, goals (outcomes) and mission.

**Action tracking** - A method of logging progress when implementing a task or set of tasks.

**Active Life** - The period during which wastes are being discharged to a waste management unit. For surface impoundments, active life includes the time when the impoundment contains fluids, including waste and leachate.

**Ad hoc investigation** - An incident investigation fashioned from the immediately available information and concerns. Typically, the ad hoc investigation is performed whenever there are no prior investigation procedures. A synonym to ad hoc is unsystematic.

**Ad libitum (Ad lib) sampling** - Data collected or a sampling method used to record something that seems interesting.

**Adaptive management** - Systematic process for continually improving management practices in response to an evaluation of outcomes/results of activities, projects, programs, and policies.

**Adaptive sampling** - Selecting an initial probability-based sample followed by additional sampling that is then based on observed results, where follow-up samples are concentrated in areas of elevated levels of the feature of interest.

**Adhesion** - The process of water being attracted or adhering to other substances.

**Adjustment** - The operation of bringing a measuring instrument into a state of performance suitable for its use. This is not calibration. Although the nature and magnitude of the adjustment is often determined by a pre-adjustment calibration, sometimes known as a first calibration.

**Adsorption** - Removal of a pollutant from air or water by collecting the pollutant on the surface of a solid material, (example: an advanced method of treating waste in which activated carbon removes organic matter from wastewater).

**Aerobic** - Living or occurring only in the presence of oxygen.

**Aerobic treatment** - Process by which microbes decompose complex organic compounds in the presence of oxygen and use the liberated energy for reproduction and growth. Such processes include extended aeration, trickling filtration, and rotating biological contactors.

**Agricultural drainage** - (D1) The process of directing excess water away from root zones by natural or artificial means, such as a system of drains placed below ground surface level. Also called subsurface drainage. (D2) The water drained away from irrigated farmland.

**Agricultural drought** - A drought which accounts for the water needs of crops during different growing stages. For instance, not enough moisture at planting time may hinder germination, leading to low plant populations and a reduction in yield.

**Algae** - Rootless plants that grow in bodies of water at rates in relative proportion to the amounts of nutrients available in the water.

**Aliquot** - A measured portion of a sample, or subsample. This term is used by the laboratory to communicate how much sample (volume or weight) was taken and actually analyzed.

**Alkaline** - A solution with a pH measurement above 7.0. Alkaline solutions contain an alkali, which is one of a specific group of elements (See also Base, Acid).

**Alkalinity** - The capacity of water to neutralize acids, imparted by the water's content of carbonate, bicarbonate, hydroxide, and on occasion borate, silicate, and phosphate. It is expressed in milligrams per liter of equivalent calcium carbonate (mg/l CaCO<sub>3</sub>).

**Allochthonous** - Derived from a source external to the stream channel (e.g., riparian vegetation as a source of organic matter) as opposed to autochthonous, which indicates a source inside the stream channel (e.g., algae or macrophytes rooted in the stream)

**Alluvial** - Relating to, composed of, or found in alluvium.

**Alluvium** - Relating to and/or clay, silt, sand, gravel, or similar detrital material deposited by running water, as in a riverbed, floor plain or delta.

**Ambient** - Pertaining to the current environmental condition.

**Ambient background concentration** - A representative concentration of the water quality in a receiving water body, determined from monitoring. The statistic or data used to determine the value from the range of data is dependent on the purpose of the monitoring and the application of the data.

**Ambient bioassessment** - Monitoring that is intended to describe general biotic condition as opposed to a diagnosis of sources of impairment.

**Ambient blank** - A blank solution that is put in the same type of bottle used for an environmental sample, kept with the set of sample bottles before sample collection, and opened at the site and exposed to the ambient conditions. See also field blank.

**Ambient medium** - Material surrounding or contacting an organism (e.g., outdoor air, indoor air, water, or soil through which chemicals or pollutants can reach the organism.

**Ambient water monitoring** - All forms of monitoring conducted beyond the immediate influence of a discharge pipe or injection well and may include sampling of sediments and living resources.

**Amphibian** - Any of a class (Amphibia) of cold-blooded vertebrates (such as frogs, toads, or salamanders) intermediate in many characters between fish and reptiles and having gilled aquatic larvae and air-breathing adults.

**Anadromous fish** - Migratory fish that are born in freshwater, migrate to the ocean where they live their adult life, and migrate back to fresh water to lay their eggs. Salmon and steelhead are two very common anadromous fish in California.

**Anaerobic** - Living or occurring only in the absence of free oxygen.

**Analyte** - An analyte is a parameter, property, or substance to be measured. Examples of analytes would include pH, dissolved oxygen, bacteria, and heavy metals.

**Anthropogenic** - Human made or caused.

**Antidegradation** – Policies or practices put in place so that no pollutant discharges or activities are permitted if they may cause surface waters already meeting water quality standards to drop below those standards

**Apparent color** - The color of the whole water sample and consists of color from both dissolved and suspended components.

**Aquatic community** - An association of interacting populations of aquatic organisms in a given water body or habitat.

**Aquatic ecosystem** - The stream channel, lake or estuary bed, water, and (or) biotic communities and the habitat features that occur therein.

**Aquatic guidelines** - Guidelines with specific levels of water quality which, if reached, may adversely affect aquatic life. These are non-enforceable guidelines issued by a governmental agency or other institution.

**Aquatic habitat** - Environments characterized by the presence of standing or flowing water.

**Aquatic invasive species (AIS)** - Are plants, animals or disease agents that are not native to an ecosystem. (AIS are also known as, but not limited to: Exotic Species, Alien Species, Invasive Organisms, Noxious Species, Naturalized Species, and Non-indigenous Aquatic Species or Non-Native Species). These species can have negative impacts on water supplies (clogged pipes, increased transpiration), agriculture (reduced water flows...), fisheries (loss of species, disease...), ecological functions (altered hydrology...), waterways (choke and congested waters, undermine levees...) and more.

**Aquatic-life criteria** - Water-quality guidelines for protection of aquatic life. Commonly refers to criteria established by the U.S. Environmental Protection Agency. See also Water-quality guidelines, Water-quality criteria, and Freshwater chronic criteria.

**Aqueous** - Something made up of water.

**Aqueous solubility** - The maximum concentration of a chemical that will dissolve in pure water at a reference temperature.

**Aquifer** - An underground geological formation or group of formations, containing water: source of groundwater for wells and springs.

**Area of Special Biological Significance (ASBS)** – A designation given to 34 ocean areas monitored and maintained for water quality by the State Water Resources Control Board. ASBS cover much of the length of California's coastal waters. They support an unusual variety of aquatic life, and often host unique individual species. ASBS are basic building blocks for a sustainable, resilient coastal.

**Arroyo** - A watercourse (such as a creek) in an arid region.

**Ash-free dry mass (AFDM)** - The portion, by mass, of a dried sample that is represented by organic matter: the concentration of AFDM per stream surface area sampled is often used as a surrogate for algal biomass.

**Assemblage** - The set of related organisms that represent a portion of a biological community (e.g., benthic macroinvertebrates).

**Assessed waters** - Water bodies for which the State is able to make use-support decisions based on actual information. Such waters are not limited to those that have been directly monitored; it is appropriate in many cases to make judgments based on other information

**Assay** - A test for a specific chemical, microbe, or an effect.

**Assessment** - The evaluation process used to measure the performance or effectiveness of a system and its elements. As used here, assessment is an all-inclusive term used to denote any of the following: audit, performance evaluation, management systems review, peer review, inspection, or surveillance.

**Assessment endpoint** - In ecological risk assessment, an explicit expression of the environmental value to be protected.

**Assimilation** - The ability of a water body to purify itself of pollutants.

**Assimilative capacity** - The capacity of a natural body of water to receive and dilute wastewaters or toxic materials without damage to aquatic life or humans who consume the water.

**ASTM International (ASTM)** - An international standards organization that develops and publishes voluntary consensus technical standards for a wide range of materials, products, systems, and services.

**Audit** - A systematic and independent examination to determine whether quality activities and related results comply with planned arrangements and whether these arrangements are implemented effectively and are suitable to achieve objectives.

**Automated Water Quality Stations (AWQS)** - An autonomous device for the collection of water quality samples and water quality measurements.

**Background concentration** - A concentration of a substance in a particular environment that is indicative of minimal influence by human (anthropogenic) sources.

**Background level** - The concentration of a substance in an environmental media (water or soil) that occurs naturally or is not the result of human activities.

**Bacteria** - Any of numerous unicellular microorganisms of the class Schizomycetes, occurring in a wide variety of forms, existing either as free-living organisms or parasites, and having a wide range of biochemical, often pathogenic properties.

**Bacterial examination** - The examination of water and wastewater to determine the presence, number, and identification of bacteria. Also called bacterial analysis.

**Bankfull** - The bankfull channel is the zone of maximum water inundation in a normal flow year (one- to two-year flood events).

**Barranca** - A deep stream with steep sides.

**Base** - Any substance that contains hydroxyl (OH-) groups and furnishes hydroxide ions in solution. A solution with a pH of greater than 7.0 (see also pH).

**Base flow** - Sustained flow of a stream in the absence of direct runoff. It includes natural and human-induced streamflows. Natural base flow is sustained largely by groundwater discharges.

**Baseline** - Information gathered at the beginning of a study from which variations found in the study are measured against. This information can also be measurements of environmental parameters during a pre-project period for the purpose of determining the range of variation of the system and establishing reference points against which changes can be measured.

**Basic** - A solution with a pH value above 7.0 (see also pH, Alkaline).

**Basin** - An area of land that drains all the streams and rainfall to a common outlet such as the outflow of a reservoir, mouth of a bay, or any point along a stream channel.

**Basket sampler** – This is a sampling device that holds clean sample bottles in it and is lowered from above into a waterbody for collection of water samples. Also known as a perforated bucket sampler.

**Bay** - A body of water that is partly surrounded by land and partly surrounded by another body of water.



**Beaufort wind force scale** - An empirical measure that relates wind speed to observed conditions at sea or on land.

**Bedload** - The particles in a stream channel that mainly move by bouncing, sliding, or rolling on or near the bottom of the stream.

**Bedrock** - A deposit of solid rock that is typically buried beneath soil and other broken or unconsolidated material and may be exposed by erosional processes.

**Benchmarks** - Standards or averages by which similar items can be compared.

**Beneficial use(s)** - The use of water resulting in appreciable gain or benefit. Beneficial uses of surface waters, groundwaters, marshes, and wetlands presented here serve as a basis for establishing water quality objectives and discharge prohibitions to attain these goals. Some examples of beneficial uses in California: water contact recreation (REC1); noncontact water recreation (REC2); industrial service supply (IND); navigation (NAV); marine habitat (MAR); shellfish harvesting (SHELL); commercial and sport fishing (COMM); wildlife habitat (WILD), fish migration (MIGR), fish spawning (SPWN).

**Benthic** – Pertaining to the bottom (bed) of a waterbody, at or beneath the interface of the sediment with the water column. The benthic zone is one of the ecological regions of a body of water. It comprises the bottom—such as the ocean floor or the bottom of a lake—the sediment surface, and some sub-surface layers.

**Benthic algae** – Algae that are attached to, or have at one point been anchored to, the stream bottom, in contrast to planktonic algae which are free-floating in the water column.

**Benthic fauna (or benthos)** - Organisms attached to or resting on the bottom or living in the bottom sediments of a water body.

**Benthic macroinvertebrates (BMI)** - Bottom-dwelling invertebrates large enough to be seen with the unaided eye.

**Best management practices (BMPs)** - Methods or measures designed and selected to reduce or eliminate the discharge of pollutants from point and nonpoint source discharges. As used in the stormwater context, BMPs are a schedule of activities, prohibitions of practices, maintenance, procedures and other management practices to prevent or reduce the pollution of waters of the state. BMPs include treatment requirements, operating procedures, and practices to control plant site runoff, spills, or leaks, sludge or waste disposal, or drainage from raw material storage.

**Bias** - (D1) The systematic or persistent distortion of a measurement process that causes errors in one direction (i.e., the expected sample measurement is different from the sample's true value). (D2) Often used as a data quality indicator, bias is the degree of systematic error present

in the assessment or analysis process. When bias is present, the sampling result value will differ from the accepted, or true, value of the parameter being assessed.

**Biofilm** - A matrix/film adhering to stream substrates and consisting of microorganisms (*e.g.*, algae, fungi, bacteria, protozoans) and detritus.

**Bias (sampling)** - An untrue representation of the population being sampled due to failure to adjust sampling frequency to the relative distribution of sub-population within the population being sampled.

**Bioaccumulate** - The net uptake of a material by an organism from food, water, and (or) respiration that results in elevated internal concentrations.

**Bioaccumulates** - Substances that increase in concentration in living organisms as they take in contaminated water, or food because the substances are very slowly metabolized or excreted.

**Bioassay** - A test to determine the relative strength of a substance or environmental sample by comparing its effect on a test organism with that of a standard preparation.

**Bioassessment** - Monitoring the aquatic environment to determine the health of a stream

**Bioindicators** - Bioindicators reflect biological attributes of ecosystem condition and represent signals that relay a complex message, potentially from numerous sources, in a simplified and useful manner. Bioindicators are measures, indices of measures, or models that characterize critical biological components of ecosystems.

**Biodiversity** - The variety of life in the world or in a specific habitat.

**Biological assessment** - An evaluation of the biological condition of a water body by using biological surveys and other direct measurements of a resident biota in surface water.

**Biological criteria (or biocriteria)** - Numerical values or narrative expressions that describe the reference biological integrity of aquatic communities that inhabit water of a given designated aquatic life use.

**Biological integrity** - The ability to support and maintain balanced, integrated functionality in the natural habitat of a given region.

**Biological magnification (or biomagnification)**- Refers to the process whereby certain substances such as pesticides or heavy metals move up the food chain. These substances work their way into rivers or lakes, and are eaten by aquatic organisms such as fish, which in turn are eaten by large birds, animals, or humans. The substances become concentrated in tissues or internal organs as they move up the chain.

**Biological monitoring (or biomonitoring)** - The use of a biological entity as a detector and its response as a measure to determine environmental conditions. Toxicity and exposure tests and biological surveys are common biomonitoring methods.

**Biochemical oxygen demand (BOD)** - A measure of the amount of organic matter that is available for decomposition in a water (or sediment) sample, as reflected by the amount of oxygen that has been consumed by microorganisms in that sample over a period of five days.

**Biological parameters** - Include measures related to the plant and animal life of the water body, such as fish species diversity and abundance, or the presence or absence of indicator fishes, aquatic invertebrates, or aquatic plants.

**Biological survey (or biosurvey)** - Consists of collecting, processing, and analyzing representative portions of a resident aquatic community to determine the community structure and function.

**Biomass** - The amount of living matter in each habitat or the total mass of a particular species or groups of species in a specified area.

**Bioremediation** - Use of living organisms to clean up oil spills or remove other pollutants from soil, water, or wastewater; use of organisms such as non-harmful insects to remove agricultural pests or counteract diseases of trees, plants, and garden soil.

**Blank** - A sample that is intended to contain none of the analytes of interest, which is subjected to the usual analytical or measurement process to establish a zero baseline or background value. Sometimes used to adjust or correct routine analytical results. A sample that is intended to contain none of the analytes of interest. A blank is used to detect contamination during sample handling preparation and/or analysis. There are several types of blanks, for example, field blank, trip blank, method blank, etc.

**Blind Sample** - A type of sample used for quality control purposes, a blind sample is a sample submitted to an analyst without their knowledge of its identity or composition. Blind samples are used to test the analyst's or laboratory's expertise in performing the sample analysis.

**Bloom** - A proliferation of algae and/or higher aquatic plants in a body of water; often related to pollution, especially when pollutants accelerate growth.

**Brackish** - Mixed fresh and salt water.

**Bridge** - A structure spanning and providing passage over a river, chasm, road, or the like.

**Brook**--A small stream.

**CalEnviroScreen** - A mapping tool that helps identify California communities that are most affected by many sources of pollution, and where people are often especially vulnerable to pollution's effects. <https://oehha.ca.gov/calenviroscreen/about-calenviroscreen>

**Calibration** - A set of operations that establish, under specified conditions, the relationship between the values of quantities indicated by a measuring instrument or measuring system and the corresponding values realized by standards.

**Calibration adjustment** - The action of adjusting the readings of an instrument to have them match a "true" value as represented by known natural conditions or by a standard solution. Calibration adjustment is always preceded by an accuracy check.

**Calibration blank** - A calibration standard that does not contain the analyte(s) of interest at a detectable level. It is necessary to determine any signal that may be produced at the detector which is not due to the presence of the analyte(s) (this signal is known as the blank indication).

**Calibration drift** - The measurable process in which a calibrated instrument's readings, over time, deviate from its point of calibration.

**Calibration standards** - Calibration standards are used to calibrate a meter. They consist of one or more "standard concentrations" (made up in the lab to specified concentrations) of the indicator being measured, one of which is the calibration blank. Calibration standards can be used to calibrate the meter before running the test, or they can be used to convert the units read on the meter to the reporting units (for example, absorbance to milligrams per liter).

**Calibrant (aka calibrator)** - A solution believed to represent the "true" concentration of an analyte, which is run through the analytical procedure in parallel to the tested samples. The sample's concentration is derived based on comparison with the calibrators run at the same procedures.

**California Department of Fish and Wildlife (CDFW)** - The California Department of Fish and Wildlife, formerly known as the California Department of Fish and Game, is a state agency under the California Natural Resources Agency. The Department of Fish and Wildlife manages and protects the state's fish, wildlife, wildflowers, trees, mushrooms, algae and native habitats. <https://wildlife.ca.gov/>

**California Department of Toxic Substances Control (DTSC)** - The California Department of Toxic Substances Control is an agency of the government of the state of California. The mission of the DTSC is to protect public health and the environment from toxic harm. <https://dtsc.ca.gov/>

**California Coastal Commission** - The California Coastal Commission is a state agency within the California Natural Resources Agency with quasi-judicial regulatory oversight on land use and public access in the California coastal zone. <http://www.coastal.ca.gov/>

**California Environmental Data Exchange Network (CEDEN)** - The State Water Board's data system for surface water quality in California.

**California Environmental Protection Agency (CalEPA)** - A state cabinet-level agency within the government of California. The mission of CalEPA is to restore, protect and enhance the environment, to ensure public health, environmental quality, and economic vitality.

<https://calepa.ca.gov/>

**California Natural Resources Agency (CNRA)** - A state cabinet-level agency in the government of California. The institution and jurisdiction of the Natural Resources Agency is provided for in California Government Code sections 12800 and 12805, et seq. Through its 25 departments, conservancies and commissions, the Natural Resources Agency is responsible for protecting historical, natural, and cultural sites, monitoring, and controlling state lands and waterways, and regulating fish and game use. <https://resources.ca.gov/>

**California Water Quality Monitoring Council** – This council was established under SB 1070, which required the boards, departments and offices within the California Environmental Protection Agency (CalEPA) and the California Natural Resources Agency to integrate and coordinate their water quality and related ecosystem monitoring, assessment, and reporting. The council operates to develop specific recommendations to improve the coordination and cost-effectiveness of water quality and ecosystem monitoring and assessment, enhance the integration of monitoring data across departments and agencies, and increase public accessibility to monitoring data and assessment information.

<https://mywaterquality.ca.gov/index.html>

**Capillary action** - The means by which liquid moves through the porous spaces in a solid, such as soil, plant roots, and the capillary blood vessels in our bodies due to the forces of adhesion, cohesion, and surface tension. Capillary action is essential in carrying substances and nutrients from one place to another in plants and animals.

**Capillary forces** - Forces that cause ground water to rise above the surface of the saturated zone into the spaces between soil particles in the unsaturated zone.

**Capillary fringe** - (D1) The porous material just above the water table that may hold water in the smaller void spaces. (D2) The zone above the water table within which the porous medium is saturated by water under less than atmospheric pressure.

**Cascade/ waterfalls** - Short, high-slope drops in stream bed elevation often accompanied by boulders and considerable turbulence. In high-slope streams, cascades and falls are often associated with step-pools. To qualify for this category, water must drop  $> 0.5$  m in height within a short longitudinal distance ( $< 0.5$  m).

**Categorical data** - Categorical data identifies a class or category for an object, or an observation based on some qualitative trait. (examples: gender: male and female, rankings like good or bad).

**Centroid** - The midpoint of that portion of the stream width which contains 50% of the total flow (that point in the increment at which discharge is equal on both sides of the point).

**Certification** - A credential earned which shows that one has specific skills or knowledge. Certifications are usually offered by a professional organization or a company that specializes in a particular field or technology.

**Certified standard** - Certified Standards are used to build the calibration curve or individual calibration standards and come from vendors accredited in ISO 17034. Each certified standard is accompanied by a certificate of analysis that certifies the composition and purity of the standard with traceability information.

**Chain of custody (COC)** - A document that tracks all the physical security of a sample and records from field collection through analysis and storage, including presence of custody seals placed during shipping.

**Channelization** - (D1) Natural or intentional straightening and deepening of streams so water moves faster. (D2) A marsh-drainage tactic that can interfere with waste assimilation capacity disturb fish and wildlife habitats and aggravate flooding.

**Characteristic** - Features or qualities belonging typically to a person, place, or thing and serving to identify it.

**Chemical oxygen demand (COD)** - A measure of the oxygen required to oxidize all compounds, both organic and inorganic, in water.

**Chemical parameters** - Include contaminants such as metals, dissolved nutrients, oils, and pesticides, and include chemical properties of the aquatic system (water, sediment, tissue...) such as dissolved oxygen, chemical oxygen demand, and acid neutralizing capacity.

**Chlorophyll  $a$**  – Primary light receptor/photosynthetic pigment in algae and cyanobacteria and higher plants: the concentration of this pigment per stream surface area sampled provides an estimate of algal biomass

**Citizen monitoring** - Monitoring of the environment conducted by an individual (an inhabitant of a city or town or similar, a civilian) or community members, usually volunteers, interested in watershed protection. Citizen monitoring activities include collecting water quality data, evaluating fish habitat, counting birds, or making visual observations of stream health. Community and resource managers use monitoring information to better protect California's waters.



**Citizen science** - The systematic collection and analysis of data; development of technology; testing of natural phenomena; and the dissemination of these activities by an individual or group on a primary avocational basis.

**Civic ecology** - A field of interdisciplinary study concerned with individual, community, and environmental outcomes of community-based environmental stewardship practices, and the interactions of such practices with people and other organisms, communities, governance institutions, and the ecosystems in which those practices take place.

**Civic science** - Civic science alludes to a changing relationship between science, expert knowledge, and citizens in democratic societies. In this perspective, citizens and the public can no longer be viewed as an exclusive domain for scientific experts and policy-makers only” with dimensions of civic science emphasizing public participation, enhancing representation of marginalized voices, and democratization of the scientific process.

**Clean Water Team (CWT)** - The Water Boards citizen and community water quality monitoring program. [www.waterboards.ca.gov/water\\_issues/programs/swamp/cwt\\_volunteer.html](http://www.waterboards.ca.gov/water_issues/programs/swamp/cwt_volunteer.html)

**Chlorinated hydrocarbons** - Compounds such as DDT and PCBs made of carbon, hydrogen, and chlorine atoms. Once released into the environment, these chemicals become biologically amplified as they move up the food chain.

**Chlorophyll** - A group of green pigments found in most plants, including phytoplankton, which are used for photosynthesis. The chlorophyll *a* pigment is generally measured.

**Clarity** - See Water clarity

**Clay** - A type of fine-grained natural soil material that contains hydrous aluminum phyllosilicates (clay minerals) that develops plasticity when wet.

**Clean Water Act (CWA)** - Federal Water Pollution Control Act, the Clean Water Act constitutes the basic federal water pollution control statute for the United States. [www.epa.gov/laws-regulations/summary-clean-water-act](http://www.epa.gov/laws-regulations/summary-clean-water-act).

**Climate** - The long-term average weather, typically averaged over a period of 30 years.

**Co-created science** – Scientists and participants collaboratively design a science project.

**Co-located (Collocated)** - Two or more portions collected at the same point in time and space so as to be considered identical. These samples are also known as field replicates and should be identified as such.

**Co-management** – The sharing of power and responsibility between the government and local resource users working collaboratively to achieve mutually agreed upon, compatible objectives to protect, conserve, use, enhance, or restore natural and cultural resources.

**Coarse particulate organic matter (CPOM)** – Particles of decaying organic material, such as leaves and twigs, that are between 1 and 10 mm in diameter and suitable for consumption by benthic macroinvertebrates in the “shredder” functional feeding group.

**Coastal zone** - Land and water adjacent to the coast that exert an influence on the uses of the sea and its ecology, or whose uses and ecology are affected by the sea.

**Cobble** - A class of rock defined on the Udden–Wentworth scale as having a particle size of 64–250 millimeters, larger than a pebble and smaller than a boulder.

**Cobble embeddedness** - The percent of surface area of cobble-sized particles (64-250 mm) buried by fine particles (<2.0 mm diameter).

**Coliform bacteria** - Bacteria that are metabolically related to *Escherichia coli* (*E. coli*), a gram-negative bacillus which lives naturally in the intestines of warm-blooded animals.

**Collaborative science** - Scientist designed studies where the participants are active in doing more than just collecting data/samples.

**Color comparator** – A device is used to determine the concentration of certain chemicals in solution. A sample that has been processed for an analyte is put in a glass tube. The tube is inserted in the comparator and visually compared against a series of colored standards, with their known chemical concentrations, until the nearest possible color match is found.

**Colorado River Board** – The Colorado River Board represents the State of California and its Members in discussions and negotiations with the Colorado River Basin States, federal, state, and local governmental agencies and Mexico regarding the management of the Colorado River.

**Colorimeter** - A device used in colorimetry that measures the absorbance of particular wavelengths of light by a specific solution. It is commonly used to determine the concentration of solute in a given solution by the application of the Beer–Lambert law, which states that the concentration of a solute is proportional to the absorbance.

**Colorimetric analysis** - A method of determining the concentration of a chemical element or chemical compound in a solution with the aid of a color reagent.

**Combined sewer overflows** - Discharge of a mixture of storm water and domestic waste when the flow capacity of a sewer system is exceeded during rainstorms.

**Combined sewers** - A sewer system that carries both sewage and storm water runoff. Normally, its entire flow goes to a waste treatment plant, but during a heavy storm, the volume of water may be so great as to cause overflows of untreated mixtures of storm water and sewage into receiving waters. Storm water runoff may also carry toxic chemicals from industrial areas or streets into the sewer system.

**Common Chemistry** - A database containing the CAS Registry Number®, chemical names (both formal and common), molecular formulas, and structures or sequences for ~7900 chemicals of widespread general public interest. [www.commonchemistry.org/](http://www.commonchemistry.org/)

**Community component** - Any portion of a biological community. The community component may pertain to the taxonomic group (fish, invertebrates, algae), the taxonomic category (phylum, order, family, genus, species), the feeding strategy (herbivore, omnivore, carnivore), or organizational level (individual, population, community association) of a biological entity within the aquatic community.

**Community-based participatory research** - A collaborative approach to research that equitably involves all partners in the research process and recognizes the strengths that each brings. Community-based participatory research begins with a research topic of importance to the community with the aim of combining knowledge and action for social change. The term has most frequently been used in the context of community health.

**Community based science** - Participant and community created science projects. The individuals and community members involved, collect samples, take measurements, conduct tests, and/or do other program tasks.

**Comparability** - A measure of the confidence with which one data set or method can be compared to another. A data quality indicator, comparability is the degree to which different methods, data sets, and/or decisions agree or are similar. A measure of the confidence with which one data set or method can be compared to another.

**Completeness** - The number of samples collected (or valid Results obtained) as compared to the number of samples (or valid Results) called for in the Planning Document (based on the number needed to enable use of the information), expressed as a percentage.

**Compliance monitoring** - Activities performed by regulators/agencies/facilities to surveil compliance (audits, investigations, etc.). The regulated entity is performing monitoring activities for compliance to a law, regulation, permit or order.

**Composite sample** - A single sample volume constructed of multiple individual samples (aliquots) taken over a specific period of time or volume of flow (period of interest). Composite sampling can be useful for estimating mean concentration of a substance, and if appropriate, compositing can result in substantial savings where the cost of analyzing individual samples is

high. Time proportion (paced) composite samples are composed of aliquots taken at uniform intervals of time over a specified period.

**Composite sampling** - Sampling method used where several samples are physically mixed into a larger composite sample. The entire composite sample may be measured for desired information, or one or more random sub-samples may be measured individually. In general, individual samples which are composited must be the same size or volume and the composite sample must be completely mixed. Composite sampling can be useful for estimating mean concentration of a substance, and if appropriate, compositing can result in substantial savings where the cost of analyzing individual samples is high.

**Composite sampling protocol** - A description of the scheme for forming and processing (mixing and homogenizing) composites. This sampling protocol will indicate whether entire samples or aliquots are to be combined, the number of groups of units to be formed, the number of units per group, which units form each group, and the amount of material from each unit to be used in forming the composite sample.

**Concentrated** - A solution that has been processed to increase the strength by removing water (or solvent) without losing the substance.

**Concentration** - The amount of a substance in a given volume or mass of a substance, usually expressed in units of mass (e.g., gram) per unit of volume (e.g., liter) or unit of mass (e.g. kg).

**Concurrent sample** - A type of replicate sample in which the samples are collected simultaneously with two or more samplers or by using one sampler and alternating collection of samples into two or more compositing containers.

**Conductivity** - A measure of the ability of water to pass an electrical current. Conductivity of water is a function of the concentration and type of dissolved solids such as chloride anions (ions that carry a negative charge) or sodium cations (ions that carry a positive charge).

**Confidence interval** - A range of values bracketing a given measurement result, within which that Result is expected to be included at a known degree of confidence.

**Confidence limits** - The upper and lower values of the confidence interval.

**Confined aquifer** - An aquifer that is separated from the atmosphere by impermeable materials such as rock or clay.

**Conformance** - An affirmative indication or judgment that a product or service satisfies the relevant specification, contract, or regulation.

**Conservation easement** - Any limitation in a deed, will, or other instrument in the form of an easement, restriction, covenant, or condition, which is or has been executed by or on behalf of

the owner of the land subject to such easement and is binding upon successive owners of such land, and the purpose of which is to retain land predominantly in its natural, scenic, historical, agricultural, forested, or open-space condition.

**Constituent** - An informal term used to describe a detectable element or component or attribute of waste or effluent.

**Constituents /Contaminants of emerging concern (CECs)** - Any chemical discovered in water or in the environment that had not previously been detected or were only present at insignificant levels. CECs can range from pharmaceuticals and personal care products to persistent organic pollutants used in many industrial processes. These chemicals make it into our Nation's lakes and rivers and have a detrimental effect on fish and other aquatic species. That have also been shown to bioaccumulate up the food web - putting even non-aquatic species at risk when they eat contaminated fish. The USGS monitors and assesses these dangerous chemicals from their source all the way through the food web.

**Contaminant** - Defined in the federal Safe Drinking Water Act as any physical, chemical, biological, or radiological substance or matter in air, water, or soil. The Department of Health Service administers the Safe Drinking Water Act in California.

**Contamination** - Inadvertent addition to the sample of something that could interfere with specific tests.

**Continuous monitoring** - A methodology that utilizes sensors connected to data loggers and provides multiple Results of a given characteristics, spaced at pre-determined time intervals.

**Contributory science** - Scientist designed project where participants collect data/samples.

**Corrective action** - Actions taken by a program which modify prior policies or procedures to address the root cause of a problem or non-conformity that impacts data quality. The objective of the action is to prevent further occurrences of the non-conformity and improve data quality.

**Creek** - A natural stream of water normally smaller than and often tributary to a river.

**Crowdsourcing** - The practice of obtaining information or input into a task or project by enlisting the services of a large number of people, either paid or unpaid. Data is typically contributed via an online community or special smartphone apps.

**Cryptorheic basin** - Drainage basins that appear to be an endorheic basin with no external water flows but does have subsurface outflows which eventually lead to the ocean.

**Cubic feet per second (cfs)** - The rate of flow passing any point equal to the volume of one cubic foot of water every second. One cubic foot is equal to 7.48 gallons per second; 448.8 gallons per minute; 646,317 gallons per day.

**Culvert** - A tunnel carrying a stream or open drain under a road or railroad.

**Cyanobacteria** - Historically referred to as “blue-green” algae, but actually chlorophyll-*a* containing prokaryotes that are capable of photosynthesis and co-occur with “true” (i.e., eukaryotic) benthic algae in streams; useful as a bioindicator, and field-sampled and laboratory-processed as soft-bodied algae.

**D-frame net** - A specialized net used for collecting stream dwelling benthic macro invertebrates. The fine mesh, usually with pores of 0.5 mm, is attached to a D-shaped frame one foot in width and mounted on a pole.

**Dam** - A barrier constructed to hold back water and raise its level, forming a reservoir used to generate electricity or as a water supply.

**Data** - Data is a set of values of qualitative or quantitative variables about one or more persons or objects or actions, while a datum (singular of data) is a single value of a single variable.

**Data comparability** - The characteristics that allow information from many sources to be of definable or equivalent quality so that this information can be used to address program objectives not necessarily related to those for which the data were collected. These characteristics need to be defined but would likely include detection limit precision, accuracy, bias, and so forth.

**Data flagging** - The process of identifying and marking a measurement as having failed a quality control or quality assurance element. Flagged data will not show up on charts and tables but will still remain in the database and may still be of potential use.

**Data management plan** – A planned approach to data management and sharing that a specific research will employ.

**Data quality** - A measure of the degree of acceptability or utility of data for a particular purpose.

**Data quality assessment** - The scientific and statistical evaluation of data to determine if data obtained from environmental operations are of the right type, quality, and quantity to support their intended use.

**Data quality objectives (DQO)** - Statements about the level of uncertainty that a decision-maker is willing to accept in data used to support a particular decision. They include specifications of how good the results should be (e.g., tolerable measurement error) and what



each result should represent. These statements are derived from the DQO Process that clarifies study's technical and quality objectives, define the appropriate type of data, and specify tolerable levels of potential decision errors that will be used as the basis for establishing the quality and quantity of data needed to support decisions.

**Data quality objectives (DQO) process** - A systematic planning tool based on the scientific method that identifies and defines the type, quality, and quantity of data needed to satisfy a specified use. DQOs are the qualitative and quantitative outputs from the DQO Process.

**Data reconciliation** - A verification phase during a data migration where the target data is compared against original source data to ensure that the migration architecture has transferred the data correctly.

**Data reduction** - The process of transforming the number of data items by arithmetic or statistical calculations, standard curves, and concentration factors, and collating them into a more useful form. Data reduction is irreversible and generally results in a reduced data set and an associated loss of detail.

**Data science** - An inter-disciplinary field that uses scientific methods, processes, algorithms, and systems to extract knowledge and insights from many structural and unstructured data. The field encompasses analysis, preparing data for analysis, and presenting findings to inform high-level decisions in an organization. As such, it incorporates skills from computer science, mathematics, statistics, information visualization, graphic design, and business.

**Data users** - The group(s) that will be utilizing the monitoring results for decision making or other purposes. Data users can include the monitors themselves as well as government agencies, schools, universities, businesses, watershed organizations, and community groups.

**Data validation** — An analyte and sample specific process that extends the evaluation of data beyond method, procedural, or contractual compliance (i.e., data verification) to determine the analytical quality of a specific data set. This process checks all documentation to determine if the test or analysis used to generate the data was valid, and if the data meets requirements and quality objectives.

**Data verification**- The process of evaluating the completeness, correctness, and conformance/compliance of a specific data set against the method, procedural, or contractual specifications.

**Database** – An organized collection of data, generally stored and accessed electronically from a computer system.

**Database management system (DBMS)** - Software that interacts with end users, applications, and the database itself to capture and analyze the data.

**Decontamination** - The action of cleaning sampling equipment and sample containers to avoid carry over of contamination from non-sample sources into a sample. This Term is also used in reference to removing hazardous contaminants from personnel, area or built space, vehicles, etc.

**Defensible** - The ability to withstand any reasonable challenge related to the veracity or integrity of project and laboratory documents and derived data.

**Deionized water** - Water that has all ions removed through ion exchange or reverse osmosis technologies.

**Delta** - The distributary at the lower end of a river where the channel is subdivided into several smaller channels with intervening islands.

**Densitometer** - A device that measures the degree of darkness or shading by forest overstory.

**Density** - A measure of how heavy a specific volume of a solid, liquid, or gas is in comparison to water.

**Depositional** - Habitats in the stream that are dominated by slow-moving water, such as pools, where deposition of materials from the water column is more likely to occur than erosion (or (re)suspension) of loose bed materials.

**Derived Endpoint (for 1 data point)** - Value calculated from multiple raw data or predicted from multiple raw data based on probabilistic considerations; represents one point in space and time or relevant to one sample.

**Descriptive statistic (for many data points)** - Value derived from many points in space and time, represent a descriptor of the population.

**Design** — The specifications, drawings, design criteria, and performance specifications. Also, the result of deliberate planning, analysis, mathematical manipulations, and design processes.

**Designated uses** - (D1) A classification specified in water-quality standards for each water body or segment that relates to the level of protection from perturbation afforded by the regulatory agency. (D2) Describes the chemical, physical, and (or) biological attributes covered by the use; this is, in essence, the narrative "criteria". (D3) Uses specified in water-quality standards for each water body or segment whether they are being attained.

**Designated waste** - Nonhazardous waste which consists of or contains pollutants which, under ambient environmental conditions at the waste management unit, could be released at concentrations in excess of applicable water quality objectives, or which could cause degradation of waters of the state.

**Detection limit (DL)** - The lowest concentration of an analyte that can be reliably detected and determined to be different from zero (background) by a single measurement at a stated level of confidence. DLs are analyte and matrix-specific and are laboratory dependent. Detection limits can be used to describe the capabilities of a method (method detection limit) or analytical equipment/instrument (instrument detection limit).

**Diatom** - A unicellular golden-brown alga (Bacillariophyta) that possesses a rigid, silicified (silica-based) cell wall in the form of a "pill box".

**Diluent** - A substance used to dilute concentrations without changing the chemical composition of the original substance.

**Dilute** - To thin out, or having been thinned out, less than full strength.

**Dilution ratio** - The critical low flow of the upstream receiving water divided by the flow of the effluent discharged. It represents the ability of the stream to assimilate waste.

**Discharge** The volume of water that passes a given location within a given period of time. Usually expressed in cubic feet per second.

**Discharger** - Any person who proposes to discharge or discharges waste that could affect the quality of California waters. The term includes any person who owns, or is responsible for the operation of, a waste management unit.

**Disinfectant** - A chemical or physical process that kills pathogenic organisms in water. Chlorine is often used to disinfect sewage treatment effluent, water supplies, wells, and swimming pools.

**Disinfectant byproduct** - A compound formed by the reaction of a disinfectant such as chlorine with organic material in the water supply; a chemical byproduct of the disinfection process.

**Dissolved oxygen (DO)** - Oxygen dissolved in water and available for living organisms to use for respiration, usually expressed in milligrams per liter or percent of saturation.

**Dissolved solids** - Disintegrated organic and inorganic material in water. Excessive amounts make water unfit to drink or use in industrial processes.

**Distilled water** - Water that has been purified by distillation (boiling the water off as steam and condensing it back to liquid, leaving the impurities behind). Having been boiled, the water is also sterile.

**Diversity** - The distribution and abundance of different kinds of plant and animal species and communities in a specified area.

**Document control** - The policies and procedures used by an organization to index documents with an appropriate date, revision number, and document ID to ensure users of document are referencing the current revision of the document and older revisions are archived/stored and no longer in use.

**Down gradient** - The direction that groundwater flows; similar to “downstream” for surface water.

**Drainage area** - The drainage area of a stream at a specified location is that area, measured in a horizontal plane, which is enclosed by a drainage divide.

**Drainage basin** – The land area where precipitation runs off into streams, rivers, lakes, and reservoirs. It is a land feature that can be identified by tracing a line along the highest elevations between two areas on a map, often a ridge. Large drainage basins, like the area that drains into the Mississippi River contain thousands of smaller drainage basins. Also called a "watershed".

**Drainage divide** - Boundary between adjoining drainage basins.

**Dredging** - Removal of mud from the bottom of water bodies. This can disturb the ecosystem and cause silting that kills aquatic life. Dredging of contaminated mud can expose biota (the flora and fauna of a region) to heavy metals and other toxics. Dredging activities may be subject to Water Boards’ regulation under state and federal laws.

**Drought** - A prolonged period with a shortage of water. See also agricultural drought, hydrological drought, meteorological drought and socioeconomic drought.

**Drought conditions** - Hydrologic conditions during a defined period when rainfall and runoff are much less than average.

**Dry** - Any surface area within the channel’s wetted width that is above water (e.g., midchannel point bars). When assessing dry habitats, only count areas with particulate substrate; do not count tops of emergent rocks and boulders.

**Duplicate sample** - Refer to field duplicate and/or laboratory duplicate.

**Ecological indicators** - Plant or animal species, communities, or special habitats with a narrow range of ecological tolerance. For example, in forest areas, such indicators may be selected for emphasis and monitored during forest plan implementation because their presence and abundance serve as a barometer of ecological conditions within a management unit.

**Ecological studies** - Studies of biological communities and habitat characteristics in NAWQA Study Units to evaluate the effects of physical and chemical characteristics of water and

hydrologic conditions on aquatic biota and to determine how biological and habitat characteristics differ among environmental settings.

**Ecology** - The branch of biology that deals with the relations of organisms to one another and to their physical surroundings.

**Ecoregions (or regions of ecological similarity)** - A homogeneous area defined by similarity of climate, landform, soil, potential natural vegetation, hydrology, or other ecologically relevant variable. Regions of ecological similarity help define the potential designated use classifications of specific water bodies.

**Ecosystem** - A community of species interacting with each other and with the physical and chemical (nonliving) environment.

**Educational science** - Using science and monitoring activities to advance environmental and science literacy.

**Effectiveness monitoring** - Documents and tracks how well management responses to environmental stressors meet intended objectives. Monitoring contributes data to a weight of evidence relating management activities and responses to changes in conditions.

**Effluent** - A discharge to a body of water from a defined or point source.

**Electrical conductivity** - The relative ability of water to conduct electrical current. Conductivity depends on the ion concentration and temperature and can be used to approximate the total dissolved solids in the water.

**Elutriation** – The process of using a liquid (water) to separate denser material (e.g., stream sediments) from lighter materials (organic particles and benthic organisms).

**Emergent plants** - Plants rooted under water, but with their tops extending above the water.

**Emerging environmental problems** - Problems that may be new and (or) are becoming known because of better monitoring and use of indicators.

**Enclosed bays** - Indentations along the coast that enclose an area of oceanic water within a distinct headlands or harbor works.

**Endorheic basin** - A drainage basin that normally retains water and allows no outflow to other external bodies of water, such as rivers or oceans, but converges instead into lakes or swamps, either permanent or seasonal. They are also called closed basins, terminal basins, internal drainage systems or internal basins.

**Endpoint** - (D1) A numerical value, representing the result of a measured parameter, that has been calculated from a number of individual measurements (of “raw data”). Examples: flow discharge in cfs (cubic feet per second), bacterial concentration in MPN/100 ml (most probable number). (D2) That stage in titration at which an effect, such as a color change, occurs, indicating that a desired point in the titration has been reached.

**Enrichment** - The addition of nutrients (e.g., nitrogen, phosphorus, carbon compounds) from sewage effluent or agricultural runoff to surface water. Enrichment greatly increases the growth potential for algae and other aquatic plants.

**Enterococci** - A group of bacteria found primarily in the intestinal tract of warm-blooded animals. Enterococci are unrelated to the coliforms; rather, they are a subgroup of the fecal streptococci group. Enterococcus is the plural form.

**Environment** - All the factors that act upon an organism or community of organisms, including climate, soil, water, chemicals, radiation, and other living things.

**Environmental conditions** - The physical, chemical, radiological, or biological characteristics of a physical medium (for example, air, water, soil, sediment) or a biological system.

**Environmental data** - Any measurements or information that describe environmental processes, location, or conditions; ecological or health effects consequences; or the performance of environmental technologies. For EPA, environmental data include information collected directly from measurements, produced from models, and compiled from other sources such as data bases or the literature.

**Environmental data operation** - Work performed to obtain, use, or report information pertaining to environmental processes and conditions.

**Environmental DNA (eDNA)** - Organismal DNA that can be found in the environment. Environmental DNA originates from cellular material shed by organisms (via skin, excrement, etc.) into aquatic or terrestrial environments that can be sampled and monitored using new molecular methods.

**Environmental education** - A process that allows individuals to explore environmental issues, engage in problem solving, and take action to improve the environment. As a result, individuals develop a deeper understanding of environmental issues and have the skills to make informed and responsible decisions.

**Environmental framework** - Natural and human-related features of the land and hydrologic system, such as geology, land use, and habitat, that provide a unifying framework for making comparative assessments of the factors that govern water-quality conditions within and among NAWQA Study Units.



**Environmental indicator** - A measurable feature or features that provide managerially and scientifically useful evidence of environmental and ecosystem quality or reliable evidence of trends in quality.

**Environmental justice (EJ)** - Equal protection from environmental hazards for individuals, groups, or communities regardless of race, ethnicity, or economic status. This applies to the development, implementation, and enforcement of environmental laws, regulations, and policies, and implies that no group should be forced to shoulder a disproportionate share of negative environmental impacts because it lacks political or economic strength.

**Environmental Laboratory Accreditation Program (ELAP)** - A program that is responsible for the accreditation of environmental testing laboratories that produce analytical data for regulatory agencies.

**Environmental medium** - An environmental category that surrounds or contacts humans, animals, plants, and other organisms (e.g., surface water, groundwater, soil or air) and through which chemicals or pollutants move.

**Environmental monitoring** - The process of measuring or collecting environmental data.

**Environmental processes** - Any manufactured or natural processes that produce discharges to, or that impact, the ambient environment.

**Environmental sample** - An environmental sample is a specimen of any material collected from an environmental source, such as water or macroinvertebrates collected from a stream, lake, or estuary.

**Environmental site assessment** - A process of determining whether contamination is present on a parcel of real property. The American Society for Testing and Materials' document entitled "Standard Practice for Environmental Site Assessment: Phase 1 Environmental Site Assessment Process" describes such a process.

**Environmental sustainability** - Long-term maintenance of ecosystem components and functions for future generations.

**Environmental technology** - An all-inclusive term used to describe pollution control devices and systems, waste treatment processes and storage facilities, and site remediation technologies and their components that may be used to remove pollutants or contaminants from, or to prevent them from entering, the environment.

**Ephemeral streams** – Streams that have flows only during and immediately following rainfall.

**Equipment (or rinsate) blank** - Clean water that has been used to rinse sampling equipment and was then collected as a regular environmental sample. Rinsates are analyzed along with

the other samples to check specifically for carryover contamination from reuse of sampling equipment.

**Equivalency** - Any body of procedures and techniques of sample collection and (or) analysis for a parameter of interest that has been demonstrated in specific cases to produce results not statistically different to those obtained from a reference method.

**Erosion** - The process in which a material is worn away by precipitation, a stream of water, glaciers, winds, and waves.

**Erosional** - Habitats in the stream that are dominated by fast-moving water, such as riffles, where stream power is more likely to facilitate erosion (suspension) of loose benthic material than deposition.

**Escherichia coli (E. coli)** - The major species in the fecal coliform group. Of the five general groups of bacteria that comprise the total coliforms, only E. coli is generally not found growing and reproducing in the environment. Consequently, E. coli is considered to be the species of coliform bacteria that is the best indicator of fecal pollution and the possible presence of pathogens.

**Estimation** - The description of certain numerical characteristics of a population.

**Estuary** - A semi-enclosed coastal body of water which has free connection with the open sea and within which seawater is measurably diluted with fresh water derived from land drainage.

**Estuarine habitat** - Tidal habitats and adjacent tidal wetlands that are usually semi-enclosed by land but have open, partly obstructed, or sporadic access to the open ocean and in which ocean water is at least occasionally diluted by freshwater runoff from the land.

**Eutrophication** - The normally slow aging process by which a lake or a standing body of water fills with organic matter, evolves into a bog or marsh, and ultimately disappears.

**Evaluation** - A process of collecting project data and information, keeping records that are used to demonstrate performance, and comparing your achievements to your goals and desired outcomes. Outcome evaluation is often characterized by quantitative assessment methods. This can be done simply through recording and documenting activities, or in a more scientific approach through rigorous experimental design and analysis.

**Evaporation** - The process of liquid water becoming water vapor, including vaporization from water surfaces, land surfaces, and snow fields, but not from leaf surfaces (see also Transpiration).

**Evapotranspiration** - The sum of evaporation and transpiration.

**Exposure indicators** - An environmental characteristic measured to provide evidence of the occurrence or magnitude of contact with a physical, chemical, or biological stressor.

**FDA action level** - A regulatory level recommended by the U.S. Environmental Protection Agency for enforcement by the Food and Drug Administration (FDA) when pesticide residues occur in food commodities for reasons other than the direct application of the pesticide. Action levels are set for inadvertent pesticide residues resulting from previous legal use or accidental contamination. Applies to edible portions of fish and shellfish in interstate commerce.

**Fecal coliforms** – Coliform Bacteria that are natural residents of the guts of warm-blooded animals. Although not pathogenic themselves, their presence in water indicates contamination with sewage or feces, which in turn suggests that disease-causing bacteria or viruses may also be present.

**Fecal Indicator Bacteria** – Bacteria which are natural inhabitants of the gastrointestinal tracts of humans and other warm-blooded animals. These bacteria are used to detect and estimate the level of fecal contamination of water. They are used to indicate the presence of a health risk.

**Fen** - A type of wetland that accumulates peat deposits. Fens are less acidic than bogs, deriving most of their water from groundwater rich in calcium and magnesium.

**Field blank** - (D1) A sample container of the same batch used for the environmental samples that has been filled, in the field, with “clean” water. The field blank is analyzed along with the other samples to check for (or confirm the lack of) container contamination. (D2) A clean analyte-free sample which is carried to the sampling site and then exposed to sampling conditions, returned to the laboratory, and treated as an environmental sample (See also ambient blank).

**Field duplicate sample** - Used for quality control purposes, field duplicate samples are two samples taken at the same time from, and representative of, the same site that are carried through all assessment and analytical procedures in an identical manner. Duplicate samples are used to measure natural variability as well as the precision of a method, monitor, and/or analyst. More than two duplicate samples are referred to as replicate samples (see also Laboratory duplicate sample).

**Field manual** - An explanatory or practical set of instructions for a person or persons when working in the field which may cover the use of equipment, filling out a data sheet, directions and description of a monitoring location and information on what to do in an emergency.

**Field operator** - The project person who conducts monitoring activities in the field, including measurements, calibrations and/or accuracy checks, and sampling.

**Filter blank** - A blank solution that is filtered in the same manner and through the same filter apparatus used for an environmental sample.

**Filtration** - The process of separating solids from a liquid by means of a porous device (filter) through which only the liquid can pass.

**Financial assistance** - The process by which funds are provided by one organization (usually governmental) to another organization for the purpose of performing work or furnishing services or items. Financial assistance mechanisms include grants, cooperative agreements, and governmental interagency agreements.

**Fines** - Substrate particles < 0.06 mm diameter. These materials feel smooth and not gritty to touch (see also Silt).

**Fish** – Any of numerous cold-blooded strictly aquatic craniate vertebrates that include the bony fishes and usually the cartilaginous and jawless fishes and that have typically an elongated somewhat spindle-shaped body terminating in a broad caudal fin, limbs in the form of fins when present at all, and a 2-chambered heart by which blood is sent through thoracic gills to be oxygenate.

**Fish passage surveys** - An assessment method that identifies barriers to fish migration (dams, culverts, road crossings...). Fish passage surveys have been critical for the management of migratory fishes.

**Fixed sample** - A sample that has been rendered chemically stable or unalterable, meaning that atmospheric oxygen will no longer affect the test result.

**Fixed-location monitoring (also fixed-station monitoring)** - Sampling a water body for pollutant concentration at one location continuously or repeatedly.

**Floating plants** - Plants that grow free floating, rather than being attached to the streambed.

**Flood** - An overflow of water onto lands that are used or usable by man and not normally covered by water. Floods have two essential characteristics: The inundation of land is temporary; and the land is adjacent to and inundated by overflow from a river, stream, lake, or ocean.

**Flood stage** - The elevation at which overflow of the natural banks of a stream or body of water begins in the reach or area in which the elevation is measured.

**Floodplain** - The flat or nearly flat land along a river or stream or in a tidal area that is covered by water during a flood.

**Floodway** - The channel of a river or stream and the parts of the floodplain adjoining the channel that are reasonably required to efficiently carry and discharge the flood water or flood flow of a river or stream.

**Flow meter** - A gauge indicating the velocity of wastewater moving through a treatment plant or of any liquid moving through a discrete conveyance.

**Flow rate** - The rate, expressed in gallons -or liters-per-hour, at which a fluid escape from a hole or fissure in a tank. Such measurements are also made to describe the movement of liquid waste, effluent, and surface water movement.

**Flow-weighed composite sample** - A sample made up of multiple sub-samples, collections of which are triggered by equal amounts of flow volumes.

**Ford** - (D1) A place where a river or other body of water is shallow enough to be crossed by wading. (D2) An engineered structure allowing passage across a stream without a bridge when the flow is low or nonexistent.

**Ford-bridge** - A ford-bridge looks like a ford, but it has a relatively small bridge designed to allow stream water flows (example: Arizona crossing).

**Freshwater** - Water that is not salty. Fresh water enters estuaries from rivers, streams and through precipitation (rain, snow...).

**Gage height**--the height of the water surface above the gage datum (zero point). Gage height is often used interchangeably with the more general term, stage, although gage height is more appropriate when used with a gage reading.

**Gaging station**--a site on a stream, lake, reservoir, or other body of water where observations and hydrologic data are obtained. The U.S. Geological Survey measures stream discharge at gaging stations.

**Game fish (Sport fish)** - Species such as trout, salmon, or bass, that are caught for recreation.

**Gas chromatograph/mass spectrometer** - An instrument that identifies the molecular composition and concentrations of various chemicals in water and soil samples.

**Geographic information systems (GIS)** - A computerized system for combining, displaying, and analyzing geographic data. GIS produces maps for environmental planning and management by integrating physical and biological information (soils, vegetation, hydrology, living resources, and so forth) and cultural information (population, political boundaries, roads, bank and shoreline development, and so forth).

**Geotag** - An electronic tag that assigns a geographical location to a photograph or video.

**Glide** - Shallow (< 0.5 m deep) sections of stream with little or no turbulence, but faster velocity than pools. Includes still or slow-moving (< 0.3 m/s) shallow backwaters and shallow margins of pools.

**Goal** - Clearly defined, desired result (intended outcome) of implementing an identified strategy that supports the mission. Goals, which can be short-term or long-term, are linked to the issues to be addressed or the problems to be solved with strategies identified in a performance plan.

**Grab sample** - A single sample collected at a particular time and place that represents the composition of the water, or soil only at that time and place.

**Graded approach** - The process of applying managerial controls to an item or work according to the intended use of the results and the degree of confidence needed in the quality of the results.

**Grain size (or particle size)** - The diameter of individual grains of sediment.

**Grassroots** - Something grassroots is at the most basic level of an idea or activity. A grassroots movement or organization is one which people in a given district, region, or community organize for collective action from the local level to affect change at the local, regional, national, or international level.

**Gravel** - A loose aggregation of rock fragments. Gravel is classified by particle size range from 2-250mm; coarse gravel is 64-250mm and fine gravel is 2-16mm.

**Gravelometer** - A pass through device used to grade or measure gravel and cobble-sized bed sediments in the field.

**Green infrastructure** - An approach to water management that protects, restores, or mimics the natural water cycle. It consists of a range of measures that use plant or soil systems, permeable pavement or other permeable surfaces or substrates, stormwater harvest and reuse, or landscaping to store, infiltrate, or evapotranspire stormwater and reduce flows to sewer systems or to surface waters.

**Grid sampling** - A method for determining the location of samples where sample locations are located at the nodes of a geometrical grid pattern (for example, square, rectangle, triangle, hexagon).

**Groundwater** - The supply of fresh water found underground, usually in aquifers, which supply wells and springs. Because ground water is a major source of drinking water, there is growing concern over contamination from leaching agricultural or industrial pollutants or leaking underground storage tanks.

**Groundwater recharge** - Refers to the addition to the water within the earth that occurs naturally from infiltration of rainfall and from water flowing over the earth.

**Guidance** - A suggested practice that is not mandatory, intended as an aid or example in complying with a standard or specification.

**Guidance document** – A companion document to this SOP that provides more information on the various applications of the indicators described herein, as well as recommendations for where and when to use this SOP. It also provides more detailed information on how to deal with special circumstances that may be encountered during bioassessment sampling.

**Gully** - A trench which was originally worn in the earth by running water and through which water often runs after rains.

**Habitat** - (D1) The place where a population or community (e.g., microorganisms, plants, animals) lives and its surroundings, both living and nonliving. (D2) A place where the physical and biological elements of ecosystems provide a suitable environment, and the food, cover, and space resources needed for plant and animal existence. (D3) The physical/chemical theater in which the ecological play takes place; it is a template for the biota, their interactions, and their evolution.

**Habitat capability** - The estimated carrying capacity of an area to support a wildlife, fish, or sensitive plant population. Habitat capability can be stated as being existing or future and normally is expressed in numbers of animals, pounds of fish, or acres of plants.

**Habitat indicator** - A physical, chemical, or biological attribute of the environment measured to characterize conditions necessary to support an organism, population, or community in the absence of pollutants or other stressors. For example, salinity of estuarine waters or substrate type in streams or lakes.

**Habitat unit** - A portion of the stream channel that can be delineated and categorized as a distinct pool, riffle, run, glide, or other physical entity with defined attributes. The variety and sequence of habitat units is a very important factor influencing fisheries habitat value, in conjunction with shelter elements etc.

**Hazard communication standard** – The practice of ensuring chemical safety in the workplace, where information about the identities and hazards of the chemicals must be available and understandable to workers.

**Hazardous waste** – (D1) Hazardous waste is a waste with properties that make it potentially dangerous or harmful to human health or the environment. (D2) Any waste is identified as such under the regulations set by the California Department of Toxic Substances Control.

**Headwaters** - The origins of a stream. They are located at the furthest point from where the water body empties or merges with another.

**Health advisory** - Nonregulatory levels of contaminants in drinking water that may be used as guidance in the absence of regulatory limits. Advisories consist of estimates of concentrations that would result in no known or anticipated health effects (for carcinogens, a specified cancer risk) determined for a child or for an adult for various exposure periods.

**Health and safety plan** - A plan that outlines the safety measures and procedures implemented in a workplace. They mainly describe what kind of hazards are involved in a project, how they can be eliminated or controlled, and what sort of equipment will be used to ensure the safety of the workers. They are also designed in accordance with the legislative requirements covering the roles and responsibilities of staff and the emergency action plan.

**Heavy metals** - High-density, metallic elements that can be toxic, e.g., lead, silver, mercury, and arsenic.

**Herbicide** - A chemical used to kill nuisance plants. Herbicides can contain pollutants found in runoff.

**Holding time** - The period of time a sample may be stored before analysis.

**Homogenate** - A mixture of algae liquid composite sample and finely chopped fragments of macroalgae that comprises the quantitative sample for the diatom taxonomic ID, chlorophyll a, and AFDM subsamples.

**Hydraulic conductivity** - The rate at which water can move through a permeable medium.

**Hydraulic gradient** - The direction of groundwater flow due to changes in the depth of the water table.

**Hydrocarbons** - Chemical compounds that consist entirely of carbon and hydrogen; also referred to as volatile organic compound.

**Hydrologic cycle** - The cyclic transfer of water vapor from the Earth's surface via evapotranspiration into the atmosphere, from the atmosphere via precipitation back to earth, and through runoff into streams, rivers, and lakes, and ultimately into the oceans.

**Hydrogeological cycle** - The natural process recycling water from the atmosphere down to (and through) the earth and back to the atmosphere again.

**Hydrogeology** - The geology of groundwater, with particular emphasis on the chemistry and movement of water.



**Hydrograph** - A graph showing variation of water elevation, velocity, streamflow, or other property of water with respect to time.

**Hydrologic basin** - The drainage area upstream from a given point on a stream.

**Hydrologic cycle** - Movement or exchange of water between the atmosphere and earth.

**Hydrologic unit code (HUC)** - A unique code, consisting of two to eight digits (based on the four levels of classification in the hydrologic unit system), that identifies each hydrologic unit.

**Hydrological drought** - A drought that refers to persistently low water volumes in streams, rivers, and reservoirs. Human activities, such as drawdown of reservoirs, can worsen hydrological droughts. Hydrological drought is often linked with meteorological droughts.

**Hydrology** - The science dealing with the properties, distribution, and circulation of water.

**Hydrolysis** - The decomposition of organic compounds by interaction with water.

**Hyporheic zone** - The region of sediment and porous space beneath and alongside a stream bed, where there is mixing of shallow groundwater and surface water. Depending on the underlying geology and topography, the hyporheic zone can be only several centimeters deep, or extend up to tens of meters laterally or deep.

**Hyporheos** - The assemblage of organisms which inhabits the hyporheic zone.

**Hypothesis test** – A statistical procedure for determining if a sample provides sufficient evidence to reject one statement regarding the population of interest (the null hypothesis) in favor of an alternative statement (the alternative hypothesis). The null hypothesis is considered the “baseline” condition and will be rejected in favor of the alternative hypothesis only when there is overwhelming evidence the null cannot be true.

**Implementation plan** - The documented logistical steps you need to take to successfully complete implementation or monitoring activities.

**Infiltration** - Flow of water from the land surface into the subsurface.

**Information** - Knowledge obtained from investigation, study, or instruction.

**Index of biotic integrity (IBI)** - A quantitative assessment tool that uses information about the composition of one or more assemblages of organisms to make inferences about condition, or ecological health, of the environments they occupy (*e.g.*, algae or benthic macroinvertebrates)

**Imhoff cone** - A clear, cone-shaped container used to measure the volume of settleable solids in a specific volume of water.

**Immiscibility** - The inability of two or more substances or liquids to readily dissolve into one another, such as soil and water.

**Impact** - A change in the chemical, physical, or biological quality or condition of a water body caused by external sources.

**Impaired waters** - A water body that has been determined under state and federal law as not meeting water quality standards or having the potential to do so in the future. Impaired waters are included on California's 303(d) list.

**Impairment** - A detrimental effect on the biological integrity of a water body caused by impact that prevents attainment of the designated use.

**Impermeable** - Not easily penetrated. The property of a material or soil that does not allow, or allows only with great difficulty, the movement or passage of water.

**Implementation monitoring** - Documents whether management practices were applied as designed or not. Project and contract administration are a part of implementation monitoring.

**Impoundment** - A body of water or sludge confined by a dam, dike, floodgate, or other barrier

**Index** - (D1) A composite of measures or indicators that can be used to track changes over time  
Inspection (D2) The examination or measurement of an item or activity to verify conformance to specifications.

**Index period** - The sampling period during which selection is based on the temporal behavior of the indicator and the practical considerations for sampling.

**Indicator** - A value that presents scientifically based information on the status of, and trends in, relevant metrics or parameters. An indicator conveys complex information in a concise, easily understood format, and has a significance extending beyond that directly associated with the metrics or parameters from which it is derived. Indicators are physical, chemical, biological, or socio-economic metrics (parameters) that represent the key elements of a complex system. Indicators simplify metrics, or data, into readily usable information that can be used to show trends or changes in a particular environmental or social condition.

**Indicator (attribute)** - Measures of environmental conditions or trends in environmental quality that can be used to evaluate resource protection programs and assess the general state of the environment.

**Indicator (molecule)** - A compound that changes color in response to changes in chemical or physical conditions.

**Indicator (organism)** - An organism whose presence suggests the presence of other organisms. e.g. coliform bacteria (the word 'indicator' is used as a function, e.g., indicator bacteria),

**Indicator (species)** - An organism that serves as a measure of the environmental conditions that exist in a given locale.

**Indigenous species** - A species that originally inhabited a particular geographic area.

**Independent assessment** - An assessment performed by a qualified individual, group, or organization that is not a part of the organization directly performing and accountable for the work being assessed.

**Inert** - Not chemically or physically active.

**Inorganic** - Being or composed of matter other than plant or animal.

**Interface** - The common boundary between two substances such as water and a solid, water and a gas, or two liquids such as water and oil.

**Interfacial tension** - The strength of the film separating two immiscible fluids (e.g., oil and water) measured in dynes per, or millidynes per, centimeter.

**Intermittent streams** - Streams which have flows only a few months out of the year, with the low flows sustained by seasonal baseflow.

**International Organization for Standardization (ISO)** - An international standard-setting body composed of representatives from various national standards organizations. The organization promotes worldwide proprietary, industrial, and commercial standards.

**Instrument detection limit** - The instrument detection limit is the lowest concentration of a given substance or analyte that can be reliably detected by analytical equipment or instruments (see detection limit).

**Inter-transects** - Transects established at points equidistant between the main transects.

**Invasive species** – Non-native plants or animals that outcompete native species and cause harm to the environment.

**Invertebrates** - Animals that lack a spinal column or backbone. Includes mollusks (e.g., clams and oysters), crustaceans (e.g., crabs and shrimp), insects, starfish, jellyfish, sponges, and any types of worms that live in the benthos.

**Irrigation** - Applying water to land areas to supply the water and nutrient needs of plants.

**Irrigation efficiency** - The amount of water stored in the crop root zone compared to the amount of irrigation water applied.

**Irrigation return flow** - Surface and subsurface water which leaves the field following application of irrigation water.

**Issue** - Discrepancy between the existing and the desired/expected condition or situation.

**Jar test** - A laboratory procedure that simulates a water treatment plant's coagulation/flocculation unit with differing chemical doses, mix speeds, and settling times to estimate the minimum or ideal coagulant dose required to achieve certain water quality goals.

**Judgmental sampling** - The use of professional judgment to select sampling locations.

**Kinetic energy** - Energy possessed by a moving object or water body.

**Knowns** - The quality control lab sends samples for selected indicators, labeled with the concentrations, to the project lab for analysis prior to the first sample run. These samples are and the results compared with the known concentrations. Problems are reported to the quality control lab.

**Laboratory** - A place equipped for experimental study in a science or for testing and analysis

**Laboratory duplicate sample** - Either internal or external field duplicates can be analyzed at an independent lab. The results should be comparable with those obtained by the project lab.

**Laboratory replicates** - A lab replicate is a sample that is split into subsamples at the lab. Each subsample is then analyzed, and the results compared. They are used to test the precision of the laboratory measurements. For bacteria, they are used to obtain an optimal number of bacteria colonies on filters for counting purposes.

**Lacustrine habitat** - All wetland and deep-water habitats with the following characteristics: situated in a topographical depression or a dammed river channel; lacking trees, shrubs, persistent emergent plants, emergent mosses, or lichens with greater than 30 percent aerial coverage; and total area that exceeds 20 acres.

**Lake** – A place where surface-water runoff (and maybe some groundwater seepage) have accumulated in a low spot, relative to the surrounding countryside.

**Lagoon** – (D1) A shallow pond where sunlight, bacterial action, and oxygen work to purify wastewater also used for storage of wastewater. (D2) A shallow body of water often separated from the sea by coral reefs or sandbar.

**Land trust** - An agreement whereby a trustee agrees to hold the title to property for the benefit of a beneficiary. The beneficiary has the right to direct the trustee, based on the established agreement. There are two types of land trusts that operate as non-profit organizations: community land trusts and land conservancies.

**Larva (Larvae)** - An immature form of an organism that will undergo metamorphosis to become a juvenile and then an adult.

**Leachate** - Any liquid fluid, formed by the drainage of liquids from waste or by the percolation or flow of liquid through waste. It includes any constituents extracted from the waste and dissolved or suspended in the fluid.

**Leachate collection system** - A system that gathers leachate and pumps it to the surface for treatment.

**Leaching** - The process by which soluble constituents are dissolved and filtered through the soil by a percolating fluid (see also Leachate).

**Left bank** - The bank which is the left side when facing *downstream* (i.e., in the direction of the current).

**Lentic waters** - Ponds or lakes (standing water).

**Levee** - A natural or manmade earthen barrier along the edge of a stream, lake, or river. Land alongside rivers can be protected from flooding by levees.

**Limnology** - The study of the physical, chemical, hydrological, and biological aspects of fresh water bodies.

**Litter** - All improperly discarded waste material, including, but not limited to, convenience food, beverage, and other product packages or containers constructed of steel, aluminum, glass, paper, plastic, and other natural and synthetic materials, thrown or deposited on the lands and waters of the state, but not including the properly discarded waste of the primary processing of agriculture, mining, logging, sawmilling, or manufacturing (see also Trash).

**Littoral zone** - (D1) That portion of a body of fresh water extending from the shoreline lakeward to the limit of occupancy of rooted plants. (2) A strip of land along the shoreline between the high and low water levels.

**Low impact development (LID)** - Storm water management practices in land development conducted to minimize impacts on the natural environment. Low Impact Development techniques include conserving natural systems and hydrologic functions by managing rainfall at the source using design techniques that infiltrate, filter, store, evaporate, and detain runoff.

**Macroalgae** - Soft bodied algae that form macroscopically discernible filaments, mats, or globose structures.

**Macrophyte, aquatic** - Herbaceous, vascular plant rooted or floating within the stream's wetted channel, such as sedge, cattail, knotweed, watercress, water-primrose, duckweed, etc.; our definition of aquatic macrophytes excludes trees, shrubs, mosses, and algae.

**Mammal** - Any of a class (Mammalia) of warm-blooded higher vertebrates (such as placentals, marsupials, or monotremes) that nourish their young with milk secreted by mammary glands, have the skin usually more or less covered with hair, and include humans.

**Management indicators** - Plant and animal species, communities, or special habitats that are selected for emphasis in planning and that are monitored during forest-plan implementation to assess the effects of management activities on their populations and the populations of other species with similar habitat needs that they may represent.

**Management indicator species** - Any species, group of species, or species habitat element selected to focus management attention for the purpose of resource production, population recovery, maintenance of population viability, or ecosystem diversity.

**Marine** - Of, found in, or produced by the sea.

**Marine debris** - Any trash or litter that ends up in a marine (saltwater) environment or the Great Lakes. It originates from a wide variety of locations and often travels great distances before ending up in the ocean.

**Marine Protected Area** – An areas or areas within coastal designated specifically to protect aquatic life. MPAs are designated by the California Department of Fish & Wildlife and the California Department of Parks and Recreation. These MPAs are often associated with ASBS. There are three kinds of MPAs: state marine reserves, state marine parks and state marine conservation areas.

**Marine Sanctuaries** – Federal marine areas like national parks. They often cover vast areas and offer another layer of special protection for the water and aquatic life within their boundaries. They are managed by the National Oceanic and Atmospheric Administration (NOAA). There are four National Marine Sanctuaries off the coast of California.

**Marsh** - A type of wetland that does not accumulate appreciable peat deposits and is dominated by herbaceous vegetation. Marshes may be fresh or saltwater, tidal or non-tidal.

**Matrix** - A matrix is a specific type of medium, such as surface water or sediment, which the analyte of interest may be contained.

**Matrix effect** - The effect of the special properties of the sample medium (e.g., water, sediment, etc.) on our ability to recover the analyte. The matrix of a given medium sample is influenced by its composition, for example sediments with high organic content will have a problematic matrix effect.

**Matrix Spike sample** - A sample prepared by adding a known amount of the target analyte to a specified amount of matrix. Spiked samples are used, for example, to determine the effect of the matrix on the method's recovery efficiency.

**Maximum contaminant level (MCL)** - Maximum permissible level of a contaminant in water that is delivered to any user of a public water system. MCLs are enforceable standards established by the U.S. Environmental Protection Agency.

**Mean** - (D1) An arithmetic derivation: the sum of all measurement result values divided by the number of measurements. Example:  $4+5+6+10+35=60$ ;  $60/5=12$ . Also referred to as an average. (D2) A measure of central tendency. A population mean is the expected value ("average" value) from a population. A sample mean is the sum of all the values of a set of measurements divided by the number of values in the set.

**Mean discharge** - The arithmetic mean of individual daily mean discharges of a stream during a specific period, usually daily, monthly, or annually.

**Measure** - Raw or analyzed data obtained from monitoring, surveys, and other valid data collection methods. Measures form the basis of indicators.

**Measure of effect/measurement endpoint** - A measurable characteristic of an ecological entity relative to an assessment endpoint, e.g., a laboratory test for eight species meeting certain requirements may serve as a measure of effect for an assessment endpoint, such as survival of fish, aquatic, invertebrate, or algal species under acute exposure.

**Measure of exposure** - A measurable characteristic of a stressor (such as the specific amount of mercury in a body of water) used to help quantify the exposure of an ecological entity or individual organism.

**Measurement data** – Measurement data has a numerical value based on quantitative data that could be placed on a number line.

**Measurement protocol** - A specified procedure for making observations or performing analyses to determine the characteristics of interest for each sampling unit. Measurement protocols include the procedures for collecting a physical sample, handling, and preparing the physical sample, and applying an analytical method to obtain a result.

**Measurement quality objectives (MQOs)** - (D1) Statements about the tolerated error and desired sensitivity of a measurement. They include extent of values for the measures of precision, accuracy, detection limit, and resolution. MQOs are a subset of Data Quality Objectives (DQOs). (D2) "Acceptance criteria" for the quality attributes measured by project data quality indicators. During project planning, measurement quality objectives are established as quantitative measures of performance against selected data quality indicators, such as precision, bias, representativeness, completeness, comparability, and sensitivity.

**Measurement range** - The measurement range is the extent of reliable readings of an instrument or measuring device, as specified by the manufacturer.

**Measurement tools and methods** - Procedures and instruments used to quantify environmental, behavioral, or socio-economic characteristics and attributes.

**Median** - The numerical value of the Result occupying the central point in the distribution of all the results in the same population.

**Medium** - The type of material (water, sediment, or tissue) in which the analyte of interest may be contained. Air, soil, food, and other substances are also referred to as mediums.

**Mesotrophic** - Reservoirs and lakes that contain moderate quantities of nutrients and are moderately productive in terms of aquatic animal and plant life.

**Metadata** - Information that answers the "who, what, when, where, why, how, and how good" questions about the data. This is information that describes the content, quality, condition, and other characteristics of data [Federal Geographic Data Committee (FGDC)], and criteria associated with their generation.

**Meteorology** - (D1) The branch of science concerned with the processes and phenomena of the atmosphere, especially as a means of forecasting the weather. (D2) The climate and weather of a region.

**Meteorological drought** - A drought specific to different regions, depending on the amount of yearly precipitation that is average for that area. For example, the southwest portion of the United States averages less than 3 inches (7.6 centimeters) of precipitation per year, while the Northwest gets more than 150 inches (381 cm) per year, according to the U.S. Department of Interior. A decrease in precipitation compared to the historical average for that area would qualify as a meteorological drought.

**Method** - A body of procedures and techniques for performing an activity (for example, sampling, chemical analysis, quantification), systematically presented in the order in which they are to be executed.



**Method blank** - A blank prepared to represent the sample matrix as closely as possible and analyzed exactly like the calibration standards, samples, and quality control (QC) samples. Results of method blanks provide an estimate of the within-batch variability of the blank response and an indication of bias introduced by the analytical procedure.

**Method comparability** - The characteristics that allow data produced by multiple methods to meet or exceed the data-quality objectives of primary or secondary data users. These characteristics need to be defined but would likely include but are not limited to data-quality objectives, bias, precision, and information on data comparability.

**Method detection limit (MDL)** - The MDL is the lowest concentration that a given substance or analyte can be detected with 99% confidence above zero.

**Method validation** - The process of substantiating a method to meet certain performance criteria for sampling and (or) analytical and (or) data handling operation.

**Metric(s)** - Units of measurement (data) that can be collected, monitored, and interpreted to track the progress or effectiveness of a specific action in achieving a particular goal. Metrics and indicators are linked in that indicators simplify metrics into more readily usable and meaningful information. That is, an indicator points to the ultimate intention or goal that defines success.

**Micro** - (D1) A prefix meaning one-millionth of a unit, example:  $\mu\text{g/l}$  - micrograms per liter.  
(D2) A prefix attached to words to denote a very small thing.

**Microalgae** - Diatoms and microscopic soft-bodied algae (can co-occur with other microorganisms in a biofilm).

**Microorganisms** - Organisms (microbes) observable only through a microscope; larger, visible types are called macro organisms.

**Microplastics** - Extremely small pieces of plastic debris that is less than 5 mm in length, found in the environment resulting from the disposal and breakdown of consumer products and industrial waste.

**Milligram (mg)** - One-thousandth of a gram.

**Milligrams per liter (mg/l)** - A unit of the concentration of a constituent in water or wastewater. It represents 0.001 gram of a constituent in 1 liter of water. It is approximately equal to one part per million (PPM).

**Million gallons per day (mgd)** - A measure of water flow.

**Minimum reporting level (MRL)** - The smallest measured concentration of a constituent that may be reliably reported using a given analytical method. In many cases, the MRL is used when documentation for the method detection limit is not available.

**Mission** - A brief statement (usually one sentence) of the purpose of, or reason for, an agency, organization, or program that describes what, why, and for whom (the customer). It is the unique reason for the existence of the agency, organization, or program.

**Mitigate** - To make less severe.

**Mitigation banking** - The preservation, enhancement, restoration or creation of a wetland, stream, or habitat conservation area which offsets, or compensates for, expected adverse impacts to similar nearby ecosystems.

**Monitoring** - Periodic or continuous surveillance, testing or collection of data using consistent methods to determine the status (or condition), level of compliance, and/or trends of environmental or socio-economic characteristics.

**Monitoring well** - A well designed for measuring water levels and testing ground-water quality.

**Monitoring plan** - A course of action that defines what kind of data will be collected when and where, and the methods by which the data will be analyzed and interpreted to answer assessment questions related to project goals

**Monitoring program** - A long-term, institutionalized effort to collect data for the purpose of determining conditions and trends of environmental or socio-economic characteristics.

**Most probable number (MPN)** - A derived endpoint based on a small number of positive/negative results from replicates of a given sample, often used in bacterial testing (e.g., for enumeration of coliforms in a water sample).

**Multi-party monitoring** - The engagement of various stakeholders, community members, or other parties in monitoring, typically in the context of plan or projects.

**Multiple Species Habitat Conservation Plan** - A comprehensive, multi-jurisdictional Habitat Conservation Plan (HCP) focusing on conservation of species and their associated habitats.

**Municipal water system** - A water system that has at least five service connections or which regularly serves 25 individuals for 60 days; also called a public water system.

**Narrative statement** - A sentence or phrase that includes a verbal description of a QA/QC result associated with a set of samples (e.g., analyses of Blanks demonstrated lack of contamination).

**National Environment Methods Index (NEMI)** - A searchable database of environmental methods, protocols, statistical and analytical methods, and procedures that allows scientists and managers to find and compare methods for all stages of the monitoring process.

[www.nemi.gov](http://www.nemi.gov)

**National Institute of Standards and Technology (NIST)** - A physical sciences laboratory and a non-regulatory agency of the United States Department of Commerce. Its mission is to promote innovation and industrial competitiveness. As part of its mission, NIST supplies industry, academia, government, and other users with over 1,300 Standard Reference Materials (SRMs). These artifacts are certified as having specific characteristics or component content, used as calibration standards for measuring equipment and procedures, quality control benchmarks for industrial processes, and experimental control samples.

**National Pollutant Discharge Elimination System (NDPES)**- A permit program under Section 402 of the Clean Water Act that imposes discharge limitations on point sources by basing them on the effluent limitation capabilities of a control technology or on local water-quality standards.

**Native knowledge** - A way of knowing or understanding the world, including traditional ecological, and social knowledge of the environment derived from multiple generations of indigenous peoples' interactions, observations, and experiences with their ecological systems.

**Native species** - Any animal and plant species originally in the United States.

**Nephelometer** - An instrument for measuring the concentration of suspended particulates in a liquid. A nephelometer measures suspended particulates by employing a light beam (source beam) and a light detector set to one side (often 90°) of the source beam. Particle density is then a function of the light reflected into the detector from the particles

**Nephelometric** – Method of measuring turbidity in a water sample by passing light through the sample and measuring the amount of light deflected.

**Nephelometric Turbidity Unit (NTU)** - A standard unit of turbidity measurement using a nephelometer.

**Neutral** - On the pH scale, neither acid nor alkaline. Pure water is neutral and has a pH of 7.0.

**National Geodetic Vertical Datum (NGVD)** - (D1) As corrected in 1929, a vertical control measure used as a reference for establishing varying elevations. (D2) Elevation datum plane previously used by the Federal Emergency Management Agency (FEMA) for the determination of flood elevations. FEMA current uses the North American Vertical Datum Plane.

**Nitrates** - One form of nitrogen, when it is combined with oxygen, that plants can use for growth.

**Nitrogen** - One of the most important atoms for life. Nitrogen (combined with hydrogen or oxygen) is an essential nutrient for plant and animal development. Too much of this nutrient can cause algal blooms and increase the amount of material available for decomposition (which lowers dissolved oxygen).

**Non-hazardous solid waste** - All putrescible and non-putrescible solid, semi-solid and liquid wastes, including garbage, trash, refuse, paper, rubbish, ashes, industrial wastes, demolition and construction wastes, abandoned vehicles and parts thereof, discarded home and industrial appliances, manure, vegetable or animal solid and semi-solid wastes and other discarded solid or semisolid waste, provided that such wastes do not contain wastes which must be managed as hazardous wastes, or wastes which contain soluble pollutants in concentrations which exceed applicable water quality objectives, or could cause degradation of waters of the state.

**Nonpoint source pollution (NPS)** - Pollution that enters water from sources that cannot be traced to a single point. Generally initiated by stormwater runoff from agricultural, urban, forestry, marina, construction, and other land uses.

**Noise (signal processing)** - Signals that are and carry no useful information. These are unwanted (and, in general, unknown random) modifications that an instrument's signal may suffer during capture, storage, transmission, processing, or conversion.

**Nutrient** - Any of a necessary complement of organic or inorganic elements or compounds that are considered essential to the life and growth of an organism.

**Nutrient pollution** - Contamination of water resources by excessive inputs of nutrients. In surface waters, excess alga production is a major concern.

**Objective** - Clearly defined, desired result (intended output) of executing/implementing an identified strategy that supports attainment of a higher-level goal or goals. Objectives are the shorter-term "goals" (interim steps taken) on which specified activities and resources are focused.

**Ocean** - Earth's largest bodies of water are called oceans. They divide Earth's continents and contain saline water.

**Ocean waters** - The territorial marine waters of the state that are outside of enclosed bays, estuaries and coastal lagoons.

**Oil spill** - An accidental or intentional discharge of oil that reaches bodies of water. Spills from tanks and pipelines can occur away from water bodies, contaminating the soil, getting into sewer systems, and threatening underground water sources.

**Oligotrophic lakes** - Deep clear lakes with few nutrients, little organic matter, and a high dissolved oxygen level.

**Organic matter** - Chemical compounds based on carbon chains or rings, and containing hydrogen with or without oxygen, nitrogen, or other compounds.

**Organism** - Any form of animal or plant life.

**Orthophosphate** - Phosphorus atom combined with 4 oxygen atoms in the 'ortho' molecular configuration to form an anion (PO<sub>4</sub>) with two negative charges. It is one of the forms of inorganic, 'reactive' phosphate, and can form salts such as K<sub>3</sub>PO<sub>4</sub> (potassium phosphate).

**Outcome** - Desired (expected/intended) or actual end result derived from outputs, activities, and inputs (i.e., the consequences carrying out a program, policy, project, function, process, etc. beyond the outputs).

**Outfall** - The pipe through which industrial facilities or wastewater treatment plants discharge their effluent (wastewater) into a waterbody, or where municipal storm drains open into a waterbody.

**Outlier** - (D1) An extreme observation that is shown to have a low probability of belonging to a specified data population. (D2) Measurement or analytical Result that differs radically from other data in the same data set and is therefore suspect or thought to be a poor representation of that environment.

**Palustrine habitat** - All nontidal wetlands that are dominated by trees, shrubs, persistent emergents, emergent mosses, or lichens, and all such wetlands in tidal areas where salinity owing to ocean-derived salts is below 0.5 part per thousand. Also, all wetlands that lack such vegetation but with all the following characteristics: areas of less than 20 acres (for example, a pond); active waves form a bedrock shoreline, features lacking; water depth in the deepest part of a basin of less than 6.5 feet at low water; and salinity owing to ocean-derived salts that is less than 0.5 part per thousand.

**Parameter** - A quantity, usually unknown, such as a mean or a standard deviation characterizing a population. Commonly misused for “variable,” “characteristic,” or “property.”

**Participatory action research** - An approach to research in and with communities that emphasize their participation in the process of studying a problem or answering a question in order to effectuate actions to address it.

**Particle size** - The diameter, in millimeters, of suspended sediment or bed material.

Particle-size classifications are:

[1] Clay—0.00024-0.004 millimeters (mm)

[2] Silt—0.004-0.062 mm

[3] Sand—0.062-2.0 mm

[4] Gravel—2.0-64.0 mm

**Parts per billion (ppb)** - The number of weight or volume units of a substance in each billion units of a solution or mixture.

**Parts per million (ppm)** - The unit commonly used to represent the degree of pollutant concentration where the concentrations are small. 1 ppm is equivalent to 1 milligram per liter (mg/l) in water or 1 mg/kg in sediment.

**Pathogen** - An organism (such as a bacterium or virus) that can cause a disease.

**Peak flow** - The maximum instantaneous discharge of a stream or river at a given location. It usually occurs at or near the time of maximum stage.

**Peak stream flow** - The maximum expected flow of surface water from a tributary watershed for a given recurrence interval.

**Peer-reviewed literature** - A referable, obtainable, published document that is reviewed by a minimum of two technical reviewers who are located external to the author's organization.

**Percentile** - The value below which a given percentage of observations in a group of observations fall. For example, the 20th percentile is the value below which 20 percent of the observations may be found.

**Perched water** - Zone of unpressurized water held above the water table by impermeable rock or sediment.

**Percent saturation** - Amount of oxygen in the water compared to the maximum it could hold at that temperature.

**Percolating water** - Water that passes through rocks or soil under the force of gravity.

**Percolation** - (D1) The movement of water downward and radically through subsurface soil layers, usually continuing downward to ground water. Can also involve upward movement of water. (D2) Slow seepage of water through a filter.

**Perennial streams** - Permanently inundated surface stream courses. Surface water flows throughout the year except in years of infrequent drought.

**Performance based methods system** - A system that permits the use of any appropriate measurement methods that demonstrates the ability to meet established performance criteria and that complies with specified data-quality needs. Performance criteria, such as precision,

bias, sensitivity, specificity, and detection limit, must be designated, and a method-validation process must be documented.

**Performance criteria** - These address the adequacy of information that is to be collected for the project. These criteria often apply to new data collected for a specific use (“primary” data).

**Performance evaluation (PE) samples.** - Used for quality control purposes, a PE sample is a type of blind sample. The composition of PE samples is unknown to the analyst. PE samples are provided to evaluate the ability of the analyst or laboratory to produce analytical results within specified limits.

**Permeability** - The capacity of a rock or soil to transmit a fluid, usually water.

**Pesticide** - A chemical used to kill destructive insects or other small animals (generally includes herbicides).

**pH** - Numerical measure of the hydrogen ion concentration used to indicate the alkalinity or acidity of a substance. Measured on a scale of 1.0 (acidic) to 14.0 (basic); 7.0 is neutral.

**Phenols** - Organic compounds that are byproducts of petroleum refining; tanning; and textile, dye, and resin manufacturing. Low concentrations cause taste and odor problems in water; higher concentrations can kill aquatic life and humans.

**Phosphorus** - One of the most important atoms for life. A nutrient that is essential for plants and animals.

**Photometer** - An instrument that measures the strength of electromagnetic radiation in the range from ultraviolet to infrared and including the visible spectrum. Most photometers convert light into an electric current using a photoresistor, photodiode, or photomultiplier. Photometers can measure illuminance, irradiance, light absorption, scattering of light, reflection of light, fluorescence, phosphorescence and/or luminescence.

**Physical habitat** - Physical habitat structure may affect the species diversity and abundance in several systems. Physical structures within an aquatic ecosystem may include stream size, channel dimensions, channel gradient, benthic substrate size and type, habitat complexity and cover, vegetation cover and structure in the riparian zone, channel-riparian interactions, reefs, shoreline type, or other physically important determinants of ecological diversity and community structure.

**Physical parameters** - Include general conditions such as temperature, flow, sediment characteristics, water color, and within-channel habitat structure.

**Phytoplankton** - Microscopic plants that are common components of our natural waters. These plants are microalgae and contain an assortment of pigments in their cells.

**Plankton** - A broad group of aquatic microorganisms that form the basis of the food chain. Included in this group are bacterioplankton (bacteria), blue-green algae (cyanobacteria), phytoplankton (plants), and zooplankton (animals).

**Point source pollution (PSP)** - Pollution discharged through a pipe or some other discrete source from municipal water-treatment plants, factories, confined animal feedlots, or combined sewers.

**Pollution** - The addition of any substance (solid, liquid, or gas) or any form of energy (such as heat, sound, or radioactivity) to the environment at a rate faster than it can be dispersed, diluted, decomposed, recycled, or stored in some harmless form.

**Polychlorinated biphenyls (PCBs)** - Toxic industrial chemical compound substances that were used in the manufacture of plastics and as insulating fluids in electrical transformers and capacitors. Banned since 1979, PCBs continue to be found in fish/animals.

**Pool** – A reach of stream that is characterized by deep, low-velocity water and a smooth surface (> 0.5 m deep, < 0.3 m/s).

**Population** - (D1) For the purposes of natural-resource planning, the set of individuals of the same species that occurs within the natural resource of interest. (D2) An aggregate of interbreeding individuals of a biological species within a specified location.

**Porosity** - Degree to which soil, gravel, sediment, or rock is permeated with pores or cavities through which water or air can move.

**Porter-Cologne Water Quality Control Act** - The Porter-Cologne Act, also known as the California Water Code, Section 7, was created in 1969 and is the law that governs water quality regulation in California. It was established to be a program to protect water quality as well as beneficial uses of water. This act applies to surface water, groundwater, wetlands and both point and nonpoint sources of pollution. There are nine regional water boards and one state water board that have resulted from this act. The act requires the adoption of water quality control plans that contain the guiding policies of water pollution management in California.

**Power analysis** - A procedure often used to determine how many samples of each population one would need compare to show statistically significant difference of a given magnitude between these populations, when the variability within populations is known.

**Precipitation** - (D1) All liquid or solid phase aqueous particles that originate in the atmosphere and fall to the earth's surface. The amount, usually expressed in millimeters or inches of liquid water depth, of the water substance that has fallen at a given point over a specified period of time. As this is usually measured in a fixed rain gauge, small amounts of dew, frost, rime, etc., may be included in the total. The more common term rainfall is also used in this total sense to



include not only amounts of rain, but also the water equivalents of frozen precipitation. For obvious reasons, precipitation is the preferred general term.

**Precision** - (D1) A measure of agreement among repeated measurements of the same property under identical, or substantially similar, conditions; expressed generally in terms of the standard deviation. (D2) A data quality indicator that provides a measure of how close repeated trials are to each other, i.e., indicates the repeatability of measurements or reproducibility of a sampling and analyses process.

**Prelaboratory** - Methods that include all activities involved in collecting, preparing, and delivering a sample to the place of analysis. For a traditional water sample, this would include activities and equipment for collecting, filtering, bottling, preserving, and shipping the sample. In the case of an in-situ measurement, there would be no prelaboratory method. In the case of a field analysis of ground water for alkalinity, prelaboratory methods would include pumping the sample and keeping it pressurized and out of contact with the atmosphere.

**Preservation (of field samples)** - Using chemicals to fix samples in the field so that parameter concentrations do not change enroute to the lab.

**Preservation blank** - A blank solution that is treated with the sampler preservatives used for an environmental sample.

**Pressure** - Physical, biological, and chemical stresses (threats) on the environment by human activities and or natural causes.

**Primary data** - Data that is collected by a researcher from first-hand sources, using methods like surveys, interviews, or experiments. It is collected with the research project in mind, directly from primary sources.

**Probability-based sampling** - A method of selecting samples such that the probability of being included in the sample is known for every unit on the sampling frame.

**Probe (or Sensor)** - A measurement device. Probes and sensors are often connected to another unit for the purpose of display or data logging of the measurement results.

**Problem definition** - A narrative that briefly states the problem a monitoring project is designed to address. These typically include background information such as previous studies that indicate why a project is needed and identify how data will be used and who will use it.

**Procedural blank** - A sample that does not contain the matrix but is brought through the entire measurement procedure and analyzed in the same manner as a test sample.

**Process** - A set of interrelated resources and activities that transforms inputs into outputs. Examples of processes include analysis, design, data collection, operation, fabrication, and calculation.

**Process wastewater** - In the context of point source discharges, process wastewater is any water, which, during manufacturing or processing, comes into direct contact with or results from the production or use of any raw material, intermediate product, finished product, byproduct, or waste product.

**Products of incomplete combustion (PICs)** - Organic compounds formed by combustion. Usually generated in small amounts and sometimes toxic, PICs are heat-altered versions of the original material fed into the incinerator (e.g., charcoal is a PIC. From burning wood).

**Proficiency test** - A type of assessment in which a sample, the composition of which is unknown to the analyst, is provided to test whether the analyst/laboratory can produce analytical results within the specified acceptance criteria.

**Project** - A data collection effort, performed by one or more organizational entities, which is limited in space and time.

**Project description** - A description of work to be performed and where it will take place. A project description identifies what kinds of samples will be taken, what kinds of conditions will be measured, which are critical, and which are of secondary importance. Indicate how a program will evaluate results--that is, how a program will be making sense out of what you find.

**Project organization** - The process of identifying all key personnel and organizations that are involved in your program, including data users. This usually includes a list their specific roles and responsibilities. However, for some monitoring projects, one individual may have several responsibilities as identified within a project's organization. Organizational charts are often used to graphically display the roles of key players identified through project organization.

**Protocols** - Protocols are detailed, written, standardized procedures for field and/or laboratory operations.

**Public land conservancy** - A State funded agency whose goal is to protect wildlife habitat. Public land trusts cannot be classified as non-profit organizations. In California, land conservancies fall under the control of the Wildlife Conservation Board (WCB). California state conservancies will purchase land themselves or assist private land trust purchase land. There are a total of ten public conservancies in California: Baldwin Hills Conservancy, California Tahoe Conservancy, Coachella Valley Mountains Conservancy, Sacramento-San Joaquin Delta Conservancy, San Diego River Conservancy, San Gabriel & Lower Los Angeles Rivers & Mountains Conservancy, San Joaquin River Conservancy, Santa Monica Mountains Conservancy, Sierra Nevada Conservancy, California Coastal Conservancy.

**Public participation** - A process that directly engages the public in decision-making and gives full consideration to public input in making that decision.

**Public records** - Pursuant to Government Code section 6252(e), public records “includes any writing containing information relating to the conduct of the public’s business prepared, owned, used, or retained by any state or local agency regardless of physical form of characteristics.” Printed and photocopied documents, internal and external correspondence, handwritten notes, computer data, electronic files, and audio and video recordings are all public records subject to disclosure unless they fall within an exemption.

**Public records act requests** – A request for access to information concerning the conduct of the people’s business is a fundamental and necessary right of every person in California, as set forth in Article 1, Section 3 of the California Constitution and the California Public Records Act (Gov’t. Code § 6250 et seq.).

**Public supply** - Water withdrawn by public governments and agencies, such as a county water department, and by private companies that is then delivered to users. Public suppliers provide water for domestic, commercial, thermoelectric power, industrial, and public water users. Most people's household water is delivered by a public water supplier.

**Purging** - Removing stagnant air or water from sampling zone or equipment prior to sample collection.

**Quality** - The totality of features and characteristics of a product or service that bears on its ability to meet the stated or implied needs and expectations of the user.

**Quality assurance (QA)** - An integrated system of management activities involving planning, implementation, assessment, reporting, and quality improvement to ensure that a process, item, or service is of the type and quality needed and expected by the data user and meets defined standards of quality with a stated level of confidence.

**Quality assurance manager (QAM)** - The individual designated as the principal manager within the organization having management oversight and responsibilities for planning, documenting, coordinating, and assessing the effectiveness of the quality system for the organization.

**Quality assurance project plan (QAPP)** - A formal document describing in comprehensive detail the monitoring objectives scope of the project and all necessary quality assurance procedures, quality control activities, and other technical activities that need to be implemented to ensure that the results of the work performed and the methods, procedure (field and laboratory) will satisfy the stated performance or acceptance criteria. to meet stated data quality objectives.

**Quality assurance program plan (QAPrP)** – A formal document describing in comprehensive detail the monitoring objectives scope of a program and its many water quality monitoring projects and is in all other aspects like a QAPP.

**Quality assurance /quality control (QA/QC)** - A system of procedures, checks, audits, and corrective actions to ensure that all EPA research design and performance, environmental monitoring and sampling, and other technical and reporting activities are of the highest achievable quality.

**Quality control** - The overall system of technical activities that measures the attributes and performance of a process, item, or service against defined standards to verify that they meet specifications established for the monitoring efforts.

**Quality control sample** - An uncontaminated sample matrix spiked with known amounts of analytes from a source independent of the calibration standards. Generally used to establish intra- laboratory or analyst-specific precision and bias or to assess the performance of all or a portion of the measurement system.

**Quality management plan** - A document that describes the quality system in terms of the organization's structure, the functional responsibilities of management and staff, the lines of authority, and the interfaces for those planning, implementing, and assessing all activities conducted.

**Quality operations** - Activities to determine the current values of physical and chemical properties, or how much of an analyte is present in a sample.

**Quality system** - A structured and documented management system describing the policies, objectives, principles, organizational authority, responsibilities, accountability, and implementation plan of an organization for ensuring quality in its work processes, products (items), and services. The quality system provides the framework for planning, implementing, and assessing work performed by the organization, and for carrying out quality assurance procedures and quality control activities.

**Radionuclide** - Radioactive particle, man-made (anthropogenic) or natural, with a distinct atomic weight number. Can have a long life as soil or water pollutant.

**Radius of influence** - (D1) The radial distance from the center of a wellbore to the point where there is no lowering of the water table or potentiometric surface (the edge of the cone of depression). (D2) The radial distance from an extraction well that has adequate airflow for effective removal of contaminants when a vacuum is applied to the extraction well.

**Raman spectroscopy** - A spectroscopic technique typically used to determine vibrational modes of molecules. It is commonly used in chemistry to provide a structural fingerprint by which molecules can be identified.

**Ranked set sampling** - A field sampling design wherein expert judgment or an auxiliary measurement method is used in combination with simple random sampling to determine which

locations in the field should be collected to be measured by the method of choice. An expert or auxiliary measurement is used to rank (order) field locations (selected using simple random sampling) with respect to the variable of interest to determine which locations to sample.

**Rapids** - Sections of stream with deep (>0.5 m), swiftly flowing (>0.3 m/s) water and considerable surface turbulence. Rapids tend to have larger substrate sizes than riffles.

**Rating curve** - A drawn curve showing the relation between gage height and discharge of a stream at a given gaging station.

**Raw data** - Results of individual measurements of a given property, often used as a group to compute an endpoint. Example: measurements of current velocity, stream width, and stream depth that are used to compute flow discharge in units of volume per time.

**Raw sewage** - An untreated municipal discharge and its contents.

**Reach** - Any length of a stream or river. The term is often used when referring to a small section of a stream or river rather than its entire length.

**Reachwide benthos (RWB)** - A method for biotic assemblage sample collection that does not target a specific substrate type, but rather objectively selects sampling locations across the reach, allowing for any number of substrate types to be represented in the resulting composite sample.

**Readiness review** - A systematic, documented review of the readiness for the start-up or continued use of a facility, process, or activity. Readiness reviews are typically conducted before proceeding beyond project milestones and before initiation of a major phase of work.

**Reagent** - A chemical substance that reacts with the target analyte to produce a measurable response.

**Reagent blank** - A mixture of any solvent(s) and/or reagent(s) that would be presented to the detector for analysis of a test sample and is analyzed to determine if it contributes to the measurement signal.

**Real-time data** - Data collected by automated instrumentation and telemetered and analyzed quickly enough to influence a decision that affects the monitored system.

**Real time water quality (RTWQ)** - Real-time water quality refers to in-stream water-quality measurements made available on the internet in real-time. Water-quality measurements are recorded in time intervals as small as 5 minutes to hourly and are often referred to as continuous.

**Reasonable potential analysis** - An analysis used to determine if an effluent will discharge pollutants at a level that will cause, have the reasonable potential to cause, or contribute to an exceedance of any State water quality standard.

**Receiving waters** - A river, lake, ocean, stream, or other waterbody into which effluent is discharged.

**Recharge** - Water added to an aquifer. For instance, rainfall that seeps into the ground.

**Record** - A completed document that provides objective evidence of an item or process. Records may include photographs, drawings, magnetic tape, and other data recording media.

**Reconnaissance** - The exploration of potential field sampling location sites to learn about land ownership, access, hazards and safety concerns, likelihood of the site to provide samples needed, and other factors needed to determine a sampling site's suitability.

**Recovery** - The act of determining whether the methodology measures all the analyte contained in a sample.

**Recovery (percent)** - The amount of analyte actually measured in a sample to which a known amount of that analyte has been previously added, expressed as a percentage of the nominal (added) value.

**Recycled water** - Water that is used more than one time before it passes back into the natural hydrologic system.

**Reference samples** - Reference samples are a solution or material prepared by a laboratory. The reference material composition is certified for one or more properties so that it can be used to assess a measurement method. Generally, the selected reference material properties are similar to the environmental-sample properties.

**Reference site** - A sampling site selected for its relatively undisturbed conditions.

**Reference value/conditions** - The chemical, physical, or biological quality or biological condition as represented by a single measurement or set of selected measurements, that is exhibited at either a single site or an aggregation of sites that represent an unimpaired, least impacted or reasonably attainable condition of an ecoregion and (or habitat).

**Regional Water Quality Control Boards (Regional Boards)** - The nine Regional Water Boards located throughout California are defined by watersheds and are responsible for enforcing water quality standards within their boundaries.

[www.waterboards.ca.gov/about\\_us/contact\\_us/rwqcb\\_directory.html](http://www.waterboards.ca.gov/about_us/contact_us/rwqcb_directory.html)

**Relative percent difference (RPD)** - An expression of precision based on how close two measurements are to each other. RPD is the difference between the two values as a percentage of the mean of these values.

**Relative standard deviation (RSD)** - The standard deviation within a group of values derived from repetitive measurements, expressed as a percentage of the mean of these values. Also known as Coefficient of Variation (%CV).

**Remediation** - (D1) Methods used to remove or contain a toxic spill or hazardous materials from a Superfund site. (D2) A generic term used to describe cleanup activities.

**Remote sensing** - The process of detecting and monitoring the physical characteristics of an area by measuring its reflected and emitted radiation at a distance (typically from satellite or aircraft).

**Repeatability** - The degree of agreement between independent test results produced by the same analyst, using the same test method and equipment on random aliquots of the same sample within a given time period.

**Replicate measurement** - A repeated measurement conducted on the same sample (e.g., in two test tubes) with matrix from the same sample jar.

**Replicate samples** - Two or more sub-samples taken from the same sample container and analyzed in parallel, or repeated titrations of the same fixed sample (i.e., measurements relating to a common Sample ID). See duplicate samples.

**Representativeness** - The measure of the degree to which data accurately and precisely represent a characteristic of a population, parameter variations at a sampling point, a process condition, or an environmental condition. Simply stated representativeness represents the degree to which data realistically portrays the conditions in the environment being monitored.

**Reptile** - Any of a class (Reptilia) of cold-blooded, air-breathing, usually egg-laying vertebrates that include alligators and crocodiles, lizards, snakes, turtles, and extinct related forms (such as dinosaurs and pterosaurs) that have a body typically covered with scales or bony plates and a bony skeleton with a single occipital condyle, a distinct quadrate bone usually immovably articulated with the skull, and ribs attached to the sternum.

**Reservoir** - Any natural or artificial holding area used to store, regulate, or control water.

**Residual** - Amount of a pollutant remaining in the environment after a natural or technological process has occurred.

**Resilience** - The capacity to respond to a perturbation or disturbance by resisting damage and recovering quickly.

**Resolution** - The smallest increment that can be discerned on the scale of a measuring device, or the capability of a method to discriminate between measurement responses.

**Response indicator** - An environmental indicator measured to provide evidence of the biological condition of a resource at the organism, population, community, or ecosystem level of organization.

**Resource Conservation Districts (RCDs)** - These are special districts of the State of California, set up to be locally governed agencies with their own locally appointed or elected, independent boards of directors. California RCDs implement projects on public and private lands, and educate landowners and the public about resource conservation to conserve soil and water, control runoff, prevent and control soil erosion, manage watersheds, protect water quality, and develop water storage and distribution. <https://carcd.org/>

**Result** - The outcome of a measurement or an observation. Results can be expressed in numbers, words (“verbal categories”), or ranges of numbers (“numeric range categories”).

**Retrospective analysis** - Review and analysis of existing data in order to address water quality objectives, to the extent possible, and to aid in the design of future studies.

**Return flow** - (D1) Surface water that returns to the natural environment after diversion for beneficial uses, such as irrigation. (D2) Subsurface flow of a stream that reemerges at the surface.

**Reuse** - The additional use of previously used water.

**Riparian** - An area of land and vegetation adjacent to a stream that has a direct effect on the stream by providing shade, habitat for wildlife, contributing allochthonous organic matter, modulating water levels via evaporative transpiration, etc.

**Riparian ecosystems** - A transition between the aquatic ecosystem and the adjacent terrestrial ecosystem; these are identified by soil characteristics or distinctive vegetation communities that require free or unbound water.

**Riparian vegetation** - The vegetation along a watercourse that is distinguished from other vegetation by its dependence on the combination of soil moisture and other environmental factors provided by a permanent or intermittent stream.

**Riparian zone** - The vegetative area on each bank of a body of water.

**Riffle** - Riffles are shallow sections (< 0.5 m deep) where the water flows (> 0.3 m/s) over coarse stream bed particles that create mild to moderate surface turbulence.



**Riparian rights** -When a landowner whose property borders a river has a right to use water from that river on his land.

**Risk management** - To control issues that can cause physical or financial injury or damage. Risk management programs include plans to reduce risk and liability by stressing safety with volunteers, purchasing insurance, and using waivers.

**River**- A natural stream of water of considerable volume, larger than a brook or creek.

**River basin** - The land area drained by a river and its tributaries.

**Round-robin study (RRS)** - The process where a set of replicate samples are sent to multiple labs to assess concentration. This type of study is employed to certify reference materials or to assess inter-lab and inter-method precision.

**Runoff** - Water from rain, melted snow, or agricultural or landscape irrigation that flows over the land surface from where it falls to another place.

**Runs/step runs** - Long, relatively straight, low-slope sections without flow obstructions. The streambed is typically even and deep (> 0.5 m deep) with water that flows faster (> 0.3 m/s) than it does in a pool. Unlike rapids, runs have little surface turbulence.

**Salinity** - A measure of the amount of salts dissolved in water. Generally reported as "parts per thousand" (i.e., grams of salt per 1,000 grams of water) and abbreviated as "ppt" or ‰ ("per mille"). Estuaries vary in salinity from 0 ppt to 34 ppt depending on tides and river inputs.

**Salt marsh** - A protected intertidal wetland where fresh water and saltwater meet.

**Salts** – In chemistry, a salt is a chemical compound consisting of an ionic assembly of cations and anions. These component ions can be inorganic, such as chloride ( $\text{Cl}^-$ ), or organic, such as acetate ( $\text{CH}_3\text{CO}_2^-$ ); and can be monatomic, such as fluoride ( $\text{F}^-$ ) or polyatomic, such as sulfate ( $\text{SO}_4^{2-}$ ). These substances can cause, or increase, salinity, when water picks them up as it passes through the air, over and under the ground, or as households and industry use it.

**Salmonids** - Collectively, this refers to all members of Salmonidae, a family of ray-finned fishes. It includes salmon, trout, chars, freshwater whitefishes, and graylings. All salmonids spawn in fresh water, but in many cases, the fish spend most of their lives at sea, returning to the rivers only to reproduce.

**Sample** - A set of units or elements selected from a larger population, typically to be observed for making inferences regarding that population.

**Sample blank (aka matrix blank)** - Sample matrices with no analyte present. Sample blanks are used for zeroing an instrument during a test procedure.

**Sample size** - The number of sample units to be collected.

**Sample support** - The portion of the sampling unit that is extracted in the field and that is subjected to the measurement protocol; the area or volume that a single sample is supposed to represent.

**Sampled population** - The set of units or elements from which a sample was selected, i.e., the units that had a chance of being included in the sample.

**Sampler blank** - A blank solution that is poured or pumped through the same field sampler used for collecting an environmental sample. These samples are used to detect for possible contamination of the sample via the sampler apparatus.

**Sampling (equipment or rinsate) blanks** - These are quality control blanks prepared by exposing reagent grade water to the equipment and containers used to collect or transfer the samples. These blanks may indicate contamination from sampling equipment, sample containers, cross-contamination during shipment, storage, or laboratory contamination.

**Sampling design** - (D1) A description of the sample collection plan that specifies the number, type and quantity of samples being collected or measured. (D2) All of the details concerning sampling units, sample selection, timing, spatial distribution, and other issues involved in gaining sufficient sampling data for a monitoring and assessment program.

**Sampling frame** - A list of sampling units from which a subset (sample) can be drawn.

**Sampling design principle** - The way the location and timing of sample collection are deliberately selected: directed based on knowledge, systematically, or at random. Non-deliberate (anecdotal) selection also occurs.

**Sampling methods requirements** - A description of a program or project's sampling methods. This includes information on parameters to be sampled, how samples will be taken, equipment and containers used, sample preservation methods used, and holding times (time between taking samples and analyzing them).

**Sampling units** - A non-overlapping set of measurements that covers an entire sampling population.

**Sand** - A granular material composed of finely divided rock and mineral particles. It is defined by size, being finer than gravel and coarser than silt. Size range is 0.06 – 2mm.

**Sanitary survey** - A method of investigating the sources of fecal contamination to a water body. Sanitary surveys are typically used for drinking water, shellfish, and watershed protection programs.

**Saturated** - Filled to the point of capacity.

**Saturated zone** - The area below the water table where all open spaces are filled with water under pressure equal to, or greater than that of the atmosphere.

**Saturation** - The condition of a liquid when it has taken into solution the maximum possible quantity of a given substance at a given temperature and pressure.

**Science, technology, engineering, and mathematics (STEM)** - A curriculum based on the idea of educating students in four specific disciplines — science, technology, engineering, and mathematics in an interdisciplinary and applied approach.

**Science, technology, engineering, arts and math (STEAM)** - An approach to learning that uses science, technology, engineering, the arts, and mathematics as access points for guiding student inquiry, dialogue, and critical thinking.

**Sea** - A body of water that is smaller than an ocean and usually located where the land and ocean meet.

**Secchi disk** - A white disk painted with alternating black and white quadrants (some are reflective single color), with a lightweight chain or non-stretching rope attached through the center. The chain or rope is marked in increments of feet or meters. A weight is attached beneath the disk so that it will sink quickly, and the line will remain taut while measurements are being made.

**Secchi disk depth** - A commonly used method for measuring water clarity/transparency measurement in lakes by using a Secchi disk. This is the point directly between the depth where the Secchi disk is lowered and disappears from sight, and the depth when it becomes visible again when raising it is referred to as the Secchi disk depth.

**Secondary data** - Data gathered from studies, surveys, or experiments that have been run by other people or for other research.

**Secondary maximum contaminant level (SMCL)** - The maximum level of a contaminant or undesirable constituent in public water systems that, in the judgment of the U.S. Environmental Protection Agency (USEPA), is required to protect the public welfare. SMCLs are secondary (non-enforceable) drinking water regulations established by the USEPA for contaminants that may adversely affect the odor or appearance of such water.

**Sediment** - Mud, sand, silts, clay, shell debris, and other particles that settle on the bottom of waterbodies.

**Sedimentation** - The deposition of suspended matter carried by water, wastewater, or other liquids, by gravity. It is usually accomplished by reducing the velocity of the liquid below the point at which it can transport the suspended material.

**Seepage** - Percolation of water through the soil from unlined canals, ditches, laterals, watercourses, or water storage facilities.

**Self-assessment** - The assessments of work conducted by individuals, groups, or organizations directly responsible for overseeing and/or performing the work.

**Self-supplied water** - Water withdrawn from a surface or groundwater source by a user rather than being obtained from a public supply. An example would be homeowners getting their water from their own well.

**Semi-confined aquifer** - An aquifer partially confined by soil layers of low permeability in which recharge and discharge can still occur.

**Senescence** - The aging process. Sometimes used to describe lakes or other bodies of water in advanced stages of eutrophication. Also used to describe plants and animals.

**Sensitivity** - The capability of a method or instrument to discriminate between measurement responses representing different levels of a variable of interest.

**Sensor** – See probe.

**Septic tank** - Underground wastewater treatment structures, commonly used in rural areas without centralized sewer systems. Septic tanks use a combination of nature and proven technology to treat wastewater from household plumbing produced by bathrooms, kitchen drains, and laundry. A typical septic system consists of a septic tank and a drainfield, or soil absorption field.

**Sequential sample** - A type of replicate sample in which the samples are collected one after the other, typically over a short time.

**Serial dilution** - The stepwise dilution of a substance in solution. Usually the dilution factor at each step is constant, resulting in a geometric progression of the concentration in a logarithmic fashion.

**Settling pond** - An open lagoon into which wastewater, contaminated with solid pollutants, is placed, and allowed to stand. The solid pollutants suspended in the water sink to the bottom of the lagoon and the liquid is allowed to overflow out of the enclosure.

**Sewage** - The waste and wastewater produced by residential and commercial sources and discharged into sewers.

**Sewage treatment plant** - A facility designed to receive the wastewater from domestic sources and to remove materials that damage water quality and threaten public health and safety when discharged into receiving streams or bodies of water.

**Sewer** - A system of underground pipes that collect and deliver wastewater to treatment facilities or streams.

**Sewershed** - The area of land where all the sewers flow to a single end point.

**Sheen** - The glimmering effects that oil has on water, as light is reflected more sharply off the surface.

**Shifting baseline** - A type of change to how a system is measured, usually against previous reference points (baselines), which themselves may represent significant changes from an even earlier state of the system

**Significant digits** - Digits in a numerical “result” showing a number that is meaningful. In most cases three significant digits are fine, e.g., 10.4 mg/l Dissolved Oxygen (all three digits are significant) or 1560  $\mu$ S (the first three are significant, the last one provides the order of magnitude).

**Silt** - A granular material of a size between sand and clay, whose mineral origin is quartz and feldspar. Silt may occur as a soil (often mixed with sand or clay) or as sediment mixed in suspension with water (also known as a suspended load) and soil in a body of water such as a river. Silts are smaller than 0.06mm in size.

**Simulated blank** - If a sample blank cannot be obtained, then, in certain cases it may be possible to create a simulation.

**Sinuosity** - The ratio of the length of the flow path between the ends of the reach and the straight-line distance between the ends of the reach (Kaufmann et al. 1999).

**Socioeconomic drought** - A drought that occurs when the demand for water exceeds the supply. Examples of this kind of drought include too much irrigation or when low river flow forces hydroelectric power plant operators to reduce energy production.

**Soft-bodied algae** - Non-diatom algal taxa; sometimes cyanobacteria are included in this assemblage.

**Solubility** - The amount of mass of a compound that will dissolve in a unit volume of solution. “Aqueous Solubility” is the maximum concentration of a chemical that will dissolve in pure water at a reference temperature.

**Solute** - A substance that is dissolved in another substance, thus forming a solution.

**Solution** - A liquid (solvent) that contains a dissolved substance (solute).

**Solvent blank** - A solvent blank is made up from the solvent(s) contained in the solution presented to the instrument. It can be used during validation to assess any interferences which may be present in the solvent. They are often used in chromatographic methods.

**Solvents** - A substance that dissolves other substances. Water dissolves more substances than any other and is known as the "universal solvent".

**Sonde** - A common name for a cylindrical, watertight chamber that houses programmable data logging software inside it and provides watertight connections to an array of measurement devices, e.g., probes.

**Source solution blank** - A blank solution that is transferred to a sample bottle in an area of the office laboratory within a clean and protected atmosphere with respect to target analytes.

**Source control** - Synonymous with waste or pollution reduction.

**Spatial composite sample** - A combination of subsamples each representing a given location within an area; each location is selected randomly, systematically, or in a directed manner

**Species** - (D1) A single, distinct kind of organism, having certain distinguishing characteristics. Organisms forming a natural population that transmit specific characteristics from parent to offspring. (D2) Chemical forms. For example, nitrogen comes in many different chemical forms, including nitrite (NO<sub>2</sub>) and nitrate (NO<sub>3</sub>).

**Specific conductance** - Rapid method of estimating the dissolved solid content of a water supply by testing its capacity to carry an electrical current.

**Specific gravity** - Also called relative density. The ratio of the density of a substance to the density of some reference substance. Hydrometers use this principle to determine salinity of a water sample, compared to fresh water.

**Specifications** - A detailed and exact statement of particulars such as a statement prescribing materials, dimensions, and workmanship.

**Spectrophotometer** - An instrument that measures the number of photons (the intensity of light) absorbed after it passes through sample solution. With the spectrophotometer, the amount of a known chemical substance (concentrations) can also be determined by measuring the intensity of light detected.

**Spectrophotometry** - A quantitative measurement of the reflection or transmission properties of a material as a function of wavelength.

**Spike** - A substance that is added to an environmental sample to increase the concentration of the target analyte by known amount; used to assess measurement accuracy (spike recovery). Spike duplicates are used to assess measurement precision.

**Spiked samples** - Used for quality control purposes, a spiked sample is a sample to which a known concentration of the target analyte has been added and the recovery of the analyte is noted.

**Split sample** - Used for quality control purposes, a split sample is one that has been equally divided into two or more subsamples. Splits are submitted to different analysts or laboratories and are used to measure the precision of the analytical methods.

**Splitter blank** - A blank solution that is mixed and separated using a field splitter in the same manner and through the same apparatus used for an environmental sample.

**Spring** - Ground water seeping out of the earth where the water table intersects the ground surface.

**Spring melt/thaw** - The process whereby warm temperatures melt winter snow and ice. Because various forms of acid deposition may have been stored in the frozen water, the melt can result in abnormally large amounts of acidity entering streams and rivers, sometimes causing fish kills.

**Stage** - The water level above some arbitrary point in the river and is commonly measured in feet.

**Stagnation** - Lack of motion in water that holds pollutants in place.

**Standard (document or procedure)** – (D1) A documented procedure that has been developed and established within the consensus principles. (D2) The term "standard" serves as an adjective in the title of documents, such as test methods, practices, and specifications, to connote specified consensus and approval. The various types of standard documents are based on the needs and usage as prescribed by the technical committees.

**Standard deviation** - (D1) A statistical measure of the dispersion of measurement results or other types of values. Often used to determine precision or the range of variation among repeated measurements. (D2) A measure of the dispersion or imprecision of a sample or population distribution as expressed as the square root of the variance and has the same unit of measurement as the mean. The standard deviation is calculated as the square root of the variance.

**Standard error** - A measure of the statistical accuracy of an estimate, equal to the standard deviation of the theoretical distribution of a large population of such estimates.

**Standard levels of taxonomic effort (STE)** - An adopted standard which defines the level of taxonomic resolution a program will utilize when identifying various organisms collected as part of a bioassessment. For example, in California there are STEs utilized for benthic macro invertebrate and algae data used in bioassessments and calculating various metrics.

**Standard material** - An umbrella term for the following: A Standard solution (e.g., pH standard buffer), or a certified device (e.g., NIST thermometer), or natural conditions that reflect a known value (e.g., water or humid air saturated with oxygen).

**Standard operating procedures (SOP)** - A document that details the method for an operation, analysis, or action with thoroughly prescribed techniques and steps to be followed. It is officially approved as the method for performing certain routine or repetitive tasks.

**Standard pH buffer** - A well-buffered solution used for calibration or for accuracy checks of pH measuring devices (also see "Standard solution").

**Standard reagent** - A solution or a suspension of particles of known properties, such as concentration or turbidity, that is provided with a test kit and used as part of the measurement procedure (e.g., reagent for turbidity comparisons in the dual cylinder kit).

**Standard reference materials (SRM)** - An SRM is a certified material or substance with an established, known, and accepted value for the analyte or property of interest.

**Standard solution** - A solution containing a known concentration of a substance, prepared, or purchased for use in the field or in the analytical laboratory. It is used for accuracy checks and calibration adjustments of instruments or lab procedures.

**State Water Resources Control Board** - The State Water Resources Control Board (State Water Board) and the nine Regional Water Quality Control Boards (Regional Water Boards), collectively known as the California Water Boards (Water Boards), are dedicated to a single vision: abundant clean water for human uses and environmental protection to sustain California's future. [www.waterboards.ca.gov](http://www.waterboards.ca.gov)

**Statistical noise** - Unexplained variability within a data sample.

**Statistical power** - The probability of detecting a difference when one exists. An increase in sample size usually will increase the power of a test by reducing the uncertainty around the mean.

**Steady-state mass balance** - The mathematical concept that the sum of upstream pollutant loads, each determined by the product of their concentration times flow, equals a resultant



downstream load after mixing.

**Storm sewer** - A sewer that carries only surface runoff, street wash, and snow melt from the land. In a separate sewer system, storm sewers are completely separate from those that carry domestic and commercial wastewater (sanitary sewers).

**Stormwater** - Precipitation, including rain, hail, and snow that doesn't seep into the ground but 'runs off' through the landscape including streets, parking lots and other parts of the storm drain system eventually flowing into the nearest stream, creek, river, lake, or ocean. The runoff is not treated in any way.

**Staff gauge** (head gauge) – A calibrated scale which is used to provide a visual indication of liquid level. When used on an inclined or sloped surface, a staff gauge is usually calibrated so that the indicated level is the true vertical level. Staff gauges are commonly installed at stream gauging stations to indicate the water stage. They are also used to indicate the water level (and hence flow rate) in open channel primary devices (flumes or weirs).

**Stratification** - (D1) Subdivision of the environmental framework. (D2) Selecting a sub-set of items that share a given feature from a wider group of items. (D3) The formation and maintenance of two distinct layers of water, e.g., hot and cold layers in a lake (usually during summer), or freshwater overlying salt water in estuaries.

**Stratified sampling** - A sampling method where a population is divided into non-overlapping subpopulations called strata and sampling locations are selected independently within each stratum using some sampling design. Stratified sampling is used to make inferences about individual strata that are inherently more homogeneous than the entire heterogeneous population.

**Stream** - A general term for a body of flowing water; natural water course containing water at least part of the year. In hydrology, it is generally applied to the water flowing in a natural channel as distinct from a canal.

**Streamflow** - The amount of water flowing in streams, rivers, and other channels.

**Stressor indicator** - A characteristic measured to quantify a natural process, an environmental hazard, or a management action that results in changes in exposure and habitat.

**Study design** - The set of methods and procedures used in collecting and analyzing measures of the variables specified in the problem research. The design of a study defines the study type (descriptive, correlational, semi-experimental, experimental, review, meta-analytic) and sub-type (e.g., descriptive-longitudinal case study), research problem, hypotheses, independent and dependent variables, experimental design, and, if applicable, data collection methods and a statistical analysis plan.

**Study question** – A specific question or hypothesis that a study is intended to answer. One monitoring project can have several study questions. Also known as monitoring objective or specific objective.

**Study unit** - Study units are geographically defined by a combination of ground- and surface-water features and generally encompass more than 4,000 square miles of land area.

**Study units survey** - Broad assessment of the water-quality conditions of the major aquifer systems of each NAWQA Study Unit. The Study-Unit Survey relies primarily on sampling existing wells and, wherever possible, on data collected by other agencies and programs. Typically, 20 to 30 wells are sampled in each of three to five aquifer subunits.

**Subsidence** - Sinking of the land surface due to a number of factors, e.g., groundwater extraction.

**Substrate** -The composition of a streambed, including both inorganic and organic particles.

**Super-saturated** - Filled to a point beyond the point of capacity.

**Surface tension** - The attraction of molecules to each other on a liquid's surface. Thus, a barrier is created between the air and the liquid.

**Surface water** - All water naturally open to the atmosphere (rivers, lakes, reservoirs, ponds, streams, impoundments, seas, estuaries, etc.).

**Surface Water Ambient Monitoring Program (SWAMP)** - The Water Boards program to provide resource managers, decision makers, and the public with timely, high-quality information to evaluate the condition of all waters throughout California. SWAMP accomplishes this through carefully designed, externally reviewed monitoring programs, and by assisting other entities state-wide in the generation of comparable data that can be brought together in integrated assessments that provide answers to current management questions.

[www.waterboards.ca.gov/water\\_issues/programs/swamp/](http://www.waterboards.ca.gov/water_issues/programs/swamp/)

**Surveillance (quality)** - Continual or frequent monitoring and verification of the status of an entity and the analysis of records to ensure that specifications are being fulfilled.

**Suspended loads** - Specific sediment particles maintained in the water column by turbulence and carried with the flow of water.

**Suspended-sediment concentration** - The ratio of the mass of dry sediment in a water-sediment mixture to the mass of the water-sediment mixture. Typically expressed in milligrams of dry sediment per liter of water-sediment mixture.

**Suspended-sediment discharge** - The quantity of suspended sediment passing a point in a stream over a specified period of time.

**Suspended sediments** - Particles of soil, sediment, living material, or detritus suspended in the water column.

**Suspended solids** - The small solid particles in water that cause turbidity. Particles of suspended sediment tend to settle at the channel bottom, but upward currents in turbulent flow counteract gravitational settling.

**Swamp** - A type of wetland dominated by woody vegetation but without appreciable peat deposits. Swamps may be fresh or salt water and tidal or non-tidal.

**Systematic sampling** - A method for determining the location of samples in which only one unit (in space or time) is selected randomly. This randomly selected unit establishes the starting place of a systematic pattern (for example, every 3 days, every 5th unit, every unit at a node on a grid design) that is repeated throughout the population.

**Tailwater** - Waters located immediately downstream from a hydraulic structure, such as a dam (excluding minimum release such as for fish water), spillway, bridge, or culvert.

**Target coordinates** - The nominal or tentative location of a sampling site, which may differ from the actual location from which samples are collected.

**Target population** - The set of all units or elements (for example, barrels of waste or points in time and/or space) about which a sample is intended to draw conclusions

**Taxon (plural taxa)** - A level of classification within a scientific system that categorizes living organisms based on their physical characteristics.

**Taxonomic key** - A reference guide used to identify organisms. They are available in varying degrees of complexity and detail.

**Taxonomic resolution** - The ability to discern on level of taxonomic hierarchy identification from another.

**Technical Advisory Committee (TAC)** - An independent collection of individuals that provide advise to a research program or project. These may be composed of members from academia, research institutions, NGOs and public/professional/non-governmental organizations knowledgeable about water quality monitoring, chemistry, geomorphology, biology, cultural history and similar areas relevant to the project's research, monitoring and geography. The TAC aims, to strengthen the scientific, policy and technical foundations of a monitoring program and its accompanying publications. To this end, it may examine monitoring plans, quality assurance

project plans, data and the contents of reports in the view of the state of the art, identifies information gaps to be addressed and formulates recommendations for further actions.

**Technical systems audit** — A thorough, systematic, on-site qualitative audit of facilities, equipment, personnel, training, procedures, record keeping, data validation, data management, and reporting aspects of a system.

**Temperature** - The physical property of matter that quantitatively expresses hot and cold. A measure of the hotness or coldness of anything as usually determined by a thermometer. Temperature is a determining factor for biological and chemical processes.

**Temperature blank** - A container filled with clean water that is shipped together with the field samples. When the lab receives the samples, the sample custodian measures the temperature of the water in the bottle and records this on the chain of custody (COC) form or in the logbook.

**Tertiary wastewater treatment** - Selected biological, physical, and chemical separation processes to remove organic and inorganic substances that resist conventional treatment practices; the additional treatment of effluent beyond that of primary and secondary treatment methods to obtain a very high quality of effluent. The complete wastewater treatment process typically involves a three-phase process.

**Thalweg** - The thalweg defines the primary path of water flow through the reach; it is often inferred by depth for practical purposes but is not always the deepest point.

**Thermal pollution** - A reduction in water quality caused by increasing its temperature, often due to disposal of waste heat from industrial or power generation processes. Thermally polluted water can harm the environment because plants and animals can have a hard time adapting to it.

**Threatened waters** - Waters that fully support their designated uses but may not support uses in the future unless pollution-control action is taken because of anticipated sources or adverse pollution trends.

**Tidal marsh** - Low, flat marshlands traversed by channels and tidal hollows, subject to tidal inundation: normally, the only vegetation present is salt-tolerant bushes and grasses.

**Timestamp** - A sequence of characters or encoded information identifying when a certain event occurred, such a photograph or a sample being taken. The information usually consists of date and time of day, sometimes accurate to a small fraction of a second.

**Time-weighted composite sample** - A composite sample made of equal sized subsamples collected at fixed time increments.

**Titration** - A method of measuring the concentration of an analyte in a solution by adding small, precise quantities of a reagent (also known as titrant) that reacts with it until it is exhausted (i.e., reaches an endpoint) and the amount of titrant used is recorded. Endpoints are often indicated by a color change.

**Titration** - Used in a titration, the titrator forcefully expels the reagent (titrant) by using a manual or mechanical plunger. The amount of titrant used is calculated by subtracting the original volume in the titrator from the volume left when the endpoint has been reached.

**Total coliforms** - A group of related bacteria that are (with few exceptions) not harmful to humans. EPA considers total coliforms a useful indicator of other pathogens for drinking water and water contact recreation.

**Total dissolved solids (TDS)** - A measure of the residual minerals dissolved in water that remains after evaporation of a solution. Usually expressed in milligrams per liter

**Total maximum daily load (TMDL)** - The maximum amounts of a given pollutant that a waterbody can receive and still support the beneficial uses listed for it.

**Total organic carbon (TOC)** - The amount of carbon found in an organic compound and is often used as a non-specific indicator of water quality.

**Toxic** - Relating to harmful effects to biota caused by a substance or contaminant.

**Toxic hot spots** - Locations in enclosed bays, estuaries, or any adjacent waters that have toxic pollution problems in the water or sediment in excess of applicable standards.

**Toxic pollutant** - Those pollutants or combinations of pollutants, including disease-causing agents, which after discharge and upon exposure, ingestion, inhalation or assimilation into any organism can, on the basis of information available, cause death, disease, behavioral abnormalities, cancer, genetic mutations, physiological malfunctions or physical deformation in such organism or their offspring. The quantities and exposures necessary to cause these effects can vary widely.

**Toxic substances monitoring program** - Designed to detect the presence and concentration of toxic pollutants in fish and other aquatic organisms in selected California streams and lakes.

**Toxic waste** - Discarded material that is capable of causing serious injury, illness, or death. These toxic materials can be poisonous, carcinogenic, or otherwise harmful to living things.

**Toxicity** - The degree to which a chemical substance or a particular mixture of substances can damage an organism. Toxicity can refer to the effect on a whole organism, such as an animal, bacterium, or plant, as well as the effect on a substructure of the organism, such as a cell or an organ. Because individuals typically have different levels of response to the same dose of a toxic

substance, a population-level measure of toxicity is often used which relates the probabilities of an outcome for a given individual in a population.

**Toxicity test** - A procedure to determine the toxicity of a chemical or an effluent by using living organisms. A toxicity test measures the degree of effect on exposed test organisms of a specific chemical or effluent.

**Traceability** - The ability to trace all activities, locations, dates/times, personnel, facilities, instruments, reagents, standards, CRMs, equipment, etc. associated with a sample result. In litigation cases, this can even go to the point of tracing the documented training process used for technical staff.

**Traditional ecological knowledge** - A cumulative body of knowledge, practice, and belief, evolving by adaptive processes and handed down through generations by cultural transmission, about the relationship of living beings (including humans) with one another and with their environment.

**Training requirements** - A written narrative identifying any specialized training or certification requirements a monitoring program will need so that all staff/volunteers can successfully complete their tasks.

**Transects** - Lines drawn perpendicular to the path of flow used for standardizing biotic sampling and data collection locations.

**Transmissibility** - The capacity of a rock to transmit water under pressure. The coefficient of transmissibility is the rate of flow of water, at the prevailing water temperature, in gallons per day, through a vertical strip of the aquifer one foot wide, extending the full saturated height of the aquifer under a hydraulic gradient of 100-percent. A hydraulic gradient of 100-percent means a one-foot drop in head in one foot of flow distance.

**Transmissivity** - The ability of an aquifer to transmit water.

**Transparency** - A measure of water clarity as defined by how far we can see through it. Secchi disks and transparency tubes are commonly used to measure the transparency of water.

**Transpiration** - The process by which water vapor from living plants is lost to the atmosphere.

**Trash** - The improperly disposed junk or rubbish generated by human activity that frequently winds up in waterways. Trash can include cigarette butts, paper, fast food containers, plastic grocery bags, cans, and bottles, used diapers, construction site debris, industrial plastic pellets, old tires, and appliances. See also Litter.

**Treated wastewater** - Wastewater that has been subjected to one or more physical, chemical, and biological processes to reduce its potential of being a health hazard.

**Treatment** - Any method, technique, or process designed to remove solids and/or pollutants from solid waste, waste-streams, and effluents.

**Treatment plant** - A structure built to treat wastewater before discharging it into the environment.

**Trends** - A trend is the consistent directional change in a population's characteristics documented by a minimum of three sampling events over a period of time (or sometimes distance); a change is a difference in a characteristic between just two sampling events.

**Tribal consultation** - The meaningful, respectful, and timely process of seeking, discussing, and considering carefully the views of others, in a manner that is cognizant of all parties' cultural values and, where feasible, seeking agreement. Consultation shall also recognize the tribes' potential needs for confidentiality with respect to places that have traditional tribal cultural significance.

**Tributary** - A smaller river or stream that flows into a larger river or stream. Usually, a number of smaller tributaries merge to form a river.

**Trip blank** - The trip blank is a sample of clean water placed in the same type of sample container that the field samples will be collected in. It can be pre-preserved prior to shipment. The trip blank is shipped with the samples.

**True color** - The measured color of water after filtering a sample to remove all suspended material.

**True value** - In the determination of accuracy, observed measurement values are often compared to true, or standard, values. A true value is one that has been sufficiently well established to be used for the calibration of instruments, evaluation of assessment methods or the assignment of values to materials.

**Turbidimeter** - A device that measures the cloudiness of suspended solids in a liquid, a measure of the quantity of suspended solids.

**Turbidity** - A measure of how much the suspended material in water results in the scattering and absorption of light rays. Turbidity is determined by measurements of light diffraction and its "quantity" is reported in nephelometric turbidity units (NTU).

**Type I error** - The statistical term for false rejection decision error.

**Type II error** - The statistical term for false acceptance decision error.

**Unconfined aquifer** - An aquifer containing water that is not under pressure; the water level in a well is the same as the water table outside the well.

**United States Environmental Protection Agency (USEPA)** – The federal agency who’s mission it is to protect human health and the environment. [www.epa.gov](http://www.epa.gov)

**Underground storage tank (UST)** - A tank located at least partially underground and designed to hold gasoline or other petroleum products or chemicals.

**Unknowns** - The quality control lab sends samples to the project lab for analysis for selected indicators, prior to the first sample run. The concentrations of these samples are unknown to the project lab. These samples are analyzed, and the results reported to the quality control lab. Discrepancies are reported to the project lab and a problem identification and solving process follows.

**Unsaturated zone** - The area above the water table where soil pores are not fully saturated, although some water may be present.

**Urban runoff** - Storm water from city streets and adjacent domestic or commercial properties that carries pollutants of various kinds into the sewer systems and receiving waters. The discharge of urban runoff is subject to NPDES permitting regulated by the Water Boards’ Municipal Storm Water program.

**Vadose zone** - The zone between land surface and the water table where the moisture content is less than saturation (except in the capillary fringe) and pressure is less than atmospheric. Soil pore space also typically contains air or other gases. The capillary fringe is included in the vadose zone.

**Validation** - An analyte and sample specific process that extends the evaluation of data beyond method, procedural, or contractual compliance (i.e., data verification) to determine the analytical quality of a specific data set.

**Validation monitoring** - Determines if predictive model coefficients are adequately protecting the targeted resources. A long-term commitment to data collection is often required to establish an adequate data base.

**Vapor** - Created when a substance (such as water) is in a gas state. Particles of the substance will be suspended or diffused in the air.

**Variance** - A statistical term used in the calculation of standard deviation, variance is the sum of the squares of the difference between the individual values of a set and the arithmetic mean of the set, divided by one less than the numbers in the set.



**Variance (sample)** - A measure of the spread of the sample. A larger variance means a larger spread. This is an estimate of population variance.

**Variance (population)** - A measure of the spread of the population. A larger variance means a larger spread. In most cases, the population variance is only a theoretical quantity-- it cannot be known with certainty because all possible data points in the population cannot be measured.

**Variability** - Observed difference attributable to heterogeneity or diversity in a population. Sources of variability are the results of natural random processes and stem from environmental differences among the elements of the population. Variability is not usually reducible by further measurement but can be better estimated by increasing sampling.

**Verification** - The process of evaluating the completeness, correctness, and conformance/compliance of a specific data set against the method, procedural, or contractual specifications.

**Vision** - Brief statement (usually one sentence) that describes the conceptual image of the desired future. A vision statement describes what your customers expect from you, what you want to be, or what you want the environment that you influence to be.

**Volatile organic compounds (VOCs)** - A group of chemicals that react in the atmosphere with nitrogen oxides, heat and sunlight to form ozone; VOCs are referred to as hydrocarbons.

**Volatility** - The tendency of a liquid to evaporate.

**Volume** - The space occupied in three dimensions.

**Volunteer monitoring** - Environmental monitoring conducted primarily by uncompensated individuals (also see Citizen science).

**Wadeable stream** - A stream that can be sampled by field crews wearing chest waders (generally < 1 meter deep for at least half the reach).

**Waste** - Includes sewage and any and all other waste substances, liquid, solid, gaseous, or radioactive, associated with human habitation, or of human or animal origin, or from any producing, manufacturing, or processing operation, including waste placed within containers of whatever nature prior to, and for purposes of, disposal. The State Board's regulations contain a waste classification system which applies to solid and semi-solid waste which cannot be discharged directly or indirectly to water of the state and which therefore must be discharged to land for treatment, storage, or disposal in accordance with state regulations. There are four classifications of waste (listed in order of highest to lowest threat to water quality): hazardous waste, designated waste, nonhazardous solid waste, and inert waste.

**Waste stream** - The total flow of solid waste from homes, businesses, institutions, and

manufacturing plants that is recycled, burned, or disposed of in landfills, or segments such as the “residential waste stream” or the “recyclable waste stream.”

**Waste treatment lagoon** - Impoundment made by excavation or earth fill for biological treatment of wastewater.

**Waste treatment plant** - A facility containing a series of tanks, screens, filters, and other processes by which pollutants are removed from water.

**Waste treatment stream** - The continuous movement of waste from generator to treater and disposer.

**Wastewater** - The spent or used water from a home, community, farm, or industry that contains dissolved or suspended matter

**Wastewater-treatment return flow** - Water returned to the environment by wastewater-treatment facilities.

**Water column** - An imaginary column extending through a water body from its floor to its surface. Ambient water quality monitoring programs may seek to quantify the water quality of a representative water column. Samples may be taken from a point or points throughout the depth of the water column.

**Water contamination** - Impairment of water quality to a degree which reduces the usability of the water for ordinary purposes, or which creates a hazard to public health through poisoning or spread of disease.

**Water clarity** - Measurement of how far an observer can see through water. The greater the water clarity, the further you can see through the water.

**Water cycle** - The circuit of water movement from the oceans to the atmosphere and to the Earth and return to the atmosphere through various stages or processes such as precipitation, interception, runoff, infiltration, percolation, storage, evaporation, and transportation.

**Water quality assessment** - The determination whether a water body is attaining its designated uses for such purposes as drinking, contact recreation, fisheries, and irrigation, based on state Water Quality Standards as provided for in the Clean Water Act of 1987 (also see beneficial use).

**Water quality benchmarks (WQB)** - Maximum concentrations of constituents that should not be exceeded in a given water body. The actual values are often derived to be protective of aquatic life. Also called WQ Criteria, WQ Objectives, or WQ Standards.

**Water quality criteria** - Specific levels of water quality criteria, standards, goals, and or thresholds that are expressed numerically or through a narrative, which if reached are expected to render a body of water unsuitable for its designated use.

**Water quality control** - The regulation of any activity or factor that may affect the quality of the state's waters. It includes the prevention and correction of water pollution and nuisance.

**Water quality control plan** - These plans contain numeric and/or narrative water quality objectives and spells out a program by which these objectives can be achieved for identified beneficial uses. There are many water quality control plans within California: Bay-Delta Plan, California Ocean Plan, California Thermal Plan, Enclosed Bays and Estuaries Plan, Inland Surface Waters, Enclosed Bays, and Estuaries (ISWEBE) Plan, Regional Board Water Quality Control Plans (Basin Plans).

**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.

**Water quality indices (WQIs)** - Composite indicators of water quality that pool together otherwise complex water quality data into an aggregate value that can be quickly and easily communicated to its intended audience.

**Water quality information** - Derived through analysis, interpretation, and presentation of water-quality and ancillary data.

**Water quality monitoring** - An integrated activity for evaluating the physical, chemical, and biological characteristics of water in relation to human health, ecological conditions, and designated water uses.

**Water quality objectives** - The limits or levels of water quality elements or biological characteristics established to reasonably protect the beneficial uses of water or the prevent problems within a specific area. Water quality objectives may be numeric or narrative.

**Water-quality monitoring** - An integrated activity for evaluating the physical, chemical, and biological character of water in relation to human health, ecological conditions, and designated water use.

**Water quality parameters** - Any of the measurable qualities or contents of water. Includes temperature, salinity, turbidity, nutrients, dissolved oxygen, and others; also known as characteristics.

**Water quality standards** - A law or regulation that consists of the beneficial designated use or uses of a water body, the numerical and narrative water-quality criteria that are necessary to protect the use or uses of that particular water body, and an antidegradation statement .

**Water-resource quality** - (D1) The condition of water or some water-related resource as measured by biological surveys, habitat-quality assessments, chemical-specific analyses of pollutants in water bodies, and toxicity tests. (D2) The condition of water or some water-related resource as measured by the following: habitat quality, energy dynamics, chemical quality, hydrological regime, and biotic factors.

**Water rights** - Legal rights to the use of water (see also Riparian rights).

**Water year** - A continuous 12-month period selected to present data relative to hydrologic or meteorological phenomena during which a complete annual hydrologic cycle normally occurs. The water year used by the U.S. Geological Survey and many other government agencies runs from October 1 through September 30 and is designated by the year in which it ends.

**Watershed** - The land area that drains water to a particular stream, river, or lake. It is a land feature that can be identified by tracing a line along the highest elevations between two areas on a map, often a ridge. Large watersheds, like the Mississippi River basin contain thousands of smaller watersheds.

**Watershed monitoring** - Monitoring primarily designed to sample and assess the characteristics and/or condition of a watershed or watersheds, or to sample and assess specific entities on a watershed basis (i.e. as a geographic unit for sampling). For example, water quality monitoring conducted on a watershed basis would include monitoring physical, chemical, and biological condition of the water body as well as specific watershed characteristics (e.g., stream corridor traits, wetlands, and watershed land use/land cover patterns) that may be related to observed water quality.

**Water solubility** - The maximum possible concentration of a chemical compound dissolved in water.

**Water-soluble substance** - A substance that can readily disperse through the environment.

**Water table** - The level of groundwater.

**Water year** - Hydrologic records are compiled and summarized for 12 months. Different agencies may use different calendar periods for their water years. Typically, the water year runs October-September in California because October is usually when the first precipitation occurs following the dry season.

**Waters of the State** - Waters of the State means any surface water or groundwater, including saline waters, within the boundaries of the state.

**Watershed** - The entire area of land from which the runoff of water (and all the sediments and dissolved materials such as nutrients or contaminants it contains) drains into a given river, lake, estuary, or ocean.

**Watershed approach** - A coordinated framework for environmental management that focuses public and private efforts on the highest priority problems within hydrologically defined geographic areas.

**Watershed area** - A region or area bounded peripherally by a divide and draining ultimately to a channel through which water flows or to a body of water.

**Watershed management** - Water resource protection, enhancement, and restoration. Ideally, watershed management means developing a solution for each watershed that considers all its problems, includes all stakeholders in defining the problems, proposing solutions, and participating in implementing a common solution.

**Weir** - (D1) A wall or plate placed in an open channel to measure the flow of water. (D2) A wall or obstruction used to control flow from settling tanks and clarifiers to ensure a uniform flow rate and avoid short-circuiting.

**Well** - A bored, drilled, or driven shaft or a dug hole whose depth is greater than the largest surface dimension and whose purpose is to reach underground water supplies or oil or to store or bury fluids below ground (see also Injection well).

**Well field** - Area containing one or more wells that produce usable amounts of water or oil.

**Well injection** - The subsurface placement of fluids into a well.

**Well monitoring** - Measurement by on-site instruments or laboratory methods of well water quality.

**Well plug** - A seal installed in a borehole or well preventing movement of fluids.

**Well point** - A hollow vertical tube, rod, or pipe terminating in a perforated pointed shoe and fitted with a fine-mesh screen.

**Wellhead Protection Area** - A protected surface and subsurface zone surrounding a well or well field supplying a public water system to keep contaminants from reaching the well water.

**Wetlands** - An area that is saturated by surface or ground water with vegetation adapted for life under those soil conditions, as swamps, bogs, fens, marshes, and estuaries.

**Wetted width** - The width of the channel containing water (the active channel), defined as the distance between the sides of the channel at the point where substrates are no longer surrounded by surface water.

**Withdrawal** - Water removed from a ground- or surface-water source for use.

**Zero blank (zero standard)** - Testing a sample with no analyte of interest in it and with what is thought to have nothing detectable by the detector. This is done to zero-out an instrument or equipment (usually a spectrophotometer).

**Zooplankton** - Aquatic microorganisms that are free floating or capable of movement. Zooplankton feed primarily on phytoplankton and bacteria, and can be either adult microorganisms, or larval forms of fish or shellfish.

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