

# Glossary

**Acid-volatile sulfide (AVS):** Reactive solid-phase sulfide fraction that can be extracted by cold hydrochloric acid. Appears to control the bioavailability of most divalent metal ions because of the sulfide ions' high affinity for divalent metals, resulting in the formation of insoluble metal sulfides in anaerobic (anoxic) sediments.

**Acute toxicity:** Immediate or short-term response of an organism to a chemical substance. Refers to generalized toxic response with lethality usually being the observed endpoint.

**Apparent Effects Thresholds (AETs):** Sediment chemistry screening values based on a biological effects correlation approach. The AET is the highest concentration at which statistically significant differences in observed adverse biological effects from reference conditions do not occur, provided that the concentration also is associated with observance of a statistically significant difference in adverse biological effects. Based on empirical data from Puget Sound. EPA defined the AET-low as the lowest AET among applicable biological indicators, and the AET-high as the highest AET among applicable biological indicators.

**Benthic abundance:** The quantity or relative degree of plentifulness of organisms living in or on the bottom of streams, rivers, or oceans.

**Benthic organisms:** Species living in or on the bottom of streams, rivers, or oceans.

**Bioavailability:** The fraction of chemical present that is available for uptake by aquatic organisms.

**Biological community:** An assemblage of organisms that are associated in a common environment and interact with each other in a self-sustaining and self-regulating relationship.

**Biological effects correlation approach:** A method for relating the incidence of adverse biological effects to the dry-weight sediment concentration of a specific chemical at a particular site based on the evaluation of paired field and laboratory data. Exceedance of the identified level of concern concentration is associated with a

likelihood of adverse organism response, but does not demonstrate that a particular chemical is solely responsible.

**Cataloging unit:** Sometimes referred to as a hydrologic unit, corresponds to a watershed that was delineated by the U.S. Geological Survey. A watershed is an area that drains ultimately to a particular watercourse of body of water. There are approximately 2,100 cataloging units in the contiguous United States, which are, on average, somewhat larger than counties. Each cataloging unit is uniquely identified with an 8-digit hydrologic unit code (HUC).

**Chronic toxicity:** Response of an organism to repeated, long-term exposure to a chemical substance. Typical observed endpoints include growth and reproduction.

**Combined sewer overflow:** A discharge of a mixture of storm water and untreated domestic wastewater that occurs when the flow capacity of a sewer system is exceeded during a rainstorm.

**Contaminated sediment:** Sediment that contains chemical substances at concentrations that pose a known or suspected threat to aquatic life, wildlife, or human health.

**Demersal species:** Swimming organisms that prefer to spend the majority of their time on or near the bottom of a water body.

**Divalent metals:** Metals that are available for reaction in a valence state of two (i.e., carrying a positive electric charge of two units).

**Ecosystem:** An ecological unit consisting of both the biotic communities and the nonliving (abiotic) environment, which interact to produce a system which can be defined by its functionality and structure.

**Effects range-median (ERM) and effects range-low (ERL) values:** Sediment chemistry screening values based on a biological effects correlation approach. Represent chemical concentration ranges that are rarely (i.e., below the ERL), sometimes (i.e., between ERL and ERM), and usually (i.e., above the ERM) associated with

toxicity for marine and estuarine sediments. Ranges are defined by the tenth percentile and fiftieth percentile of the distribution of contaminant concentrations associated with adverse biological effects.

**Elutriate phase toxicity test:** Toxicity test in which sediments are mixed with test water for a fixed period of time, the test water is then siphoned off, and test organisms are introduced to the test water (the elutriate) in the absence of sediments. Useful for representing the exposure to chemicals that can occur after sediments have been resuspended into the water column or after they have passed through the water column as part of dredged material disposal operations.

**Equilibrium concentration:** The concentration at which a system is in balance due to equal action by opposing forces within the system. When the partitioning of a nonionic organic chemical between organic carbon and pore water and partitioning of a divalent metal between solid and solution phases are assumed to be at equilibrium, an organism in the sediment is assumed to receive an equivalent exposure to the contaminant from water only or from any equilibrated phase. The pathway of exposure might include pore water (respiration), sediment carbon (ingestion), sediment organism (ingestion), or a combination of routes.

**Equilibrium partitioning (EqP) approach:** Approach used to relate the dry-weight sediment concentration of a particular chemical that causes an adverse biological effect to the equivalent free chemical concentration in pore water and to that concentration sorbed to sediment organic carbon or bound to sulfide. Based on the theory that the partitioning of a nonionic organic chemical between organic carbon and pore water and the partitioning of a divalent metal between the solid and solution phases are at equilibrium.

**Histopathology:** The study of diseases associated with tissue changes or effects.

**Hydrology:** A science dealing with the properties, distribution, and circulation of water on the surface of the land, in the soil, and in the atmosphere.

**Interstitial water:** Water in an opening or space, as between rock, soil, or sediment (i.e., pore water).

**Microbial toxicity test:** Type of toxicity test in which members of the microbial community (i.e., bacteria) are used as the test organism. Microbial responses in toxicity tests have been recommended as early warning indicators of ecosystem stress. However, questions

have been raised concerning the sensitivity of sediment microbial toxicity testing.

**Molar concentration:** The ratio of the number of moles (chemical unit referring to the amount of an element having a mass in grams numerically equal to its atomic weight) of solute (the substance being dissolved or that present in the smaller proportion) in a solution divided by the volume of the solution expressed in liters.

**National Sediment Inventory (NSI):** A national compilation of sediment quality data and related biological data. Results of the evaluation of data from the NSI serve as the basis for the report to Congress on the incidence and severity of sediment contamination across the country (i.e., the National Sediment Quality Survey). Eventually, all compiled NSI data will be incorporated into the new, modernized STORET, where they will be permanently stored.

**Nonionic organic chemicals:** Compounds that do not form ionic bonds (bonds in which the electrical charge between bonded atoms in the compound is unequally shared). Nonionic compounds do not break into ions when dissolved in water and therefore are more likely to remain in contact with and interact with sediment compounds or other compounds in water.

**Nonpoint source pollution:** Pollution from diffuse sources without a single point of origin or pollution not introduced into a receiving stream from a specific outlet. Such pollutants are generally carried off the land by storm water runoff. Sources of nonpoint source pollution include atmospheric deposition, agriculture, silviculture, urban runoff, mining, construction, dams and channels, inappropriate land disposal of waste, and saltwater intrusion.

**Nonpolar organic chemicals:** Compounds that do not exhibit a strong dipole moment (there is little difference between the electrostatic forces holding the chemical together). Nonpolar compounds tend to be less soluble in water. In aquatic systems, nonpolar chemicals are more likely to be associated with sediments or other nonpolar compounds than with the surrounding water.

**Point source pollution:** Pollution contributed by any discernible, confined, and discrete conveyance including, but not limited to, any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock, concentrated animal feeding operation, or vessel or other floating craft, from which pollutants are or may be discharged.

**Pore water:** See Interstitial water.

**Probable effects levels (PELs) and threshold effects levels (TELs):** Biological effects correlation-based sediment chemistry screening values similar to ERMs/ERLs. A generalized approach used to develop effects-based guidelines for the state of Florida and others. The lower of the two guidelines for each chemical (i.e., the TEL) is assumed to represent the concentration below which toxic effects rarely occur. In the range of concentrations between the two guidelines, effects occasionally occur. Toxic effects usually or frequently occur at concentrations above the upper guideline value (i.e., the PEL). Ranges are defined by specific percentiles of both the distribution of contaminant concentrations associated with adverse biological effects and the "no effects" distribution.

**River Reach:** A stream segment between the consecutive confluences of a stream. Most river reaches represent simple streams and rivers, while some river reaches represent the shoreline of wide rivers, lakes, and coastlines. EPA's River Reach File 1 (RF1) was completed for the contiguous United States in the mid-1980s and includes approximately 68,000 river reaches. The average length of a river reach is 10 miles. The more detailed version of the Reach File (RF3) was not used for the National Sediment Inventory.

**Sampling Station:** A specific location associated with latitude/longitude coordinates where data have been collected. Defined by the data source, sponsoring agency, and station identification code. Multiple sampling stations can have the same latitude/longitude coordinates if labeled with a different station identification code for sampling performed on different dates or by different sponsoring agencies.

**Sediment quality advisory levels (SQALs):** Equilibrium partitioning-based sediment chemistry screening values. Derived using the same approach used to develop sediment quality criteria; however, SQALs may be based on a limited set of aquatic toxicity data.

**Sediment quality criteria (SQC):** Published draft sediment quality criteria for the protection of aquatic life. Based on the equilibrium partitioning-based approach using the highest quality toxicity and octanol/water partitioning data, which have been reviewed extensively. Draft SQCs have been developed by EPA for

five nonionic organic chemicals: acenaphthalene, dieldrin, endrin, fluoranthene, and phenanthrene.

**Simultaneously extracted metals (SEM):** Metal concentrations that are extracted during the same analysis in which the acid-volatile sulfide (AVS) content of the sediment is determined.

**Solid-phase toxicity test:** A toxicity test in which test organisms are exposed directly to sediments. Sediments are carefully placed in the exposure chamber and the chamber is then filled with clean water. Resuspended particles are allowed to settle before initiation of exposure. Solid-phase toxicity tests integrate multiple exposure routes, including chemical intake from dermal contact with sediment particles as well as ingestion of sediment particles, interstitial water, and food organisms.

**Theoretical bioaccumulation potential (TBP):** An estimate of the equilibrium concentration of a contaminant in tissues if the sediment in question were the only source of contamination to the organism. TBP is estimated from the organic carbon content of the sediment, the lipid content of the organism, and the relative affinities of the chemical for sediment organic carbon and animal lipid content.

**Total organic carbon (TOC):** A measure of the organic carbon content of sediment expressed as a percent. Used to normalize the dry-weight sediment concentration of a chemical to the organic carbon content of the sediment.

**U.S. Environmental Protection Agency (EPA) risk levels:** Levels of contaminant concentrations in an exposure medium that pose a potential carcinogenic risk (e.g.,  $10^{-5}$ , or a 1 in 100,000 extra chance of cancer over a lifetime) and/or noncancer hazard (i.e., exceeds a reference dose). Used in this document to estimate human health risk associated with the consumption of chemically contaminated fish tissue.

**U.S. Food and Drug Administration (FDA) tolerance/action or guideline levels:** FDA has prescribed levels of contaminants that will render a food "adulterated." The establishment of action levels (the level of a food contaminant to which consumers can be safely exposed) or tolerances (regulations having the force of law) is the regulatory procedure employed by FDA to control environmental contaminants in the commercial food supply.

