Glossary of Water-Quality Monitoring Term

Terms were provided by the agencies listed within the parentheses.

A | B | C | D | E | F | G | H | I | J | K | L | M | N | O | P | Q | R | S | T | U | V | W | X | Y | Z

A

Adverse effect - An action that has an apparent direct or indirect negative effect on the conservation and recovery of an ecosystem component listed as threatened or endangered [U.S. Forest Service (USFS)].

Ambient 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 [U.S. Environmental Protection Agency (USEPA) Region 5].

Ancillary data -

A. Other categories of data (see *Water-quality data*) critical to interpreting water-quality data and formulating courses of action. These ancillary categories of data will be considered only as they relate to information management and data sharing. Ancillary data critical to water-quality decisionmaking include, but are not limited to, land use/land cover; water use; population and demographics; soils, geology, and geochemistry; municipal and industrial waste disposal; agricultural and domestic chemical applications; climatological data; and human health and ecological effects [Intergovernmental Task Force on Monitoring Water Quality (ITFM)].

B. Those variables that might influence the indicators independent of what they are designed to denoefte [Environmental Monitoring and Assessment Program (EMAP)].

C. Data that are collected as a consequence of collecting target data, but that are not considered to be essential (Ohio EPA).

Aquatic community - An association of interacting populations of aquatic organisms in a given water body or habitat (USEPA Region 5).

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

Aquatic habitat *Environments characterized by the presence of standing or* flowing water (USFS).

Aquifer - A body of rock that is sufficiently permeable to conduct ground water and to yield economically significant quantities of water to wells and springs [Bates, Robert L., and Jackson, Julia A., eds., 1987, *Glossary of Geology* (3d ed.): Alexandria, Va., American Geological Institute, p. 33].

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 (USEPA Region 5, modified).

B

Beneficial uses - Management objectives.

Benthic fauna (or benthos) - Organisms attached to or resting on the bottom or living in the bottom sediments of a water body (USEPA Region 5).

Bioaccumulate - The net uptake of a material by an organism from food, water, and (or) respiration that results in elevated internal concentrations [U.S. Fish and Wildlife Service (USFWS)].

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 (USEPA Region 5).

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 (USEPA Region 5).

Biological integrity - Functionally defined as the condition of the aquatic community that inhabits unimpaired water bodies of a specified habitat as measured by community structure and function (USEPA Region 5).

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

biomonitoring methods (USEPA Region 5).

Biological survey (or biosurvey) - Consists of collecting, processing, and analyzing representative portions of a resident aquatic community to determine the community structure and function (USEPA Region 5).

Biomonitoring - The measurement of biological parameters in repetition to assess the current status and changes in time of the parameters measured (USFWS).

C

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 (USEPA Region 5).

Compliance monitoring - A type of monitoring done to ensure the meeting of immediate statutory requirements, the control of long-term water quality, the quality of receiving waters as determined by testing effluents, or the maintenance of standards during and after construction of a project (modified from Resh, D. M., and Rosenberg, V.H., eds., 1993, *Freshwater Biomonitoring and Benthic Macroinvertebrates*: New York, Chapman and Hall, 488 p).

Contaminant - A material added by humans or natural activities that may, in sufficient concentrations, render the environment unacceptable for biota. The mere presence of these materials is not necessarily harmful (USFWS).

Critical habitat - Those areas designated as critical for the survival and recovery of threatened or endangered species (USFS).

D

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 (ITFM/Data Methods Collection Task Group).

Data quality objectives - In the context of water- quality monitoring, the characteristics or goals that are determined by a monitoring or

interpretive program to be essential to the usefulness of the data. They would include, but not be limited to, the specification of delineation of the limits of precision and bias of measurements, the completeness of sampling and measurements, the representativeness of sites relative to program objectives, the validity of data, and so forth (ITFM/Data Methods Collection Task Group).

Deep-water habitats - Permanently flooded lands that lie below the deep-water boundary of wetlands (USFS).

Designated uses -

A. 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 (USEPA/OST).

B. Describes the chemical, physical, and (or) biological attributes covered by the use; this is, in essence, the narrative "criteria" (Ohio EPA).

C. Uses specified in water-quality standards for each water body or segment whether or not they are being attained (USEPA Region 5).

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

E

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 (USFS).

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 (USEPA Region 5).

Ecosystem - A system that is made up of a community of animals, plants, and bacteria and its interrelated physical and chemical environment (USFWS).

Effectiveness monitoring - Documents how well the management practices meet intended objectives for the riparian area. Monitoring evaluates the cause and effect relations between management activities and conditions of the riparian dependent resources. Terrestrial and instream methods

constitute monitoring that evaluates and documents the total effectiveness of site-specific actions (USFS).

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

Endangered species -

A. Any species in danger of extinction throughout all or a significant portion of its range (USFS).

B. Animals, birds, fish, plants, or other living organisms that are threatened with extinction by manmade or natural changes in their environment. Requirements for declaring a species endangered are contained in Endangered Species Act.

Environmental indicators - A measurable feature or features that provide managerially and scientifically useful evidence of environmental and ecosystem quality or reliable evidence of trends in quality (ITFM).

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 (ITFM).

Estuarine habitat - Tidal habitats and adjacent tidal wetlands that are usually semienclosed 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 (USFS).

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

F

Featured (or species emphasis) - A species of high public interest and demand. The management goal for these species usually is to maintain or improve habitat capability when economically and biologically feasible (USFS).

Fish and wildlife - Any nondomesticated member of the animal kingdom that includes, without limitation, any mammal, fish, bird, amphibian, reptile, mollusk, crustacean, arthropod, or other invertebrate and that includes any part, product, egg, or offspring thereof or the dead body or parts thereof (USFS).

Fixed-station monitoring - The repeated long-term sampling or measurement of parameters at representative points for the purpose of determining environmental quality characteristics and trends (USEPA Region 5).

G

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) (USEPA Region 5).

H

Habitat -

A. 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 (USFS).

B. The physical/chemical theater in which the ecological play takes place; it is a template for the biota, their interactions, and their evolution (Hutchinson, 1965; Southwood, 1977).

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 (USFS).

Habitat indicator - A physical, chemical, or biological attribute measured to characterize the conditions necessary to support an organism, population, community, or ecosystem in the absence of stressors (EMAP).

I

Impact - A change in the chemical, physical, or biological quality or condition of a water body caused by external sources (USEPA Region 5).

Impairment - A detrimental effect on the biological integrity of a water body caused by impact that prevents attainment of the designated use (USEPA Region 5).

Implementation monitoring - Documents whether or not management

practices were applied as designed. Project and contract administration is a part of implementation monitoring (USFS).

Index period - The sampling period during which selection is based on the temporal behavior of the indicator and the practical considerations for sampling (Ohio EPA, modified).

Indigenous species - A species that originally inhabited a particular geographic area (USFS, modified).

L

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 emergents, emergent mosses, or lichens with greater than 30 percent aerial coverage; and total area that exceeds 20 acres (USFS).

Listed species - Any species of fish, wildlife, or plant officially designated by an agency as being endangered or threatened (USFS, modified).

M

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 (USFS).

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 (USFS).

Metadata - Information that describes the content, quality, condition, and other characteristics of data [Federal Geographic Data Committee (FGDC)].

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 data-quality objectives, bias, precision, information on data comparability, and so forth (ITFM/Data Methods Collection Task Group).

Method validation - The process of substantiating a method to meet certain

performance criteria for sampling and (or) analytical and (or) data handling operations (ITFM)

Metric - A biological attribute, some feature or characteristic of the biotic assemblage, that reflects ambient conditions, especially the influence of human actions on these conditions (ITFM; Technical Appendix G).

Monitoring -

A. The repeated measurement of some parameters to assess the current status and changes over time of the parameters measured (USFWS).

B. Periodic or continuous surveillance or testing to determine the level of compliance with statutory requirements and (or) pollutant levels in various media or in humans, animals, and other living things (ITFM).

N

National Pollutant Discharge Elimination System - 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 (USEPA Region 5).

Native species - Any animal and plant species originally in the United States (USFS).

Nonpoint-source pollution - A contributory factor to water pollution that cannot be traced to a specific spot; for example, pollution that results from water runoff from urban areas, construction sites, agricultural and silvicultural operations, and so forth (USEPA Region 5).

P

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 (USFS).

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 (ITFM).*

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

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 (ITFM).

Point-source pollution - Pollution discharged through a pipe or some other discrete source from municipal water-treatment plants, factories, confined animal feedlots, or combined sewers (USEPA Region 5).

Population -

A. For the purposes of natural-resource planning, the set of individuals of the same species that occurs within the natural resource of interest (USFS, modified).

B. An aggregate of interbreeding individuals of a biological species within a specified location (USEPA Region 5).

Potential habitat - Habitat that is suitable for, but currently unoccupied by, the species or community in question (USFS).

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 of pumping the sample and keeping it pressurized and out of contact with the atmosphere (ITFM/Data Methods Collection Task Group).

R

Reference value/conditions -

A. A single measurement or set of selected measurements of unimpaired water bodies characteristic of an ecoregion and (or) habitat (USEPA/OST).

B. The chemical, physical, or biological quality or condition that is exhibited at either a single site or an aggregation of sites that represent the least impacted or reasonably attainable condition at the least impacted reference sites (Ohio EPA).

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 (EMAP).

Riparian - Of, pertaining to, or situated or dwelling on the bank of a river or other water body (Shuh-shiaw Lo, 1992, *Glossary of Hydrology:* Littleton, Colo., Water Resources Publications, p. 1250).

Riparian areas - Geographically delineable areas with distinctive resource values and characteristics that compose the aquatic and riparian ecosystems (USFS, modified).

Riparian dependent resources - Resources that owe their existence to a *riparian area* (USFS).

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 (USFS).

Riparian habitat - The transition zone between aquatic and upland habitat. These habitats are related to and influenced by surface or subsurface waters, especially the margins of streams, lakes, ponds, wetlands, seeps, and ditches (USFS, modified).

River reach - A river or stream segment of a specific length. Most reaches extend between the points of confluence with other streams (USEPA Region 5).

Riverine habitat - All wetlands and deep-water habitats within a channel, with two exceptions--wetlands dominated by trees, shrubs, persistent emergents, emergent mosses, or lichens and habitats with water that contains ocean-derived salt in excess of 0.5 part per thousand.

S

Selection criteria - A set of statements that describe suitable indicators or a rationale for selecting indicators (ITFM).

Sensitive species - Those plant and animal species for which population viability is a concern (USFS).

Standard - As used in American Society for Testing and Materials (ASTM), a *document that has been developed and established within the consensus principles of the ASTM and that meets the approval requirements of ASTM procedures and regulations. 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 of the ASTM. "Consensus principles " include timely and adequate notice to all known interested parties; opportunity for all affected interests to participate in the deliberations, discussions, and decisions that affect the proposal; maintenance of records of discussions, decisions, and data accumulated in standards development; timely publication and distribution of minutes of meetings; distribution of ballots to all eligible voters and full reporting of results; and careful attention to minority opinions throughout.

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 (EMAP).

T

Threatened species - Any species that is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range (USFS).

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 (USEPA Region 5).

Total maximum daily load - The total allowable pollutant load to a receiving water such that any additional loading will produce a violation of water-quality standards (USEPA Region 5).

Toxic - Relating to harmful effects to biota caused by a substance or contaminant (USFWS).

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 (USEPA Region 5).

V

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. If the standard, which requires use of 50 percent or less of streamside herbaceous forage, for example, fails to achieve the desired instream habitat condition, then the standard would have to be modified for less

forage consumption in the riparian complex(es) (USFS, modified).

Viable population - A population that has the estimated numbers and distribution of reproductive individuals to ensure the continued existence of the species throughout its existing range in the planning area (USFS).

W

Water-quality criteria - *Criteria* that comprise numerical and narrative *criteria.* Numerical criteria are scientifically derived ambient concentrations developed by the USEPA or the States for various pollutants of concern so that human health and aquatic life can be protected. Narrative criteria are statements that describe the desired water-quality goal (USEPA Region 5).

Water-quality data - Chemical, biological, and physical measurements or observations of the characteristics of surface and ground waters, atmospheric deposition, potable water, treated effluents, and waste water and of the immediate environment in which the water exists.

Water-quality information - Derived through analysis, interpretation, and presentation of water-quality and ancillary data (ITFM).

Water-quality limited segment - A stretch or area of surface water where technology-based controls are not sufficient to prevent violations of water-quality standards. In such cases, new permit limitations are based on ambient-water-quality considerations (USEPA Region 5).

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 uses (ITFM/Technical Appendix B).

Water-quality standard - 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 (USEPA Region 5).

Water-resource quality -

A. 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 (USEPA/OST).

B. 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 (Ohio EPA).

Watershed - The land area that drains into a stream, river, lake, estuary, or coastal zone (USEPA Region 5).

Wetlands- Habitat that is transitional between terrestrial and aquatic where the water table is usually at or near the land surface or land that is covered by shallow water. Wetlands have one or more of the following characteristics: at least periodically, the land supports predominantly hydrophytic plants; the substrate is predominantly undrained hydric soil; and the substrate is nonsoil and is saturated with water or covered by shallow water at sometime during the yearly growing season (USFS).

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