

GLOSSARY
SAN DIEGO CREEK CAUSAL ASSESSMENT PROJECT
APRIL 10, 2015

Assemblage – An association of interacting populations of organisms in a given waterbody. (1)

Benthic Macroinvertebrates – Animals without backbones, living in or on sediments or other substrates, of a size large enough to be seen by the unaided eye, and which can be retained by a U.S. Standard No. 30 sieve (28 openings per inch, 0.595-mm openings) (1)

Biological Assessment (Bioassessment) – Evaluation of ecosystem condition using biological surveys and other direct measurements of resident biota. (4)

Biological Endpoint – The condition of a sensitive aquatic life resource that is judged to reflect “balanced flora and fauna.” (paraphrased from 3); **Assessment Endpoints** – The valued ecosystem characteristics that are desired to be protected. (3)

Biological Gradient – A regular increase or decrease in a measured biological attribute with respect to space (e.g., below an outfall), time (e.g., since a flood), or an environmental property (e.g., temperature). (4)

Biological Integrity – “...the ability of an aquatic ecosystem to support and maintain a balanced, adaptive community of organisms having a species composition, diversity, and functional organization comparable to that of natural habitats within a region.” (2)

Biota – The plants and animals living in a habitat. (2)

CADDIS – The Causal Analysis/Diagnosis Decision Information System, a web-based technical support system for implementing the *Stressor Identification* process. (4)

California Stream Condition Index (CSCI) – A new, statewide bioassessment tool for perennial, wadeable streams that uses benthic macro invertebrates (BMI) to infer habitat condition. The CSCI is an example of a site-specific, modeled expectation index, where a sample is evaluated on its deviation from expected reference conditions. A sample is evaluated from two perspectives: the ecologically meaningful functional or tolerance metrics, via a predictive Multi-Metric Index (pMMI) and the composition of the community as a whole, via an Observed:Expected (O/E) index. A score of 1 implies that a sample is in complete reference condition and lower scores indicate poorer condition.

Case – The situation that is the subject of a causal analysis; for example, the case may be an impaired stream reach and the upstream and downstream reaches, or an estuary and the lower reaches of its tributaries. (4)

Causal Analysis – A process by which data and other information are organized and evaluated, using quantitative and logical techniques, to determine the likely cause of an observed condition. (4); **Causal Inference** – Reasoning to the conclusion that something is, or is likely to be, the cause of something else (*paraphrased from Encyclopedia Britannica*)

Cause – A stressor or set of stressors that occurs at an intensity, duration, and frequency of exposure sufficient to result in a change in an identified biological effect. (4)

Comparator Site – A site, or series of sites, that is environmentally (e.g., rainfall, slope, watershed size, or geology) similar to the test site and serves to contrast observed biological condition and stressor exposure to the test site. Ideally, comparator sites would have similar biological expectations to the test site, but differing observed biological community and stressor exposure. A comparator site does not have to be a “high-quality” reference site. The comparator site should have similar natural gradients as the test site. (*D Gillete, SCCWRP*)

Conceptual model – A graphic depiction of the causal pathways linking sources and effects that ultimately is used to communicate why some pathways are unlikely and others are very likely. (4)

Confirmation Bias – A tendency to search for or interpret information in a way that confirms one's preconceptions, leading to statistical errors. (*Science Daily*)

Diatom – Microscopic algae with cell walls made of silicon and of two separating halves. (2)

Ecoregion – A region defined by similarity of climate, landform, soil, potential natural vegetation, hydrology, and other ecologically relevant variables. (2)

EPT Taxa – Ephemeroptera (mayflies), Plecoptera (stoneflies), and Trichoptera (caddisflies). Insects from these orders “tend to be very sensitive to various forms of pollution”

Functional Groups – A means of dividing organisms into groups, often based on their method of feeding (e.g., shredder, scraper, filterer, predator), type of food (e.g., fruit, seeds, nectar, insects), or habits (e.g., burrower, climber, clinger). (2)

High Gradient Streams – Streams in moderately to highly sloping landscapes having substrate primarily composed of coarse sediment particles or frequent coarse particulate aggregations along stream reaches. (1)

Impairment – A detrimental effect on the biological integrity of a waterbody caused by an impact that prevents attainment of the designated use. (2)

Index of Biological Integrity – A colloquialism for the Southern California IBI (Ode et al. 2005). An MMI bioassessment tool based upon benthic macroinvertebrate communities designed for use in perennial, wadeable streams of the chaparral (xeric) and mountainous ecoregions of

southern California. Samples are evaluated by comparing metric values to distributions of those metrics at reference sites from the ecoregions. Metrics used in the Southern Coastal California IBI are: number of EPT taxa, number of predator taxa, number of Coleoptera taxa, percent non-insect taxa, percent intolerant individuals, percent tolerant taxa, and percent abundance of collector individuals (Ode et al, 2005).

Indicator – Quantitative measure that points to the status of biological endpoints and which can be related quantitatively to criteria. (3)

Inference – The act of reasoning from *evidence*. (4)

Low Gradient Streams – streams in low to moderately sloping landscapes having substrates of fine sediment or infrequent aggregations of coarse particulate aggregations along stream reaches. (1)

Macroinvertebrates – Animals without backbones that can be seen with the naked eye (caught with a 1 mm² mesh net). Includes insects, crayfish, snails, mussels, clams, fairy shrimp, etc. (2)

Metric – A measurable characteristic of the biota that changes in some predictable way with increased human influence. (1)

Multi-Metric Index (MMI) – A bioassessment approach that measures biological integrity by summarizing community information into multiple, typically ecologically meaningful, categories or metrics. Samples are evaluated by comparing them to metric values from some standard value; typically observed measurements from reference sites. (*D. Gillett, SCCWRP*)

Natural Gradient – Abiotic forcing factors that are known to influence community composition of benthic macroinvertebrates, but are not influenced by localized anthropogenic activities. Examples include rainfall, slope, watershed size, and underlying geology. (*D. Gillette, SCCWRP*)

O/E Ratio – A bioassessment approach using the observed ratio of taxa observed in sample to a site-specific expectation. The expectation is a modeled prediction based upon communities observed at environmentally similar reference sites. In general, O/E refers to the specific percent of taxa expected in the absence of disturbance, where O represents the number of observed taxa at the site and E represents the number of taxa expected in the absence of disturbance. (*D. Gillett, SCCWRP*)

Periphyton – A broad organismal assemblage composed of attached algae, bacteria, their secretions, associated detritus, and various species of microinvertebrates. (1)

Pollutant – Any substance introduced into the environment that adversely affects a resource. (4)

Pollution – The Clean Water Act (Section 502.19) defines pollution as "the [hu]man-made or [hu]man-induced alteration of chemical, physical, biological, and radiological integrity of water." (2)

Predictive Multi-Metric Index (pMMI) – A multimetric index (MMI) where metric scores are measured as the departure of the observed metric value from a site-specific expectation modeled from environmentally similar reference sites. The pMMI method is similar to the SC-IBI approach, but accounts for site-specific variability using a predictive modeling approach. (*D. Gillett, SCCWRP*)

Primary Producers – Organisms capable of producing their own food, e.g., algae. (1)

Proximate Cause – The *cause* that induces the *effect* through direct exposure. (4)

Proximate Stressor – The *stressor* that directly induces the biological *effect* of concern. This is equivalent to *causal agent*, but emphasizes the negative consequences of exposure. (4)

Reference Site – A minimally impaired site that is representative of the expected ecological conditions and integrity of other sites of the same type and region. (2)

Riffles – Shallow areas in a stream where water flows swiftly over gravel and rock. (1)

Runs – Deep areas in a stream where water flows fast with little or no turbulence. (1)

Spatial/Temporal Co-occurrence – A *type of evidence* that involves observation of two entities or conditions at the same place or time; it is sometimes shortened to *co-occurrence*. (4)

Strength-of-Evidence analysis – A structured inferential process that uses multiple lines of evidence to identify the most likely cause or causes of a biological impairment. (4)

Stressor – Any physical, chemical or biological entity that can induce an adverse effect. (4)

Stressor Identification – A methodology for determining the most probable cause of an observed biological impairment, using elimination, diagnosis, and strength-of-evidence analysis. (4)

Stressor-Response – 1. The relationship between the intensity, frequency, or duration of exposure to a stressor and the intensity or frequency of a biological response. 2. A model of that relationship. Equivalent to exposure-response and concentration-response. (4)

Taxa – A grouping of organisms given a formal taxonomic name such as species, genus, family, etc. The singular form is taxon. (2)

Taxa Richness – The number of distinct species or taxa that are found in an assemblage, community, or sample. (2)

Taxonomic Composition – The number and arrangement of distinct species that are found in an Assemblage. (1)

Tolerance – Measure of degree to which a particular taxon can persist in anthropogenically-disturbed systems. We expect to find highly tolerant taxa at severely degraded sites. (4)

Tolerance Value – A numerical value that represents the relative sensitivity of a species or other taxon to a particular *agent*. (4)

SOURCES:

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<http://water.epa.gov/type/wetlands/assessment/glossary.cfm>
3. U.S. EPA 2010. [Methods and Approaches for Deriving Numeric Criteria for Nitrogen/Phosphorus Pollution in Florida's Estuaries, Coastal Waters, and Southern Inland Flowing Waters](#)
4. U.S. EPA CADDIS Glossary: http://www.epa.gov/caddis/caddis_glossary.html