

Implementing Oregon's Biocriteria Standard in NPDES Permits

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TOPICS

- What is the Oregon biocriteria standard?
- How has DEQ implemented it?
- What issues are associated with implementing it through NPDES permits?

Biocriteria Standard

FIRST PRINCIPLES

- The stated objective of the Clean Water Act (CWA) “is to restore the chemical, physical, and *biological* integrity of the Nation’s waters” (§ 101)
- As elements of this objective, the CWA’s “national goals” include:
 - “[T]he discharge of pollutants . . . [will] be eliminated by 1985”
 - An “interim goal of water quality which provides for the protection and propagation of fish, shellfish, and wildlife . . . by July 1, 1983”
- The 1987 CWA amendments directed states to establish numeric criteria for toxic pollutants and, where numeric criteria weren’t available, to “adopt criteria based on biological monitoring or assessment methods” (§ 303(c)(2)(B))

HISTORY OF OREGON'S STANDARD

- In response to the 1987 CWA amendments, EPA:
 - Issued national program guidance for biological criteria in April 1990
 - Directed states to adopt narrative biological criteria as an initial step in the development of numeric biological criteria
- This prompted DEQ to develop Oregon's biocriteria standard, which the Oregon Environmental Quality Commission adopted in 1991
- DEQ intended that numeric biocriteria standards would be established by 1996, but no numeric standards have yet been developed

BIOCRITERIA STANDARD

“Waters of the State must be of sufficient quality to support aquatic species without detrimental changes in the resident biological communities” (OAR 340-041-0011)

REGULATORY DEFINITIONS

- “**Without detrimental changes in the resident biological community**” means “no loss of ecological integrity when compared to natural conditions at an appropriate reference site or region”
- “**Ecological integrity**” means “the summation of chemical, physical, and biological integrity capable of supporting and maintaining a balanced, integrated, adaptive community of organisms having a species composition, diversity, and functional organization comparable to the natural habitat of the region”
- “**Appropriate reference site or region**” means “a site on the same water body or within the same basin or ecoregion that has similar habitat conditions and represents the water quality and biological community attainable within the areas of concern”

DEQ RULEMAKING COMMENTS

- Because “biosurvey results directly assess the status of a waterbody relative to protection of beneficial uses,” a determination that the biocriteria standard is not met may be based solely on biological monitoring and without an identified chemical or physical impairment
- The qualifiers “significant” and “excessive,” which had been included in the proposed standard, were removed from the final standard
- “The primary biological communities used for assessing aquatic environments are fish and macroinvertebrates. Aquatic plants and algae are also important components of aquatic systems”
- “For point source evaluations the ‘appropriate reference site’ will usually be a location immediately upstream . . . with similar physical habitat characteristics as sites below the discharge”

Assessment Methods

ASSESSMENT METHODS

- To date, implementation of Oregon's biocriteria standard has been confined largely to DEQ's periodic water quality assessments pursuant to CWA § 303(d)
- Because the standard itself does not specify a method for assessing whether it is met, DEQ has developed a nonexclusive assessment methodology for § 303(d)

2018 § 303(d) METHODOLOGY

- Uses DEQ's Predictive Assessment Tool for Oregon (PREDATOR) to evaluate macroinvertebrate communities in perennial, wadeable streams
- Macroinvertebrate taxa data from a sample site are compared with the taxa predicted by PREDATOR using data from regional reference sites
- The assessment is based on the ratio of observed taxa (O) to the expected reference taxa (E): O/E. For example:
 - If the O/E ratio is ≤ 0.80 (based on a single sample) or ≤ 0.85 (based on multiple samples) at a site in the Marine Western Coastal Forest Region (most of Western Oregon, including the Willamette Valley), the water segment is listed as "impaired" for not meeting the biocriteria standard

OTHER ASSESSMENT METHODS

- The PREDATOR O/E model is not the exclusive assessment methodology
- Other methods, which DEQ would employ on a case-by-case basis, include:
 - Multimetric indices
 - Upstream-downstream comparisons of macroinvertebrate community composition and function
 - Assessments of fish and algal communities

Issues Associated with Implementing the Biocriteria Standard in NPDES Permits

GENERAL QUESTIONS REGARDING CONTRIBUTION

- When evaluating observed differences between the sample site and the reference site, there are at least three separate questions to consider:
 - Does the reference site accurately represent the natural or unaffected conditions at the sample site?
 - If so, are the observed differences within the range of variation at the reference site?
 - If the observed differences are outside the range of variation at the reference site, is there a *de minimis* level of difference that would not constitute impairment?

WHAT REFERENCE SITE SHOULD BE USED?

- A regional reference site can be used to assess whether a waterbody is impaired, but it cannot be used to determine whether or to what extent an NPDES source is contributing to the impairment
- To evaluate the contribution of an NPDES source, the reference site will generally need to be an upstream site that differs from the downstream comparison site only in not being influenced by the NPDES source
- Because the upstream site itself may be impaired, however, it may not provide a fully accurate characterization of the NPDES source's contribution and could create a moving target as upstream water quality changes
- To fully characterize a source's contribution, a total maximum daily load (TMDL) determination may be needed

WHICH METRIC(S) SHOULD BE USED?

- The biocriteria standard applies to all biological communities, including fish, macroinvertebrates, algae, and macrophytes
- The choice of metric will be influenced by the existence and applicability of standard methodologies and the relative difficulty of using them
- The absence of a specified metric may lead to inconsistent implementation of the standard from source to source and also to inconsistent results for the same source

WHAT PERMIT CONDITIONS ARE NEEDED TO ELIMINATE A SOURCE'S CONTRIBUTION?

- If the NPDES source is contributing to the biocriteria standard not being met, the pollutant or other cause must be identified
- Once the cause is identified, the discharge limits or other permit conditions needed to eliminate the source's contribution must be determined
- This step may be difficult because the precise relationship between the discharge and the biological condition of the receiving stream will generally be unknown

QUESTIONS?

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