



State of Oregon Department of Environmental Quality

Chronology of Biocriteria Assessment in Oregon

2010

In 2010, Oregon DEQ used their newly developed biocriteria assessment methodology to identify waters that had impaired macroinvertebrate communities. During development of the original methodology, DEQ selected 10th and 25th percentiles of reference conditions as the threshold for aquatic life use support to be consistent with previous assessments that had been performed through regional macroinvertebrate surveys.

DEQ's 2010 methodology identified impairment of the aquatic life use through the methodology outlined below:

Category 3c: Impairing Pollutant Unknown

Comparison to the assessment benchmark shows the biological community is impaired, but the pollutant causing the impairment is unknown, and a TMDL cannot be developed.

Macroinvertebrate sampling data from perennial, wadeable streams evaluated by DEQ using the PREDATOR model showing:

- $\geq 15\%$ taxa loss in the Marine Western Coastal Forest (MWCF) region,
- $\geq 22\%$ taxa loss in the Western Cordillera and Columbia Plateau (WCCP) region,
- or
- $\geq 50\%$ taxa loss in the Northern Basin and Range (NBR) region.

Category 3B: Insufficient Data – Potential Concern

Some macroinvertebrate sampling data from perennial, wadeable streams evaluated using the PREDATOR model are inconclusive and are insufficient to assign a status category until additional information is collected. Macroinvertebrate sampling data from perennial, wadeable streams evaluated by DEQ using the PREDATOR model showing:

- 8% to 14% taxa loss or $> 24\%$ taxa gain in the Marine Western Coastal Forest (MWCF) region,
- 8% to 21% taxa loss or $> 23\%$ taxa gain in the Western Cordillera and Columbia Plateau (WCCP) region, or
- 25% to 49% taxa loss in the Northern Basin and Range (NBR) region.

Results showing taxa loss in these ranges could be due to sampling error or modeling error and may be over or under-estimating taxa loss. A large gain of observed taxa over expected may indicate more natural diversity, or may indicate disturbance that has enhanced diversity. Additional samples are necessary to better assess biological conditions. A minimum of 5 replicate samples should be collected to provide sufficient data for status classification. The stream is a potential concern until more information is evaluated.

Category 2: Attaining

Macroinvertebrate sampling data from perennial, wadeable streams evaluated by DEQ using the PREDATOR model showing:

- 0% to 8% taxa loss or 0% to 24% taxa gain in the Marine Western Coastal Forest (MWCF) region,
- 0% to 7% taxa loss or 0% to 23% taxa gain in the Western Cordillera and Columbia Plateau (WCCP) region, or
- < 25% taxa loss in the Northern Basin and Range (NBR) region.

Data Requirements for assessment:

One sample result is sufficient to evaluate for the assessment using the benchmarks developed from the PREDATOR model. If samples from multiple years are available, the most recent sample result of Category 2 or Category 5 will determine the site status. If the most recent sample result is Category 2 and a previous sample is Category 5, the site status will be Category 3b. Recent Category 2 sample results must outnumber earlier Category 5 sample results for the site status to be considered Category 2.

When results for replicate site samples are collected to clarify inconclusive results (Category 3B), a minimum of 5 samples is required to achieve the target statistical confidence. The site will be assigned a status category if 3 out of 5 replicate samples show results in the Category 2 or Category 5 ranges. Replicate samples must be collected in the same sampling season, in the same reach, or in adjacent and comparable reaches.

In Practice:

If samples from multiple years are available, the most recent sample result of Category 2 or Category 5 will determine the site status, only if it corroborated a previous listing or the previous listing was Category 3B. The rationale behind this requirement was requiring more evidence to remove an impairment listing than the initial listing. For example, if a 2017 sample was determined to be Category 5, but a previous 2015 sample was Cat 3b, then the current impairment status would be Category 5. Similarly, if a 2017 sample were found to be Category 5 and the previous 2015 sample was Category 2, then the current status would be Category 3B.

In theory, the rationale behind requiring five samples to clarify inconclusive results was that DEQ wanted to see more evidence of actual biological condition prior to moving impairment status in one direction or another. In lieu of performing statistical testing (e.g., means tests between a site and the reference population), the majority sample approach was selected instead. In practice, there were few cases where this amount of data collection took place.

EPA's Review:

In its review of the 2010 Integrated Report, EPA agreed with DEQ's determination that 321 segments were impaired for biocriteria based on its use of the PREDATOR tool. EPA did not, however, agree with DEQ that these waterbodies should not be put on Oregon's Section 303(d) list and that a TMDL could not be developed for these waterbodies because the pollutants were

unknown. Therefore, EPA disapproved DEQ’s failure to include these 321 water quality limited segments on Oregon’s Section 303(d) list based on the determination that they are impaired for “pollutant unknown” and included these waterbodies as Category 5 on the 2010 Integrated Report. In its approval letter, EPA stated its expectation that DEQ will “...include all biological impairments in Category 5...”.

As a result of the 2010 Integrated Report approval process, DEQ modified its biocriteria methodology for the 2012 report:

2012 Assessment Methodology

PREDATOR Model Region	Assessment Category		
	Category 5: Water Quality Limited	Category 3B: Insufficient Data/Potential Concern	Category 2: Attaining
Marine Western Coastal Forest	≥ 15% taxa loss	9% - 14% taxa loss or > 24% taxa gain	0% - 8% taxa loss or 0% - 24% taxa gain
	PREDATOR score ≤ 0.85	PREDATOR score 0.86 to 0.91 or > 1.24	PREDATOR score 0.92 to 1.24
Western Cordillera and Columbia Plateau	≥ 22% taxa loss	8% - 21% taxa loss or > 23% taxa gain	0% - 7% taxa loss or 0% - 23% taxa gain
	PREDATOR score ≤ 0.78	PREDATOR score 0.79 to 0.92 or > 1.23	PREDATOR score 0.93 to 1.23
Northern Basin and Range	≥ 50% taxa loss	25% - 49% taxa loss	< 25% taxa loss
	PREDATOR score ≤ 0.50	PREDATOR score 0.49 to 0.75	PREDATOR score > 0.75

For the 2012 Integrated Report, DEQ proposed 27 new Category 5 biocriteria listings. During their review, EPA contended that Oregon did not assess all readily available data and proposed 24 additional biocriteria listings.

Based on preliminary discussions between DEQ and EPA regarding revisions to the biocriteria assessment methodology, EPA strongly encouraged DEQ to remove the Category 3B option for biocriteria in their next Integrated Report. EPA indicated that DEQ did not have the monitoring program to support this categorical listing, this category caused a lot of confusion among stakeholders, and EPA would ultimately list them as Category 5 regardless. Were Oregon to remove the Category 3B option, Oregon’s biocriteria methodology for the 2018 Integrated Report would read: (see below).

Category 5: Water Quality Limited, TMDL Needed (303(d) List)

Macroinvertebrate sampling data from perennial, wadeable streams evaluated by DEQ using the PREDATOR model showing:

- 15% or more taxa loss in the Marine Western Coastal Forest (MWCF) region,
- 22% or more taxa loss in the Western Cordillera and Columbia Plateau (WCCP) region,
or
- 50% or more taxa loss in the Northern Basin and Range (NBR) region.

Category 2: Attaining

Macroinvertebrate sampling data from perennial, wadeable streams evaluated by DEQ using the PREDATOR model showing:

- Less than 15% taxa loss or in the Marine Western Coastal Forest (MWCF) region,
- Less than 22% taxa loss or in the Western Cordillera and Columbia Plateau (WCCP) region, or
- Less than 50% taxa loss in the Northern Basin and Range (NBR) region.

DEQ is now seeking input on its biocriteria threshold approach. Are Oregon's biocriteria thresholds valid and do they adequately represent the cutoff where aquatic life use is considered to be impaired?