Indiana's Water Quality Assessment Methodology To Determine Aquatic Life Use Support

<table>
<tr><th colspan="3">Aquatic Life Use Support - Rivers and Streams</th></tr>
<tr><td rowspan="3">Toxicants</td><td colspan="2">Dissolved metals, pesticides, polynuclear aromatic hydrocarbons (PAHs), free cyanide, and ammonia were evaluated on a site-by-site basis and judged according to the magnitude of the exceedance(s) of Indiana's WQS and the number of times the exceedance(s) occurred. For any one pollutant (grab or composite samples), the following assessment criteria are applied to data sets consisting of three or more measurements.</td></tr>
<tr><td>Fully Supporting</td><td>Not Supporting</td></tr>
<tr><td>No more than one exceedance of the acute or chronic criteria for aquatic life within a three year period[1].</td><td>More than one exceedance of the acute or chronic criteria for aquatic life within a three year period.</td></tr>
<tr><td rowspan="3">Conventional inorganics</td><td colspan="2">Dissolved oxygen, pH, sulfate, and chloride were evaluated for the exceedance(s) of Indiana's WQS. For any one pollutant, the following assessment criteria are applied to data sets consisting of three or more measurements.</td></tr>
<tr><td>Fully Supporting</td><td>Not Supporting</td></tr>
<tr><td>Criteria are exceeded in less than or equal to 10% of measurements.</td><td>Criteria are exceeded in greater than10% of measurements.</td></tr>
<tr><td>Nutrients</td><td colspan="2">Nutrient conditions were evaluated on a site-by-site basis using the benchmarks described below. In most cases, two or more of these conditions must be met on the same date in order to classify a waterbody as impaired. This methodology assumes a minimum of three sampling events:
Total Phosphorus -- One or more measurements greater than 0.3 mg/L
Nitrogen (measured as NO3 + NO2) – One or more measurements greater than 10.0 mg/L
Dissolved Oxygen (DO) – One or more measurements below the water quality standard of 4.0 mg/l or measurements that are consistently at/close to the standard, in the range of 4.0-5.0 mg/L or values greater than 12.0 mg/L
pH measurements – One or more measurements exceed the water quality standard of no more than 9.0 pH units or measurements are consistently at/close to the standard, in the range of 8.7-9.0 pH units
Algal Conditions -- Algae are described as "excessive" based on field observations by IDEM scientists.</td></tr>
<tr><td rowspan="2">Benthic aquatic macroinvertebrate Index of Biotic Integrity (mIBI) Scores (Range of possible scores is 12-60)</td><td>Fully Supporting</td><td>Not Supporting</td></tr>
<tr><td>mIBI greater than or equal to 36</td><td>mIBI less than 36</td></tr>
<tr><td>Fish community (IBI) Scores (Range of possible scores is 0-60)</td><td>IBI greater than or equal to 36</td><td>IBI less than 36</td></tr>
<tr><th colspan="3">Aquatic Life Use Support – Rivers and Streams</th></tr>
<tr><td>Qualitative habitat use evaluation (QHEI) (Range of possible scores is 0-100)</td><td colspan="2">The Qualitative Habitat Evaluation Index (QHEI) is not used to determine aquatic life- use support. Rather, the QHEI is an index designed to evaluate the lotic habitat quality important to aquatic communities and is used in conjunction with mIBI or IBI data, or both, to evaluate the role that habitat plays in waterbodies where impaired biotic communities (IBC) have been identified. QHEI scores are calculated using six metrics: substrate, instream cover, channel morphology, riparian zone, pool/riffle quality, and gradient. A higher QHEI score represents a more diverse habitat for colonization of aquatic organisms. IDEM has determined that a QHEI total score of <51 indicates poor habitat. For streams where the macroinvertebrate community (mIBI or mHab) or fish community (IBI) scores indicate IBC, QHEI scores are evaluated to determine if habitat is the primary stressor on the aquatic communities, or if there may be other stressors/pollutants causing the IBC.</td></tr>
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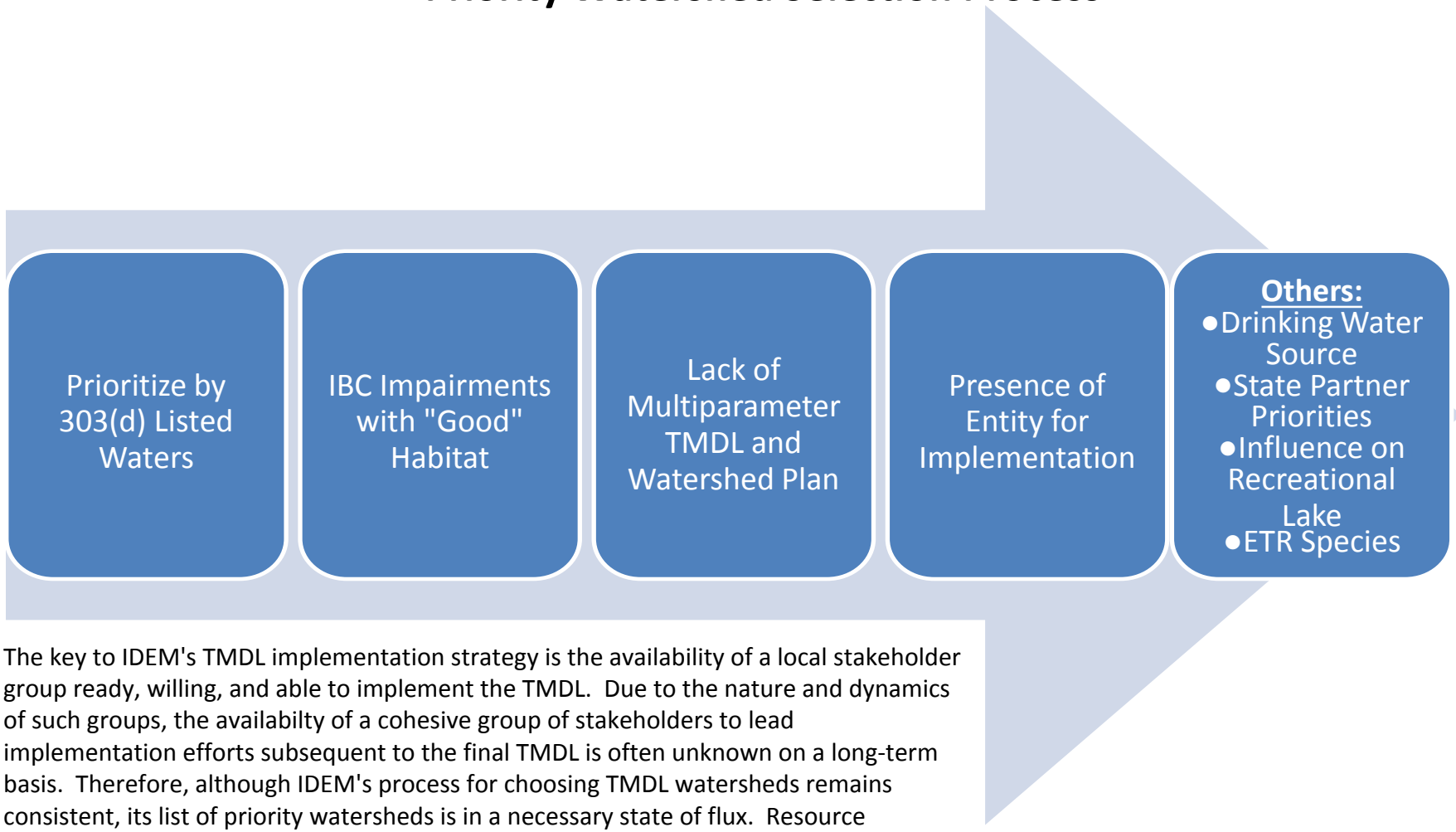
[1] For Indiana waters within the Great Lakes Basin, acute aquatic criteria refer to the "criterion maximum concentration (CMC) identified in 327 IAC 2-1.5, and the chronic aquatic criteria refer to the criterion continuous concentration (CCC) also described therein. For downstate waters (those located outside of the Great Lakes Basin, the acute aquatic criteria refer to the "AAC" values shown in 327 IAC 2-1 and the chronic aquatic criteria are shown as the "CAC" values.

INDIANA'S TMDL PROGRAM PRIORITY FRAMEWORK
Priority Watershed Selection Process



The key to IDEM's TMDL implementation strategy is the availability of a local stakeholder group ready, willing, and able to implement the TMDL. Due to the nature and dynamics of such groups, the availabilty of a cohesive group of stakeholders to lead implementation efforts subsequent to the final TMDL is often unknown on a long-term basis. Therefore, although IDEM's process for choosing TMDL watersheds remains consistent, its list of priority watersheds is in a necessary state of flux. Resource constraints limit IDEM's TMDL development commitment to one 10-digit HUC watershed per fiscal year. These TMDLs are restricted to streams and rivers with *E. coli* impairment and impaired biotic communities thought to be caused by one or more of the following:

* Dissolved oxygen
* Algae
* Total suspended solids
* Phosphorus