

## #12: SURFACE WATER

### OPTIONAL METRIC FOR CATEGORY A & B & C CITIES

**Bold, green font indicates data elements that are eligible to be recognized at Step 5 if improvement is demonstrated.**

#### DATA ELEMENTS

- 12.1 % of lake, river & wetland shoreline with at least a 50' vegetation buffer
- 12.2 % of water bodies showing at least good clarity readings OR number of citizen lake/river monitors
- 12.3 *One city-defined element or index number*

#### DEFINITIONS

- **Vegetation buffers** are 50-foot strips of land paralleling lake, river, and wetland shorelines with perennial grass, trees, or shrubs. (Element 12.1)
- **Clarity (also called transparency) readings** are taken with Secchi disks (in feet) on lakes or with Secchi tubes (in centimeters) on streams and reported in the ranges of excellent, very good, good, fair, and poor. Secchi tube data is a surrogate for total suspended solids (TSS). (Element 12.2)
- **One key Element** gives cities an opportunity to highlight a measured number or a calculated index number that has special relevance to the city. For example:
  - For some cities – especially those with multiple water bodies in poor condition that have all been researched - tracking % of water bodies that are on the state's impaired waters list and/or % of TMDLs that are met (Total Maximum Daily Limits [of pollutants]) may be very important and easily obtained from the MPCA. Impairments are measured for aquatic life, aquatic recreation, and aquatic consumption. See <https://www.pca.state.mn.us/water/maps-minnesotas-impaired-waters-and-tmdls>
  - The MPCA's **Trophic State Index (TSI)** for 3000 MN lakes combines measurement of Secchi water clarity, algae and nutrient level (phosphorus), reporting whether lakes support Aquatic Recreation Use (AQR). AQR for streams is dependent on maximum levels of bacteria (E. coli), and **Aquatic Life (AQL) for streams** is dependent on threshold measurement of fish, invertebrates and water chemistry.
  - **Pollutant levels for chemicals of concern** – chloride, mercury, a pesticide, nitrogen, sulfuric acid – may be the most relevant data elements for some cities.
  - **Minneapolis's Lake Aesthetics and User Recreation Index** (LAURI: <http://www.minneapolismn.gov/sustainability/indicators/WCMS1P-082085>) measures: 1) public health status at swimming beaches; 2) water quality including clarity; 3) aesthetics such as color, odor, and debris; 4) availability and ease of public access for recreational uses; and 5) habitat quality for plant and fish diversity. These five indices are scored on a scale of one to 10.
  - **The Wetland Health Evaluation Program** ( WHEP: <http://www.mnwhep.org/index.htm>) in Dakota and Hennepin Counties has been reporting an index of biotic integrity since 1997, covering invertebrates and vegetation.
  - **Score Your Shore** (<http://www.dnr.state.mn.us/scoreyourshore/index.html>) from the MN Dept. of Natural Resources assesses habitat conditions of developed lake lots, which can be used to set and track goals for shoreland revegetation and improvement. It provides an objective and systematic method to assess the type, quantity and quality of the existing shoreland habitat, recognizing, for example, that turf grass is not as effective as native vegetation at protecting water quality.
  - **SALT** (Element 12.3)

#### DATA SOURCES

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- City GIS maps; Google maps; maps from local lake and river associations. (Element 12.1)
- Data collected by the city, volunteers, associations, Metropolitan Council. (Elements 12.1 and 12.2)
- Maps from <http://www.mndnr.gov/buffers>, MN Board of Water and Soil Resources, county Soil and Water Conservation Districts, Watershed Districts, Watershed Management Organizations. (Element 12.1 and 12.2)
- County water plans, city Surface Water Management Plans. (Element 12.2)
- The MPCA Citizen Lake and Citizen Stream Monitoring Programs have information on transparency for 1000 lakes and 400 or so stream sites, with an excellent/good/fair/poor breakdown for the most current data: <https://www.pca.state.mn.us/water/citizen-monitoring-program-annual-summary> (Element 12.2)

### CALCULATION AND PUBLIC REPORTING

- **For the vegetation buffer calculation**, use GIS data or estimates from Google maps to first total the length of shorelines around lakes and wetlands, and add in stream lengths. Include the length of ditches controlled by Ditch Authorities. Then measure/estimate the lengths of lake/wetland shorelines that have at least 50 feet of perennial vegetation, and add in the lengths of streams/ditches that have at least 50 feet of perennial vegetation on each side. Finally, divide the vegetated footage by the total shoreline footage and express the fraction as a percentage for the year immediately prior to the GreenStep reporting year. (Element 12.1)
- **For calculation of % of water bodies** within city limits showing (in the year immediately prior to the GreenStep reporting year) at least good clarity readings, first check with the appropriate MPCA contact below to see if there is data and to understand the use of it. For example, “good” for lakes might mean exceeding total suspended solids thresholds, which are different for different ecoregions in the state. And “good” for streams might refer to specific stream segments or stream stations. (Element 12.2)
  - **If there is no data**, work with the appropriate MPCA contact below to recruit community volunteers – and then **report the number of volunteers** - to join the Citizen’s Monitoring program that uses stream/lake methodologies from the MPCA Citizen Monitoring Handbook and Instruction Manual at <https://www.pca.state.mn.us/water/citizen-water-monitoring> (Wetlands use the methodologies of WHEP at <http://www.mnwhep.org>).
  - After several years of data collected by monitors, your city will be in a position to report the % of water bodies Element.
- **Since it typically takes a few years to see any change** in these numbers, water bodies need not be re-measured every year. In years when no new measurement is done, simply report the last measurement and note the calendar year during which the measurement was done. (Elements 12.1 and 12.2)

### RATIONALE

**Because lakes, streams and wetlands are central to Minnesota's economy and our way of life**, it is imperative that private and public entities, including cities, work to maintain and improve their local water quality. Reflecting this importance, Minnesota's Management and Budget state agency includes, as one of the state's 40 key indicators, the percent of MN lakes with good water quality.

Part of working to improve water quality must include helping community members hear about and understand data elements that show whether progress is being made. Because there are so many mandated and voluntary measures of water quality, GreenStep proposes two common measures for all cities and one city-specific measure. Based upon feedback from cities and water quality experts, GreenStep anticipates some refinement of these measures over time.

**Buffer studies** by the Pollution Control Agency (<https://www.pca.state.mn.us/water/buffers-improve-water-quality>) and others show that a 50' strip of permanent vegetation along lakes, streams, and wetland reduces the volume of runoff and the quantity of pollutants entering those waters, helping to protect and restore water quality and healthy aquatic life, natural stream functions and aquatic habitat. Buffers do not solve every water-quality problem and can/should be narrower or wider

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depending on specific circumstances. Increasing the number and width of buffers is a current focus of effort by Minnesota state agencies. 50 feet on lands adjacent to public waters and 16.5 feet on lands adjacent to public ditches is the target width: see <http://www.dnr.state.mn.us/buffers/index.html> and [http://files.dnr.state.mn.us/publications/waters/buffer\\_strips.pdf](http://files.dnr.state.mn.us/publications/waters/buffer_strips.pdf)

**Clarity, or transparency, is a quick and easy** measurement that tells us a lot about a lake or stream's water quality. First, it indicates the amount of light penetration into a lake or stream, which is important for plant growth and a healthy aquatic environment. Second, Secchi transparency provides an indirect measure of the amount of suspended material in the water. Suspended material in lakes most often consists of algae, while sediments are more common in streams.

### STEP 5 TARGETS

While there are various state laws about buffers in different settings, any improvement in buffers within a city is assured of delivering benefits due to the typical hard-surface treatment of land along urban streams, lakes and wetlands. On average, streams in Minnesota that, along their length, have under 25% of their buffers intact, have poor or very poor aquatic life. Thus 25% or more is a minimum goal for buffers.

The DNR's Know Your Score approach can provide a more ecologically accurate way to track and improve the function of buffers. Increasing water clarity has recreational, economic and ecologic benefit; the MPCA uses a statistical test to determine whether the data for each lake or stream exhibits increasing or decreasing clarity trends.

### NEED HELP? CONTACT

**Laurie Sovell**, Citizen Stream Monitoring Program, MN Pollution Control Agency  
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