

#12: SURFACE WATER

OPTIONAL METRIC FOR CATEGORY A & B & C CITIES

Bold, green font indicates metrics that must improve to be recognized at Step 5

METRICS

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

METRIC DEFINITION

- **Vegetation buffers** are 50-foot strips of land paralleling lake, river, and wetland shorelines with perennial grass, trees, or shrubs. (Metric 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 data is a surrogate for total suspended solids (TSS). Note that “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). (Metric 12.2a)
- **Number of citizen monitors** is the number of people who are measuring water bodies within city limits. (Metric 12.2b)
- **One key metric** gives cities an opportunity to highlight a measured number or a calculated index number, such as those below, that has special relevance to the city. (Metric 12.3)
 - **Impaired waters** (lakes, streams, wetlands) are those failing to meet one or more water quality standards: clarity, algae, toxic algae, nutrients, Aquatic Recreation Use (AQR), bacteria, Aquatic Life (AQL), Index of Biotic Integrity; or number of beach closures.
 - **% of TMDLs that are met** (Total Maximum Daily Limits of pollutants) may be very important and easily obtained from the MPCA for some cities – especially those with multiple water bodies in poor condition that have all been researched.
 - **Pollutant levels for chemicals of concern** – chloride, mercury, a pesticide, nitrogen, sulfuric acid – may be the most relevant metrics for some cities. While this GreenStep metric #12 is about surface water, if **groundwater** supplies your city’s drinking water and the quality of that groundwater is of much more concern than surface water, then report a groundwater metric covering, for example, arsenic, chloride or nitrate.
 - **Minneapolis’s Lake Aesthetics and User Recreation Index** 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.
 - **Score Your Shore** from the MN Dept. of Natural Resources assesses habitat conditions of developed lake lots, which can be used to set and track metric 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.
 - **The Wetland Health Evaluation Program** in Dakota and Hennepin Counties has been reporting an index of biotic integrity since 1997, covering invertebrates and vegetation.
 - **Report 12.1 or 12.2 a or b** if those are key metrics for your city and ones whose numbers are most likely to show yearly improvement

DATA SOURCES

- **MN Dept. of Natural Resources** maps: <http://www.mndnr.gov/buffers> (Metric 12.1)
- **Maps:** city GIS: Google maps; maps from local lake and river associations; county Soil and Water Conservation Districts; Watershed Districts, Watershed Management Organizations, Metropolitan Council (Metric 12.1)
- **MPCA Citizen Lake and Citizen Stream Monitoring Programs:** <https://www.pca.state.mn.us/water/citizen-monitoring-program-annual-summary> (Metric 12.2)
- **MPCA impaired waters and TMDLs viewer:** <https://www.pca.state.mn.us/water/impaired-waters-viewer-iwav> (Metric 12.3)
- **Score Your Shore:** <http://www.dnr.state.mn.us/scoreyourshore/index.html> (Metric 12.3)
- **Wetland Health Evaluation Program** (Hennepin and Dakota counties): <http://www.mnwhep.org/> (Metric 12.3)
- **A-F Met Council grades for Twin Cities lakes** in 7 counties: <https://metro council.org/Wastewater-Water/Services/Water-Quality-Management/Lake-Monitoring-Analysis.aspx> (Metric 12.3)
- **Data collected by** the city, volunteers, associations, Metropolitan Council (Metrics 12.1 - 12.3)

METRIC 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 (times two, for both sides of each stream/river). 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. (Metric 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, use the MPCA monitoring map to divide number of good or better water bodies by the total number of water bodies within city limits. As needed check with the stream or lake MPCA contact below. (Metric 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.
- **For percent impaired waters** within city limits showing (in the year immediately prior to the GreenStep reporting year) at least one impairment, use the MPCA impaired waters viewer to divide number of impaired water bodies by the total number of water bodies within city limits. (Metric 12.3)
- **For a different city-defined metric**, report that number and a short explanation in the notes section of the GreenStep survey report form. (Metric 12.3)
- **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. (Metrics 12.1 - 12.3)

METRIC 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.

Minnesota GreenStep Cities Performance Metrics for Recognition at Steps 4 and 5

Part of working to improve water quality must include helping community members hear about and understand metrics 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 wetlands 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 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>.

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 METRIC 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 challenge for this goal is that streams are affected by land uses along their upstream length outside city limits, uses over which cities have no formal control.

The DNR's Know Your Score approach can provide a more ecologically accurate way to track and improve the function of lake buffers. Increasing water clarity has recreational, economic and ecologic benefits as determined by studies over several decades.

For cities tracking chloride pollution, cities can use the indirect measure of de-icing salt use reduction. Reasonable percent reduction goals are 30% over the first year or two, and around 70% over several years.

NEED HELP? CONTACT

Citizen Monitoring Program, Minnesota Pollution Control Agency, 1-800-657-3864, Lakes: clmp.pca@state.mn.us, Streams: csmp.pca@state.mn.us

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