

Aquatic Life Use Assessments (Streams; 10-year data window)

Parameter	Assessment Time Frame	2A Standard (Trout Water)	2B/Bd/C Standard (Non-Trout, Warm Water)	LRV (Class 7) Standard
Conventional Water Chemistry				
Dissolved Oxygen	Annual	7 mg/L minimum	5 mg/L minimum	1 mg/L daily average
pH	Annual	6.5 – 8.5	6.5 - 9	6 - 9
TSS/S-tube	April-September	TSS < 10 mg/L, Stube > 55 cm	North: TSS < 15 mg/L, Stube > 40 cm	
			Central: TSS < 30 mg/L, Stube > 25 cm	
			South: TSS < 65 mg/L, Stube > 10 cm	

Dissolved Oxygen

- Data window is year-round. Minimum of 20 samples before 9 am to fully support aquatic life (based on DO and River Eutrophication alone). For listing, at least 10% of samples exceed the standard and must have at least 3 exceedances. During stressor ID work, often times a sonde is deployed for an extended period of time to gage the magnitude of the exceedance (daily minimum) and duration of time spent below the standard.

pH

- Data window is year-round. Standard is a range bracketing pH of 7 (neutral) can exceeds on the acidic or basic side of the pH scale. pH data is used in Unionized-Ammonia calculation as well. For listing, at least 10% of samples exceed the standard and must have at least 3 exceedances.

TSS

- Data window is April – September. For listing, at least 10% of samples exceed the standard and must have at least 3 exceedances.

Aquatic Life Use Assessments (Toxics in Streams; 3-year data window)

Parameter	Assessment Time Frame	2A Standard (Trout Water)	2B/Bd/C Standard (Non-Trout, Warm Water)	LRV (Class 7) Standard
Toxics				
Un-ionized Ammonia	Annual	16 ug/L	40 ug/L	500 ug/L
Chloride	Annual	230 mg/L and 860 mg/L	230 mg/L and 860 mg/L	

Toxics are year round parameters. Data viewed in 3 year windows. Un-ionized ammonia has one standard per use class. Chloride has both chronic and acute standards; 2 exceedances of chronic or 1 exceedance of acute warrants a listing regardless of overall sample counts.

Un-ionized Ammonia

- Consider measurement accuracy of temperature, pH, and Ammonia-Nitrogen used in the Un-ionized Ammonia calculation (temp & pH must be observed within 1 hour of Ammonia-Nitrogen grab sample).
- If Ammonia-Nitrogen values are below the detection limit, do not consider the calculated Un-ionized Ammonia value as an exceedance.

Chloride

- Standard also applied to lakes and considers both depth and surface concentrations separately.

For toxics, it is simply a count of exceedances (ex. 2 of 6 samples within the 3 year window exceed the chronic standard).

Aquatic Life Use Assessments (River Eutrophication Standards; 10-year data window)

Region	Nutrient	Stressor		
	TP µg/L	Chl-a µg/L	DO flux mg/L	BOD ₅ mg/L
North	50	7	3.0	1.5
Central	100	18	3.5	2.0
South	150	35	4.5	3.0

pH	minimum	maximum
2a waters	6.5	8.5
2b waters	6.0	9.0

(pH is for all regions)

Assessment Time Frame June – September (10-year data window)

- **TP, Chl-a** – seasonal average (minimum of 12 samples of each), however, professional judgment may be required (i.e. hypothetically, if 10 samples of TP have a seasonal mean of 500 µg/L, and 10 samples of chl-a taken on the same date as TP have a mean of 90: a listing may be warranted). These cases must be clear cut, with no possibility of a grey area.
- **BOD** – seasonal average
- **DO Flux** – average flux, minimum of a 4 day deployment
- **TP and Chl-a** - most important parameters for RES assessment.

Aquatic Rec. Use Assessments (Bacteria in streams; 10-year data window)

Parameter	Assessment Time Frame	2A Standard (Trout Water)	2B/Bd/C Standard (Non-Trout, Warm Water)	LRV (Class 7) Standard
E. coli	April-October	126 MO/1260 IND	126 MO/1260 IND	630 MO/1260 IND May-Oct

Minimum of 15 data points in 10 years. 10% exceedance of individual standard or 1 or more monthly geometric mean exceedances warrants a listing. A minimum of 5 samples per geometric mean are required. Professional judgment comes into play again. Hypothetically, if 4 samples from any month yield a geometric mean large enough that an ideal value of '1 MPN/100 mL' would still exceed the geometric mean, a listing is possible. Again, it must be a clear cut and obvious scenario.

Aquatic Rec. Use Assessments (Lake Eutrophication)

Data window is 10-years. June-September seasonal means are used. A minimum of 8 surface samples of TP and Chl-a are needed for seasonal mean calculation and assessment. TP must exceed the ecoregion standard to warrant a listing, otherwise the data are insufficient to determine if nutrients are driving impairment.

Ecoregion	TP	Chl-a	Secchi
	ppb	ppb	meters
NLF – Lake trout (Class 2A)	< 12	< 3	> 4.8
NLF – Stream trout (Class 2A)	< 20	< 6	> 2.5
NLF – Aquatic Rec. Use (Class 2B)	< 30	< 9	> 2.0
NCHF – Stream trout (Class 2a)	< 20	< 6	> 2.5
NCHF – Aquatic Rec. Use (Class 2b)	< 40	< 14	> 1.4
NCHF – Aquatic Rec. Use (Class 2b) Shallow lakes	< 60	< 20	> 1.0
WCBP & NGP – Aquatic Rec. Use (Class 2B)	< 65	< 22	> 0.9
WCBP & NGP – Aquatic Rec. Use (Class 2b) Shallow lakes	< 90	< 30	> 0.7

Find any updates on Water Quality Standards Here: <https://www.pca.state.mn.us/water/water-standards-and-rules>