

1st Aquatic Habitat Subcommittee Meeting of the Natural Areas Technical Advisory Committee Plan: 2020 Update

January 29th, 2020

Goal:

Identify the most significant remaining aquatic natural areas as well as other areas vital to the maintenance of endangered, threatened, and rare plant and animal species in Southeastern Wisconsin.

Proposed Approach and Elements for Inclusion:

Develop a weighted ranking approach to evaluate biological conditions within each stream reach or lake. Utilize published and widely-used models and biotic indices when available as well as verified species observations of special concern, threatened, or endangered species. Incorporate elements of morphology, water quality, land use, and habitat connectivity. Elements and potential biotic indices for consideration for streams and lakes are listed below:

Streams and Rivers

Potential Elements	Potential Data or Indices	Associated Data Sources
Water Quality	303(d) Impairment Listing; Outstanding and Exceptional Resource Waters	Surface Water Data Viewer (SWDV)
Channel Modification	% imperviousness; % urban; meander and/or sinuosity	SEWRPC Land Use
Connectivity	Adjacency to natural areas or critical habitat – longitudinal and lateral connections	Self-referential
Thermal Regime and Flow	Stream Natural Community ^a	SWDV
Fish	Fish IBI ^b ; Trout streams	SWDV; WDNR Fish Database?
Macroinvertebrates	Macroinvertebrate IBI ^c ; HBI ^d	SWDV; Surface Water Integrated Monitoring System (SWIMS)
Mussels	Verified mussel observations	Wisconsin Mussel Monitoring Program ^e
Riparian Buffers	Undeveloped areas within set distance from stream	SEWRPC Land Use
Rare Species	Observations of SC, THR, or EN species; regionally uncommon species	Natural Heritage Inventory (NHI) Database ^f

Lakes

Potential Elements	Potential Data or Indices	Associated Data Sources
Water Quality	303(d) Impairment Listing; Outstanding and Exceptional Resource Waters	SWDV
Size and Hydrology	Lake Natural Community ^g	SWDV
Fish	Lake Fishery Classification	Data from Rypel et al., 2019 ^h
Aquatic Plants	FQI ⁱ ; % invaded; Macrophyte bioassessment ^j	WDNR Aquatic Plant Point-Intercept Database
Sensitive Areas	% of waterbody in Sensitive Area	SWDV
Mussels	Verified mussel observations	Wisconsin Mussel Monitoring Program ^e
Connectivity	Adjacency to natural areas or critical habitat – longitudinal and lateral connections	Self-referential
Rare Species	Observations of SC, THR, or EN species; regionally uncommon species	Natural Heritage Inventory (NHI) Database ^f

^a<https://dnr.wi.gov/topic/Rivers/naturalcommunities.html#river>

^bLyons, J. 1992. Using the index of biotic integrity (IBI) to measure environmental quality in warmwater streams of Wisconsin. General; Technical Report NC-149, U.S. Forest Service, North Central Forest Experiment Station, St. Paul, Minnesota; Lyons, J., L. wang, and T.D. Simonson. 1996. Development and validation of an Index of Biotic Integrity for coldwater streams in Wisconsin, *North American Journal of Fisheries Management* 16:2, 241-256; Lyons, J., R.R. Peiette, and K.W. Niermeyer. 2001. Development, validation, and application of a fish-based index of biotic integrity for Wisconsin's large warmwater rivers. *Transactions of the American Fisheries Society* 130: 1077-1094; Lyons, J. 2006. A fish-based index of biotic integrity to assess intermittent headwater streams in Wisconsin, USA. *Environmental Monitoring and Assessment* 122: 239-258; Lyons, J. 2012. Development and validation of two fish-based indices of biotic integrity for assessing perennial coolwater streams in Wisconsin, USA. *Ecological Indicators* 23: 402-412.

^cWeigel, B.M. 2003. Development of stream macroinvertebrate models that predict watershed and local stressors in Wisconsin. *Journal of the North American Benthological Society* 22: 123-142; Weigel, B.M., and J.J. Dimick, 2011. Development, validation, and application of a macroinvertebrate-based index of biological integrity for nonwadeable rivers of Wisconsin. *Journal of the North American Benthological Society* 30: 665-679.

^dHilsenhoff, W.L. 1987. An improved biotic index of organic stream pollution. *The Great Lakes Entomologist* 20:1:7, 31-39.

^e<http://wiatri.net/inventory/mussels/>; <https://www.inaturalist.org/projects/wisconsin-mussel-monitoring-program>

^f<https://dnr.wi.gov/topic/nhi/>

^g<https://dnr.wi.gov/topic/Rivers/naturalcommunities.html#lakes>

^hRypel, A.L., T.D. Simonson, D.L. Oele, J.D.T. Griffin, T.P. Parks, D. Seibel, C.M. Roberts, S. Toshner, L.S. Tate, and J. Lyons. 2019. Flexible classification of Wisconsin lakes for improved fisheries conservation and management. *Fisheries* 44:5, 225-238.

ⁱNichols, S.A. 1999. Floristic quality assessment of Wisconsin lake plant communities with example applications. *Journal of Lake and Reservoir Management* 15:2, 133-141.

^jMikulyuk, A., M. Barton, J. Hauxwell, C. Hein, E. Kujawa, K. Minahan, M.E. Nault, D.L. Oele, and K.I. Wagner. 2017. A macrophyte bioassessment approach linking taxon-specific tolerance and abundance in north temperate lakes. *Journal of Environmental Management* 199: 172-180.