BEST PRACTICE GUIDANCE FOR EARLY DETECTION OF INVASIVE AQUATIC PLANTS

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February 7, 2023

Recommended Baseline Monitoring of Aquatic Plants in Wisconsin

Design	Geo-located grid of evenly spaced points determined by lake area, estimated littoral zone, and shoreline complexity; meander 'boat survey' also included to capture incidental plant species not found on rake or as a visual (observed within 6 ft of sampling site)
Unique Elements	Systematic, quantitative, and replicable; collects data on native & invasive plants; design allows for statistical analysis and comparisons of plant communities within a lake across survey years, as well as comparisons amongst different lakes.
Objective	Quantitatively assess native & invasive macrophyte spatial distribution and relative abundance (i.e., rake fullness ratings)

Recommended Baseline Monitoring of Aquatic Plants in Wisconsin

Outputs	1) Frequency of occurrence, species richness, relative abundance, and maximum depth of plant colonization; 2) Water depth and sediment at each site; 3) qualitative boat survey species list; 4) Vouchers; 5) Spatial distribution data
Trade-offs	Time to complete (varies based on lake size, water clarity, plant density, etc.); high level of plant taxonomic knowledge required; recommended sampling window (July-Aug) may miss early season species (e.g., CLP)
Outstanding questions	Frequency of surveys? current recommendation is to re-survey every ~5 years for 'baseline' data; however more regular surveys may be warranted if used for early detection?

Rapid Macrophyte Habitat Assessment

Design	Transect based design using a rake to sample macrophytes at individual points stratified by lake depth; transects (min = 10) are arranged perpendicular from shore and evenly distributed along the shoreline
Unique Elements	Rapidly sample macrophyte biotic conditions (i.e., habitat) and collect data on growth forms present
Objective	Rapid assessment of plant habitat in lakes sampled as part of EPA NLA
Outputs & results	P/A of 8 invasive aquatic plant species; P/A of macrophytes lumped by growth form (i.e., not species specific); number of morphologically distinct species

Rapid Macrophyte Habitat Assessment

Trade offs	Only 8 AIP identified as targets; less spatial coverage; requires a low level of plant taxonomic knowledge; relatively quick to implement (~1-3 hrs per lake)
Outstanding questions	Comparative analysis across lakes where methodology has been implemented; was piloted by WDNR during development (over a decade ago) but unclear if protocol has been used beyond this effort

AIS Early Detection

Design	Use snorkeling, rakes, and D-nets to search all access locations, 5 targeted sites that will include areas of disturbances or unique features that might be suitable for target species, and visual shoreline meander of all habitats
Unique elements	Specifically targets invasive plants and invasive animals; also collects veliger tows and waterflea tows and dredges
Objective	Early detection of aquatic invasive species
Outputs & results	P/A and relative abundance of AIS entered in DNR database and shared on spatial webpages; initiate local communication and response

AIS Early Detection

Trade-offs	Takes ~2 hours per mile of shoreline. Lose detection of facultative species if meander is not completed. Doesn't look 'everywhere'; opportunistic and not quantitative sampling
Outstanding questions	Probability of detection has not been tested.

AIS Snapshot Day

Design	Single-day to train volunteers and send them to pre-identified probable locations targeting specific species using minimal tools (rakes and home-made scopes)
Unique elements	Volunteers collect samples and return to host training site for verification
Objective	Detect P/A and relative abundance of aquatic invasive species
Outputs & results	Specimens and photographs submitted for verification
Trade-offs	Uses citizen scientists (pluses and minuses); limited to proximity to training site; event held in August (may detect water garden releases, but miss early season plants such as CLP)
Outstanding questions	Efficacy of local host training; false negatives

Citizen Lake Monitoring Network (CLMN)

Design	Volunteers monitor their shoreline/lake for P/A of AIS
Unique elements	Local knowledge & intimate familiarity with their lake ability to place samplers
Objective	Detect AIS P/A and changes
Outputs & results	Identify what looked for, P/A data entered in DNR database following QA
Trade-offs	Only monitor their lake, perhaps only their shore and maybe not highest risk areas
Outstanding questions	Need QA to know what was missed

Questions?