

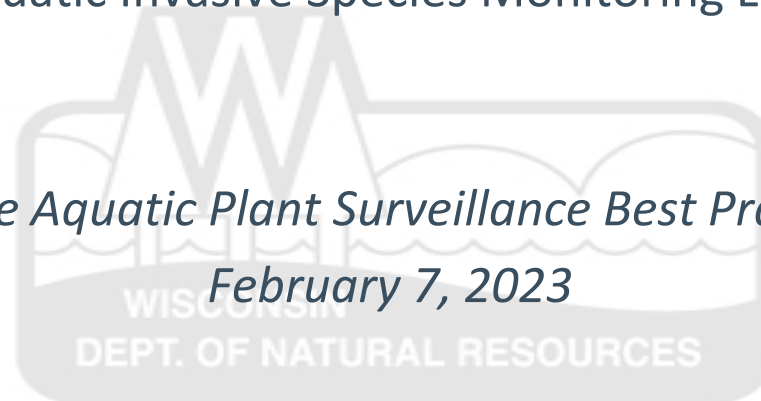
# BEST PRACTICE GUIDANCE FOR EARLY DETECTION OF INVASIVE AQUATIC PLANTS

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# Recommended Baseline Monitoring of Aquatic Plants in Wisconsin

<b>Design</b>	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)
<b>Unique Elements</b>	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.
<b>Objective</b>	Quantitatively assess native & invasive macrophyte spatial distribution and relative abundance (i.e., rake fullness ratings)

# Recommended Baseline Monitoring of Aquatic Plants in Wisconsin

<b>Outputs</b>	<ol style="list-style-type: none"><li>1) Frequency of occurrence, species richness, relative abundance, and maximum depth of plant colonization;</li><li>2) Water depth and sediment at each site;</li><li>3) qualitative boat survey species list;</li><li>4) Vouchers;</li><li>5) Spatial distribution data</li></ol>
<b>Trade-offs</b>	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)
<b>Outstanding questions</b>	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

<b>Design</b>	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
<b>Unique Elements</b>	Rapidly sample macrophyte biotic conditions (i.e., habitat) and collect data on growth forms present
<b>Objective</b>	Rapid assessment of plant habitat in lakes sampled as part of EPA NLA
<b>Outputs &amp; results</b>	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

<b>Trade offs</b>	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)
<b>Outstanding questions</b>	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

<b>Design</b>	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
<b>Unique elements</b>	Specifically targets invasive plants and invasive animals; also collects veliger tows and waterflea tows and dredges
<b>Objective</b>	Early detection of aquatic invasive species
<b>Outputs &amp; results</b>	P/A and relative abundance of AIS entered in DNR database and shared on spatial webpages; initiate local communication and response

# AIS Early Detection

<b>Trade-offs</b>	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
<b>Outstanding questions</b>	Probability of detection has not been tested.

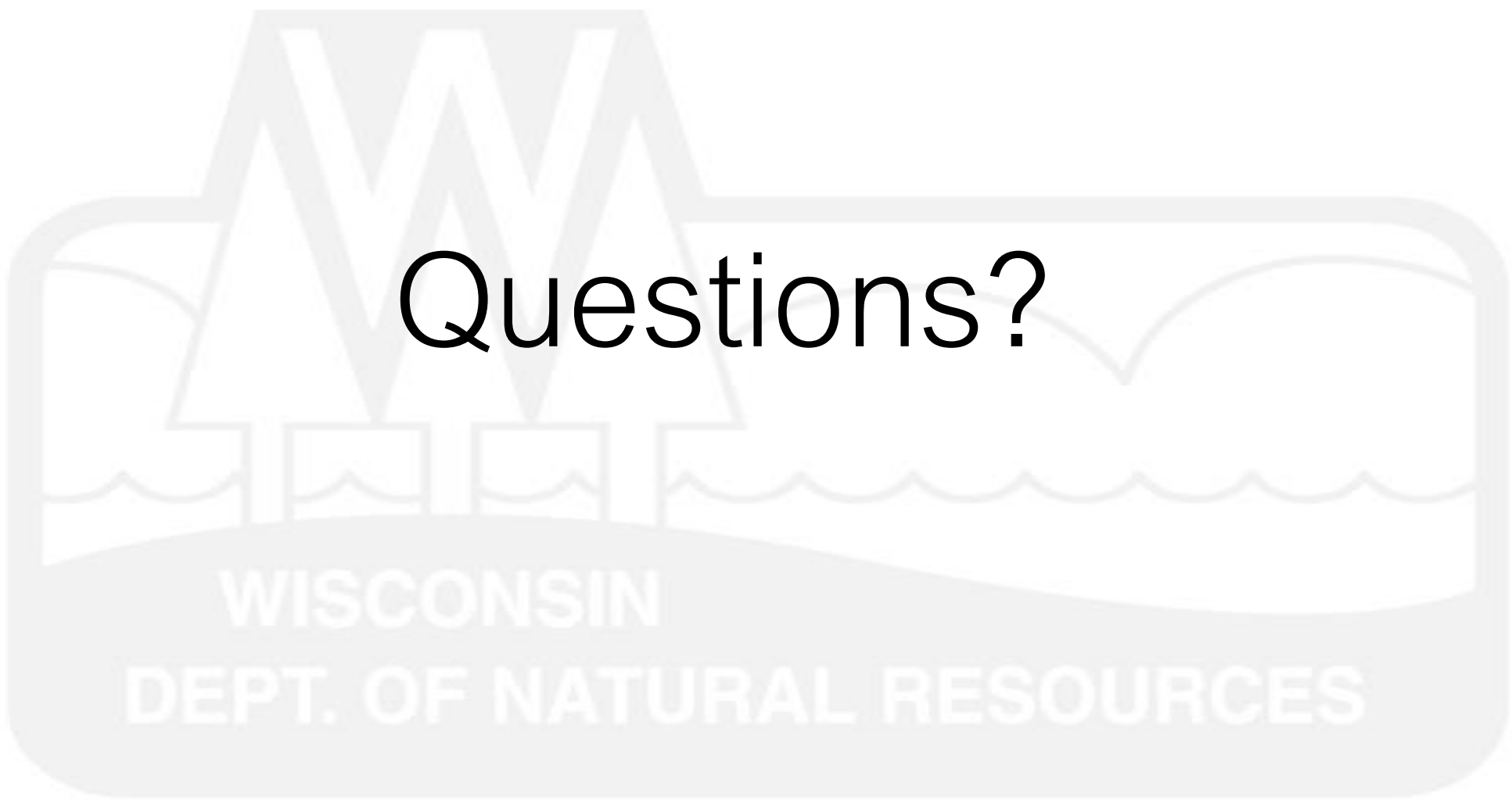
# AIS Snapshot Day

<b>Design</b>	Single-day to train volunteers and send them to pre-identified probable locations targeting specific species using minimal tools (rakes and home-made scopes)
<b>Unique elements</b>	Volunteers collect samples and return to host training site for verification
<b>Objective</b>	Detect P/A and relative abundance of aquatic invasive species
<b>Outputs &amp; results</b>	Specimens and photographs submitted for verification
<b>Trade-offs</b>	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)
<b>Outstanding questions</b>	Efficacy of local host training; false negatives



# Citizen Lake Monitoring Network (CLMN)

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



Questions?