

## 2006 Aquatic Plant Monitoring Guidelines

As part of an enhanced aquatic pesticides review process implemented by the NYSDEC in 2005, applicants for the use of aquatic pesticides in some lakes may be required to develop aquatic plant management and monitoring plans. This will allow for a more consistent evaluation of these applications by NYSDEC permit review staff, and to build a more complete and defensible record on which to base permit application decisions.

The criteria adopted in 2006 to trigger the development of these plans generally focus on waterbodies for which the NYSDEC requires an elevated level of protection and concern. These include waterbodies heavily used by the public for fishing, boating and other recreational activities, through access provided by New York State; waterbodies used for potable water; waterbodies in which rare, threatened, or endangered species can be found; and waterbodies identified by the NYSDEC as a priority for water resource protection and restoration, through inclusion on the state Priority Waterbody List compiled by the Division of Water. A master list of waterbodies meeting one or more of these criteria has been assembled by the NYSDEC and is provided on the NYSDEC's Division of Solid and Hazardous Materials website.

Instructions for developing aquatic plant management plans are found on the NYSDEC Bureau of Water Assessment and Management website as Appendix A of 'A Primer on Aquatic Plant Management in New York State'. A direct link to this web site is <http://www.dec.state.ny.us/website/dow/bwam/aquatic/ch6p4.pdf>.

Waterbodies on this list have been assigned standards for developing aquatic plant monitoring plans, based on a three tiered system. Tier III monitoring guidelines exceed those identified for Tier II and Tier I waterbodies. Tier II monitoring guidelines closely resemble those developed for Tier I waterbodies, but have been modified slightly to address specific concerns.

This document provides instructions for developing an aquatic plant monitoring plan within the three tiered system. A general summary of the rake toss methodology is outlined, followed by a short summary of the monitoring guidelines for each tier. Examples of Aquatic Plant Monitoring forms for each tier are also included in this document. These guidelines were developed with the assistance of Paul Lord and Robert Johnson from Cornell University.

For more information about these monitoring guidelines, please contact:

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## Summary of the Rake Toss Methodology

### Equipment:

- Two metal rake heads (handles cut as close to head as possible) wired together
- Woven nylon line, at least 40 feet



### Sampling Method:

- Go to sample point and record GPS coordinates on Aquatic Plant Sampling form
- Toss rake length of line
- Retrieve rake **slowly** into boat
- Estimate overall plant abundance using Cornell abundance scale (see abundance table below)
- Remove plants from rake tines
- Separate plants into individual piles corresponding to individual plant types (species)
- **Tier I:** Estimate abundance of target and exotic species using Cornell abundance scale. Estimate abundance of all other plants (collectively) using same scale
- **Tier III:** Estimate % abundance of all species using Cornell abundance scale
- Record plant abundance on Aquatic Plant Sampling form
- Make sure all plants are removed from tines of rake
- Go to next sampling point and repeat process

### Cornell Plant Abundance Scale:

Z = zero plants	= no plants on rake
T = trace plants	= fingerful on rake
S = sparse plants	= handful on rake
M = medium plants	= rakeful of plants
D = dense plants	= difficult to bring into boat

This methodology was adapted from the U.S. Army Corps of Engineers and further developed by Paul Lord and Bob Johnson from Cornell University.

**Pesticides Program Monitoring Requirements**  
**Tier I Lakes**

<u>Method:</u>	Rake Toss- One Toss Per Site
<u>Frequency:</u>	One Sampling Event Pre-Application (preferably at time when target plant grows most extensively) One Sampling Event Post-Application (at time when target plant grows most extensively)
<u>Number of Sampling Sites:</u>	Lakes < 100 hectares: Larger of 15-50 Sites or 1 Site/hectare of Littoral Zone (portion of lake less than 10-15 feet deep) Lakes > 100 hectares: Larger of 30-50 Sites or 1 Site/hectare of Littoral Zone (portion of lake less than 10-15 feet deep)
<u>Site Locations:</u>	Equally Distributed Throughout Littoral Zone (preferably chosen from 100m x 100m grid overlay on map of lake) 50% of Sites in Treatment Area (spot treatment)
<u>Site Identification:</u>	GPS Coordinates, UTM NAD27 Preferred
<u>Site Mapping:</u>	Sites Labeled on USGS Topographic Maps
<u>Plant Identification:</u>	Target and Exotic Plants Identified to Species Level All Other Plants Listed as “Other”
<u>Plant Abundance:</u>	Quantified by Cornell/US Army Corps Abundance Scale: Z = no plants T = trace plants = fingerful on rake S = sparse plants = handful on rake M = medium plants = rakeful of plants D = dense plants = difficult to bring into boat
<u>Archiving:</u>	Digital photographs of Target and Exotic Plants
<u>Bookkeeping:</u>	Plant IDs and Abundance Listing in Table (preferably spreadsheet)
<u>Reporting:</u>	Annual Report- Summary of Methodology and Data Tables Report Due by December 31 <sup>st</sup> of Treatment Year

**Pesticides Program Monitoring Requirements**  
**Tier II Lakes**

<u>Method:</u>	<b><u>1. If Listed for Rare, Threatened, or Endangered Species (RTE):</u></b> Rake Toss at Sites > ¼ Mile From Known Location(s) of RTE Species, One Toss Per Site Diver Sampling (Swimover or 1 m <sup>2</sup> Transect, Collection of Single Archive Specimen only) at Sites within ¼ Mile of Known Location(s) of RTE Species  <b><u>2. If Listed for Any Other Reason:</u></b> Rake Toss- One Toss Per Site
<u>Frequency:</u>	One Sampling Event Pre-Application (preferably at time when target plant grows most extensively) One Sampling Event Post-Application (at time when target plant grows most extensively)
<u>Number of Sampling Sites:</u>	Lakes < 100 hectares: Larger of 15-50 Sites or 1 Site/hectare of Littoral Zone (portion of lake less than 10-15 feet deep) Lakes > 100 hectares: Larger of 30-50 Sites or 1 Site/hectare of Littoral Zone (portion of lake less than 10-15 feet deep)
<u>Site Locations:</u>	<b><u>1. If Listed for Rare, Threatened, or Endangered Species (RTE):</u></b> At Least 50% of Sites Within ¼ Mile of Known Location(s) of RTE Species <b><u>2. If Listed for Potable Water</u></b> At Least 25% of Sites Within ¼ Mile of Known Location(s) of Major Potable Water Intake(s) <b><u>3. If Listed for Any Other Reason</u></b> At Least 25% of Sites Within ¼ Mile of Outlet/Connection to Other Major Waterways <b><u>4. If Spot (Partial Lake) Treatment</u></b> 50% of Sites in Treatment Area (spot treatment)  <b>Additional Conditions:</b> Sampling Sites Equally Distributed Throughout Littoral Zone (preferably chosen from 100m x 100m grid overlay on lake map)
<u>Site Identification:</u>	GPS Coordinates, UTM NAD27 Preferred
<u>Site Mapping:</u>	Sampling Sites, Location of Outlet, Potable Water Intakes, and Location of RTE Species (if known or applicable) Labeled on USGS Topographic Maps

Plant Identification: Target and Exotic Plants Identified to Species Level  
All Other Plants Listed as “Other”

**Additional Conditions**

**1. If Listed for Rare, Threatened, or Endangered Species**

RTE Identified to Species Level (verification from Natural Heritage Program or botanist needed)

Plant Abundance: Quantified by Cornell/US Army Corps Abundance Scale:

Z = no plants

T = trace plants = fingerful on rake

S = sparse plants = handful on rake

M = medium plants = rakeful of plants

D = dense plants = difficult to bring into boat

Archiving: Digital photographs of Target and Exotic Plants, **RTE Species**

Bookkeeping: Plant IDs and Abundance Listing in Table (preferably spreadsheet)

Reporting: Annual Report- Summary of Methodology and Data Tables  
Report Due by December 31<sup>st</sup> of Treatment Year

**Pesticides Program Monitoring Requirements**  
**Tier III Lakes**

<u>Method:</u>	Rake Toss- Two Tosses Per Site
<u>Frequency:</u>	One Sampling Event Pre-Application (preferably at time when target plant grows most extensively) One Sampling Event Post-Application (at time when target plant grows most extensively) Additional Sampling Events Post-Application if Target Species Not Adequately Controlled or Non-Target Impacts in YOT
<u>Number of Sampling Sites:</u>	Lakes < 100 hectares: Larger of 50 Sites or 1 Site/hectare of Littoral Zone (portion of lake less than 10-15 feet deep) Lakes > 100 hectares: Larger of 50-100 Sites or 1 Site/hectare of Littoral Zone (portion of lake less than 10-15 feet deep)
<u>Site Locations:</u>	Equally Distributed Throughout Littoral Zone (chosen from 100m x 100m grid overlay on GIS coverage of lake) 50% of Sites in Treatment Area (spot treatment)
<u>Site Identification:</u>	GPS Coordinates, UTM NAD27
<u>Site Mapping:</u>	Map Generated from Software- ArcView, MapInfo, DeLorme Xmap/3-D TopoQuads, etc.
<u>Plant Identification:</u>	Target, Exotic, RTE Plants Identified to Species Level All Other Plants Identified to Genus Level
<u>Plant Abundance:</u>	Percent Abundance of All Species Overall Abundance Quantified by Cornell/US Army Corps Scale: Z = no plants T = trace plants = fingerful on rake S = sparse plants = handful on rake M = medium plants = rakeful of plants D = dense plants = difficult to bring into boat
<u>Archiving:</u>	Digital Photographs of All Plants Voucher Specimen for Target, Exotic, RTE Species
<u>Bookkeeping:</u>	Plant IDs and Abundance Provided in Electronic Spreadsheet/ Database
<u>Reporting:</u>	Annual Report- Summary of Methodology and Data Tables Report Due by December 31 <sup>st</sup> of Treatment Year

Example Tier I Aquatic Plant Survey Form

Lake Name				Start Time:				Description Starting Point:				Station							
Sampling Date:				End Time:				Lat:		Long:		Description							
Station#	Sample#	Lat/ NAD27 E	Long/ NAD27 N	Depth (m)	Plant Abundance	Exotics/Target Plants:						Native and Other Plants:							
						Eurasian watermilfoil	water chestnut	curly leaved pondweed	fanwort	Other Target:	Other Target:	Other Target:							
1	1																		
2	1																		
3	1																		
4	1																		
5	1																		
6	1																		
7	1																		
8	1																		
9	1																		
10	1																		
11	1																		
12	1																		
13	1																		
14	1																		
15	1																		
16	1																		
17	1																		
18	1																		
19	1																		
20	1																		
Abundance Values: Z = Zero; T = Trace (fingerful); S = Sparse (handful), M = Moderate (rakeful); D = Dense (too much to bring in boat)																			
Additional Comments:																			

Example Tier II Aquatic Plant Survey Form

Lake Name					Start Time:				Description Starting Point:								Station					
Sampling Date:					End Time:				Lat:					Long:				Description				
Station#	Sample#	Lat/ NAD27 E	Long/ NAD27 N	Depth (m)	Plant Overall Abundance	Exotics/Target/RTE Plants:					Native and Other Plants:											
						Eurasian watermilfoil	water chestnut	curly leafed pondweed	fanwort	Other Target:	RTE Species 1:	RTE Species 2:										
1	1																					
2	1																					
3	1																					
4	1																					
5	1																					
6	1																					
7	1																					
8	1																					
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14	1																					
15	1																					
16	1																					
17	1																					
18	1																					
19	1																					
20	1																					

Abundance Values: Z = Zero; T = Trace (fingerful); S = Sparse (handful), M = Moderate (rakeful); D = Dense (too much to bring in boat)

Additional Comments:




Example Tier III Aquatic Plant Survey Form

Lake Name						Start Time:					Description Starting Point:				Station					
Sampling Date:						End Time:					Lat:					Long:	Description			
Station#	Sample#	Lat/ NAD27 E	Long/ NAD27 N	Depth (m)	Overall Plant Abundance	Percent Exotics and Target Plants:						Percent Native and Other Plants:								
						Eurasian watermilfoil	water chestnut	curly leafed pondweed	fanwort	Other Target:	Other Target:									
1	1																			
1	2																			
2	1																			
2	2																			
3	1																			
3	2																			
4	1																			
4	2																			
5	1																			
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10	2																			
11	1																			
11	2																			
12	1																			
12	2																			

Abundance Values: Z = Zero; T = Trace (fingerful); S = Sparse (handful), M = Moderate (rakeful); D = Dense (too much to bring in boat)

Additional Comments: