

**Strategy for Control of Hydrilla in Deep Creek Lake**



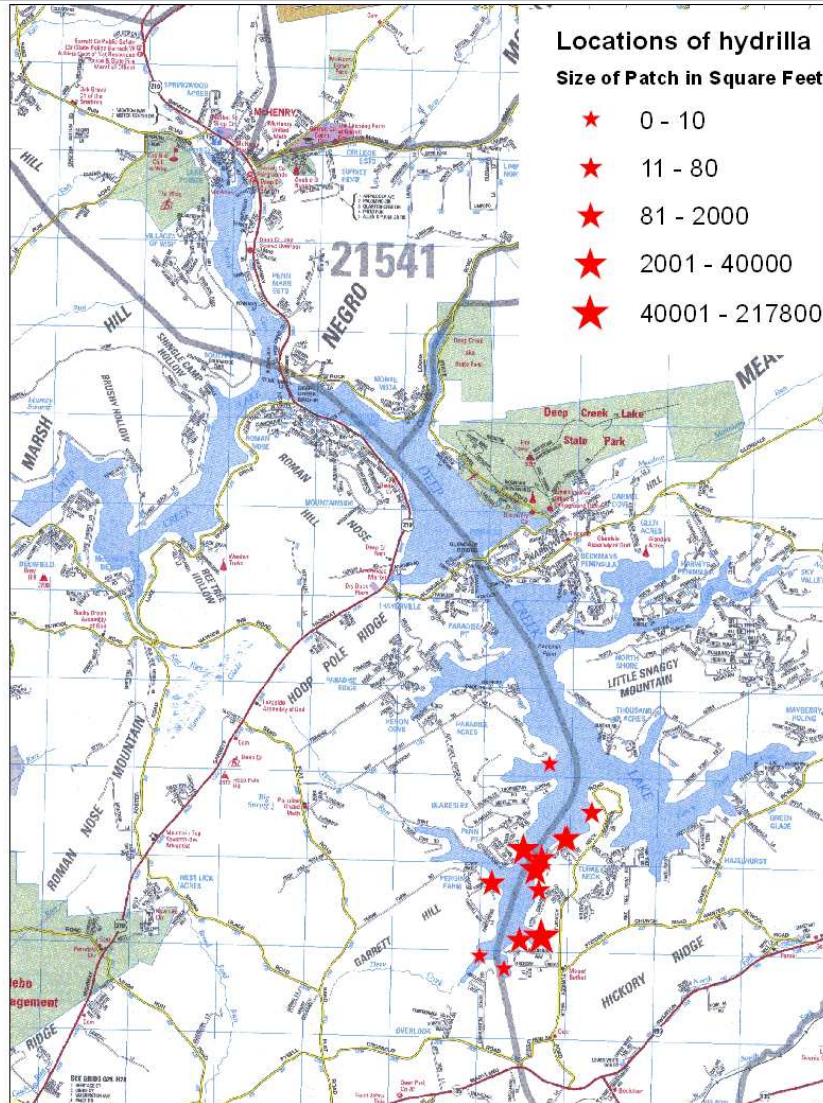
**Strategy for Control of Hydrilla in Deep Creek Lake  
DCL Policy Review Board Meeting  
3/20/2014**

## Hydrilla Discovery Timeline

- September 21-
  - *Hydrilla verticillata* was first detected in DCL during routine sampling in September 2013 by Resource Assessment Service (RAS) divers.
- September 30
  - Samples were collected and taken to an outside expert (Nancy Rybicki, USGS) for positive identification and determination of the biotype (monoecious).
- October 20
  - Follow-up surveys in the south west arm of the lake detected thirteen infestations, ranging from one square meter up to five acres in size.

2013 is the first instance where DNR observed *Hydrilla* in DCL. Prior mention in *Journal of Aquatic Plant Management* article (Madeira, 2000).

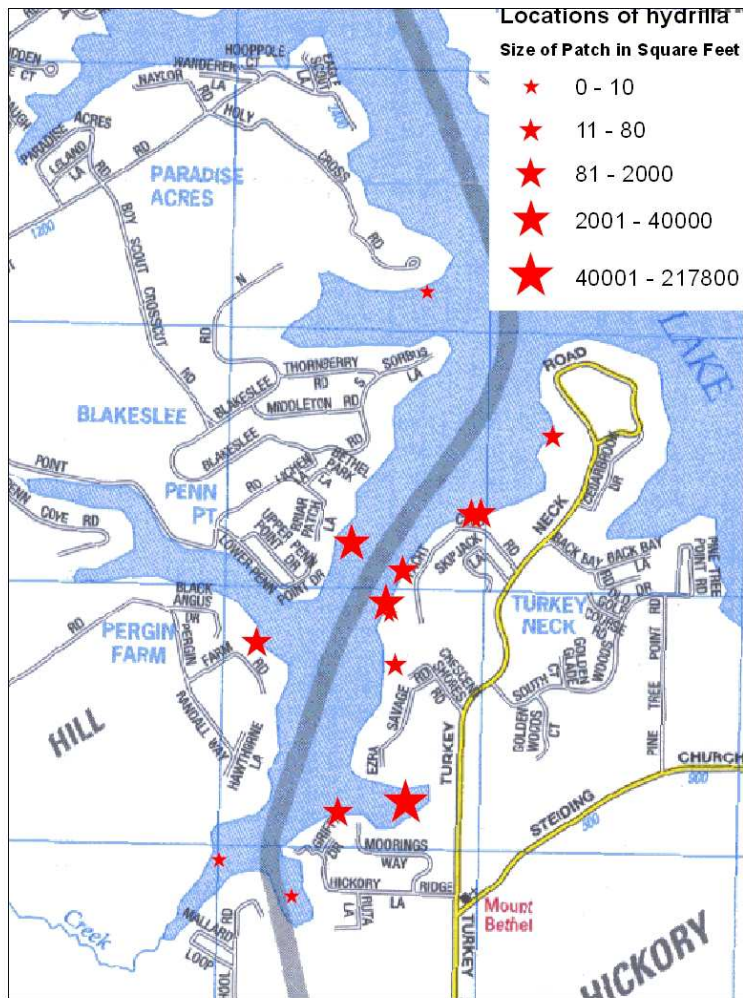
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# Map of DCL Hydrilla Infestations



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- Thirteen infestations, ranging from one square meter up to five acres in size.
- All infestations are located in a confined arm of the lake, which is advantageous from a management perspective.

## Reasons for Concern in Deep Creek Lake

- *Hydrilla* grows extremely quickly and produces numerous reproductive/overwintering structures
- *Hydrilla* has adapted to grow under low light conditions, which gives it the ability to colonize deeper water and out-compete native species. This unique adaptation extends the possible habitat to a much greater portion of the lake.
- *Hydrilla* can create a surface canopy in the upper two feet of the water column, thus limiting the available light to lower growing native species.
- Dense growth at the water surface can create changes in water temperature, wave action, oxygen production and pH, which reduced the suitability of infested waterways for use by aquatic fauna (Holler, 2009).

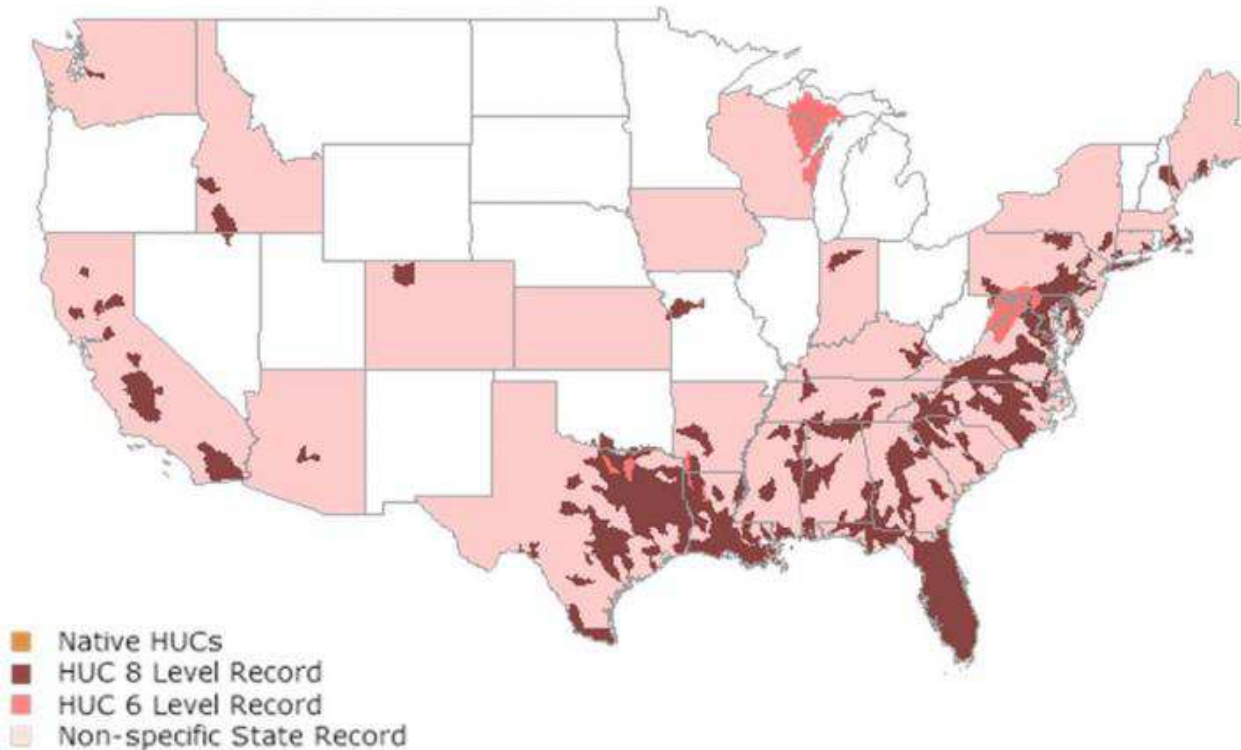
## Reasons for Concern in Deep Creek Lake Cont'd

- In addition to impacts on native vegetation, dense surface canopies interfere with water flow, boat traffic and fishing.
- Dense surface canopies also radically change the habitat quality for fish.
- Water can become stagnant under dense canopies and suppress or prevent oxygen recirculation.
- Invasive plants reduce the diversity of native plant communities, which leads to reduction in the diversity of both fishes and aquatic insects.
- Invasive plants are harmful to the diversity and function of aquatic ecosystems and can have an adverse impact on water resources (Madsen, 2009).

## *Hydrilla* distribution in U.S.



*Hydrilla verticillata*



Map created on 8/4/2011. United States Geological Survey



## **Members of DNR's expert panel convened to advise on *Hydrilla* mgt. strategy**

Dr. Mike Netherland- University of Florida/United States Army Corps of Engineers

Dr. Lynn Gettys-University of Florida

Dr. John Madsen- Mississippi State University

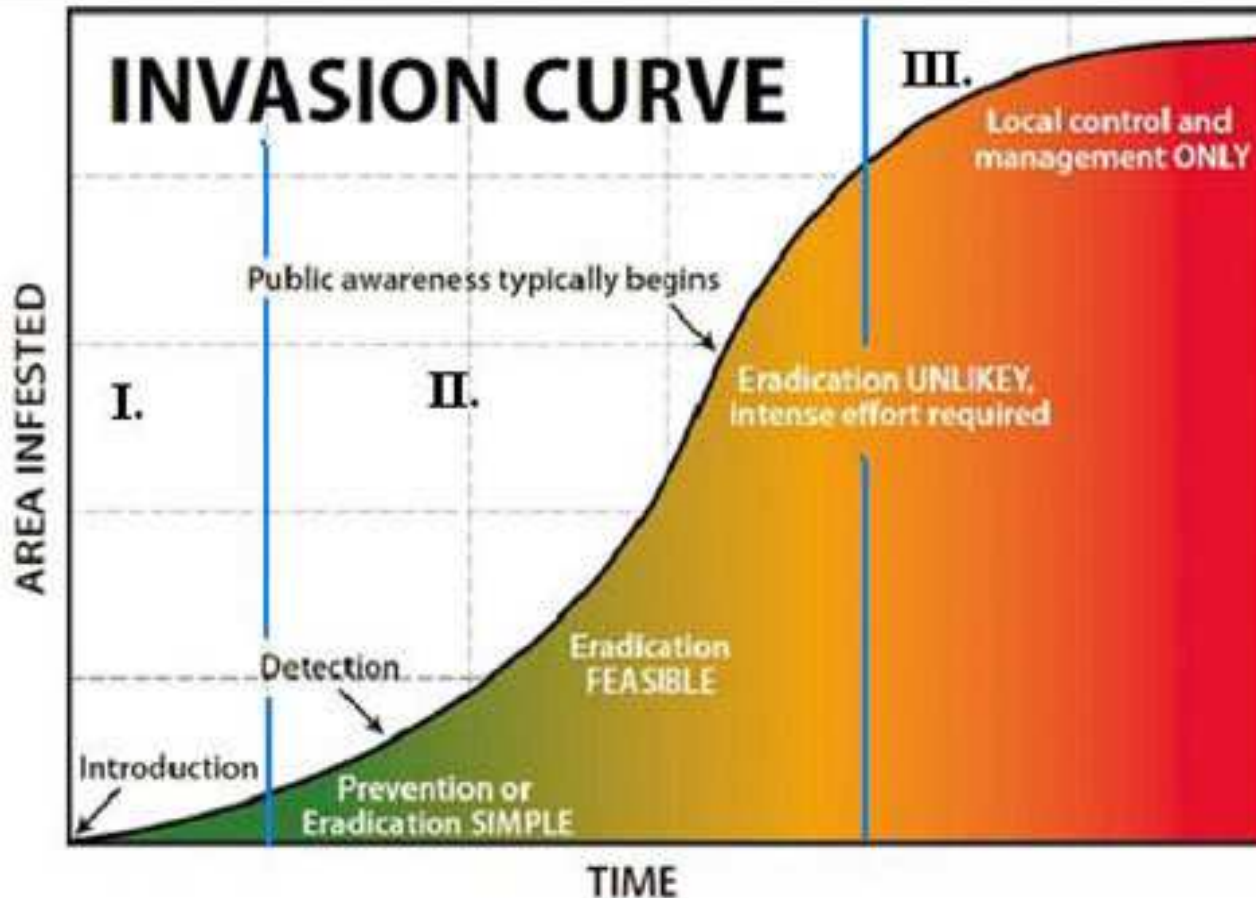
Mr. James Balyszak -Cornell University Extension

Dr. Nancy Rybicki-United States Geological Survey

Dr. Robert Richardson-North Carolina State University



Strategy for Control of Hydrilla in Deep Creek Lake



- Since this is the first confirmed sighting of *Hydrilla* in DCL, DNR has a unique opportunity to get ahead of the management of this species.
- If no action is taken and *Hydrilla* spreads throughout the lake, future costs will be more substantial and there will be potential diminished use of the resource.

- DNR evaluated possible control options
  - **Drawdown**
  - **Mechanical**
  - **Biological**
  - **Chemical**
  - **No Action**

- **Drawdown**

- Would not work for monoecious *Hydrilla* because the plant dies in the winter.
- For drawdown to be effective, the soil temperatures and sediment need to experience a hard freeze to affect the tubers. Snow cover will act to insulate the exposed sediment, which can reduce drawdown effectiveness.
- While drawdowns may kill axillary turions near the sediment surface, tubers are too deep in the sediment and can survive.
- The Cayuga Inlet Project drawdown in New York was unsuccessful.
- In a separate project in a Texas reservoir, an extended drawdown for 2 years was conducted, hoping that desiccation would kill the tubers. Tests found 100% viability even after two years (Doyle, 2001).

## Strategy for Control of Hydrilla in Deep Creek Lake

- **Mechanical**
  - Mechanical removal is of limited utility due to the potential for stem fragments to spread and for tubers to remain behind in the lake bottom mud.
  - The physical removal of sediments during the dredging process could remove the *Hydrilla* tuber population (found in the sediment). However, a great deal of care needs to be taken to ensure the dredging spoils are removed and taken off-site.
  - Diver assisted suction harvesting (DASH) can become dangerous for divers and lots of fragments are able to pass through the filter and back into the water.
  - By-catch is also a problem with mechanical harvesting.



## Strategy for Control of Hydrilla in Deep Creek Lake

- **Biological**

- Insect control of *Hydrilla* in Deep Creek Lake is not a viable strategy at this time. Weevils have failed to become established in the United States, and while the flies, midges and moths are established in the Southern United States and have demonstrated appreciable impacts to *Hydrilla* at the local scale, system-wide, effective control has not been demonstrated (Cuda, 2002).
- Grass carp are a means of biological control for a number of aquatic plant species. Grass carp do not target specific species, but instead have a wide ranging diet, which means that they would also consume native, non-invasive, and beneficial plant species, in addition to *Hydrilla*. This could have an adverse impact on non-target plant species.
- Grass carp are currently illegal in MD.

## No Action Approach

- Maryland
  - Loch Raven Reservoir is 2,400 acre drinking water impoundment in Baltimore County.
  - Staff first discovered *Hydrilla* in 2003, but did not take aggressive approach-
  - In 2013, there is an estimated 1,200 acres with monotypic stands of *Hydrilla*,
  - Bathymetry of the southern part of the reservoir is very steep, rocky substrate, which has held the infestation in check in that portion of Loch Raven
  - Seneca Creek State Park and Black Hills Regional Park in Montgomery County have also not actively managed *Hydrilla*, and their lakes are inundated with *Hydrilla*.

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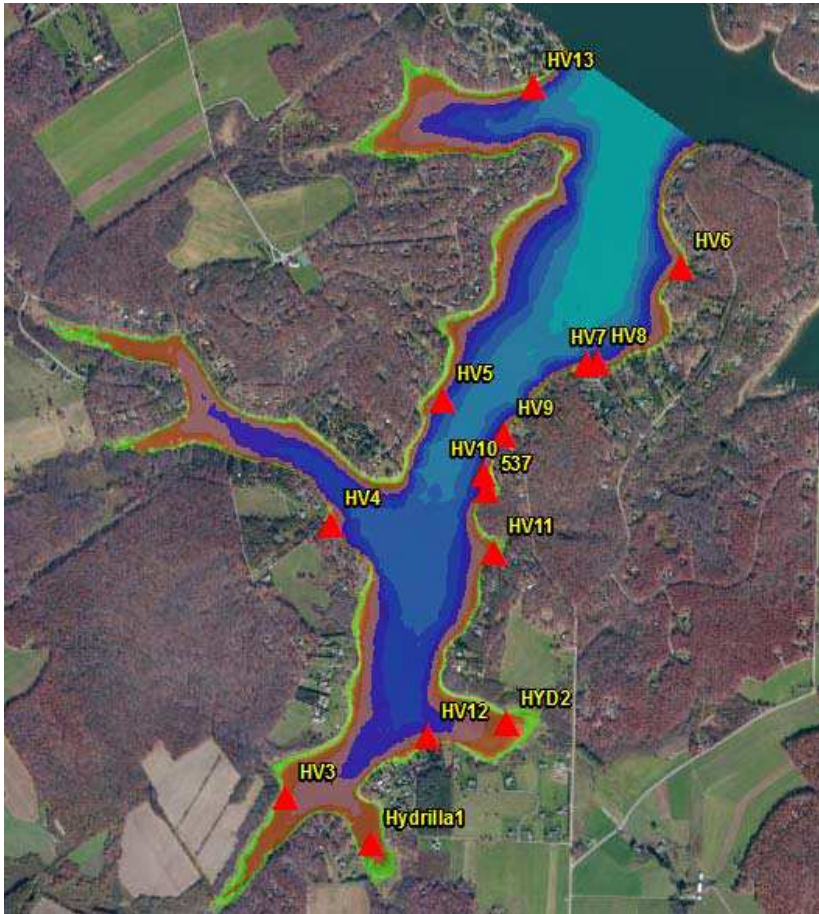
- **Chemical control** –
  - Aquatic herbicides are chemicals that kill macrophytes or inhibit their normal growth through direct toxic reactions or by hampering their photosynthetic ability.
  - Some chemicals are species-specific and others affect a broad spectrum of plants. The herbicide is usually applied to the water directly above the nuisance weed bed and the plants are left to die and degrade within the lake.
  - Herbicides can be used to effectively control *Hydrilla*, but one of the most significant problems associated with chemical control of any submersed species is dilution.
  - The target application rate is the critical component in the management plan. DNR has consulted with SePro reps, contractors and experts from our panel to develop an effective treatment plan.

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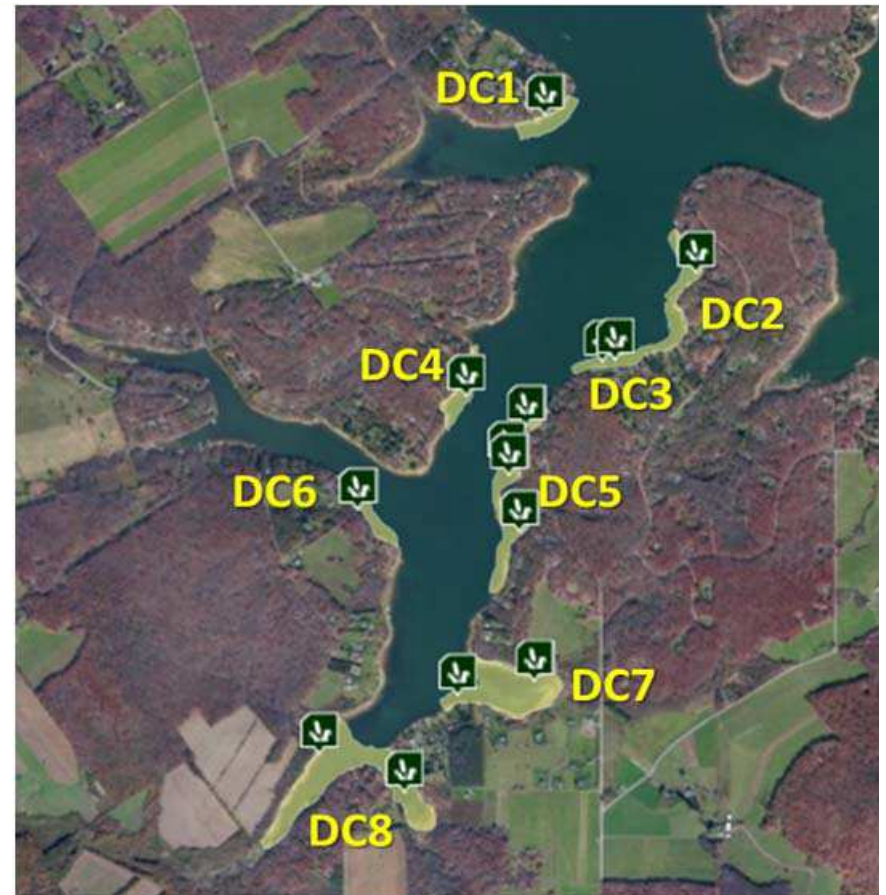
- Prior to treatment, water quality and *Hydrilla* tuber monitoring will take place in the proposed treatment areas. Tubers are reproductive structures found in the sediment, and their decline or absence will be the best indicator of herbicide effectiveness. DNR will monitor the tuber population during the course of the management plan to track the success of the herbicide treatment.
- DNR will use three herbicides that have produced successful results in projects conducted by our expert panel.
  - Fluridone (Trade name SonarOne™) will be used for the majority of the block treatments. It is absorbed by plant shoots and from hydrosol by the roots. *Hydrilla* is very sensitive to low doses of fluridone, native plants are less sensitive, so the total community impact will be lower.
  - Diquat (Trade name Reward™) is a non-volatile herbicidal chemical for use in aquatic areas. Absorption is quite rapid with visible effects in a few days.
  - Flumioxazin (Trade name Clipper™) is a broad spectrum herbicide for control of invasive and noxious weeds in water bodies with limited outflow.



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**2013 Hydrilla Infestations  
with bathymetry**



**Enlarged Treatment areas proposed  
by Dr. Mark Heilman, Sepro**





- Herbicide pellet application

## Treatment Plan Phase 1

- When RAS divers determine growth has begun in most of the areas, treatment with granular Sonar™ will begin (May)
- Contractors would treat every three weeks until sometime in August.
- A Fastest™ assay will be collected by RAS field staff weekly between each Sonar™ treatment to ensure the proper dosage rate.
- If the herbicide levels drop below the desired treatment rate, the schedule will be modified or additional herbicide will be used to maintain proper dosage.
- Sonar™ treatment would continue through the summer so that plants emerging from the sediment would immediately uptake the herbicide and destroy the plants from within the vascular tissue.
- It is a slow process that requires the proper amount of herbicide to be effective.

## Treatment Plan Phase 2

- Re-growth can occur, so follow-up treatments of contact herbicide may be necessary throughout the summer.
- During routine tuber collection and water quality testing, RAS staff will survey the treatment areas to ensure no *Hydrilla* is present.
- Licensed applicators from DNR Fisheries staff will work with the RAS crew to mark off the smaller infestations with buoys and treat each area with a sub-surface injector that will inject the herbicide down to plant level.
- The expert panel suggests using DiQuat™ or Clipper™ liquid on smaller patches as they can effectively kill plants within hours.



## Public Relations

- DNR will contact all of the local residents within the treatment area by mail with the details and instructions for closure and water use.
- All of the water appropriation permit holders will be contacted to make them aware of the treatment.
- DNR park ranger staff and Natural Resource Police officers will enforce water closures from boat traffic during the herbicide treatment.
- DNR field staff and contractors will monitor herbicide levels after it is applied until and will conduct its usual suite of water quality monitoring to assess water conditions post-treatment.

## Outreach and Education

### ATTENTION BOATERS

#### Stop the Spread of Invasive Plants and Animals

Before launching your boat or leaving this site please  
use this Invasive Species Disposal Station to:

Dispose of any plants or animals that are clinging to your boat,  
vehicle, trailer, motor and other fishing or boating equipment

Dump your bait bucket

*Please also remember to drain your boat before leaving*



**STOP AQUATIC  
HITCHHIKERS!**

[www.ProtectYourWaters.net](http://www.ProtectYourWaters.net)

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION  
[www.dec.ny.gov](http://www.dec.ny.gov)

- DNR OCM working to design a sign to educate boaters about their responsibility in stopping the spread of invasive species.
- They will be placed at all public and private launches.

## Outreach and Education



- Stations will be constructed at the DCL State Park boat launch for boaters to dispose of vegetation removed from their vessels.
- Private marinas will be encouraged to construct stations and erect signs to educate the public.

## Outreach and Education



- DNR will hire three seasonal employees as launch stewards, and they will work the state park and private marinas to educate the public and facilitate proper boat cleaning.



## Outreach and Education



- An instructional video on how to properly clean your vessel can be posted on DNR's website, Access DNR, and it will link to other stakeholders' websites

## Summary

- Control of Hydrilla has the potential to be a multi-year, ongoing effort
- DNR will secure multi-year permit from MDE to allow for annual treatments.
- Continued funding for this project must be found to maintain the *Hydrilla* control plan.
- Models from other states have secured grants, received funding from local municipalities, taxes on boat registration fees, dock permits and launch fees.
- DNR is committed to intensive SAV, water quality, habitat, and fisheries monitoring throughout the process
- The continued protection for the long-term use of DCL for multiple stakeholders is of utmost importance to DNR, Garrett Co., Property Owners and all who enjoy this reach resource