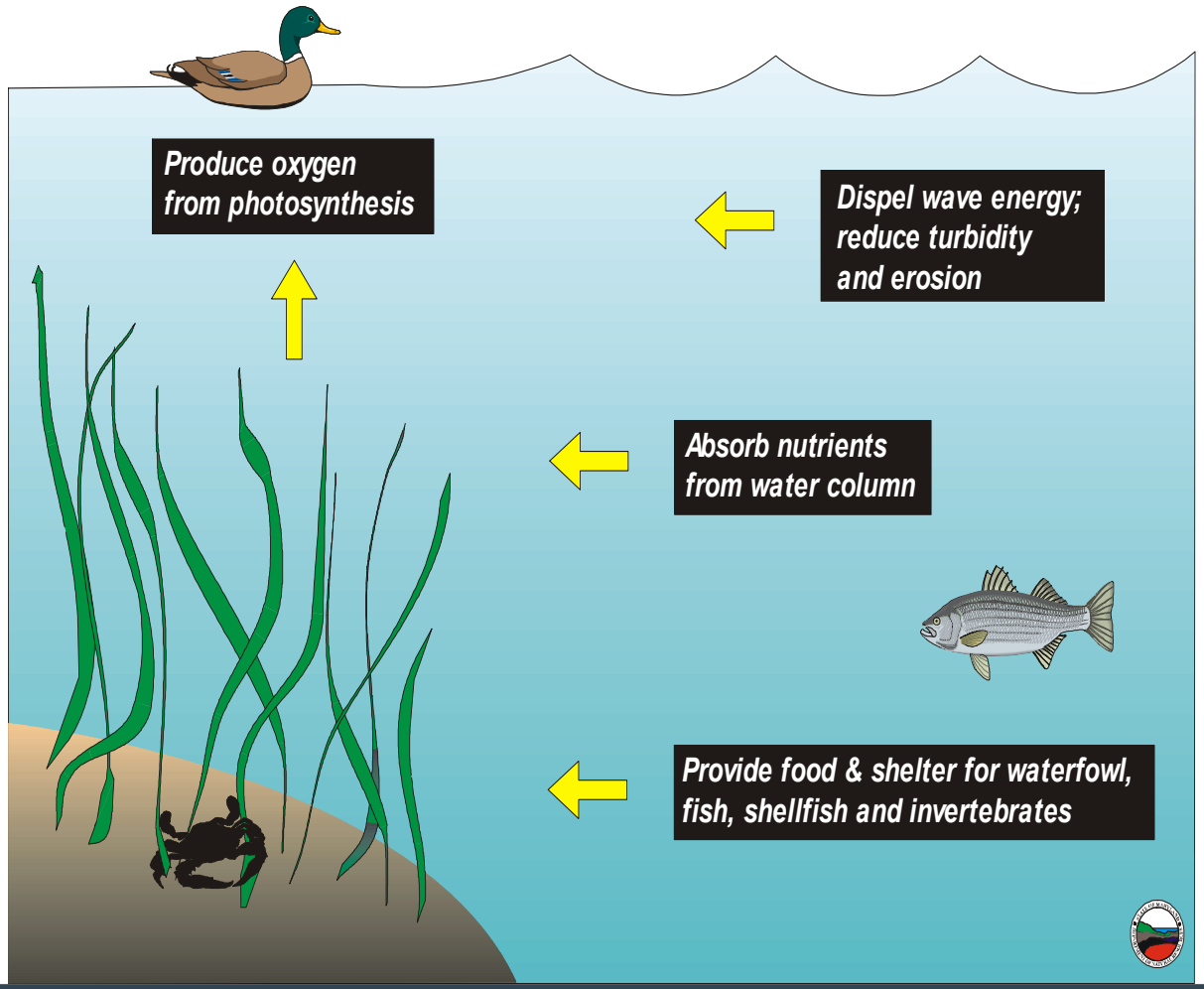
SAV in Deep Creek Lake
Watershed Management Plan Steering Committee
Lee Karrh 2/3/2014

Benefits of Bay Grasses



Benefits of SAV Communities

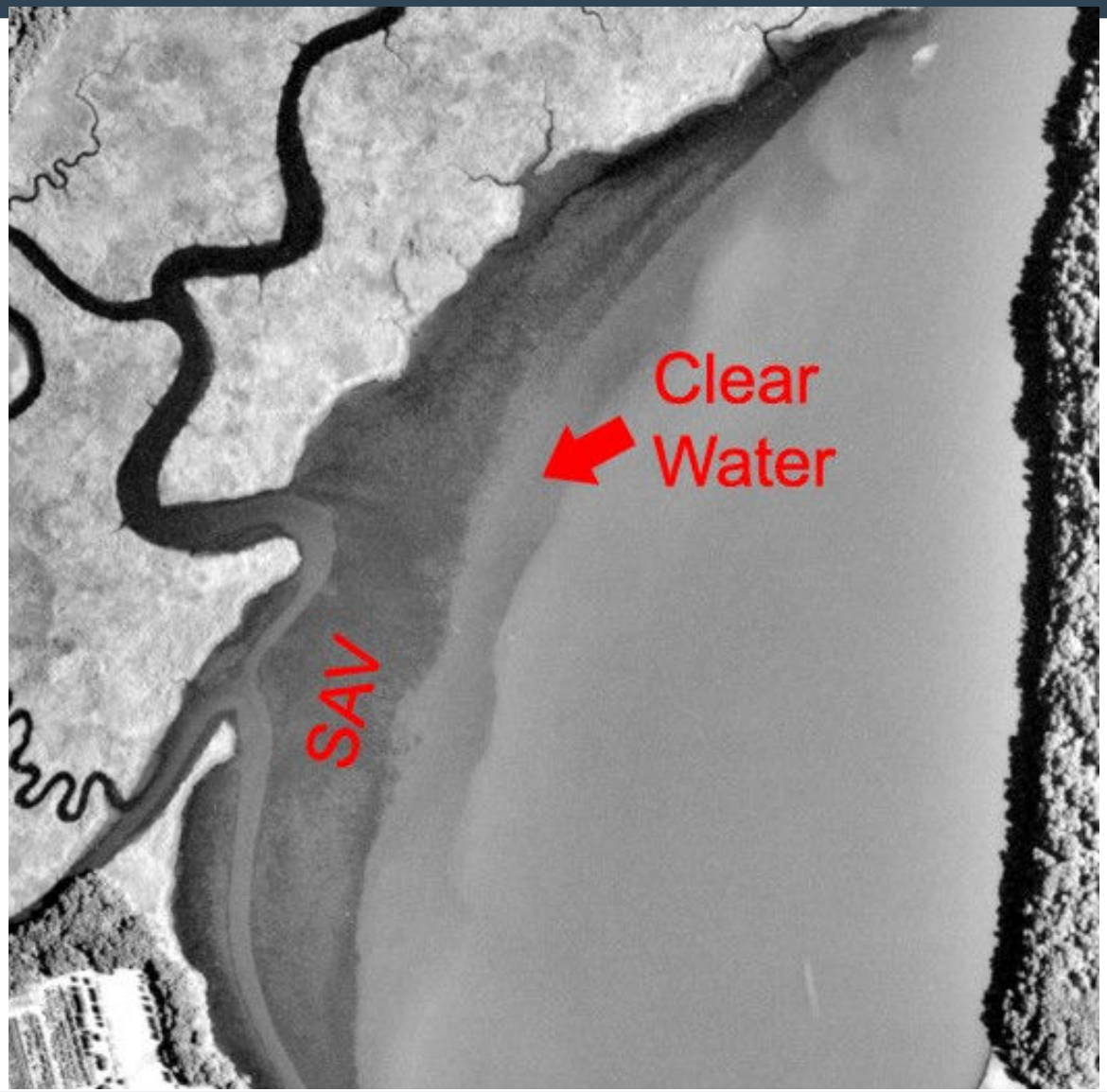
- Physical
- Chemical
- Biological

Benefits of SAV Communities

- Physical
  - stabilize sediments
  - buffer wave energy- stabilize shorelines
  - slow water movement- settle particulates
  - substrate for macroinvertebrates, periphyton
- Chemical
- Biological


Wind
Direction

SAV in Deep Creek Lake



Benefits of SAV Communities

- Physical
- Chemical
  - fix carbon (photosynthesis)
  - produce oxygen
  - absorb and sequester nutrients
- Biological

- Physical
- Chemical
- Biological
  - critical habitat for many fish, shellfish and invertebrates
  - seeds and vegetative matter are a food source for birds, mammals and fish

SAV in Deep Creek Lake

American Widgeon

Widgeon grass

SAV in Deep Creek Lake

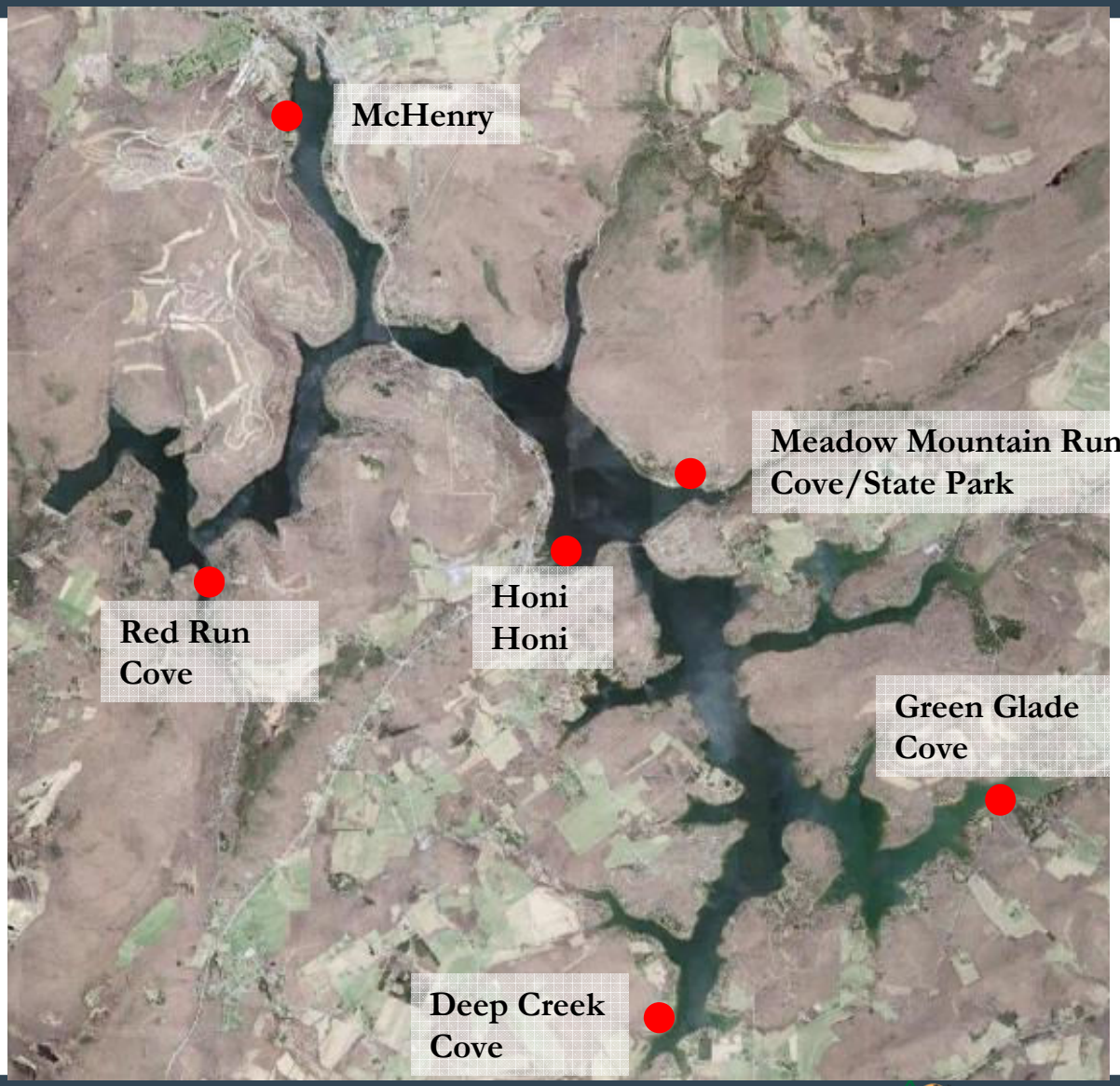
Detriments of SAV

- SAV can make navigation and swimming more difficult
- Exotic species may not have the habitat/food value of natives
- A large abundance of SAV can be unsightly or otherwise unpleasant to some people

SAV in Deep Creek Lake

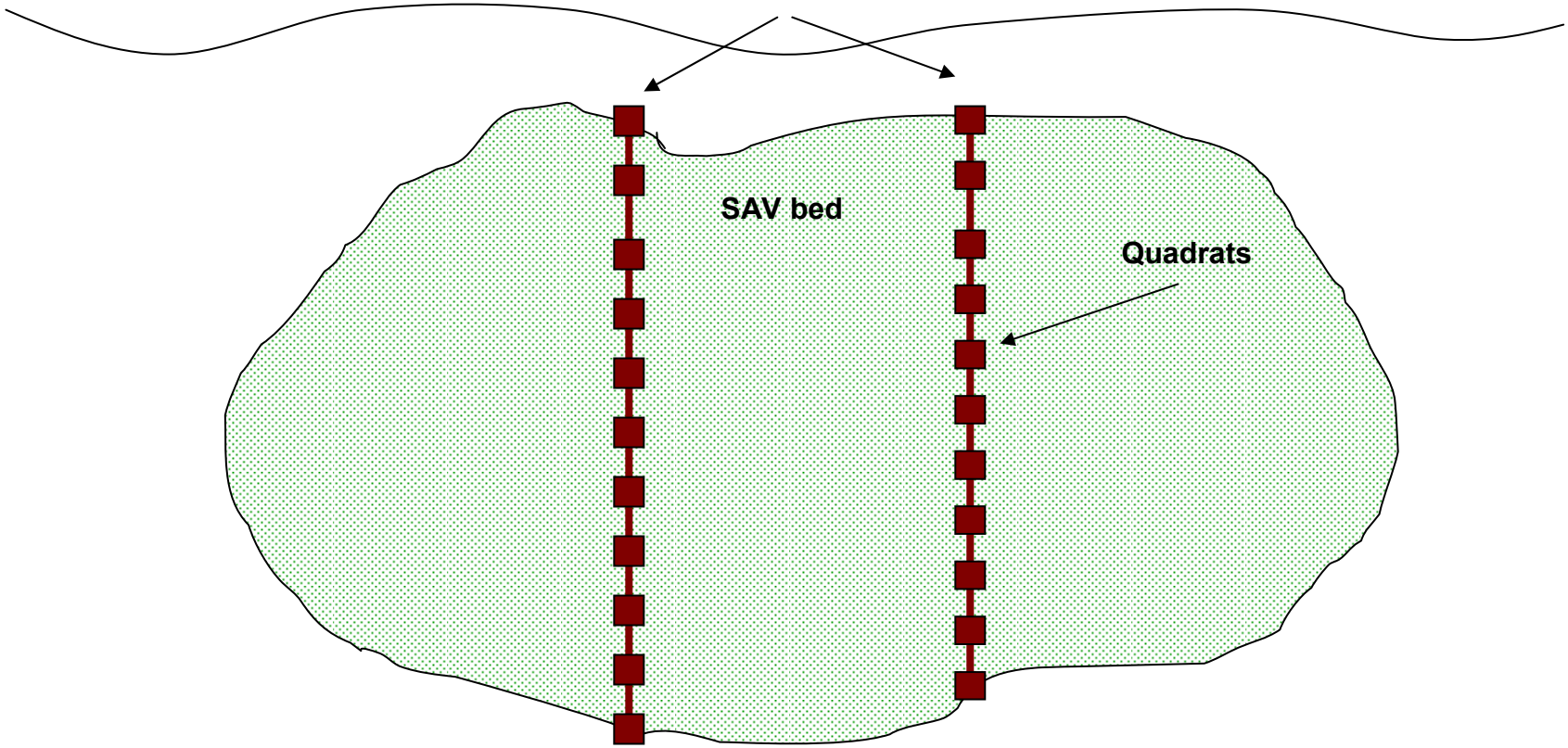
Long-term Monitoring project
6 sites, one transect per site, visited 3 times per year

Invasive Species Mapping Efforts, entire shoreline of the lake is surveyed over a two to three day period.



Deep Creek Lake Transect Design

Eleven 0.25m2 quadrats sampled along the length of each transect at even intervals. Length of transects vary based on width of bed



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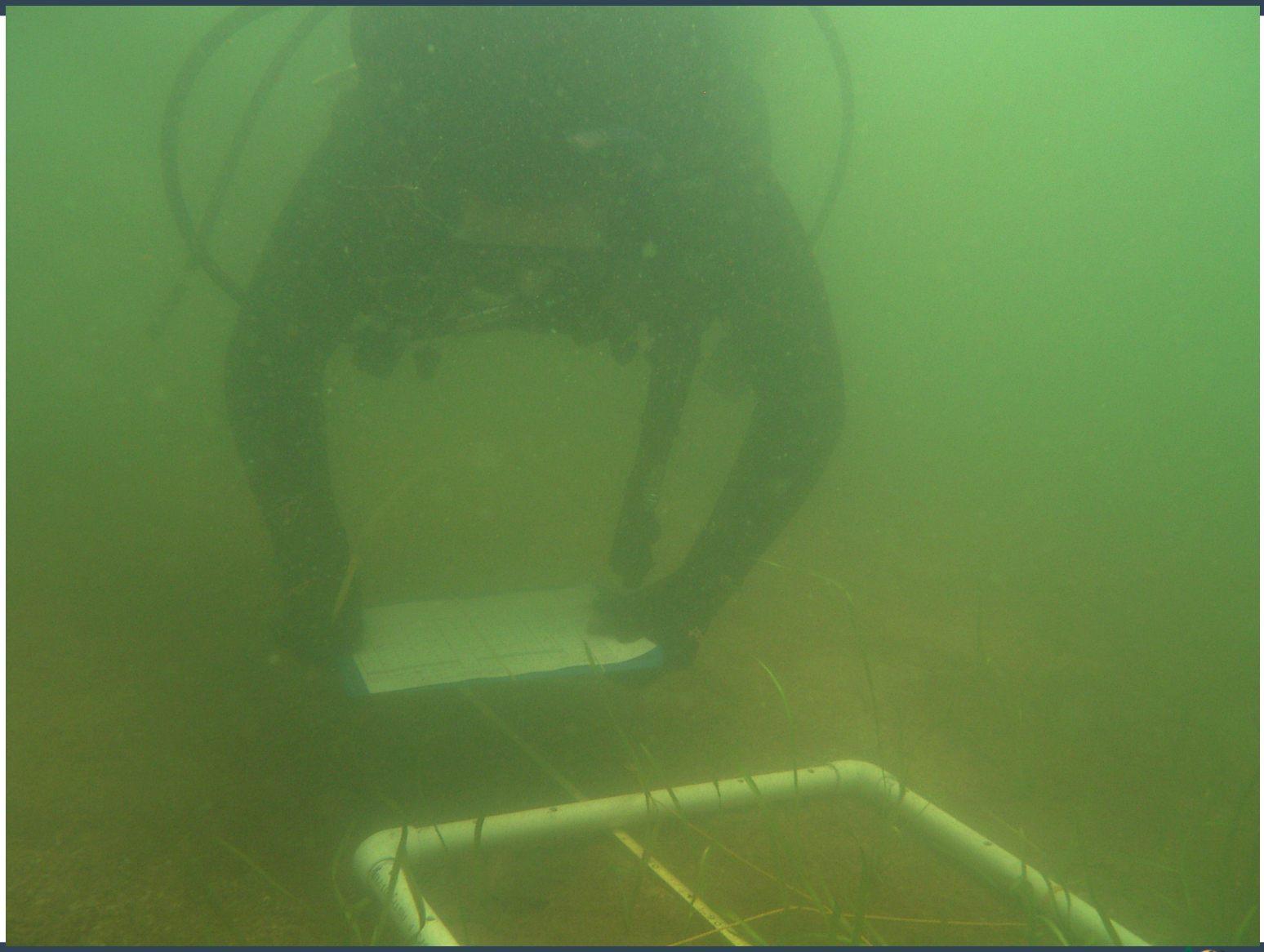


Specific non-destructive measurements taken within each vegetated quadrat include:

- **Total SAV % cover**
- **Total macroalgae % cover**
- **Total % cover of each individual species (genera or type for macroalgae)**
- **Canopy height of all species of SAV present – even if not dense enough to form "canopy"**
- **Shoot count of each species/genera present within lower right quarter of quad (quads are divided into four segments)**
- **Water depth measured at each quad along all transects**

- Ok, so why collect this information?
  - Provides holistic data to lake managers to assist them in making decisions
  - Track performance of the lake over time
    - SAV is very sensitive to minute changes in water quality
      - The grass is there all the time, exposed to changes in water quality on scales missed by monthly sampling
      - The grass will respond to favorable conditions by growing deeper and/or more dense, to unfavorable conditions by moving shallower and becoming less dense

- Results to date of the monitoring project
  - The majority of observed species, as well as the physical characteristics of each survey site, showed no significant change in density or distribution from 2010 to 2013.
  - There is a diverse population of SAV growing throughout the lake with densities ranging from sparse to 100% cover where present.
  - Ten genera of vascular plants (nineteen species) and two genera of macroalgae were observed on the transects and during the shoreline surveys.
  - *Sagittaria cristata*, (Crested arrowhead), *Vallisneria americana*, (Wild celery), *Elodea canadensis*, (Canadian waterweed), *Ceratophyllum demersum*, (Coontail), and *Myriophyllum* spp., (Watermilfoil) were dominant vascular species observed throughout the lake. Macroalgae was also dominant in some areas.

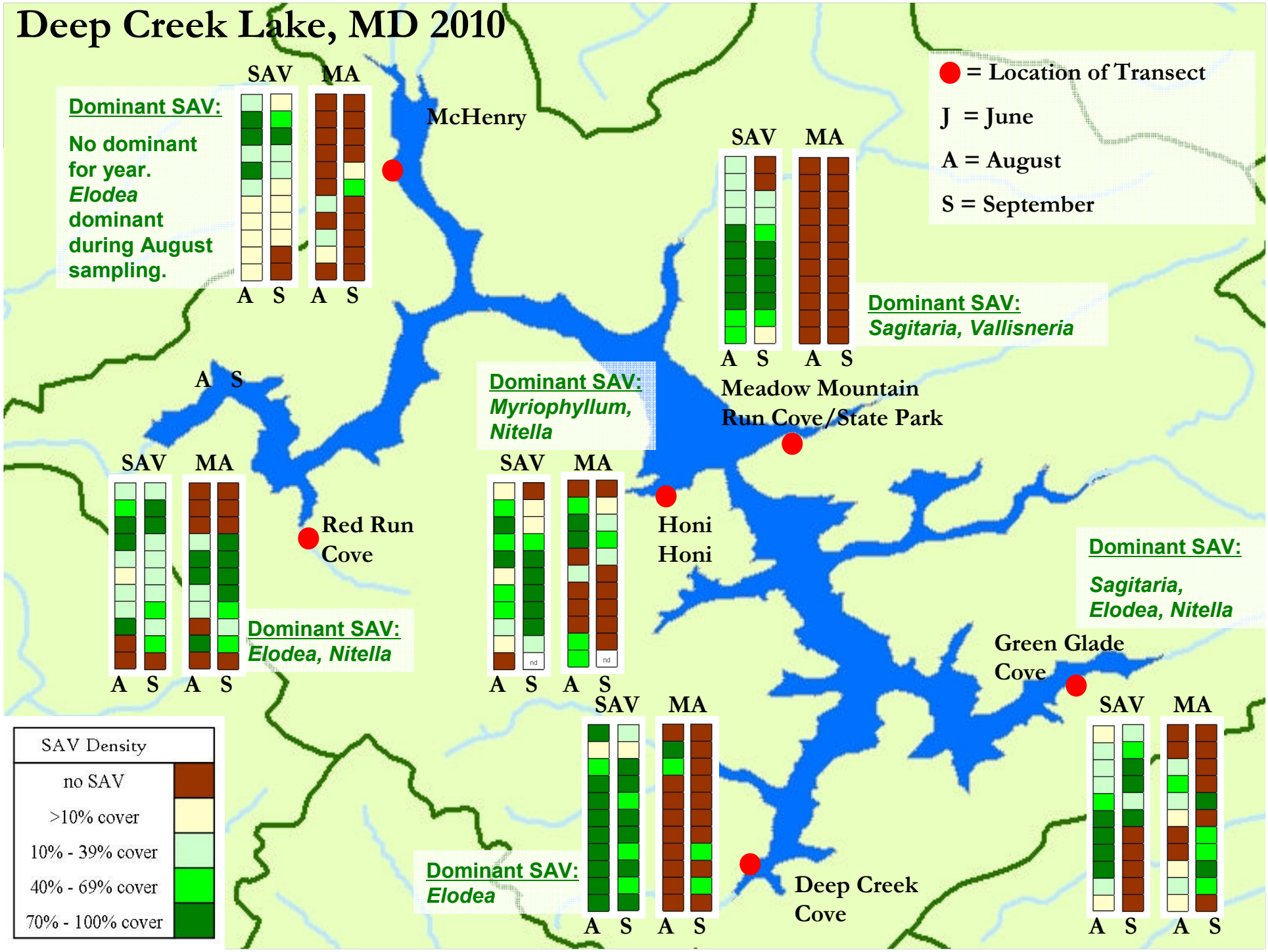
SAV in Deep Creek Lake

- Species zonation is apparent at every site with *Sagittaria cristata* dominating the shallows; *Potamogeton* spp., *Vallisneria americana*, and *Ceratophyllum demersum* dominating the mid depths; and *Elodea canadensis*, *Myriophyllum* spp., and Macroalgae most commonly observed at greater depths.
- The distribution and abundance of these species differ primarily by site, with significant annual changes occurring rarely.
- Potamogeton amplifolius and P. robinssii were observed during the surveys. Both of these species are rare and thought to be extirpated from Maryland waters.
- Based on the six study areas under this assessment, there is no evidence that Myriophyllum density increased significantly from 2010 to 2013, but frequency of occurrence is trending upwards.

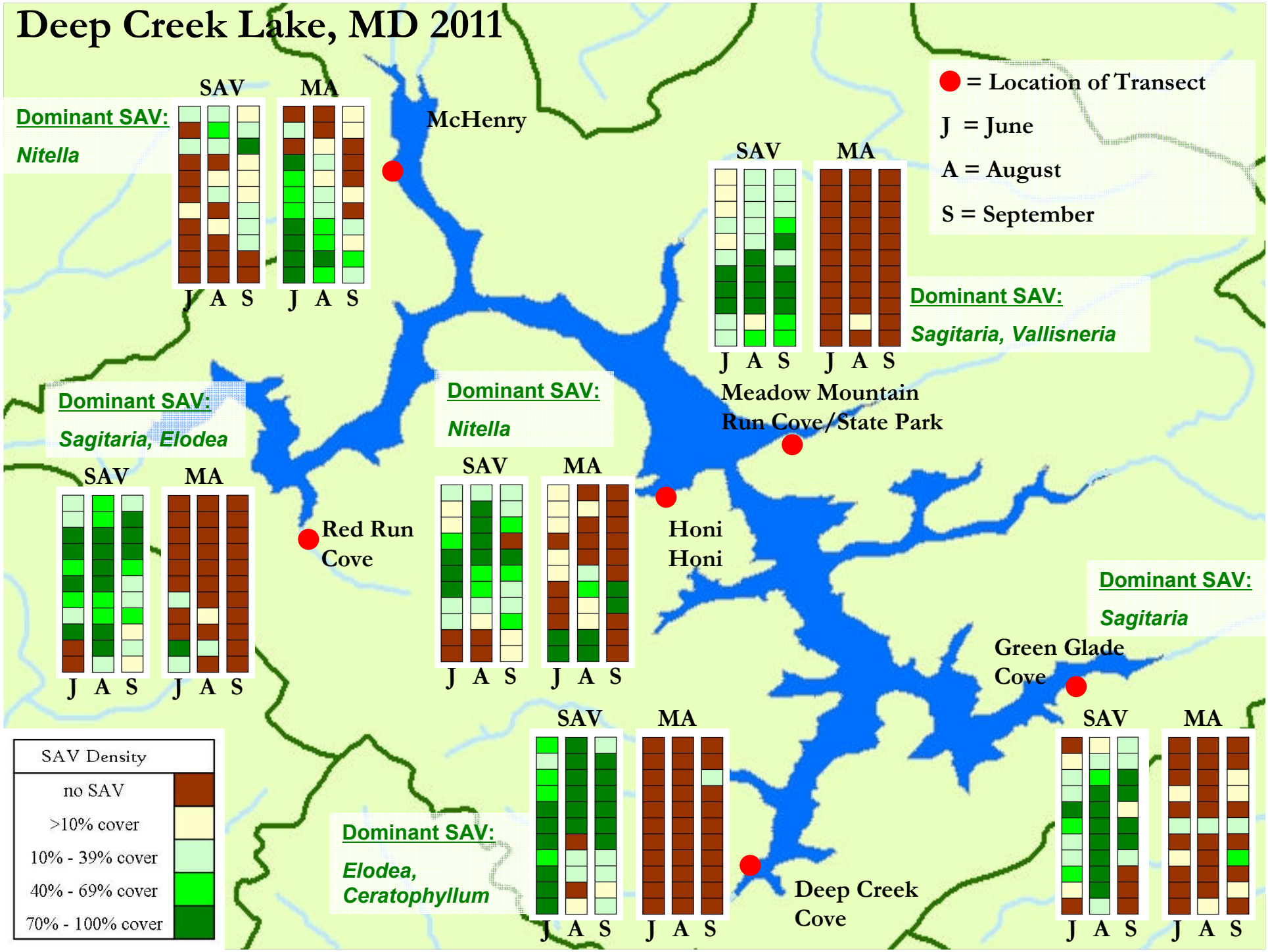
SAV in Deep Creek Lake

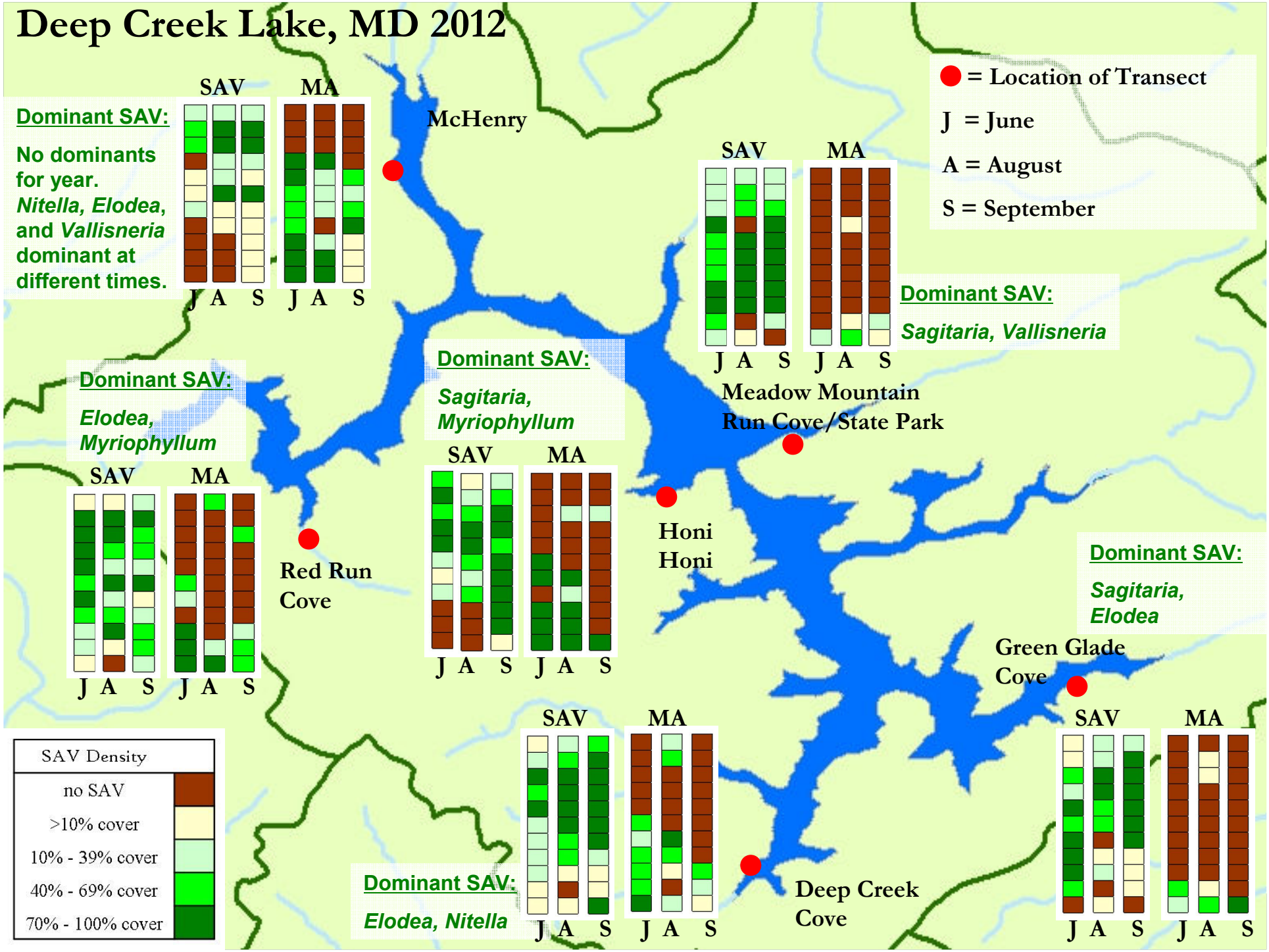
- DNR biologists conducted a second *Myriophyllum* survey in 2013. Results of the survey indicate that there was both less *Myriophyllum* in June 2013 than in July 2012, and that it was more difficult to locate. These results are likely due to lower than normal spring temperatures, increased turbidity, and abnormally high water levels. *Myriophyllum* was present at 69 locations throughout the Lake at the time of the 2013 survey, and occupied less than 2% (~29 acres) of available benthic habitat.
- During the September transect survey, the invasive aquatic plant *Hydrilla verticillata* was discovered in Deep Creek Cove. In response, an additional comprehensive shoreline survey was completed on October 21, 2013. The results of the survey indicate that *Hydrilla* is growing in 14 locations at varying densities in the Lake, but those 14 sites are contained within the southwest leg. A panel of experts from around the country has been assembled to advice MD DNR of control options in the implementation of a Deep Creek Lake specific *Hydrilla* Management Plan.
- The high density and diversity of SAV in DCL is promoting water clarity throughout the lake and providing habitat for a healthy population of fish and invertebrates.

Deep Creek Lake, MD 2010

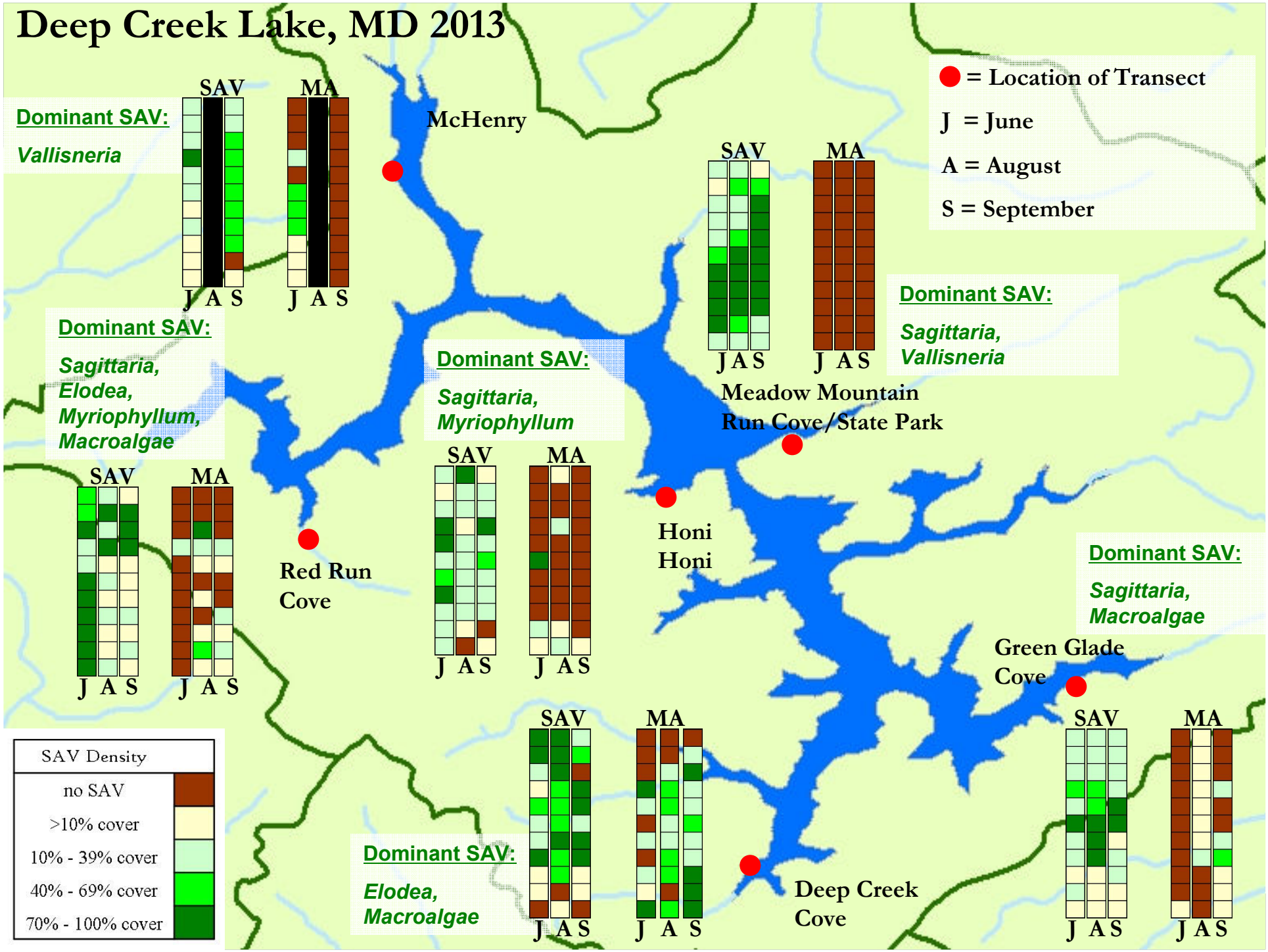


Deep Creek Lake, MD 2011




Deep Creek Lake, MD 2012
= Location of Transect
J = June
A = August
S = September
Dominant SAV:
No dominants for year. Nitella, Elodea, and Vallisneria dominant at different times.
SAV
MA
J A S J A S
McHenry
Dominant SAV:
Sagitaria, Vallisneria
Meadow Mountain Run Cove/State Park
Dominant SAV:
Elodea, Myriophyllum
Dominant SAV:
Sagitaria, Myriophyllum
Red Run Cove
Honi Honi
Dominant SAV:
Sagitaria, Elodea
Green Glade Cove
SAV Density
no SAV
>10% cover
10% - 39% cover
40% - 69% cover
70% - 100% cover
Dominant SAV:
Elodea, Nitella
Deep Creek Cove

Deep Creek Lake, MD 2013



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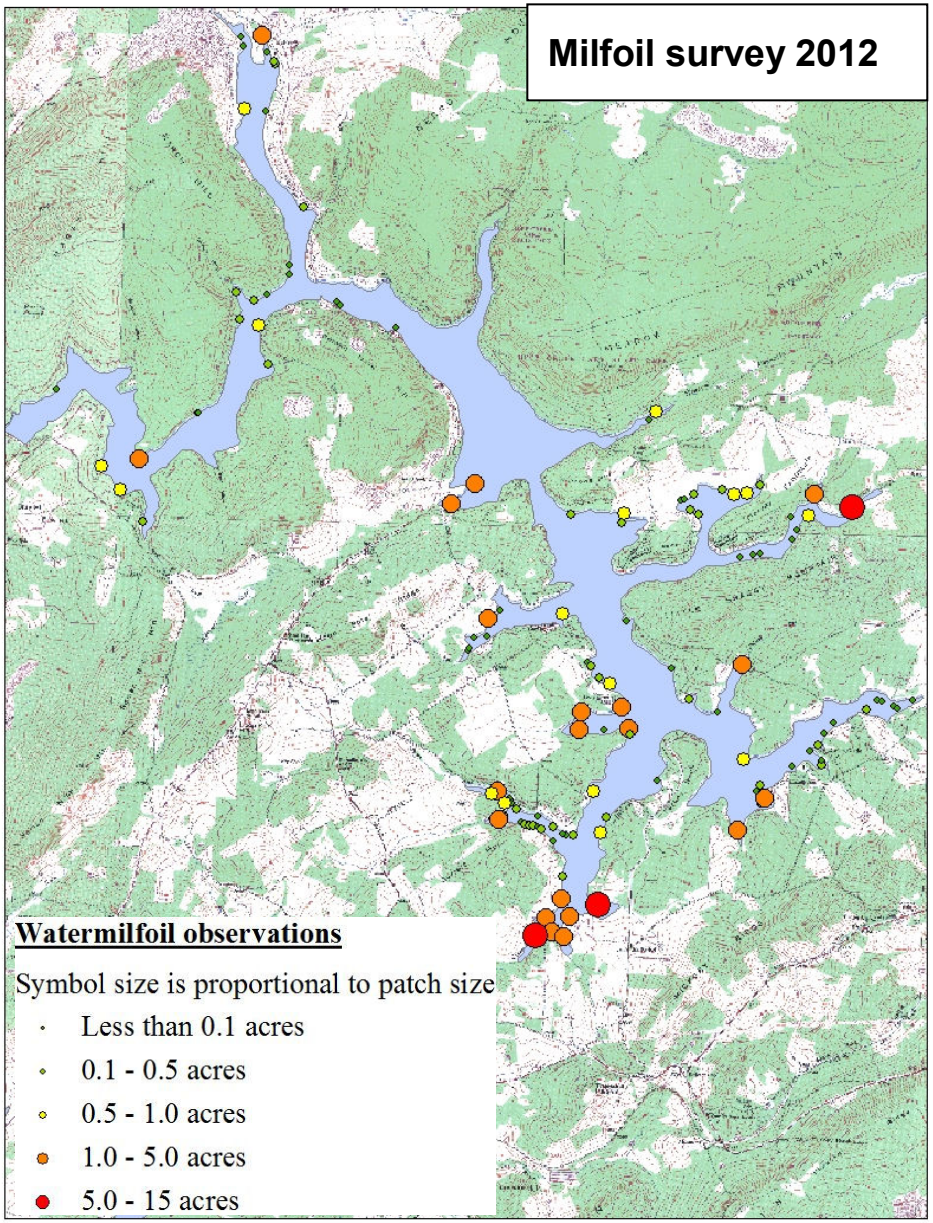

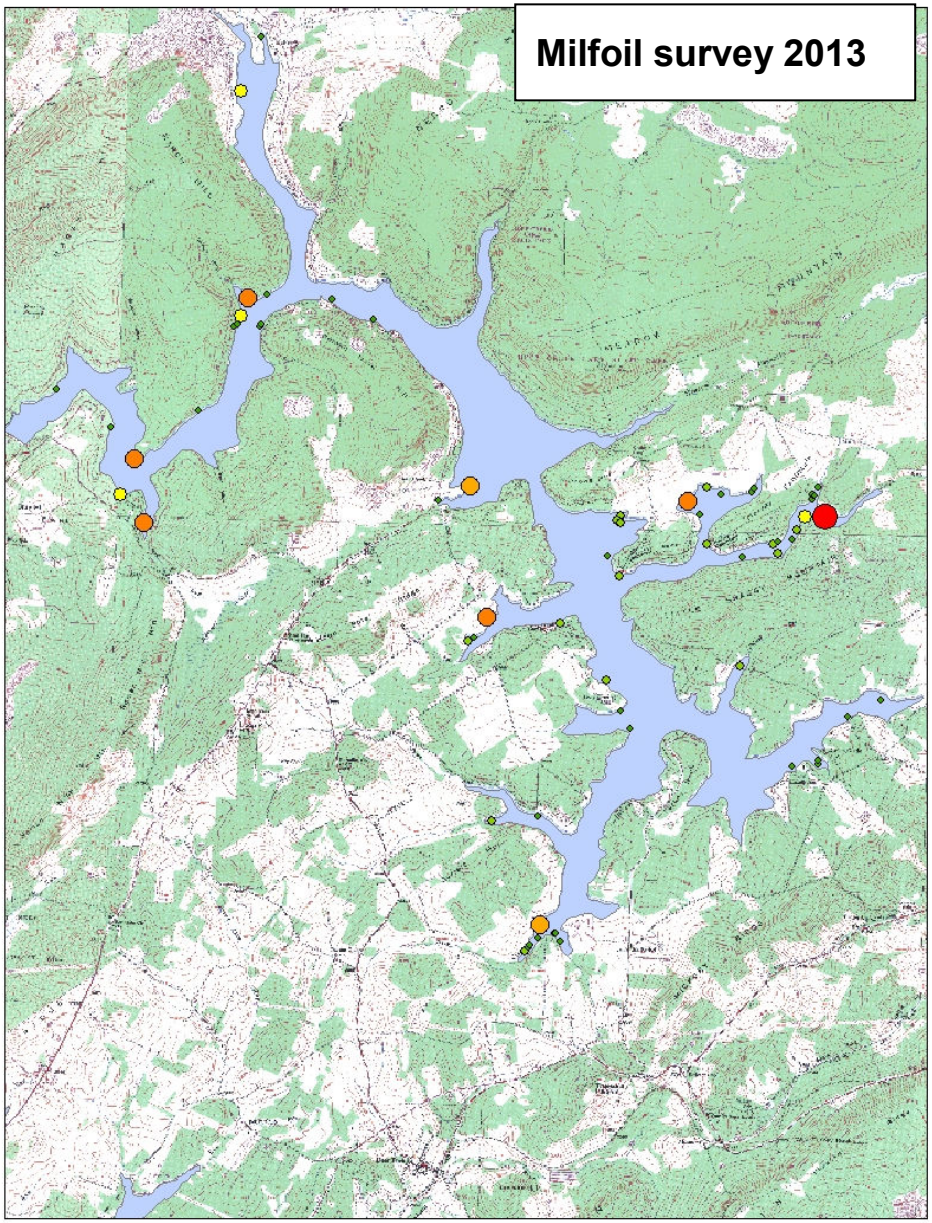

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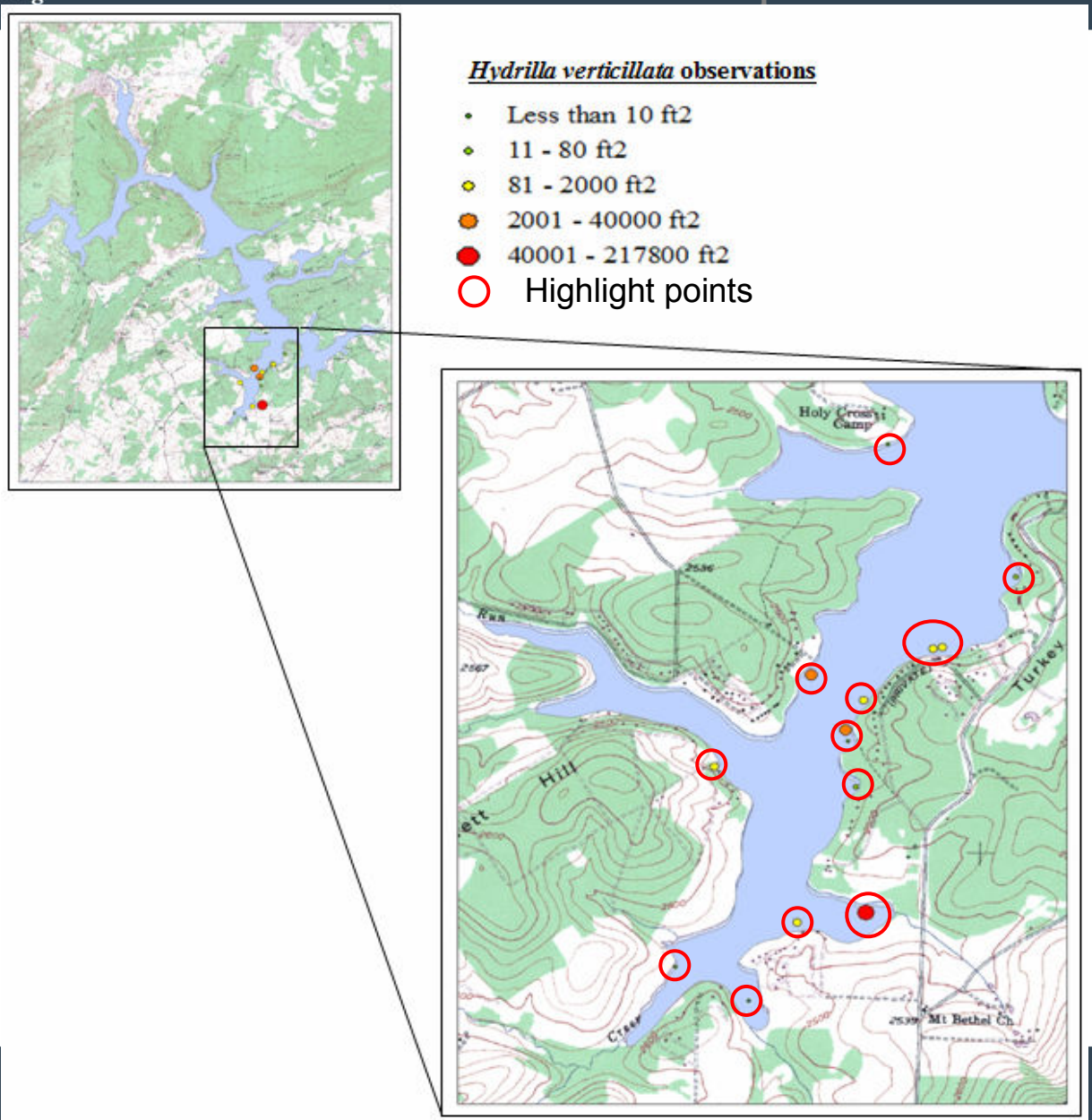

- Next Steps through 2014
  - Develop *Hydrilla* management plan
    - Had last expert panel meeting on 1/30/14
  - Implement plan in Spring (May or June)
  - Continue routine transect monitoring
  - Continue and expand invasive species monitoring
  - Evaluate results of monitoring and management efforts
  - Adapt and revise for 2015.

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