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M E M O R A N D U M

TO:	John T. Richard, District Conservationist	SUBJECT:	2012 Vegetation Monitoring Report Smith and Sayles Reservoir, Glocester, RI Attachments: Figures 1-3
FROM:	Matt Ladewig, Certified Lake Manager	ESS PROJECT NO.:	S442-001
COPY TO:	File	DATE:	October 3, 2012

ESS Group, Inc. (ESS) performed a one-day aquatic vegetation survey at Smith and Sayles Reservoir on behalf of the Sand Dam Reservoir Association on August 30, 2011. The purpose of the vegetation survey was to evaluate the effect of the ongoing herbicide management program on target invasive and non-target native aquatic flora and fauna within Smith and Sayles Reservoir. ESS previously mapped Smith and Sayles Reservoir for aquatic vegetation during the month of August in 2009 (to collect data for the Lake Management Plan) and in 2010 and 2011 (as part of the vegetation monitoring program).

METHODS

ESS revisited areas previously mapped for macrophyte cover (expressed as a percent of bottom occupied) and biovolume (depth of water column filled) in Smith and Sayles Reservoir in 2009, 2010, and 2011. Depending on the depth and type of plant growth at each location a pole rake, throw rake, Aquascope® view tube and/or underwater camera were used to assess the macrophyte community. A TrimbleXT GPS with sub-meter accuracy was used to collect position and record species composition at selected locations, as well as plant biovolume, plant cover, and water depth. As in previous years, particular focus was given to mapping major invasive species beds. This year, ESS also used a Secchi disk to measure water clarity due to concerns over the possibility of algal growth in the pond.

Conditions at the pond were photo documented during the survey and observations of fish, wildlife, and dominant macrophyte species were also recorded.

Using field notes and GPS data, maps were prepared in GIS to depict the location and quantify the extent of all major plant beds (both cover and biovolume) within Smith and Sayles Reservoir. Additionally, the density and extent of variable-leaf milfoil (*Myriophyllum heterophyllum*) beds in the pond were delineated.

RESULTS

Aquatic Macrophytes

Sixteen aquatic macrophyte species were present in Smith and Sayles Reservoir at the time of survey (Table A). One macroalgal species, six emergent species and filamentous green algae (Chlorophyceae) were also found in the pond. Variable-leaf milfoil was the only exotic invasive species found in the pond. In 2012, the most widespread native species were stonewort (*Nitella sp.*), common bladderwort (*Utricularia macrorhiza*) and humped bladderwort (*Utricularia gibba*).

Dense macrophyte cover increased somewhat in Smith and Sayles Reservoir from 2011 with 46% (84.7 acres) of the pond exhibiting cover greater than 75% (Figure 1). However, nearly all of this dense cover was associated with extensive beds of native species including low-growing stonewort (actually a macroalgal species) and various bladderwort species. Less than 1% (1.06 acres) of the pond had high

biovolume (biovolume greater than 50%; Figure 2) in 2012. This is the lowest percentage observed since ESS conducted its first survey in 2009.

An even smaller area of the pond contained exotic invasive variable-leaf milfoil beds. Sparse growths were present in just one cove and covered approximately 0.06 acres (much less than 1% of the pond) (Figure 3). This is the lowest extent of variable-leaf milfoil ever observed by ESS in Smith and Sayles Reservoir during the peak of the growing season.

Occasionally, ponds that are treated for excessive macrophyte growth can become more susceptible to algae blooms since dieback of the plants may reduce competition between algae and plants for nutrients. Dying plants may also release nutrients into the water column, further fueling algal growth. However, no evidence of a cyanobacteria (blue-green algae) bloom was detected in Smith and Sayles Reservoir on the day of the survey and water clarity was high (as evidence by the visibility of a Secchi disk on the pond bottom in 3.0 meters of water).

Table A. Aquatic and emergent macrophyte species observed at Smith and Sayles Reservoir

Scientific Name	Common Name	2010	2011	2012
Aquatic Macrophytes and Algae				
Brasenia schreberi	Watershield	X	X	X
Chara sp.	Muskwort	X		
Eriocaulon aquaticum	Sevenangle pipewort	X	X	X
Eleocharis sp.	Spikerush	X	X	X
Elatine sp.	Waterwort	X	X	X
Chlorophyceae	Filamentous green algae	X	X	X
Gratiola aurea	Golden hedge-hyssop	X	X	X
Isoetes sp.	Quillwort	X	X	X
Myriophyllum heterophyllum	Variable-leaf milfoil	X	X	X
Nymphoides cordata	Little floating heart	X	X	X
Nitella sp.	Stonewort	X	X	X
Nuphar lutea variegata	Yellow water lily	X	X	X
Nymphaea odorata	White water lily	X	X	X
Potamogeton bicupulatus	Snailseed pondweed	X	X	X
Potamogeton natans	Floating pondweed	X	X	X
Proserpinaca palustris	Mermaid weed		X	
Utricularia gibba	Humped bladderwort	X	X	X
Utricularia macrorhiza	Common bladderwort	X	X	X
Utricularia purpurea	Purple bladderwort	X	X	X
Utricularia radiata	Little floating bladderwort	X	X	X
Key Emergent Macrophytes				
Dulichium arundinaceum	Three-way sedge	X	X	X
Pontederia cordata	Pickerelweed	X	X	X
Sagittaria sp.	Arrowhead	X	X	X
Scirpus cyperinus	Wool-grass		X	X
Sparganium americanum	Burreed	X	X	X
Typha latifolia	Cattail		X	X

Fish and Wildlife

As in previous years, centrarchid (sunfish) nests were observed in many shallow areas of the pond with sandy substrates. Bluegill (*Lepomis macrochirus*) and largemouth bass (*Micropterus dolomieu*) were directly observed at multiple locations in the pond. No fish mortality was observed at the time of survey.

Canada Goose, a resident waterfowl species previously sighted at the pond in moderate to large groups, was not observed on or around Smith and Sayles Reservoir during the 2012 survey, although resident geese are still believed to make use of the pond. The most notable avian observation during the 2012 survey was an adult Bald Eagle, which briefly approached the pond and made a single foraging stoop over the water. Other avian species observed directly using Smith and Sayles Reservoir include Mallard, Great Blue Heron, Double-crested Cormorant, Herring Gull, and Belted Kingfisher.

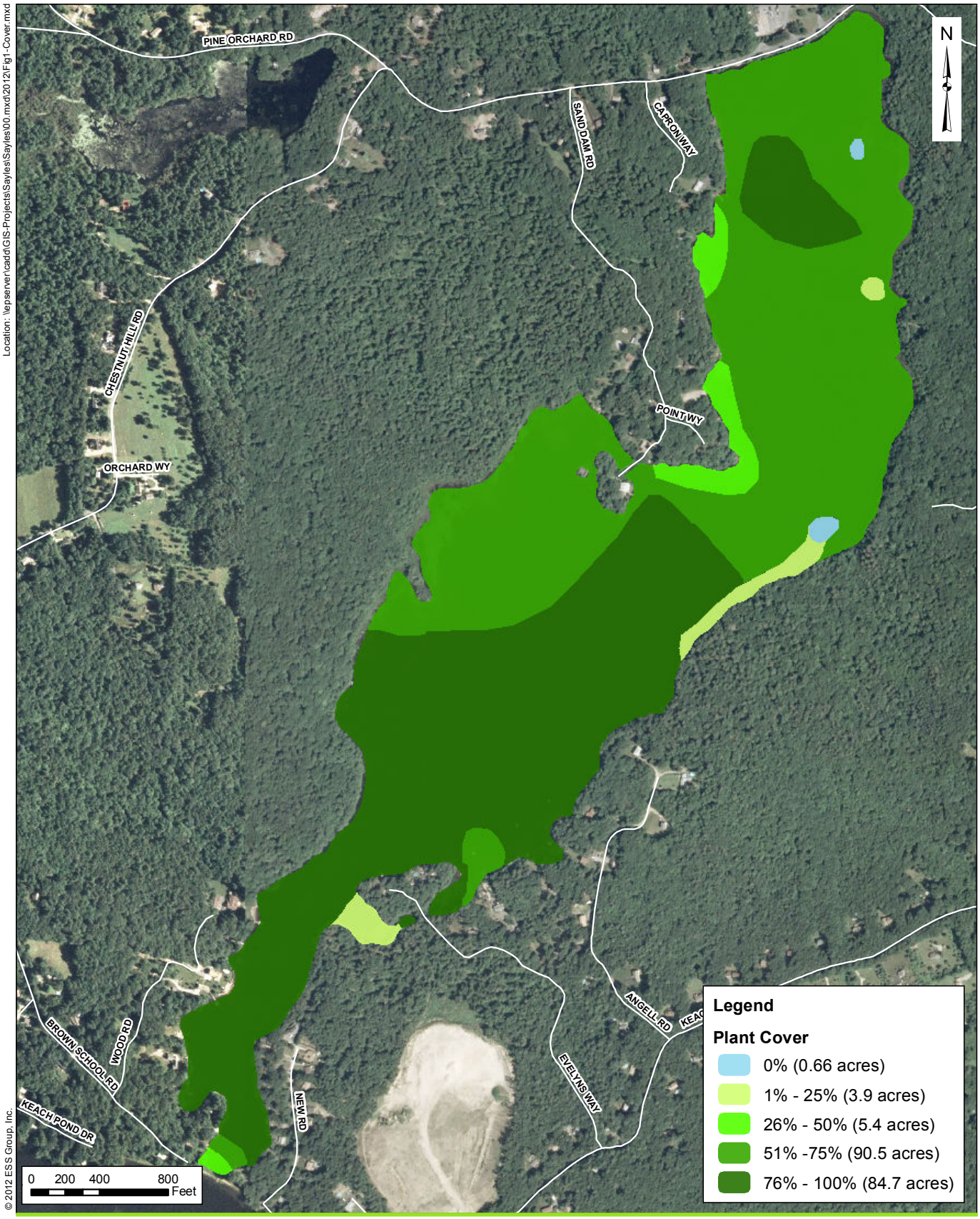
Several painted turtles (*Chrysemys picta*) were observed basking on emergent logs or rocks in shallow waters of the pond.

SUMMARY AND CONCLUSIONS

Areas of the densest macrophyte biovolume in Smith and Sayles Reservoir appear to have decreased between August 2010 and August 2012. Native macrophyte cover is still widespread throughout the pond and has maintained a similar diversity to previous years although biovolume, particularly of large species (such as common bladderwort) appears to have decreased. Overall, the native macrophyte community does not appear to have experienced significant negative impacts from the herbicide treatment program at Smith and Sayles Reservoir. Invasive variable-leaf milfoil cover in 2012 was present at the lowest levels observed since ESS began conducting surveys at the pond. The only variable-leaf milfoil bed documented was a sparse growth isolated in a shallow cove on the southeastern periphery of the pond. Management of this species through the combination of drawdown and targeted herbicide treatment appears to have been effective in keeping it from establishing dense and extensive beds during the period of peak development.

Long-term success in controlling variable-leaf milfoil and preventing the introduction of other invasive species will likely require vigilant monitoring (in-pond and, if possible, at the public boat launch) and coordination with the residents of Keach Pond just upstream. Active management through carefully conducted drawdown will help minimize the growth of variable-leaf milfoil in shallow waters. However, targeted herbicide applications may be needed from time to time to control re-growth of variable-leaf milfoil in deeper waters as well as larger beds that develop in shallow waters. Small and readily accessible beds may be controlled through various forms of hand harvesting, as long as those performing the work are careful to remove the entire plant (including the roots) and prevent the escape of vegetative fragments.

As part of the monitoring program going forward, we recommend that aquatic macrophytes be mapped again in 2013 during the peak of the growing season to maintain consistency with previous surveys and to evaluate the effectiveness of any management actions taken. This survey also serves as a way to ensure that any new invasive species infestations will be found quickly. Quickly identified new infestations have a higher chance of being successfully controlled or eradicated. Careful monitoring should continue to be a key focus for the Smith and Sayles Reservoir management program.



Location: \\epserver\cadd\GIS-Projects\Sayles\Sayles\00.mxd\2012\Fig1-Cover.mxd

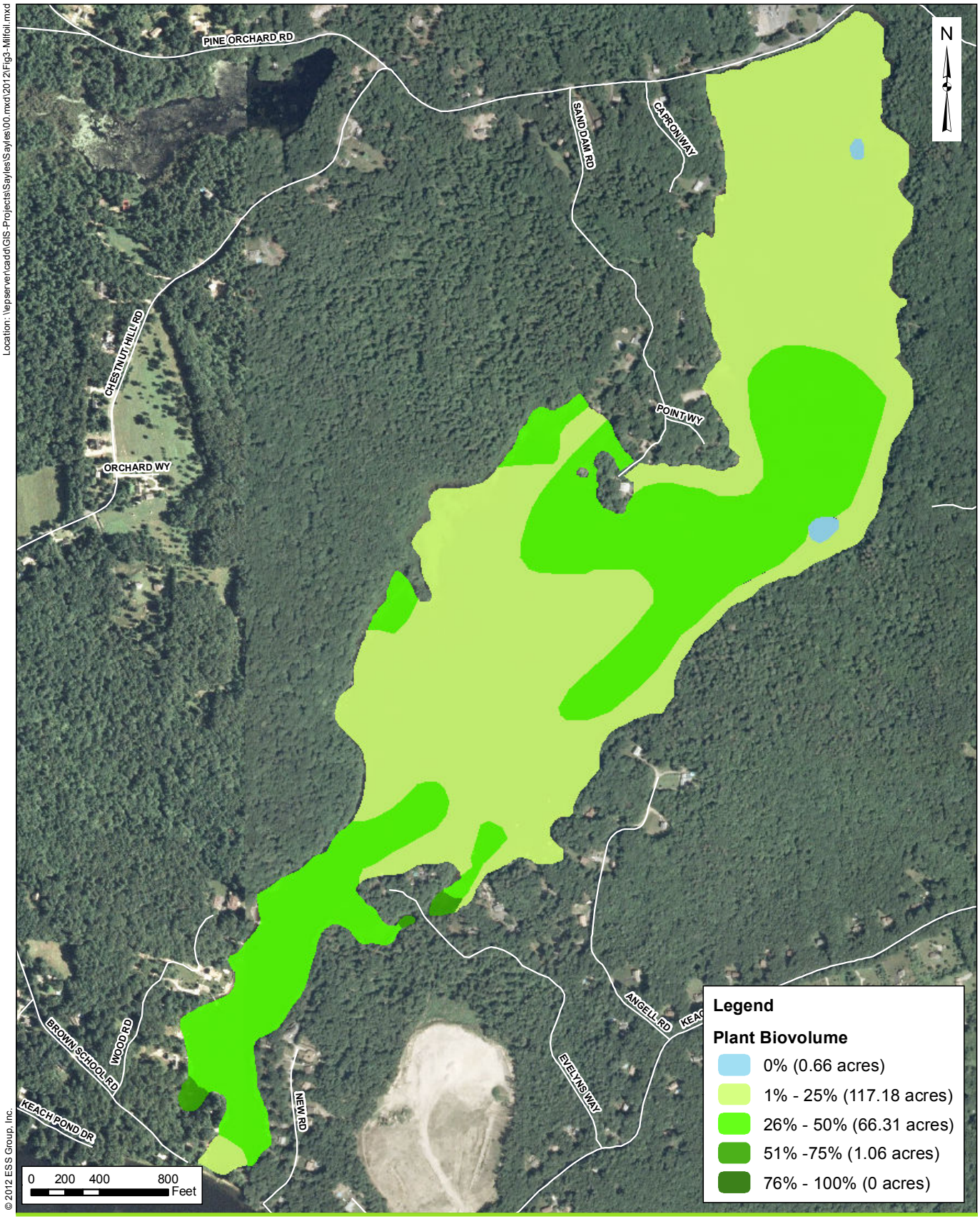
Sand Dam Reservoir Association
Glocester, Rhode Island

1 inch = 800 feet

Source: 1) 2011 RIDEM Multispectral Orthophotography, 2011

Aquatic Macrophyte Cover
August 31, 2012

Figure 1



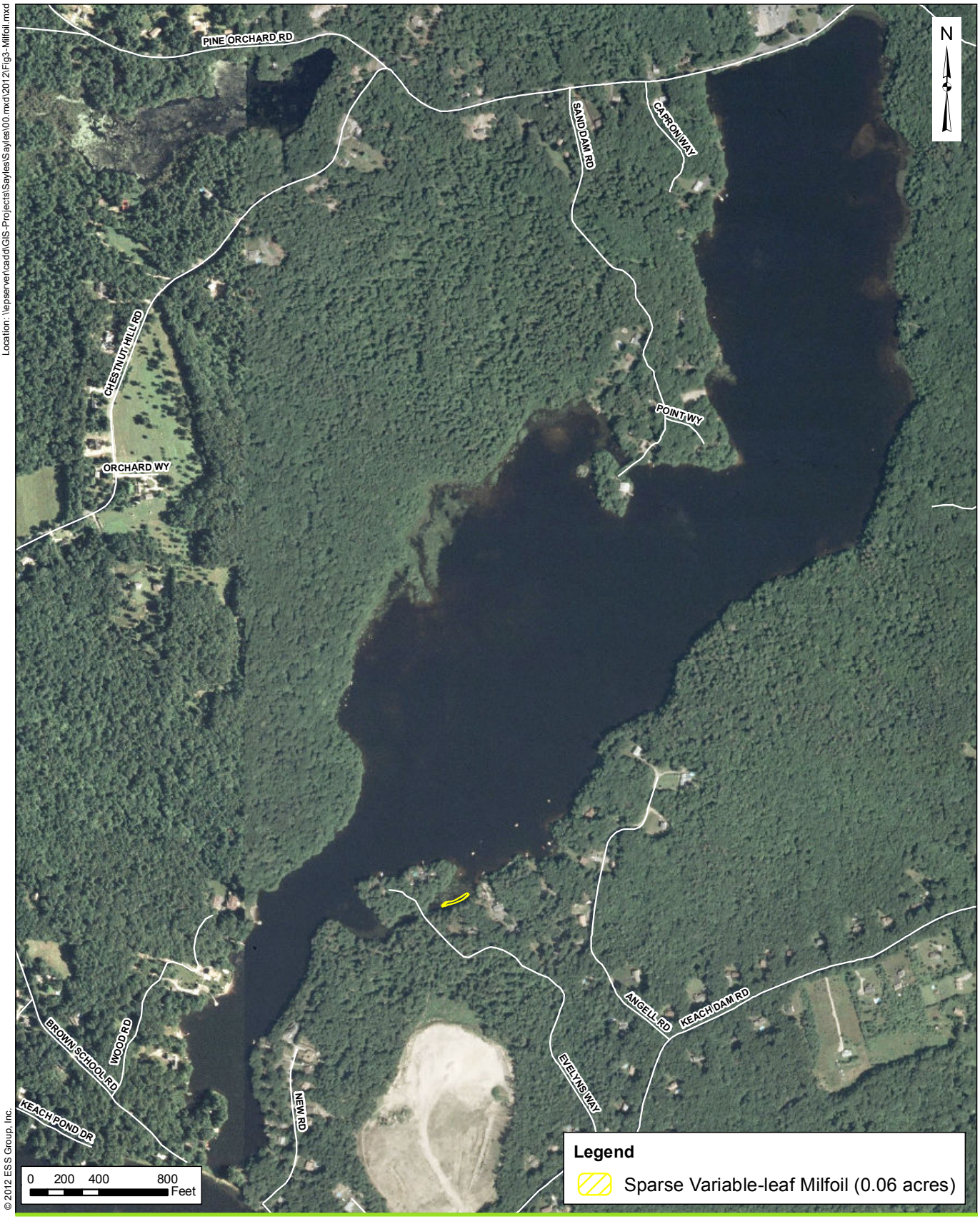
Sand Dam Reservoir Association
Glocester, Rhode Island

1 inch = 800 feet

Source: 1) 2011 RIDEM Multispectral Orthophotography, 2011

Aquatic Macrophyte Biovolume
August 31, 2012

Figure 2



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Sand Dam Reservoir Association
Glocester, Rhode Island

1 inch = 800 feet

Source: 1) 2011 RIDEM Multispectral Orthophotography, 2011

Variable-leaf Milfoil Cover
August 31, 2012

Figure 3