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M E M O R A N D U M

TO:	John T. Richard, District Conservationist	SUBJECT:	2011 Vegetation Monitoring Report Smith and Sayles Reservoir, Glocester, RI Attachments: Figures 1-3
FROM:	Carl Nielsen, Certified Lake Manager	ESS PROJECT NO.:	S442-000
COPY TO:	File	DATE:	October 12, 2011

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 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 (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 and 2010. 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, plant biovolume, plant cover, and water depth. As in previous years, particular focus was given to mapping major invasive species beds.

Conditions at the lake were photo documented during the survey and observations of fish, wildlife, and dominant macrophyte species were recorded on a field map.

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 lake were delineated.

RESULTS

The survey covered all portions of the lake that were mapped in 2009 and 2010 (Figure 1).

A total of 17 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 or on the shoreline. Of these species, variable-leaf milfoil was the only invasive exotic species found in the lake. As in 2009 and 2010, the most widespread species were stonewort (*Nitella sp.*), common bladderwort (*Utricularia macrorhiza*), variable-leaf milfoil, humped bladderwort (*Utricularia gibba*), and purple bladderwort (*Utricularia purpurea*). One new species of aquatic macrophyte, mermaid weed (*Proserpinaca palustris*), was observed in the lake in 2011. This species is native and was only observed in one cove of Smith and Sayles Reservoir.

The area of dense macrophyte cover in Smith and Sayles Reservoir was somewhat lower in 2011 than in 2009 or 2010 with 40% (73.8 acres) of the lake exhibiting cover greater than 75% (Figure 1). As in previous years, much of this dense cover was associated with extensive beds of native species including

low-growing stonewort (actually a macroalgal species) and various bladderworts.

Approximately 1% (2.3 acres) of the lake also had high biovolume (>50%; Figure 2) in 2011. This is a slight increase over 2010 when high biovolume was spread over 2.0 acres of the lake. However, 2011 was the first time that ESS did not observe any beds where biovolume exceeded 75%. Additionally, as in previous years, many of the higher biovolume beds were dominated by native bladderwort species, including common and purple bladderwort, rather than invasive variable-leaf milfoil.

Invasive variable-leaf milfoil beds were present over approximately 6.5 acres (4%) of the lake bed (Figure 3). This is the lowest extent of variable-leaf milfoil ever observed by ESS in Smith and Sayles Reservoir. Variable-leaf milfoil cover was sparse to patchy and no dense growths were observed. Much of the reduction in extent was due to the retraction of the large bed in the center of the lake and the disappearance of the patchy to dense growths at the southern end of the lake. However, a few small areas of new or denser variable-leaf milfoil growth were noted, particularly near one of small coves along the southeastern shoreline of the lake.

Centrarchid nests were observed in many shallow areas of the lake with sandy substrates and bluegill (*Lepomis macrochirus*) were directly observed throughout the lake. No fish mortality was observed at the time of survey.

No Canada Goose individuals were observed on Smith and Sayles Reservoir during the 2011 survey, although resident geese are still believed to make use of the lake. More than 30 Mallard ducks were observed, most of which were first-year individuals.

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

Scientific Name	Common Name	2010	2011
Submerged Macrophytes			
Brasenia schreberi	Watershield	X	X
Chara sp.	Muskwort	X	
Eriocaulon aquaticum	Sevenangle pipewort	X	X
Eleocharis sp.	Spikerush	X	X
Elatine sp.	Waterwort	X	X
Chlorophyceae	Filamentous green algae	X	X
Gratiola aurea	Golden hedge-hyssop	X	X
Isoetes sp.	Quillwort	X	X
Myriophyllum heterophyllum	Variable-leaf milfoil	X	X
Nymphoides cordata	Little floating heart	X	X
Nitella sp.	Stonewort	X	X
Nuphar lutea variegata	Yellow water lily	X	X
Nymphaea odorata	White water lily	X	X
Potamogeton bicupulatus	Snailseed pondweed	X	X
Potamogeton natans	Floating pondweed	X	X
Proserpinaca palustris	Mermaid weed		X
Utricularia gibba	Humped bladderwort	X	X
Utricularia macrorhiza	Common bladderwort	X	X
Utricularia purpurea	Purple bladderwort	X	X
Utricularia radiata	Little floating bladderwort	X	X

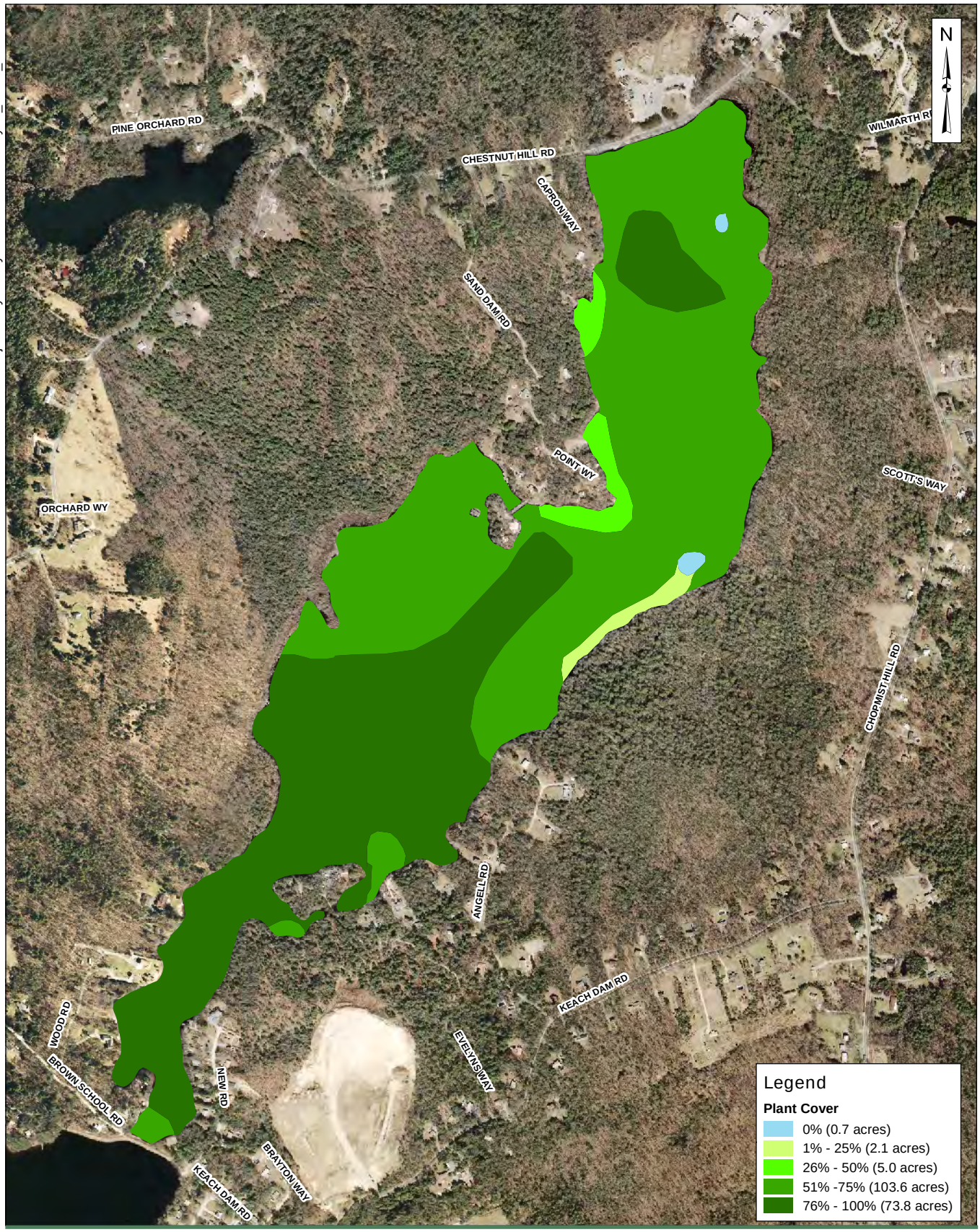
Scientific Name	Common Name	2010	2011
Key Emergent Macrophytes			
Dulichium arundinaceum	Three-way sedge	X	X
Pontederia cordata	Pickerelweed	X	X
Sagittaria sp.	Arrowhead	X	X
Scirpus cyperinus	Wool-grass		X
Sparganium americanum	Burreed	X	X
Typha latifolia	Cattail		X

SUMMARY AND CONCLUSIONS

Areas of the densest macrophyte cover and biovolume in Smith and Sayles Reservoir appear to have decreased between August 2010 and August 2011. However, native macrophyte cover is still widespread throughout the lake and has maintained a similar diversity to previous years. Therefore, 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 has significantly decreased from previous surveys conducted in 2010 and 2011. Larger beds of this species have retracted while many smaller beds have disappeared. Although a few areas of new or denser variable-leaf milfoil growth have emerged in 2011, management of this species appears to have been effective in keeping it from establishing dense and extensive beds during the period of peak development.

Given the fact that variable-leaf milfoil fragments will continue to be sourced from within Smith and Sayles Reservoir and from upstream sources for the foreseeable future, ESS recommends that the long-term plan of addressing variable-leaf milfoil through annual herbicide treatments continue until these plant beds are small enough to be managed through hand harvesting. We also recommend that the aquatic macrophytes be mapped again in 2012 during the peak of the growing season to maintain consistency with previous surveys and to evaluate the effectiveness of any management actions. In addition to providing a tool for evaluating the success of management efforts at the lake, the annual macrophyte survey improves the chances that any new invasive species infestations will be found quickly so that control can be implemented immediately to minimize the expense of any necessary control efforts. It will be essential to continue to implement actions in the long-term plant management plan in 2012 so that the growth of nuisance species in the lake can be managed over time.

Location: G:/GIS-Projects/Sayles/Sayles/00-mxd/2011/Sayles_Cover_2011.mxd



ESS Group, Inc.

Engineers
Scientists
Consultants

SAND DAM RESERVOIR ASSOCIATION
Glocester, Rhode Island

Scale: 1" = 900'

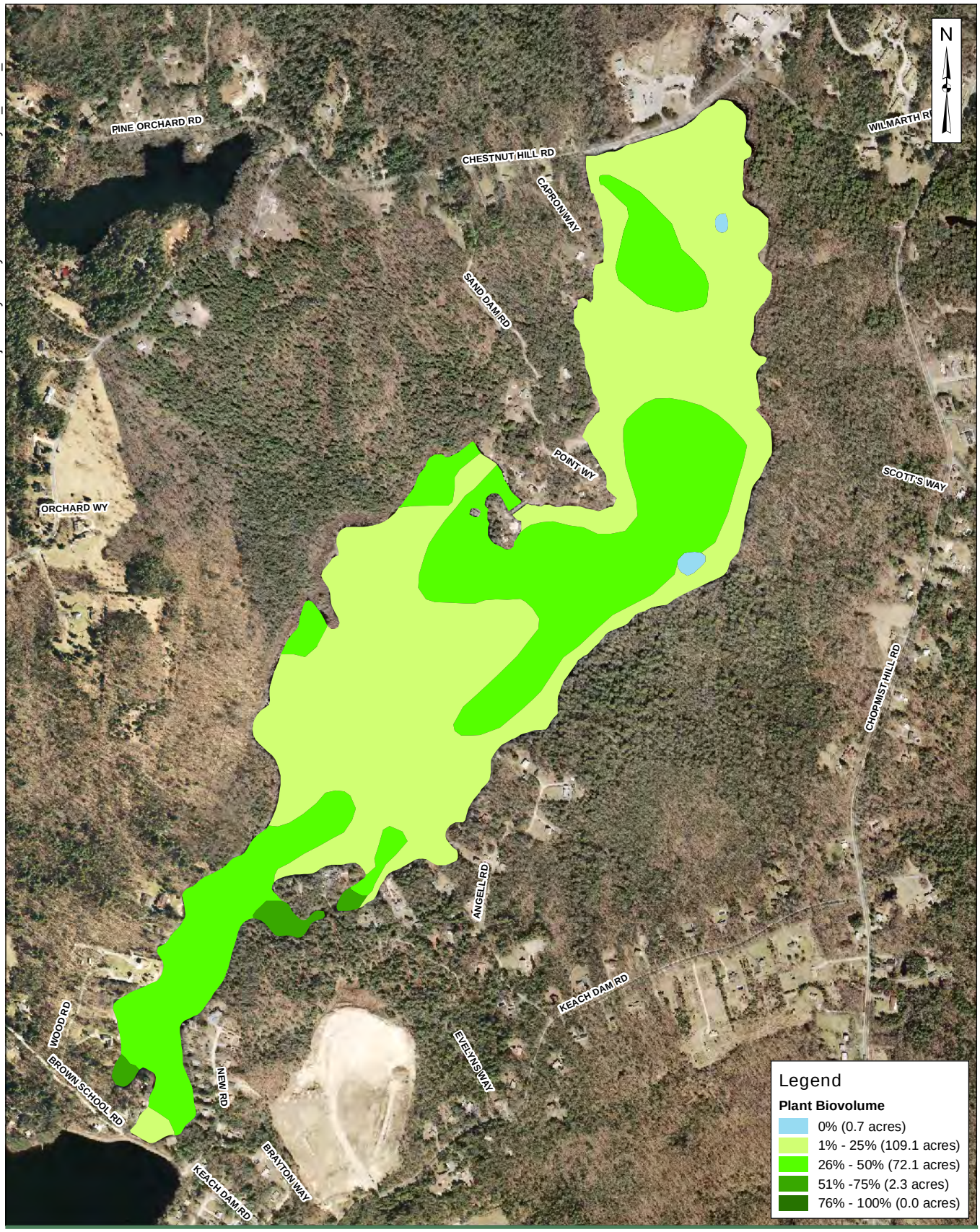
0 500 1,000 Feet

Source: 1) RIGIS, Orthos, 2004 2) RIGIS, Roads, 1997
3) ESS, Macrophytes, 2011

Smith and Sayles Reservoir
Macrophyte Cover
August 30, 2011

Figure
1

Location: G:/GIS-Projects/Sayles/Sayles/00-mxd/2011/Sayles_Biovol_2011.mxd



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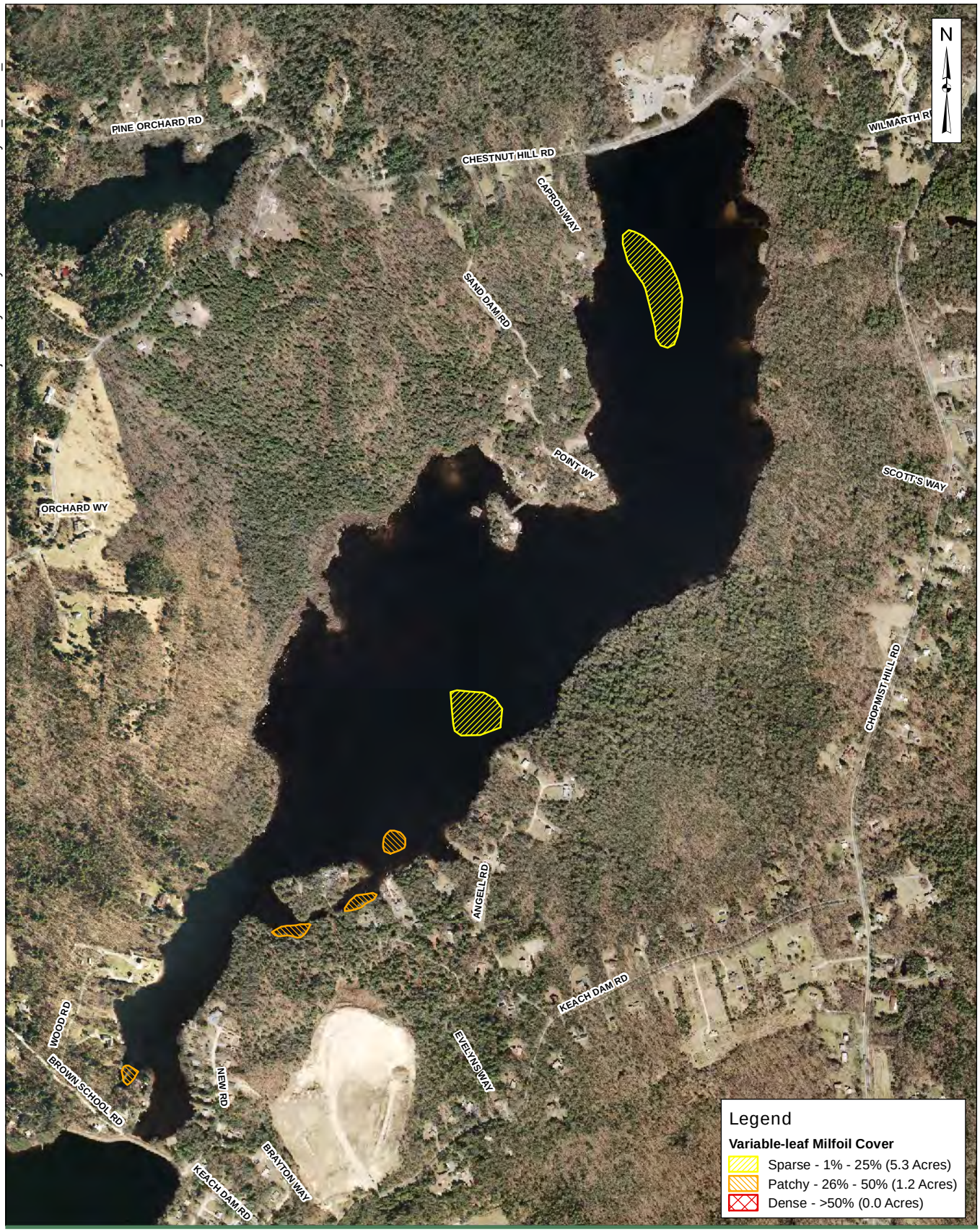
Smith and Sayles Reservoir
Macrophyte Biovolume
August 30, 2011

Figure
2

Location: G:/GIS-Projects/Sayles/Sayles/00-mxd/2011/Sayles_VLMilfoil_2011.mxd



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Smith and Sayles Reservoir
Variable-leaf Milfoil Density
August 30, 2011

Figure
3