

LPT-235-04

→ Jim R, Walnut

Black Otter Lake Plant Restoration Follow-up Survey

October 24, 2004

Jim - this is the
final report for
LPT-235.

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Thanks,
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Written by:

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Introduction

Black Otter Lake is a shallow 75-acre impoundment located in the village of Hortonville. Two intermittent tributaries that drain agricultural areas of Outagamie County and one storm water drainage inlet feed the lake. Black Otter Creek drains from the lake directly into the Wolf River.

Due to its shallowness and the nutrient inputs from the watershed, Black Otter Lake has a history of nuisance aquatic plants, water quality, and sedimentation problems. In 2002 Aquatic Biologists Inc. completed a comprehensive lake management study, which found that high nutrient inputs continued to enter the lake.

To help improve the lake, the Black Otter Lake District received a Lake Protection Grant from the Wisconsin Department of Natural Resources to restore beneficial aquatic plants. Aquatic plant restoration was performed in the eastern and southern inlet bays of the lake (figure 1.) On May 7, 2004 a total of 6,300 aquatic plants were introduced into the lake. Volunteers from the Black Otter Lake District, Hortonville High School, and Aquatic Biologists, Inc participated in the planting. Students from the Hortonville high school performed a majority of the planting. A total of 11 emergent plant species were used in the restoration efforts (table 1). A description of each plant species used in the restoration project is also included.

On October 13, 2004 a plant survey was conducted in the planting areas to document the survival success of the planting project. Plant surveys were conducted in both the eastern and southern inlet planting areas.

Methods

One week prior to planting a lake draw down was implemented to help gain desirable water levels for planting. Also prior to planting, the restoration sites were marked with wooden lath stakes. Each lath was color coded to correlate with a certain plant species (see Black Otter Lake planting description sheet 1). Students were paired into teams and given instructions on proper planting locations and methods (see Black Otter Lake planting description sheet 2). Students and team leaders planted the plant material with the use of small boats and waders.

Plant surveys were performed within each of the planting areas. Stem counts for each emergent plant were taken.

Results and Discussion

Frostbitten?
Common bur-reed (*Sparganium eurycarpum*), hardstem bulrush (*Scirpus acutus*), softstem bulrush (*Scirpus validus*), and spatterdock (*Nuphar variegata*) showed positive survival results (table 2). Common arrowhead (*Sagittaria latifolia*), pickerel plant (*Pontederia cordata*), and water plantain (*Alisma subcordatum*) were present but could not be accurately accessed due to frostbitten leaf foliage. Wild Rice (*Zizania spp.*) and White water lily (*Nymphaea odorata*) were present but in low numbers. Wild celery (*Vallisneria americana*) and river bulrush (*Scirpus fluviatilis*) were not observed.

An addition plant survey within the planting areas next summer would help to more accurately assess the survival success of the plant restoration project. Timing of the survey this season prohibited some of the species to be accurately identified and accessed.

Native Aquatic Plants : Description and Values

Native aquatic plants serve an important purpose in the aquatic environment. They play an instrumental role in enhancing the ecological balance in ponds, lakes, wetlands, rivers, and streams. Native aquatic plants have many values: To touch on a few, they serve as: 1) an important buffer (filter) against nutrient loading and toxic chemicals, 2) key components in erosion control, 3) important fish and wildlife habitat. The following is a description of the plants used for this project.

1



Common Arrowhead (*Sagittaria latifolia*) also known as duck potato is a perennial herb that is a very common shoreline plant. As its' name implies, leaves are shaped like an arrowhead. The leaves vary greatly in size and shape. Common arrowhead produces small white flowers made up of three rounded petals. Ecologically, duck potato is considered one of the highest valued aquatic plants for wildlife. The high-energy tubers and seeds are relished by a variety of wildlife, including several species of waterfowl. Arrowhead stands provide rearing habitat for fish and help aid in shoreline stabilization.



Softstem Bulrush (*Scirpus validus*), and **Hardstem Bulrush** (*Scirpus acutus*), are common perennial pond and lake colonizers that can grow in water up to 5 feet. Softstem and hardstem bulrush support long cylindrical leaves that grow 3-8 feet high. Bulrushes are second only to pondweeds in the number of animal users. They provide important spawning, nursery, and foraging habitat for fish, especially northern pike. Bulrush beds offer important cover and nesting opportunities for many bird species. Seeds are consumed by a variety of waterfowl. Bulrush species also play an important role in improving water quality. They are very effective at taking up excessive nutrients and stabilizing both shoreline and bottom sediment.



Common Bur-reed (*Sparganium eurycarpum*) is a perennial herb that tends to grow in shallow waters. This emergent has sword-like leaves that resemble a compressed triangle in cross section and grow 2-4 feet. Bur-reed produces a large seed crop that is consumed by a variety of waterfowl. Like bulrush, bur-reed provides excellent habitat for nesting birds and important habitat for fish. Common bur-reed also anchors bottom sediment and offers nutrient filtering capabilities.



Water Plantain (*Alisma subcordatum*) is a common shoreline colonizer that grows well on exposed mud flats in water less than 1 foot deep. Water plantain is a perennial herb that supports broad, flat leaves that grow 1-2 feet high. Tiny white flowers are spread out on a highly branched flower stalk. Like arrowhead, water plantain has many ecological values. The sturdy flower stalk offers a popular perch for songbirds and insects. A variety of waterfowl consume both tubers and nutlets. Water plantain also provides juvenile fish rearing habitat and shoreline buffering.



Pickerel Plant (*Pontederia cordata*) is an ornamental perennial that can grow in water up to 3 feet deep. Pickerel plant is made up of glossy, heart shaped leaves and a showy violet blue flower spike. The colorful flower stalk serves as a nectar source and home for many beneficial insects. Pickerelweed also offers exceptional habitat for both adult and juvenile fish. The robust leaves and rhizomes play a key role in shoreline stabilization and help buffer wave action.



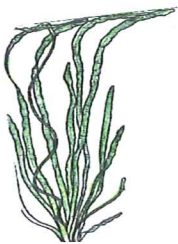
White Water Lily (*Nymphaea odorata*) emerges from a buried rhizome. Durable round stalks grow up from the rhizome. This perennial herb supports large round leaves (4-10 inches) wide that float at the water's surface. Leaves appear waxy green on top and reddish-purple on their undersides. At mid-summer showy white flowers float at the waters' surface. Lilies serve as important fish cover, especially for largemouth bass. White water lily seeds are eaten by waterfowl; rhizomes, flowers, and leaves are consumed by beaver, deer, and moose. With large broad leaves, lilies also help prevent shoreline erosion by slowing wave action.



Spatterdock (*Nuphar variegata*) also known as yellow water lily is a perennial herb that produces yellow, rounded flowers. Large (4-10 inches) long, heart-shaped leaves float at the waters surface. Spatterdock prefers soft sediment and can grow in water up to 6 feet deep. Leaf stalks have flattened wings and emerge from a buried spongy rhizome. With large buried rhizomes, spatterdock helps stabilize bottom sediment. The large leaves also help buffer the impact of wave action on the shoreline. Like lilies, spatterdock offers excellent fish habitat. Seeds are eaten by waterfowl; leaves, rhizomes, and flowers are relished by beaver, moose, and deer.



Wild Rice (*Zizania aquatica*) is an annual emergent grass that grows from seed each year. Flower stalks rise up to 9 feet tall. Wild Rice can grow in waters up to 3 feet deep. Rice establishes best in clear, shallow moving waters that have a mucky substrate. Ecologically, wild rice is prized by an array of wildlife. A variety of waterfowl, shorebirds, and songbirds relish the large seeds. Muskrats use the robust stems for lodge building and as a food source. Wild rice beds also provide spawning habitat for fish and help stabilize bottom sediment.



Water Celery (*Vallisneria spiralis*) also known as eel-grass has long ribbon-like leaves that emerge in clusters. Leaves have a prominent central stripe and leaf tips tend to float gracefully at the water's surface. In the fall, a vegetative portion of the rhizome will break free and float to other locations. Water Celery is considered one of the best all natural waterfowl foods. The entire plant is relished by waterfowl, especially canvasbacks. Eel-grass beds serve as an important food source for sea ducks, marsh birds, and shore birds. Fish also find water celery a popular hiding spot.

Figure 1. Black Otter Lake 2004 Plant Restoration Locations

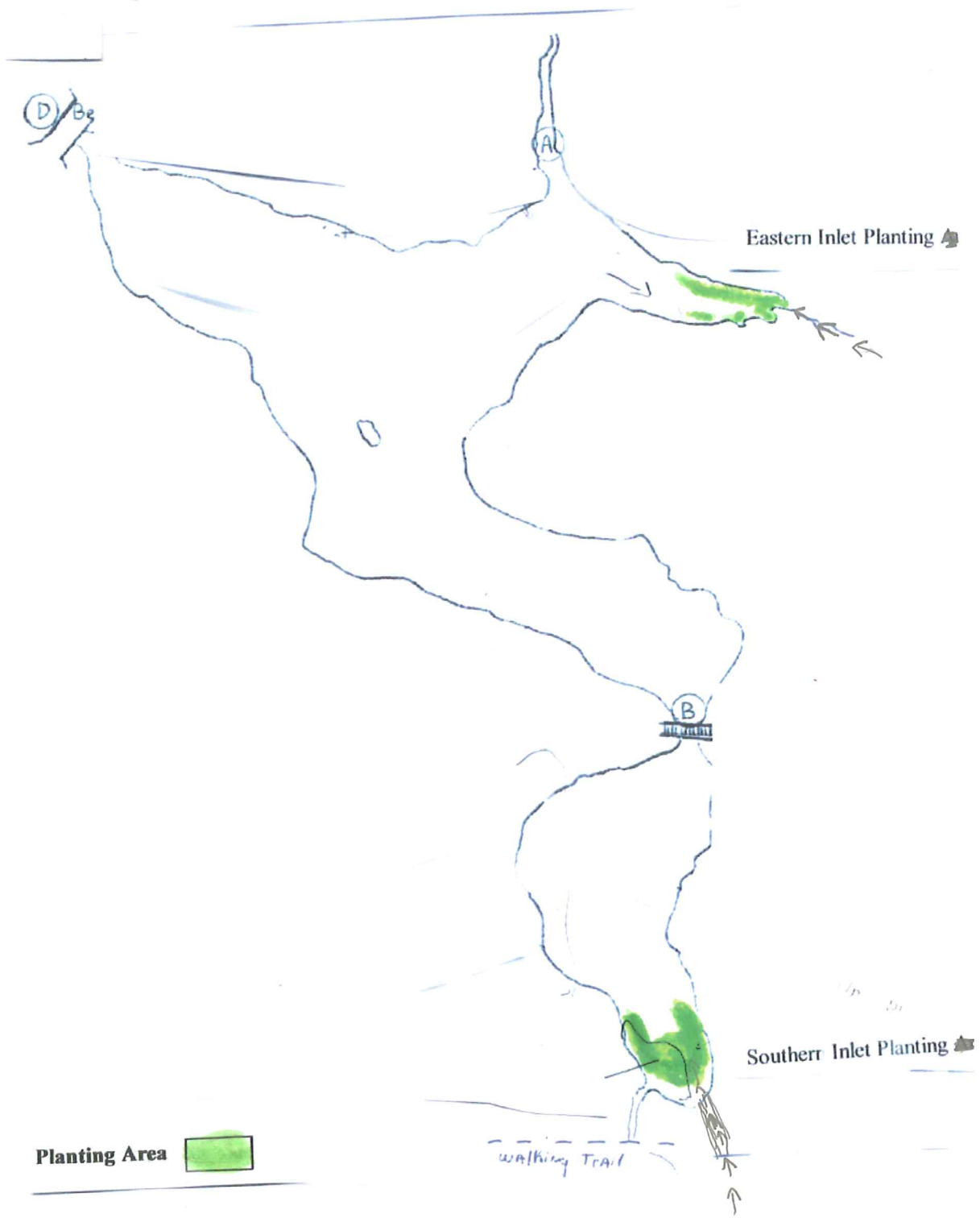


Table 1. Aquatic Plant List for the Plant Restoration Project on Black Otter Lake.

Species			
common name	scientific name		quantity
Common Arrowhead	<i>Sagittaria latifolia</i>	M	400
Common Bur-reed	<i>Sparganium eurycarpum</i>	M	400
Hardstem Bulrush	<i>Scripus acutus</i>	P	600
Pickerelweed	<i>Pontederia cordata</i>	M	400
River Bulrush	<i>Scripus fluviatilis</i>	M	400
Softstem Bulrush	<i>Scripus validus</i>	P	600
Spatterdock	<i>Nuphar variegata</i>	R	50
Water Plantain	<i>Alisma subcordatum</i>	M	400
Wild Celery	<i>Vallisneria americana</i>	RO	1500
White Water Lily	<i>Nymphaea odorata</i>	R	50
Wild Rice	<i>Zizania spp.</i>	RO	1500
			6300

M = Planted from a pot at a mature size

P = Planted from a plug

R = Planted from a rhizome

RO=Planted from a rooted seedling

Black Otter Lake Planting Description (Sheet 1)

Yellow Pond Lily and White Water Lily color code = **Yellow**

- 5 tubers of white water lily can be planted at each yellow stake.
- 2-3 large pots of yellow pond lily can be planted at each yellow mark.

Wild Celery and Wild Rice color code = **Orange**

- Around 50 seedlings of each of the species can be planted at each orange stake.

Arrowhead and Water Plantain color code = **Red**

- 9-10 potted plants can be planted at each red stake.

Pickerel Plant and Bur-reed color code = **Green**

- 9-10 potted plants of bur-reed can be planted at each green stake.
- 9-10 large rootstock of pickerel plant can be planted at each green stake.

Soft-stem, Hard-stem, and River Bulrush color code = plain (no color)

- 9-10 potted plants of hard-stem and soft-stem can be planted at each plain stake.
- 9-10 bare root sections of river bulrush can also be planted at each plain stake.

- **All stakes in the planting location will be marked with a ribbon. Once you have planted the correct plant next to the stake, please remove the ribbon. This will let everyone know that plants have been installed at that particular stake.**
- **Please try to keep each plant within a 10ft. radius of the planting stake.**

Black Otter Lake Planting Description (Sheet 2)

Team

- #1 (Spatterdock, White Water Lilies) color code = Yellow**
- Team members in this group will need to be in boats. These two plant species are planted in deeper water.
 - Planting locations will be marked with yellow stakes.
 - Rhizomes (Large roots) will need to be buried into the sediment so they don't float to the surface. **5 rhizomes** of spatterdock and white water lily will be planted at each stake.
 - Planting of these two species should go quickly.
- #2 (Wild Celery, Wild Rice) color code = Orange**
- Team members in this group will also need to be in boats. These species are planted in deeper depths.
 - Planting locations will be marked with orange stakes.
 - These species will be planted as small bare root material and seed. Roots will be pushed into the sediment. Any seeds will just have to be broadcast across the water near the desired location.
 - **50 plants** (seedlings) of wild celery and rice will be planted at each orange stake.
- #3 (Arrowhead, Water Plantain) color code = Red**
- Team members in this group will need to be in waders or hip boots. A small boat will also be needed to reach the stakes on the opposite side of the bay.
 - Planting locations will be marked with red stakes.
 - Arrowhead and Water Plantain are in pots and will need to be buried into the soft sediment.
 - **10 plants** of both species will be planted at each red stake.
- #4 (Pickerel Plant, Bur-reed) color code = Green**
- Team members in this group will need to be in waders and in boats.
 - Planting locations will be marked with green stakes.
 - Both plants will need to be buried into the soft sediment.
 - **10 plants** of pickerel plant and bur-reed will be planted at each green stake.
- #5 (Soft-stem, Hard-stem, and River Bulrush) color code = none (plain stake no color)**
- Team members will need to be in both boats and boots.
 - Planting locations will be marked with a plain stake.
 - All bulrushes will be in pots and needed to be buried into the sediment.
 - **10 plants** of each of the 3 bulrushes will be planted at each plain stack.
 - This team will have allot of planting to do.

Black Otter Lake Planting Project Continued

Team

#6 (Plant Deliverers)

- Team members will bring the plants into the bay by motorboat. Life jackets will need to be worn at all times when you're riding in the boats.
 - This group can also help with planting once all the plants have been staged at the planting site.
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- **All stakes in the planting location will be marked with a ribbon. Once you have planted the correct plant next to the stake, please remove the ribbon. This will let everyone know that plants have been installed at that particular stake.**
 - **Please try to keep each plant specie within a 10ft. radius of the planting stake.**
 - **Bring raingear and old clothes. If you bring a boat, please remember to bring paddles and life jackets.**
 - **Don't forget to have lots of fun.**

Shown below are volunteers participating in the planting efforts at Black Otter Lake.



Table 2. Results of the plant survey conducted on Black Otter Lake during October, 2004.

Species common name	Planted Quantity	Survey Quantity	Estimated % Survival
Common Arrowhead	400	Frost	
Common Bur-reed	400	272	68.0%
Hardstem and Softstem Bulrush	1000	978	97.8%
Pickerelweed	400	Frost	
River Bulrush	400	Not Detected	
Spatterdock	50	70	140.0%
Water Plantain	400	Frost	
Wild Celery	1500	Not Detected	
White Water Lily	50	3	6.0%
Wild Rice	1500	10	0.7%
	6100	1333	