BALSAM LAKE SENSITIVE AREA SURVEY REPORT AND MANAGEMENT GUIDELINES

This

document is to be used
With its companion document
"Guidelines for protecting, maintaining,
And understanding lake sensitive areas"

BALSAM LAKE SENSITIVE AREA SURVEY REPORT AND MANAGEMENT GUIDELINES

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A BRIEF SUMMARY OF BALSAM LAKE, POLK COUNTY, SENSITIVE AREAS AND MANAGEMENT GUIDELINES

The following is a brief summary of the BALSAM Lake sensitive area sites and the management guidelines. A detailed description of BALSAM Lake's sensitive areas can be found in the attached "Integrated Sensitive Area Assessment". Also, the attached "Guidelines for Protecting, Maintaining, and Understanding Sensitive Areas" provides management guidelines for the sensitive areas. It is hoped that these two attached documents will be used as guidance when dealing with the valuable resource that is BALSAM Lake.

I. The following sensitive areas contain aquatic plant communities which provide important fish and wildlife habitat: 1, 2, 4, 5, 6, 8, 9, 10, 11, 12, 13, 15, 17, 18, 19, 22, 23, 25, 26, 27, 29, 31, 32, and 34 (see attached map). Management guidelines for these sites are:

1. Limit aquatic vegetation removal to navigation channels or, at some sites, there should be no aquatic vegetation removal. See the site-specific recommendations.

2. Attempts should be made to control the exotic plant purple loosestrife. Removing the flowers and seedheads and placing them in a garbage bag for disposal, and treating the plant with the herbicide “Rodeo™” should treat small infestations. Large infestations require introduction of a loosestrife-eating beetle.

3. Prohibit littoral zone alterations covered by Wisconsin Statutes Chapter 30, unless there is clear evidence that such alterations would benefit the lake's ecosystem.

4. Leave large woody debris, logs, trees, and stumps, in the littoral zone to provide habitat for fish and other aquatic organisms.

5. Leave an adequate shoreline buffer of un-mowed natural vegetative cover.

6. Prevent erosion, especially at construction sites.

7. Strictly enforce zoning ordinances.

8. Eliminate nutrient inputs to the lake caused by lawn fertilizers, failing septic systems, and other sources.

9. Site 6 should be considered for acquisition by the lake district or a conservation organization, or zoned conservancy to ensure it remains in its present state.

II. The following sensitive areas provide gravel and coarse rock rubble habitat that are important for walleye spawning: 3, 7, 14, 16, 20, 21, 24, 28, 30, 33, and 35 (see map). The management guidelines for gravel and coarse rock rubble sensitive areas are basically similar to the guidelines for the aquatic plant community sensitive areas. The emphasis may be somewhat different in that:

1. It is critically important that no alteration of the gravel and coarse rock substrate occur at these sites, unless such alterations would improve walleye spawning. Chapter 30, Wisconsin Statutes, regulates such alterations.

2. Erosion control on or near shorelines is especially important adjacent to walleye spawning areas to prevent siltation of spawning habitat.

3. Chemical treatment and mechanical removal of aquatic plants need not be quite as restrictive as in aquatic plant sensitive areas**.** However, no removal of aquatic plants should be done unless necessary.

It should be noted that the recommendations made in these sensitive area management guidelines are in general good guidelines for managing the entire lake, but are especially important in the designated sensitive areas.

LAKE MANAGEMENT

INTEGRATED SENSITIVE AREA ASSESSMENT SUMMARY

LAKE: BALSAM Lake COUNTY: Polk

DATE OF SURVEYS: August 1, 1989
April 14-27, 1994
July 12, 1999

NUMBER OF SENSITIVE AREAS: 35

SITE EVALUATORS:
D.N.R. Fish Biologist: Rick Cornelius
D.N.R. Water Resources Biologist: Jim Cahow
D.N.R. Water Resources Biologist: Frank Koshere
D.N.R. Environmental Specialist: Mark Sundeen
D.N.R. Wildlife Technician: Jim Reimer

Introduction

This sensitive area lake survey is an integrated approach to resource management providing lake associations, individual property owners, zoning officials, boards of adjustment, and other interested groups or individuals with specific management recommendations that can be used to improve and protect the overall health of the BALSAM Lake ecosystem. Some of these recommendations will provide guidance as to what should be maintained or protected to insure future health of the lake ecosystem, while also acknowledging special and exceptional resource areas; other recommendations will focus on what should be restored or fixed to insure the different functional attributes of the ecosystem are all properly functioning together to insure full ecosystem health and biotic integrity. Readers of this document should refer to the accompanying companion document "**Guidelines for protecting, maintaining, and understanding lake sensitive areas**" which provides specific recommendations on how to protect the identified sensitive areas, while also helping the reader better understand why they are important to a healthy lake ecosystem.

This sensitive area survey was conducted on BALSAM Lake, which is located in central Polk County. BALSAM Lake is 2,054 acres in size, and is the largest lake in Polk County. The lake is separated into two main basins, a shallow east basin (maximum depth – 12 feet) known as “East BALSAM”, and a deeper, larger west basin (maximum depth – 37 feet). Two smaller basins extend to the north of the main basin, and are known as “Boston Bay” and “Little BALSAM”. There are eight islands in BALSAM Lake. The lake has two permanent inlets, Harder Creek and Rice Creek, and one permanent outlet, BALSAM Branch. There is a dam with a 29-foot head at the outlet.

The water of BALSAM Lake is clear and fertile, and has an MPA of 84 ppm. Summer Secchi disk readings range from 4.3 feet to 10.9 feet, with the heaviest algae blooms normally occurring in “East BALSAM” and “Little BALSAM”.

The shoreline is mostly developed with dwellings, and part of the lake is within the Village of BALSAM Lake. There are four developed boat landings and a village park on the lake.

Primary gamefish and panfish species are largemouth bass (common), walleye (common), northern pike (present), bluegills (common), black crappies (common), yellow perch

(common), pumpkinseeds (present), rock bass (present), green sunfish (present), and bullheads (common).

Vegetation on some of the shoreline is composed of natural plant cover consisting of all three layers that should be present in any healthy lake shoreline buffer (trees, shrubs, herbaceous ground cover). Efforts should be made to educate residents about the importance of retaining the existing natural plant cover in shoreline areas while encouraging the restoration of those areas that have been previously converted to lot-wide mowed lawns to the water's edge.

Sensitive areas were assigned a number designation beginning with 1 at a site on the north end of East BALSAM lake and continuing in a counter clockwise direction (see map). Sensitive areas fell into two basic categories; aquatic plant communities providing important fish and wildlife habitat (sensitive areas: 1, 2, 4, 5, 6, 8, 9, 10, 11, 12, 13, 15, 17, 18, 19, 22, 23, 25, 26, 27, 29, 31, 32, and 34), and gravel and coarse rock rubble substrate important for walleye spawning (sensitive areas: 3, 7, 14, 16, 20, 21, 24, 28, 30, 33, and 35).

Resource Value of Site "1"

This area incorporates most of the undeveloped shoreline at the north end of East BALSAM Lake. Its length is approximately 1,800 feet and extends out to the 5' depth, approximately 150' from shore.

This area represents the largest fish and wildlife area on the East BALSAM section of the lake. Plant species growing here represent a very diverse community of emergent, submergent and floating leaf vegetation.

Emergent and submergent plant species here include pickerelweed, bur reed, white and yellow water lilies, and arrowhead. Submergent vegetation includes flatstem pondweed, coontail, milfoil, wild celery, duckweed, large-leafed pondweed, P. pusillus, P. illinoensis, P. pectinatus, and mud plantain. Most species are present in equally distributed amounts. In the early spring, the predominant vegetation is curly-leafed pondweed, but it dies back naturally in June.

Sport fish species consist of northern pike, largemouth bass, and panfish. The vegetation provides valuable spawning, feeding and nursery areas for the fish populations. Largemouth bass and panfish use the substrate of sand and gravel for spawning from May until June.

The riparian property is a mix of upland and wetland habitats. This area possesses excellent wildlife values. Ducks and other migratory birds use this area as a nesting and rearing area. Great Blue Herons feed along the shore. Hawks and eagles have been observed perched here. Furbearers and other mammals use this area for cover, food, and water.

Care should be taken to prevent shoreline erosion into the area. The aquatic vegetation helps prevent shoreline erosion. This well-balanced distribution of aquatic vegetation species indicates a healthy and stable ecosystem. Protection of the existing native plants is an important method of helping diminish invasions of purple loosestrife and Eurasian milfoil.

There should be no aquatic vegetation removal from this site, and no chemical treatment allowed. Efforts should be taken to prevent erosion from developments, and shoreland and wetland ordinances should be strictly enforced.

Resource Value of Site "2"

This area, commonly known as Ferraro's Bay, is a small, shallow lagoon approximately 300 feet long and 100 feet wide, located on the middle western shore of East BALSAM Lake.

A band of Canada bluejoint grass surrounds the entire shoreline of the lagoon. Emergent vegetation here includes bulrush, cattails, sedges, lily pads, arrowhead, bur reed, and pickerelweed. Submergent species include large-leafed pondweed, Robbin's pondweed, coontail, milfoil, and elodea. Star duckweed and small duckweed are prominent throughout the entire area.

The bay is surrounded by yard and pasture, and emergent plants form a buffer from 1-20 feet in depth from the shoreline. The vegetative community of the bay provides a small, but unique fish and wildlife habitat.

Fish species using the area consist of bluegill, largemouth bass, and northern pike. Vegetation in the bay provides valuable feeding and nursery areas for fish populations.

Shorebirds, songbirds and waterfowl use this area for nesting, feeding and rearing young.

The substrate is sand and gravel covered by an accumulation of sediments. The area acts as a nutrient and sediment trap for the surrounding area and the aquatic vegetation helps prevent shoreline erosion. Protection of the existing native plants is an important method for helping to diminish invasions of purple loosestrife and Eurasian milfoil.

Chemical or mechanical treatment of aquatic vegetation should be limited to a 25-foot navigation channel. Erosion prevention and strict enforcement of shoreland and wetland ordinances are important.

Resource Value of Site "3"

This area consists of about 1,300 feet of sand, gravel, and rock shoreline on the west side of East BALSAM Lake. This shoreline is a walleye spawning area. Littoral substrate should not be altered in any way. Erosion prevention and strict enforcement of shoreland and wetland ordinances are important.

Resource Value of Site "4"

This area consists of a shallow bay adjacent to a shrub swamp wetland on the southwest corner of East BALSAM Lake. This location is just north of the narrows between East BALSAM and BALSAM Lake proper. Behind the band of wetland is high ground supporting a hardwood cover. This sensitive area includes approximately 2,400 feet of shoreline extending between two points of land. Also included are two state-owned islands with shallow plant communities connecting them to the shore.

Emergent plant varieties are very diverse, including sedges, grasses, lily pads, smartweed, bur reed, pickerelweed, cattails, and spike rush. Coontail, milfoil, elodea, whitestem pondweed, large-leafed pondweed, Robbin's pondweed, and narrow-leaf pondweeds are the primary submergent plants. Other plants include duckweed, water celery, and water meal.

Waterfowl depend on the area vegetation for a food source and a place to nest and rear young. This area is also inhabited by a variety of amphibians and reptiles. Raccoon and muskrat and other furbearers feed and rear their young here. They depend on the vegetation for cover and shelter. Songbirds use this area year-round for feeding, nesting and rearing their young.

Sport fish species consist of northern pike, largemouth bass, and panfish. The vegetation provides valuable spawning, feeding and nursery areas for the fish populations. Largemouth bass and panfish use the substrate for spawning from May until July.

This fragile wetland complex helps prevent the invasion of non-native species of vegetation such as purple loosestrife and Eurasian milfoil. Protection should be afforded the native vegetation.

Chemical treatment or mechanical harvesting of aquatic vegetation should be limited to 25-foot navigation channels to developed properties as necessary. Erosion prevention and strict enforcement of shoreland and wetland ordinances is important.

Resource Value of Site "5"

This site is comprised of a small bay to the north side of BALSAM Lake near the entrance to East BALSAM Lake. The bay is approximately 100 feet across and includes about 150' of shoreline. The adjacent property to the shoreline is fairly steep and covered with hardwood and shrubs. Although the area is developed, very little shoreline improvement has taken place.

Near the water's edge are patches of reed canary grass, milkweed, smartweed, and Joe-Pye weed. Emergent and floating leaf vegetation includes white and yellow water lily, pickerelweed, and cattails. Large-leaf pondweed and coontail are the most common submergent species. Also present are flatstem pondweed, Robbin's pondweed, sago pondweed, bushy pondweed, and wild celery. Watermeal, small duckweed, and star duckweed are found throughout the area. In spring and early summer, curly-leaf pondweed is abundant in this area, but dies back naturally in June.

Sport fish species consist of northern pike, largemouth bass, and panfish. The vegetation provides valuable spawning, feeding and nursery areas for the fish populations. Waterfowl and shorebirds feed in this area. Amphibians and reptiles are common inhabitants of this site.

Although very small, this site represents a unique ecosystem with an extremely diverse plant and animal community. Care should be taken to prevent erosion into the area. The present vegetation helps prevent shoreline erosion. Protection of existing native plants is an important method of helping diminish invasions of purple loosestrife and Eurasian milfoil.

Chemical or mechanical treatment of aquatic vegetation should be limited to a 25-foot navigation channel to the developed site at the back of the bay. Erosion prevention and strict enforcement of shoreland and wetland ordinances are important.

Resource Value of Site "6"

This site is the largest designated sensitive area on BALSAM Lake. It is approximately 11,000 feet long and includes an additional 1,000 feet of and adjacent island. The entire bay is relatively shallow. Excellent plant growth extends into the 5' to 7' depths. This area is located on the north side of the lake and is commonly known as "Stump Bay". Approximately 95% of this area is undeveloped. The only improved property is found along the eastern side of the bay in Section 1. Most of the remaining riparian property is wetland and presents the dominant wetland area on the lake.

Emergent and submergent plant species include bur reed, cattails, and white water lily. Also present are arrowhead, pickerelweed, reed canary grass and yellow water lily. Wild rice is present near the inlet of Harder Creek and bulrush is found along the east shore of the bay.

Because of the size of this area, different areas of the bay have different dominant species of submergent plants. Elodea is present throughout but dominant on the western side of the pay. Floating leaf pondweed is dominant in the southwest area near the point. Sago pondweed is dominant along the eastern side of the bay. Coontail, large-leaf pondweed, narrow-leaf pondweed and water celery are abundant throughout the site. Flatstem, Robbin's clasping leaf, whitestem, and curly-leaf pondweed are common. Buttercup, milfoil, mud plantain, and bushy pondweed are also present.

Sport fish species here consist of northern pike, largemouth bass, and panfish. This site represents a primary northern pike spawning area. The vegetation provides valuable spawning grounds for all species. The fish use this area for feeding, cover and nursery areas.

Waterfowl use this site as a place to nest and rear young. Migrating waterfowl use this area for shelter and feeding during the spring and fall. Shore birds and birds of prey are often sighted in this area. Songbirds use the wetland adjacent to this site as a nesting and rearing area.

A variety of reptiles, amphibians and mammals are common inhabitants of this area.

The substrate is sand and gravel covered by an accumulation of sediments. The bay acts as a nutrient and sediment trap for the surrounding area.

This site represents the most biologically diverse area on BALSAM Lake. Many of the plant species mentioned play a valuable environmental role in the stability and health of this ecosystem. The aquatic vegetation also helps prevent shoreline erosion. Protection of the existing diversification of native plants can help diminish invasions of purple loosestrife and Eurasian milfoil.

Chemical or mechanical treatment of aquatic vegetation should be confined to a 25-foot navigation channel into existing sites in Section 1 on the east shore. Erosion prevention and strict enforcement of shoreland and wetland ordinances are important. This large, mostly undeveloped bay provides great aesthetic and fish and wildlife value to the BALSAM Lake ecosystem. It should be zoned conservancy and should be considered for acquisition by the lake district or a conservation organization to ensure it remains in its present state.

Resource Value of Site "7"

This area consists of about 950 feet of sand, gravel, and rock shoreline on the west and south sides of Carlson Island. This shoreline is a walleye spawning area, and the littoral substrate should not be altered in any way. Erosion prevention and strict enforcement of shoreland and wetland ordinances are important.

Resource Value of Site "8"

This site is located in the back of a bay on the east shore of the area known as "Boston Bay". The area of concern is approximately 500 feet of shoreline and extends 300 feet from shore at the farthest point in a line extending from shore to shore across the bay. At sometime this area was probably a swampy wetland. Evidence of large stumps can still be seen throughout the bay and a border of bog-like conditions exists between the water and high ground. The bay is surrounded by long, steep banks directing significant amounts of runoff to the water. The substrate consists of sediments and muck. The outer edge of this site is a firm sand and rubble base.

A diverse emergent community exists here. Pickerelweed, arrowhead, yellow water lily, white water lily, cattail, bur reed and bluejoint are common species. Submergent vegetation includes coontail and mud plantain in large quantities. Also present is large-leaf pondweed, flatstem pondweed, clasping leaf pondweed, narrow-leaf pondweed, curly-leaf pondweed, buttercup, milfoil, elodea and wild celery.

Fish populations of northern pike, largemouth bass and panfish can be found here. The vegetation provides valuable spawning, feeding and nursery areas for the fish.

Waterfowl use this site as a feeding area. Great Blue Herons and other wading birds frequent this area to feed.

The site acts as a nutrient and sediment trap for the surrounding area and the aquatic vegetation helps prevent shoreline erosion. Protection of the existing native plants is an important method for helping control invasions of purple loosestrife and Eurasian milfoil.

Chemical treatment or mechanical aquatic vegetation control should be limited to a 20-foot navigation channel straight into the peripheral sites, and one channel straight down the center of the bay to the middle properties. Erosion prevention and strict enforcement of shoreland and wetland ordinances are important.

Resource Value of Site "9"

This site includes parts of both sides of the narrows between Big BALSAM and Little BALSAM Lakes and an adjacent bay to the east of the narrows in Little BALSAM Lake.

Emergent plant species here include cattails, yellow and white water lilies, pickerelweed, arrowhead, and bur reed. Large-leaf pondweed, coontail and wild celery are the primary submergent plants. Other plants include bluejoint, milfoil, elodea, flatstem pondweed, Richardson's pondweed, curly-leaf pondweed, mud plantain, and bushy pondweed.

Sport fish species consist of largemouth bass, panfish, northern pike, and walleyes. The vegetation in this area provides valuable feeding and nursery areas for the fish populations.

Migrating waterfowl use this area for shelter and feeding during the spring and fall.

A variety of reptiles and mammals are common inhabitants of this area.

Care should be taken to prevent shoreline erosion in this area. The aquatic vegetation helps prevent shoreline erosion. Protection of the existing native plants is an important method of helping diminish invasions of purple loosestrife and Eurasian milfoil.

There should be no chemical treatment of aquatic vegetation on the west side of the narrows, or in the undeveloped east bay. Continued chemical treatment is allowed on developed sites on the east side of the narrows to a maximum of 80 feet out from shore. Mechanical control is allowed to developed sites.

Resource Value of Site "10"

This site is located at the far northwest end of "Little" BALSAM Lake which includes the inlet from Rice Creek. The approximate shoreline length is 2,000 feet, most of which is undeveloped. Steep banks surround the south and north sides with wetland closing the northwest end.

Emergent plant species include bur reed and both white and yellow lily. Other emergents here are cattails, bulrush, and bluejoint. Watermeal and duckweed are abundant on the water's surface. Predominant submergent species are waterweed and coontail with large-leaf pondweed found in some areas of this site.

Sport fish species consist of northern pike, largemouth bass, and panfish. Northern pike and panfish spawn in this area. The vegetation provides valuable spawning, feeding, and nursery areas for fish populations.

The riparian property is a mix of upland and wetland habitats. This area possesses excellent wildlife values. Ducks and other migratory birds use this area as a nesting and rearing area. Furbearers and other mammals use this area for cover, food, and water.

Care should be taken to prevent shoreline erosion of this area. The site acts as a nutrient and sediment trap for the surrounding area and the aquatic vegetation helps prevent shoreline erosion. Protection of the existing native plants is an important method of helping diminish invasions of purple loosestrife and Eurasian milfoil.

Chemical or mechanical aquatic vegetation control should be allowed on the south banked shore only. Treatment may consist of a 20-foot access channel to developed sites as development occurs.

Resource Value of Site "11"

This area is comprised of a small shallow bay located midway along the south shore of Little BALSAM Lake. Approximately 400 feet of shoreline is included in this site and extends 100 feet out from shore. A small wetland of tamarack and tagalder is found along the shore.

Emergent plant varieties are very diverse, including bur reed, yellow water lily, bulrush, arrowhead, and cattails. Big duckweed, small duckweed, and watermeal are found over much of the surface area. Coontail is the dominant submergent species present. Other

submergents include flatstem pondweed, Richardson's pondweed, waterweed, bush pondweed, wild celery, water marigold, and mud plantain.

Fish species consist of northern pike, largemouth bass, and panfish. The vegetation provides valuable spawning, feeding, and nursery areas for the fish populations. Largemouth bass and panfish use the substrate for spawning from May until June.

Care should be taken to prevent shoreline erosion. Aquatic vegetation helps prevent shoreline erosion. Protection of the existing native plants is an important method of helping diminish invasions of purple loosestrife and Eurasian milfoil.

There should be no aquatic vegetation removal at this site, by either chemical or mechanical means. Erosion prevention and strict enforcement of shoreland and wetland ordinances are important.

Resource Value of Site "12"

This area is located about midway along the north shore of the main body of BALSAM Lake. It is comprised of a bulrush bed which begins 75 feet from shore and is 200 feet by 75 feet in size. Submergent vegetation found among the bulrush is large-leaf pondweed and flatstem pondweed.

This area represents valuable nursery and feeding area for the fish populations found here. Largemouth bass, bluegill and walleye use the substrate of sand and gravel for spawning from April until June. Waterfowl use this area for cover and feeding. Great Blue Herons feed throughout this shallow site.

Protection of existing native plants will insure the continued use by fish and wildlife as well as help diminish invasions of purple loosestrife and Eurasian milfoil.

There should be no aquatic vegetation removal at this site, by either chemical or mechanical means.

Resource Value of Site "13"

This area is located in the northwest corner of BALSAM Lake and includes the Highway 48 boat launch. The approximate length of this site is 800 feet; 200 feet of which is along Highway 48 and 600 feet along the north shore to the east of the boat launch. This area extends 200 feet out from shore.

The submergent vegetation is primarily large-leaf pondweed and coontail. Many other diverse species inhabit this area in lesser amounts. Wild celery bush pondweed, sago pondweed, Richardson's pondweed, and flatstem pondweed are found here.

Emergent species include cattails, white water lily, yellow water lily, pickerelweed, and spike rush.

Sport fish species using the area include northern pike, largemouth bass, and panfish. The vegetation here provides valuable spawning, feeding and nursery areas for the fish populations.

Care should be taken to prevent erosion into the area. The aquatic vegetation helps prevent shoreline erosion. Protection of the existing native plants is an important method of helping diminish invasions of purple loosestrife and Eurasian milfoil.

Chemical or mechanical control of aquatic vegetation should be limited to a 25-foot navigation channel to developed sites.

Resource Value of Site "14"

This area consists of about 2,900 feet of sand, gravel, and rock shoreline on the south shore of the west end of the lake. This shoreline is a walleye spawning area, and the littoral substrate should not be altered in any way. Erosion prevention and strict enforcement of the shoreland and wetland ordinances are important.

Resource Value of Site "15"

This area is located along the east shore of the first island from the town boat launch. The approximate length of this site is 600 feet and extends 100 feet from shore.

The substrate in this area consists of sand and gravel. The emergent vegetation found here is white water lily, yellow water lily, bur reed and small patches of arrowhead. The dominant submerged species is wild celery with beds of large-leaf pondweed and milfoil found in the deeper water.

Sport fish species found here include northern pike, largemouth bass, and panfish. The vegetation provides valuable spawning, feeding, and nursery areas for the fish populations. Spawning occurs here from April through June.

Waterfowl use this area for feeding, rearing young, and shelter from predators and boat traffic. Herons feed along the shore.

There is no history of chemical or mechanical control in this area. The island is limited to the number of developments which can occur there. The need for access through this area is unlikely in that many other locations are more desirable. There should be no aquatic vegetation removal at this site.

Care should be taken to prevent shoreland erosion into the area. The aquatic vegetation helps prevent shoreline erosion. Protection of the existing native plants is an important method for helping diminish invasions of purple loosestrife and Eurasian milfoil.

Resource Value of Site "16"

This site consists of approximately 800 feet of sand, gravel, and rock shoreline on the north and west shore of First Island. This shoreline is a walleye spawning area, and the littoral substrate should not be altered in any way. Erosion prevention and strict enforcement of shoreland and wetland ordinances are important.

Resource Value of Site “17”

This area is found within the City of BALSAM Lake. It is a large bay with approximately 2,000 feet of shoreline and a large wetland marsh extending to the northwest from the shore.

Dominant emergent plant species include white and yellow water lilies and cattails. Arrowhead pickerelweed and bur reed are found in lesser amounts.

Largemouth pondweed is abundant throughout the area. Other submergent species include flatstem pondweed, Robbins' pondweed and blatterwort. Curly-leaf pondweed is present, but dies back naturally in June.

Sport fish species include northern pike, largemouth bass, and panfish. The substrate is used for spawning from April through June. The vegetation provides valuable feeding, nursery, and cover areas for the fish population.

Wood ducks, mallards, and Great Blue Herons depend on the vegetation for food and a place to nest. Migrating waterfowl frequently rest in the wetland areas.

Amphibians and reptiles and furbearing mammals are common inhabitants here. They depend on the vegetation for cover and shelter. Songbirds use this area for nesting, feeding, and rearing their young.

This site represents an important fragment of the ecosystem with an extremely diverse plant and animal community. Care should be taken to prevent erosion into the area. The present vegetation helps prevent shoreline erosion. Protection of existing native plants is an important method of helping diminish invasions of purple loosestrife and Eurasian milfoil.

No chemical treatment of aquatic vegetation should occur at this site. Mechanical control may consist of five-foot wide fingers or lanes to provide access for fishing and a channel to provide access to the Polk County Bank dock.

Resource Value of Site “18”

This area is known as “the millpond”. It is located between County Highway “I” and the BALSAM Branch dam. Due to limited size, access, and depth, this entire area is included in the sensitive designation.

Submergent vegetation includes milfoil, flatstem pondweed, and large-leaf pondweed. Coontail, Richardson's pondweed and Robbins' pondweed are present in lesser amounts. Most of this site contains white water lily with bulrush and bur reed also being present.

Sport fish species include northern pike, largemouth bass, and panfish. The vegetation provides valuable spawning, feeding and nursery areas for the fish populations.

Waterfowl, songbirds, and Great Blue Herons depend on the vegetation for a source of food. A variety of reptiles and amphibians inhabit this area. Raccoons and other mammals feed along the shore.

Care should be taken to prevent erosion into this area. The present vegetation helps prevent shoreline erosion. Protection of existing native plants is an important method of helping diminish invasions of purple loosestrife and Eurasian milfoil.

Chemical or mechanical control of aquatic vegetation may consist of 25-foot navigation channels extending straight out from developed areas, not to exceed 100 feet.

Resource Value of Site "19"

This area is located along the southeast edge of Pine Island. This site consists of an emergent plant community which extends approximately 150 feet along the shoreline and 50 feet out from shore.

Yellow water lily and pickerelweed are the dominant emergent species in this area. Cattails and bur reed are found along the shore. Submergent plants found here are the high value species, wild celery and large-leaf pondweed.

Sport fish species inhabiting this area include northern pike, walleye, largemouth bass, and panfish. The vegetation provides valuable spawning, feeding, and nursery areas for the fish populations. Spawning occurs here from April to July.

Waterfowl depend on the area vegetation for a food source, shelter, and a place to nest and rear young. Herons and other shorebirds frequent this area to feed.

Care should be taken to prevent shoreline erosion into the area. The aquatic vegetation helps prevent shoreline erosion. Protection of the existing native plants is an important method of helping to diminish invasions of purple loosestrife and Eurasian milfoil.

There should be no vegetation removal at this site.

Resource Value of Site "20"

This site consists of about 650 feet of sand, gravel, and rock shoreline on the east, north, and west shore of Pine Island. This shoreline is a walleye spawning area, and the littoral substrate should not be altered in any way. Erosion prevention and strict enforcement of shoreland and wetland ordinances are important.

Resource Value of Site "21"

This area consists of the entire shoreline (about 800 feet) of Cedar Island. This shoreline is a walleye spawning area, and the littoral substrate should not be altered in any way. Erosion protection and strict enforcement of shoreland and wetland ordinances are important.

Resource Value of Site "22"

This area is a small shallow bay along the south shore of BALSAM Lake. It is approximately 200 feet of shoreline extending 100 feet from shore.

Emergent plant species include yellow water lily floating in most locations of the bay. Arrowhead and bur reed are found along the shore in the shallower depths.

The submergent species in this area are wild celery and large-leaf pondweed. Some milfoil can be found in small colonies.

Sport fish species which can be found here are northern pike, largemouth bass, and panfish. This shallow bay is used for spawning by bass and panfish from May to July. The vegetation here provides cover for small fish as well as providing food or habitat for feeding for the fish populations.

Waterfowl feed and rear their young here. Migrating waterfowl rest and feed here during Spring and Fall movements.

Care should be taken to prevent shoreline erosion and the aquatic vegetation help prevent this type of problem. Protection of the existing native plants is an important method of helping to diminish invasions of purple loosestrife and Eurasian milfoil.

There should be no vegetation removal at this site.

Resource Value of Site “23”

This area is commonly known as “Rat’s Skin Bay”. It is located along the southern shore of BALSAM Lake. Its size includes approximately 2,000 feet of shoreline and includes the entire area of the bay. The entire shoreland surrounding the bay is developed.

The plant community of the bay is very diverse. Floating plant species include white water lily, yellow water lily, and watermeal. Emergents found here are bur reed, pickerelweed, bulrush, and cattails.

Coontail is the most abundant emergent species on this site. Robbins' pondweed and star duckweed are also very common. Richardson's pondweed, milfoil, bushy pondweed, mud plantain and wild celery are also present.

Fish species here consist of northern pike, largemouth bass, and panfish. The vegetation provides valuable spawning, feeding, and nursery areas for the fish populations.

Waterfowl use this site as a place to nest, feed, and rear young. Migrating waterfowl use this area for shelter and feeding during the spring and fall.

Many of the plant species listed play a valuable environmental role in the stability and health of this ecosystem. The aquatic vegetation also helps prevent shoreline erosion. Protection of the existing diversification of native plants can help invasions of purple loosestrife and Eurasian milfoil.

Chemical or mechanical control of aquatic vegetation may consist of one primary navigation channel 50 feet wide entering the bay and branching, going to both ends of the bay. From the primary channel, 25-foot fingers may extend to developments. Erosion prevention and strict enforcement of shoreland and wetland ordinances are important.

Resource Value of Site “24”

This site consists of the entire shoreline (about 1,600 feet) of Bear Island. This shoreline is a walleye spawning area, and the sand, gravel, and rock littoral substrate should not be altered in any way. Erosion prevention and strict enforcement of shoreland and wetland ordinances are important.

Resource Value of Site "25"

This area is a small bay midway along the south shore. The shoreline involved at this site is approximately 500 feet and extends out into the lake from the mouth of the bay about 200 feet to the 5 foot depth. Development in this area is very limited at this time. High, steep banks are found along the south side of the bay. Emergent vegetation found here is predominantly yellow water lily. Some bur reed and arrowhead is found near the shore. Large duckweed and watermeal is found floating in the area.

Submergent vegetation is very prolific and quit diverse. Robbins' pondweed is dominant at the shallower depths and wild celery is abundant in the 2 to 5 foot depths. Large-leaf pondweed, milfoil, and coontail are present in most of the area. Flatstem pondweed, bushy pondweed, mud plantain, narrow leaf pondweed, and curly leaf pondweed can all be found in various locations of this area.

Sport fish species here are northern pike, largemouth bass, and panfish. The vegetation provides valuable spawning, feeding, cover, and nursery areas for the fish populations.

Although small, this site presents a very unique ecosystem with an extremely diverse plant and animal community. Care should be taken to prevent shoreline erosion into the area. The aquatic vegetation helps prevent shoreline erosion. Protection of the existing native plants is an important method of helping to diminish invasions of purple loosestrife and Eurasian milfoil.

Chemical treatment or mechanical control is limited to a 20-foot channel to the developed property in the bay.

Resource Value of Site "26"

This area is a large shallow bay located about midway along the south shore of BALSAM Lake. The total shoreline involved with this site is approximately 1,000 feet and extends out from the mouth of the bay 125 feet to the 5-foot depth. Compared to other locations along this shore, the riparian property here is near lake level. Development here is total.

Emergent vegetation includes white and yellow water lily floating in widely separated clusters in various locations of the bay. Bur reed, pickerelweed, and arrowhead are found sporadically along the shoreline.

Submergent vegetation in this area is much more prolific. Wild celery is found throughout the area. Large-leaf pondweed, Richardson's pondweed, and mud plantain are also very abundant. Other species included here are Sago pondweed, narrow leaf pondweed, coontail, and milfoil.

Sport fish species found in this area are northern pike, largemouth bass, and panfish. Many of the plant species listed for this site provide important needs for the fish found here. Cover,

shelter, food, and nursery areas are among them. The substrate is used for spawning bass and panfish during May and June.

Waterfowl and wading birds use this area for feeding during migration and during the summer months.

Care should be taken to prevent shoreline erosion into the area. The aquatic vegetation helps prevent shoreline erosion. Protection of the existing native plants is an important method of helping to diminish invasions of purple loosestrife and Eurasian milfoil.

Chemical treatment or mechanical control should be limited to 25-foot navigation channels to developed property.

Resource Value of Site "27"

This area consists of the south and west side of Paradise Island. The length of this site is approximately 500 feet on each side and extends 75 feet from the shoreline.

The important feature of this site is the amount and diversity of the emergent vegetation in the area close to the shoreline. Species found here are bur reed, yellow water lily, pickerelweed and bulrush. In lesser amounts are white water lily and cattails.

Fish species using this area are northern pike, largemouth bass, and panfish. Vegetation here provides valuable spawning, feeding, and nursery areas for the fish populations. The fish also depend on the structure in the area for spawning in April through June.

Shorebirds, songbirds and waterfowl use this area for feeding and resting during migration. Ducks and loons nest and rear young in and near this site. Herons feed in this area.

Care should be taken to prevent shoreline erosion into the area. The aquatic vegetation helps prevent shoreline erosion. Protection of the existing native plants is an important method of helping to diminish invasions of purple loosestrife and Eurasian milfoil.

There should be no aquatic vegetation removal at this site.

Resource Value of Site "28"

This site consists of approximately 600 feet of shoreline on the north side of Paradise Island. This shoreline is a walleye spawning area, and the sand, gravel, and rock littoral substrate should not be altered in any way. Erosion prevention and strict enforcement of shoreland and wetland ordinances are important.

Resource Value of Site "29"

This area is located along the southeast shore of Big Island, extending approximately 1,600 feet from point to point and out from shore 200 feet to the 5 foot depth.

The emergent vegetation in this area is quite heavy. Yellow and white water lily covers the majority of the area. Navigational channels leach into developed properties and are kept open

by boat traffic. Pickerelweed, bur reed, cattails, and bulrush are found in the shallower areas near shore. Large duckweed was found in heavy concentrations at the time of the inspection.

Submergent species found here include large-leaf pondweed, flatstem pondweed, Richardson's pondweed, coontail, milfoil, mud plantain, and wild celery. Submergent populations are very evenly distributed throughout this area.

Sport fish inhabiting this area are walleyes, northern pike, largemouth bass, and panfish. The substrate provides valuable spawning areas for these species from April through June. The vegetation provides food, cover, and nursery area for the fish populations.

Waterfowl nest and rear young here. The vegetation provides food and shelter for migrating and nesting ducks. Wading birds feed along the shore.

Care should be taken to prevent shoreline erosion into the area. The aquatic vegetation helps prevent shoreline erosion. Protection of the existing native plants is an important method of helping diminish invasions of purple loosestrife and Eurasian milfoil.

Chemical treatment or mechanical control should be limited to 25-foot navigation channels to developed properties.

Resource Value of Site “30”

This site consists of about 4,800 feet of sand, gravel, and rock shoreline on the east, north, and west shoreline of Big Island. This shoreline is a walleye spawning area, and the littoral substrate should not be altered in any way. Erosion prevention and strict enforcement of shoreland and wetland ordinances are important.

Resource Value of Site “31”

This area is a very small pocket along the south shore before the narrows between BALSAM Lake and East BALSAM Lake. The shoreline along both sides of this area is steep and wooded. This site is 100 feet long and extends out from shore 75 feet. The shoreland here is of lesser grade than the surrounding area and serves as a drainage run for the adjacent properties.

Yellow water lily, bulrush and pickerelweed are the dominant forms of emergent vegetation. Coontail, flatstem pondweed and large-leaf pondweed are the submerged species.

Sport fish species found here are northern pike, largemouth bass, and panfish. The vegetation provides shelter, food, and nursery habitat for the fish populations.

Amphibians and reptiles are found here. Furbearers and other mammals use this access to the water’s edge.

Care should be taken to prevent shoreline erosion into the area. The aquatic vegetation helps prevent shoreline erosion. Protection of the existing native plants is an important method of helping diminish invasions of non-native species such as purple loosestrife and Eurasian milfoil.

No vegetation removal should occur at this site.

Resource Value of Site “32”

This area consists of a large bay with a peninsula to the east side. The total shoreline length of this site is approximately 2,250 feet.

This area contains several habitat types. Here we find marshy areas covered with grasses and sedges; other areas rimmed with rushes and cattails; dense growths of lily pads and pickerelweed. Riparian vegetation is of hardwood forest.

Submergent vegetation is made up of significant amounts of large-leaf pondweed, flatstem pondweed, coontail, milfoil, and Robbins' pondweed. Other species include elodea, clasping-leaf pondweed, and whitestem pondweed. Curly-leafed pondweed is found in this area in late spring and early summer.

Sport fish species consist of northern pike, largemouth bass, walleye, and panfish. The vegetation provides valuable spawning, feeding and nursery area for the fish populations. Waterfowl, songbirds, and Great Blue Herons depend on the vegetation for a source of food and a place to nest. A variety of reptiles and amphibians inhabit this area. Raccoons and other mammals feed along the shore.

Protection of this fragile ecosystem is an important method to help diminish invasions of non-native plant species such as purple loosestrife and Eurasian milfoil.

Chemical treatment or mechanical control should be limited to 20-foot navigation channels to developed properties.

Resource Value of Site “33”

This site consists of a peninsula which terminates to a rocky shoal which extends 300 feet beyond the point and ends with a small rocky protuberance sparsely covered with vegetation. This site also includes the east side of the peninsula and a portion of the southwest shoreline of East BALSAM Lake. In all, the total shoreline length of this site is approximately 3,800 feet. This sand, gravel, and rock shoreline is an important walleye spawning area, and the littoral substrate should not be altered in any way. Also, there should be no aquatic vegetation removal at this site. Erosion prevention and strict enforcement of shoreland and wetland ordinances are important.

Resource Value of Site “34”

This area consists of approximately 500 feet of shoreline located in the southeast corner of East BALSAM Lake. This shoreline and adjacent upland area is an old pasture. There appears to be little or no livestock activity near the water at this time.

The shoreline and shallows are inhabited predominantly by Bidens and reed canary grass. Emergent species include yellow water lily, pickerelweed, arrowhead, bur reed and cattails. The substrate in this area is sandy with overlying organic sediments.

Submergent plants include coontail in abundance. Other common species include elodea, wild celery, bushy pondweed, and star duckweed. Also present are large-leaf, clasping, curly-leafed pondweeds, and Robbins' pondweed.

Sport fish species using the area consist of bluegill, largemouth bass, and northern pike. Vegetation in this area provides valuable spawning, feeding, and nursery habitat for the fish populations.

In this area of the lake, this is the only location supporting such a wide variety of vegetation. Going to the south from this site and following up the shoreline to Site 1 is continuous development to the water's edge. This distance represents approximately half of the East BALSAM Lake shoreline. Protection of the existing diversification of native plants can help diminish invasions of non-native species.

There should be no aquatic vegetation removal at this site.

Resource Value of Site "35"

This area consists of approximately 3,200 feet of sand, gravel, and rock shoreline on the east shore of East BALSAM Lake.

This shoreline is a walleye spawning area, and the littoral substrate should not be altered in any way. Erosion prevention and strict enforcement of shoreland and wetland ordinances are important.

General Lake Wide Recommendations

The following different areas/RECOMMENDATIONS were identified as priorities by the DNR's integrated team of biologists and water regulations and zoning staff for the maintenance and protection of a healthy BALSAM Lake ecosystem. To help better understanding the specific management recommendations that should be followed for each of the following areas the reader should refer to the accompanying companion document "**Guidelines for protecting, maintaining, and understanding lake sensitive areas**".

I. Protection and restoration of shoreline buffers. This provides protection for water quality, aquatic plant communities, and other habitat.

II. Protection of existing aquatic plant communities.

III. Aggressive erosion control measures for all bare soil areas with an emphasis on all construction and ground breaking. This provides protection for water quality, aquatic plant communities, and coarse rock rubble walleye spawning habitat.

IV. Limit the use of fertilizers on lakeshore lawns.

V. Support the aggressive application of existing zoning regulations and support the development of future ones to prevent unnecessary impacts to the ecosystem, which could be avoided if future development is accomplished in a wise and careful manner considerate of the resource.

VI. Encourage the retention of large woody debris in near shore areas. Fallen trees provide critical habitat.

VII. Develop an aggressive education program by local lake association to promote the above mentioned guidelines.

VIII. Implement land acquisition or easements to protect critical areas from any possible future development.

BALSAM Lake Aquatic Plant Species List

PLANT SPECIES	COMMON NAME
Bidens beckii	Water Marigold
Carex sp.	Sedges
Ceratophyllum demersum	Coontail
Eleocharis sp	Spikerush
Elodea canadensis	Elodea
Lemna trisulca	Forked Duckweed
Lythrum salicaria	Purple Loosestrife
Myriophyllum sp.	Northern Water Milfoil
Najas sp.	Slender Naiad (Bushy Pondweed)
Nuphar sp.	Yellow Water Lily
Nymphaea sp.	White Water Lily
Phalaris arundinacea	Reed Canary Grass
Polygonum amphibirm	Smartweed
Pontederia cordata	Pickerelweed
Potamogeton sp.	Narrowleaf Pondweed
Potamogeton amplifolius	Large-leaf Pondweed
Potamogeton crispus	Curly-leaf Pondweed
Potamogeton illinoensis	Illinois Pondweed
Potamogeton pectinatus	Sago Pondweed
Potamogeton pusillus	Small Pondweed
Potamogeton praelongus	White-stem Pondweed
Potamogeton richardsonii	Claspingleaf Pondweed
Potamogeton robbinsii	Fern Pondweed (Robbins' Pondweed)
Potamogeton zosteriformis	Flat-stem Pondweed
Ranunculus sp.	Water Buttercup
Sagittaria sp.	Arrowhead
Scirpus sp.	Bulrush
Sparganium sp.	Bur reed
Typha augustifolia	Cattail
Utricularia vulgaris	Bladderwort
Vallisneria americana	Eel Grass (Wild Celery)