Nature Preserve Management Plan – Bessey Creek Preserve, Little Traverse Conservancy

EEB 556 Field Botany of Northern Michigan

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Abstract

Bessey Creek Nature Preserve (BCNP) is a nature preserve in Cheboygan County, Michigan, owned by the Little Traverse Conservancy, Harbor Springs, Michigan. Limited information has been available pertaining to the natural environment and management concerns of the Preserve. To better understand the plant diversity, ecological significance, and management requirements for BCNP, the Field Botany Class at University of Michigan Biological Station conducted a comprehensive investigation of the flora of BCNP in the summer of 2011. BCNP is a relatively small preserve (0.2 ha), with 109.8 m of water frontage on northwest Douglas Lake and 46.1 m of road frontage. Four general habitats were found within the preserve. These habitats include the relatively dry roadside with many weedy or invasive species, the *Fraxinus nigra* (black ash) swamp consisting mainly of wetland species, the littoral zone along Douglas Lake dominated by grasses and sedges, and the open water of Douglas Lake and Bessey Creek. Despite of its small size, BCNP has relatively high preservation value. The diversified covertypes in the preserve ensure high plant diversity and provide various wildlife habitats. We collected 116 plant specimens in total within BCNP. Among these species, seven invasive or weedy species (*Phalaris arundinacea, Myosotis scorpioides, Lonicera morrowii, Cirsium arvense, Aegopodium podagraria, Celastrus orbiculatus,*and *Lythrum salicaria*) were identified. Fourteen species of conservation concern (*Myriophyllum sibiricum, Campanula aparinoides, Carex lasiocarpa, Comarum palustre, Dulichium arundinaceum, Equisetum fluviatile, Lathyrus palustris, Lobelia cardinalis, Platanthera psycodes, Nuphar variegata, Cladium mariscoides, Carex aquatilis, Carex rostrata,* and *Chelone glabra*) were also identified within BCNP, and may need protective management. In addition, Bessey Creek has aesthetic value with its beautiful views of Douglas Lake and the creek area that is not blocked by any structures. Accordingly, we recommend the following points for future management:

1) The invasive species such as *Lythrum salicaria*, *Aegopodium podagraria*, and *Celastrus orbiculatus* should be controlled as they are in the early stages of colonization but could severely impact plant communities.

2) We recommend minimum disturbance of human activities in BCNP, because of the small size of the preserve and the high biodiversity, as well as diversified habitats there.

3) Several signs of unnatural disturbances (dumping of lawn waste, litter, a dragging trail, etc.) have been found within BCNP. These conditions should be monitored.

4) We noticed relatively high wildlife diversity in BCNP. Many different species of birds, fish (young pike, swarms of baby bullheads), and aquatic mammals, as well as a turtle hatching area have been observed in BCNP. A study of animal use of the preserve would be a useful addition to the ecological knowledge of BCNP.

General background information and acquisition history

Size: 0.2023 ha (0.5 acres)

Water Frontage: 109.758 m (360.10 ft) on Douglas Lake

Road Frontage: 46.1436 m (151.39 ft) on Silver Strand Road

Site Location: Munro Township, Cheboygan County. Located between two residential properties on Douglas Lake, 9758 and 9950 Silver Strand Road. Across Silver Strand Road from the Judson Pike Marsh Preserve Area.

Legal Description: Lots 9 & 10 of Lambert Wilson Subdivision, a part of the E. 1/2 of Sec. 18, T 37 N, R 3 W, Munro Township, Cheboygan County, MI

Tax ID: 080-L10-000-009-00

Project Type: Fee Purchase

Acquisition Date: 1989

Attached Maps

Driving Directions: From Pellston, head north on U.S. 31, also known as Stimpson Street, towards the Regional Airport. Turn right onto Van Road, then left on Silver Strand Road. The preserve will be located on the right and is marked by a Little Traverse Conservancy sign. Please see attached road map for the area near the Preserve (Figure 1-A and 1-B).

Plat: The attached map shows ownership of various parcels of land in the area surrounding Bessey Creek (Figure 2).

Aerial Photograph: Please see attached figure of an aerial view of Bessey Creek Preserve (BCP) with preserve boundaries shown in green (Figures 3 and 4).

Topographic Soils Map: Please see attached figure of the soils map for BCNP (Figure 5). The preserve is on a base of 47A soil, meaning that it has Ingalls loamy sand, with less than 3 percent slopes. It is not well drained.

Watershed Map: Please see attached figure of the Douglas Lake watershed (Figure 6).

Photographs

A brief photographic overview, Figure 7, shows the preserve map with photos as an introduction to the BCNP area. Please see the several attached photographs (Figures 8-17), of the preserve and areas of interest within or surrounding the preserve at the end of this management plan. Photographs of specific areas connected with management topics of interest are noted throughout this document. The photographs include scenic overviews, examples of the habitat types, and noteworthy issues that may be of management interest.

Resource Protection

The national infestation of emerald ash borer is slowly moving northward from southern Michigan (Jones 1993). As BCNP consists largely of hardwoods swamp with black ash as a major species, this is of particular management concern (Vegetative Sampling, see Chapter 2). There is also a possible bronze birch bark borer infestation in Cheboygan County, as the pests have been found in northern lower Michigan since 1992 (Jones 1993). Although there is only a small birch population in the preserve, this is still of concern since it causes tree death. Other resources that need to be protected include turtle and bird nesting habitat, and the fisheries of the nearby Pike Marsh that discharge into the lake at BCNP.

Watershed Location/ Description

Bessey Creek is part of the Douglas Lake watershed. In the northwest area of Douglas Lake where the preserve is located, the soils are dominated by peat and muck, with some lacustrine sand and gravel. BCNP is located in Marl Bay of Douglas Lake, where the alkalinity is 124 to 128 mg $CaCO_3$/L (Geddes 1997). The immediate border of the lake near Bessey Creek is distinguished by single family or institutional developments, mixed in with northern hardwoods forests. The northern part of the lake watershed, immediately above Bessey Creek near Munro and Lancaster Lakes, is characterized by large amounts of agricultural areas, interspersed with northern and lowlands hardwoods. There is a cedar swamp along the upstream portion of Bessey Creek, which is believed to be the major contributor of tannins and lignins to Douglas Lake (Geddes 1997).

Habitats/Covertypes

There are four general habitats found within the preserve area: The roadside, *Fraxinus nigra* swamp, the littoral marsh, and the open aquatic habitat of Douglas Lake and Bessey Creek.

The roadside is a relatively dry area. Many exotic species were found in this area.

The swamp (i.e. hardwoods swamp with black ash and maple dominance) is a swamp wetland with peaty soils and standing water especially in spring and early summer. Water is about 30 to 60 cm in this area year-round. The flora of this habitat consists mainly of wetland species.

The littoral marsh of Douglas Lake and Bessey Creek is dominated by Cyperaceae (sedges) and Poaceae (grasses). The water level here is between 60 to 90 cm year-round. Wetland and submerged, emergent, and floating aquatic plant species can be found in this habitat, as well as in the open water of Douglas Lake and Bessey Creek. The water level of Douglas Lake we sampled was 90 cm or higher.

Soils/Landforms/Hydrology

The BCNP is located on Cheboygan loamy sand, and has between 0 to 6 percent slopes, indicating that the ground is very flat. The surface layer of soil is mixed black and light gray loamy sand about 2 inches thick. The subsurface layer is pinkish gray loamy sand about 4 inches thick. The subsoil is about 22 inches thick (USDA Soil Conservation 1991).

Douglas Lake is a kettle lake, meaning that large chunks of ice became imbedded in the ground as the glacier retreated, and then melted to fill the holes they created. Bessey Creek connects Lancaster Lake, a smaller kettle lake, and Douglas Lake. Bessey Creek is also the only steady input for Douglas Lake, discharging approximately 0.24 m^3 of water per second (Geddes 1997).

Biological Inventory

116 plant species were collected within BCNP in this study (See Chapter 1, Floristic Inventory).

Threatened/Endangered/Special Concern Species/Rare Species (TBC)

Noteworthy Exotic Species

Seven invasive or weedy species were identified in Bessey Creek Preserve.

Aegopodium podagraria, family Apiaceae, "Goutweed" – This is a perennial plant in the carrot family, and found in 15 counties in Michigan. In some areas, this plant is considered a noxious weed (Nilsson & Hertefeldt 2008). It is also listed as an invasive species in Connecticut and Massachusetts according to USDA. Goutweed is an aggressive invasive plant that forms dense patches, displaces native species, and greatly reduces species diversity in the ground layer. Goutweed patches inhibit the establishment of conifers and other native tree species as well (National Parks Service 2005).

Celastrus orbiculatus, family Celastraceae, "Oriental bittersweet" – This vine species is found in 11 counties in Michigan, and is widely considered as an exotic and invasive species because of its characteristics of forming thick monospecific stands and ability to effect community structure by crowding out other plants. This species is becoming more widespread in the Strats Region in recent years (Uva et al. 1997; Southeast Exotic Pest Plant Council. 1996).

Cirsium arvense, family Asteraceae, "Canada thistle" –This sharply spined thistle is considered a pest of natural wetlands found in 65 counties in Michigan, and is moving southward (Bennett 2001; Reznicek et. al. 2011). This highly invasive thistle prevents the coexistence of other plant species through shading, competition for soil resources and possibly through the release of chemical toxins poisonous to other plants (National Parks Service 2005).

Lonicera morrowii, family Caprifoliaceae, "Morrow honeysuckle" - This is an exotic honeysuckle from Japan, and a widespread invasive species throughout Northern American (Gleason and Cronquist 1991; Hunter and Mattice 2002). It is found in 28 counties in Michigan. This exotic bush honeysuckle can rapidly invade and overtake a site, forming a dense shrub layer that crowds and shades out native plant species. They alter habitats by decreasing light availability, by depleting soil moisture and nutrients, and possibly by releasing toxic chemicals that prevent other plant species from growing in the vicinity (National Parks Service 2005).

Lythrum salicaria, family Lythraceae, *"*purple loosestrife" - This species was introduced from Europe and a widely invasive species, and found in 50 counties in Michigan (Gleason and Cronquist 1991; Blossey et al. 2001). It is listed as noxious weed or banned as an invasive species in 33 states in the U. S. according to the USDA. The highly invasive nature of purple loosestrife allows it to form dense, homogeneous stands that restrict native wetland plant species, including some federally endangered orchids, and reduce habitat for waterfowl (National Parks Service 2005).

Myosotis scorpioides, family Boraginaceae, "forget-me-not" - This is an exotic species escaped from cultivation in gardens and found in 52 counties in Michigan (Crow and Hellquist 2000; Chadde 2003). This plant can be weedy or invasive (Hoffman & Kearns 1997), and is prohibited in Connecticut and Massachusetts according to the USDA. It has a tendency to grow in thick mats that can choke out other plants (Wells 1999).

Phalaris arundinacea, Family Poaceae, "Reed canary grass" – This wetlands grass is apparently native in part, but is becoming a serious problem due to its habit of growing in dense stands that choke out all other vegetation (Kettenring, 2011; Reznicek et. al., 2011). It is found in 72 counties in Michigan.

Three out of the seven exotic species are located at the roadside; *Myosotis, Celastrus, Aegopodium, Lonicera, Lythrum,* and *Phalaris* are all located within the preserve in the swamp.

Although these species were not found, LTC should monitor BCNP for the invasive haplotype of *Phragmites australis* (Saltonstall 2002). The native genotype is present. We should also be monitoring for the colonization of *Potamogeton crispus*, and *Myriophyllum spicatum,* which are noxious aquatic invasive species found in northern Lower Michigan.

Species of Conservation Value

Fourteen species of special concern (Coefficient of Conservatism ≥ 7) were identified within BCNP. All Coefficients of Conservation (CC) were obtained from Michigan Flora Online (Reznicek et.al. 2011).

Campanula aparinoides, Campanulaceae, "Marsh bellflower", CC: 7– This species is usually a calciphile and can be found in wet habitats (Gleason and Cronquist 1991). It can be found in 73 counties in Michigan (Reznicek et al 2011). It is listed as a threatened species in Tennessee (USDA Plants Profile).

Carex aquatilis, Cyperaceae, "Sedge"*,* CC:7- This species can be found in calcareous wet habitats, sometimes in water up to 3 dm deep. It can be found in 58 counties in Michigan (Reznicek et al 2011). It is listed as threatened or a special concern species in Connecticut and Pennsylvania, and as an endangered species in New Jersey (USDA Plants Profile).

Carex lasiocarpa, Cyperaceae, "Sedge", CC: 8 – This species is one of the major components of floating mats in marshes and fens because of its well-developed rhizomes (Reznicek et al 2011). It can be found in 66 counties in Michigan (Reznicek et al 2011). It is threatened in Tennessee because of invasive species (USDA Plants Profile).

Carex rostrata, Cyperaceae, "Sedge", CC:10- This species is colonial from long-creeping rhizomes, and grows in poor to rich fens It only can be found in 4 counties in Michigan. (Reznicek et al 2011) It is listed as threatened species in Tennessee (USDA Plants Profile). It is a circumboreal species (Gleason and Cronquist 1991).

Chelone glabra, Plantaginaceae, "Turtlehead" , CC: 7- This species grows in moist habitats, typically on low grounds and stream margins, as well as wet thickets (Wells 1999). It can be found in 71 counties in Michigan (Reznicek et al 2011). It is listed as an exploitably vulnerable species in New York (USDA Plants Profile).

Cladium mariscoides, Cyperaceae, "Sedge"*,* CC:10 – This obligate wetlands sedge is often found in calcareous environments. Its rhizomes are very important building components of floating mats in fens, bogs, and marshes (Reznicek et al 2011).

Comarum palustre, Rosaceae, "Marsh cinquefoil", CC: 7 – This is a common wetland species in Northern America and Canada (Gleason and Cronquist 1991). It can be found in 66 counties in Michigan (Reznicek et al 2011). It is listed as endangered in New Jersey (USDA Plants Profile).

Dulichium arundinaceum, Cyperaceae, "Three-way sedge", CC: 7 - This is an aquatic or semi-aquatic plant of the lakes, streams, and ponds (Gleason and Cronquist 1991). It can be found in 71 counties in Michigan. Although it is a widely-distributed species of North America, it is listed as a species of concern to some degree in Michigan Flora Online (Reznicek et al 2011).

Equisetum fluviatile, Equisetaceae, "Water horsetail", CC: 7 - This species is basically a marsh emergent, commonly occurring on lakeshores in Northern America and Canada (Gleason and Cronquist 1991). It can be found in 51 counties in Michigan (Reznicek et al 2011). It is listed as threatened or a special concern species in Maryland and Rhode Island (USDA Plants Profile)

Lathyrus palustris, Fabaceae, "Marsh pea", CC: 7- This is a species of wild pea, commonly occurring in moist thickets and shores (Gleason and Cronquist 1991). It can be found in 47 counties in Michigan (Reznicek et al 2011). It is listed as threatened or endangered species in five states of the US (USDA Plants Profile).

Lobelia cardinalis, Campanulaceae, "Red lobelia", CC: 7 – This species has brightly red flowers and can be found in swamps and floodplain forests (Gleason and Cronquist 1991). It can be found in 68 counties in Michigan (Reznicek et al 2011). It is listed as a threatened species in Arizona, Florida, and New York (USDA Plants Profile).

Myriophyllum sibiricum, Haloragaceae, "Spike water-milfoil", CC:10 – This native water-milfoil is critical to aquatic invertebrates as both habitat and food. It can be found in 63 counties in Michigan (Reznicek et al 2011).The replacement of this species by the invasive Eurasian species, *Myriophyllum spicatum*, can indirectly damage aquatic food webs (Wilson 2009).

Nuphar variegata, Nymphaeaceae, "Yellow pond-lily", CC: 7 –This water lily is commonly seen in lakes, ponds, quiet rivers and streams of North America and Canada (Gleason and Cronquist 1991). It can be found in 68 counties in Michigan (Reznicek et al 2011). It is listed as an endangered species in Ohio (USDA Plants Profile), but is abundant in Michigan areas.

Platanthera psycodes, Orchidaceae, "Purple fringed orchid", CC: 7 – This is a species of Orchid family, commonly seen in moist shores at borders of forests (Gleason and Cronquist 1991), and considered endangered in many areas (IESP Board 1999). It can be found in 66 counties of Michigan (Reznicek et al 2011). It is listed as threatened or endangered species in nine states of the US (USDA Plants Profile).

Cultural Features

No known cultural features pertaining to human history exist at this site.

Land Use History

No information is known about historical use of our site. The Judson family once homesteaded in the area during the late 1800s. It is unlikely that any structures were ever built on the preserve due to frequent flooding and absence of any structure ruins. Fishing at the site is likely both in the past and present (see Current Site Use and Conditions).

Scenic Qualities

BCNP has beautiful views from the lakeshore and creek area of Douglas Lake (Figures 10-12). From the road, the BCNP appears as a patch of wooded swampland between two residential areas. From Douglas Lake, the BCNP may be unnoticeable except for the creek mouth, as it blends in with other similar wooded areas around the lakeshore. The preserve is characterized by dense vegetation. Difficulty walking through the marsh and swamp hampers access for scenic opportunities. Water is often up to the average person's knees, and with the additional impediments that fallen trees provide, most people will not be able or willing to move through the creek to enjoy the views. (Figures 14-A and 14-B).

Educational demand/potential

The preserve is a fine example of a black ash swamp that provides wildlife habitat values. A snapping turtle was observed on site, as was a female bullhead patrolling two swarms of bullhead finger lines, and small pike in the littoral marsh (Figure 11). There are several special species of plants, including a wild orchid, with a high Coefficient of Conservation that make the flora noteworthy (Please see "Species of Conservation Value" under the Threatened/Special Concern Species heading). Those studying fish may be interested in the preserve's pike, as they spawn in nearby Pike Marsh and must swim via the creek mouth in BCNP to reach the lake. In a relatively small area the preserve is also an excellent example of the habitat transitions that occur from terrestrial to aquatic habitats. These habitat zones range from terrestrial at the roadside to a wooded swamp, marsh, and littoral zone to fully aquatic environments along the creek and lakeside.

Adjacent land use/ownership/protection status

Both sides of the preserve are owned and inhabited by private residents. This adjacent land use does not seem to have a major affect on the preserve. However, there is a small footpath cut into the preserve on the west side, at N 45.60184 W 84.71603. This path goes towards the creek, and is likely used to gain easy access to the water for fishing. There is also a larger mowed path adjacent to BCNP on the west that is of management concern because it represents a corridor for the introduction of invasive species (Figures 9-A and 9-B). In addition, the neighbor to the east has been disposing of yard waste by dumping it over property lines into BCNP. This may be a source of invasive *Aegopodium* and *Celastrus* (Figure 17).

Nearby outdoor recreational lands/ trails/ facilities

The preserve property extends into Douglas Lake, and therefore may be affected by any water activities that occur in the area. Lake level fluctuations and recreational pastimes, such as motor-boating are most likely to have an effect on BCNP. There are no parks or other public outdoor recreational areas nearby.

Public road access/ parking features

There is no parking at the preserve site at this time. Silver Strand Road is publicly accessible, but any parking to get into the creek must be done at the side of the road, which is unpaved and somewhat narrow (Figure 8).

Current site use and conditions

The creek and inside of the preserve appear to be virtually unused. In 2011 the University of Michigan Biological Station Field Botany class conducted a floristic inventory and vegetation study along with this management plan. One possible issue that may need attention is the encroachment of the path to the creek as a private fishing area by the neighboring property owners, or the use of motorboats going into the creek (Figures 9-A and 15). In addition, the neighbor to the east has been dumping leaf and lawn clippings into BCNP along the property boundary. Clippings appear to be the source of *Aegopodium* that is starting to grow into the preserve along the east boundary and is present growing along the house adjacent to the east BCNP boundary (Figure 17). Also, in the east corner of BCNP at the property line along the Douglas Lake shore an old row boat is sunken into the shrub thicket. This rotting boat may warrant removal.

Resource protection management problems/needs

Some trash was found floating through to the preserve from the lakeshore (Figure 16). There are possible litter issues from the path running along the right side of the creek on the neighbor's property, as a boat is stored there. The *Phragmites australis* in the littoral zone habitat is the native genotype, but if there are invasive populations in other areas of the lake there is a chance of invasion. There are other exotic invasive plants in BCNP that require attention. *Lythrum, Celastrus,* and *Aegopodium* are all relatively new invasions, which if controlled early will help to manage later ecological problems. Also, there are so many fallen trees in the preserve that it is possible that some of them did not fall naturally, particularly since some show evidence of being obviously cut. Who cut these trees, whether the neighbors or LTC, is not known.

Reports or studies pertaining to the preserve

One of few investigations of Bessey Creek is a vegetation study (F. C. Gates 1911). The general description and covertype and habitat information in that study are generally consistent with this study. Gates recognizes the abundance of *Sparganium simplex, Scirpus validus*, and *Cardamine pennsylvanica* in Bessey Creek, suggesting a change in species composition to some extent during the last 100 years. Also, Haynes and Hellquist did an aquatic plant survey of Douglas Lake in the 1970s, including of Bessey Creek. They noted the presence of *Potamogeton natans, P. illinoensis, P. pectinatus, P. zosteriformis, P. gramineus, P. friesii, P. praelongus, P. richardsonii, Najas flexilis, N. guadalupensis, Elodea canadensis, Vallisneria americana, Ceratophyllum demersum, Utricularia vulgaris*, and *Myriophyllum exalbescens*. They also noted that Bessey Creek was a possible entry for *Potamogeton epihydrus* and other plants from the Lancaster Lake area to wash into Douglas Lake, particularly during strong storms (Haynes and Hellquist 1978). One other study of Bessey Creek focused on water chemistry and limnology investigations, by K. L. Savoie in 1983.

Stakeholder Individuals/ Groups Identified

Munro Township, the Douglas Lake Association, UMBS and private landowners are possible stakeholders (D. Fuller, personal communication, 2011).

Donor or Funder Wishes or Restrictions

A restrictive covenant has been placed on the land that it shall never be used as a boat launching site, as the Douglas Lake Association was opposed to the state's consideration of the site for that purpose. This proposition precipitated the acquisition of the preserve by LTC in 1989.

Legal Agreements or Licenses that impact this preserve

The above-mentioned covenant is the only legal agreement that pertains to the property.

Is there a Conservation Easement on this nature preserve?

No, there are no conservation easements placed on BCNP (D. Fuller, personal communication, 2011).

Are there any utility rights-of-way across the property?

No, there are no rights-of-way on the property at this time.

MANAGEMENT OBJECTIVES

Overall level of use

Recommendation: The BCNP should be managed for use as category #2 (use not promoted).

Rationale: In order to promote more use, extensive changes would have to be made to the preserve to make it more accessible to the public. As the preserve is so small, this process would cause significant damage to most of the habitat. However, it is not recommended that the Little Traverse Conservancy sign be removed, as it informs the public that the area is a protected nature area and may deter trespassers.

Outside Review of Management Plan

Recommendation: NA

Rationale: NA

Timeline: NA

Communications with neighboring property owners

Recommendation: It is recommended that a visit be made to the property owners both to the east and west of the preserve.

Rationale: The neighbors to the west have cut a fishing footpath through the middle of the preserve to the creek from their property. It should be explained to them that the creek

is crucial for the successful spawning of pike and other fish upstream, and that it would be appreciated if they could fish in the lake itself, instead of the preserve. They also have a larger mowed path along the boundary between the preserve and their property that may serve as an invasive species introduction corridor. The neighbors to the east have been disposing of lawn clippings in the preserve resulting in the introduction of *Aegopodium* which can become noxious groundcover.

Timeline: It would be most beneficial if the conservancy were to speak with the neighbors at their earliest convenience.

Preserve Name

Recommendation: The site should remain named Bessey Creek Nature Preserve.

Rationale: The preserve contains the mouth of Bessey Creek, and it will maintain the historical connotations of the area.

LTC Logo Sign

Recommendation: No additional logo signs are needed.

Rationale: The preserve is small enough that the one sign at the roadside is enough to mark the preserve properly as LTC protected property.

Cost: $0

Timeline: NA

Other signs

Recommendation: No additional signage is needed.

Rationale: Fishing should not be much of a problem, nor should hunting as the preserve is small enough to make it unlikely. Posting can create resentment among neighbors, so it is best to leave the signs as they currently are.

Cost: NA

Timeline: NA

Survey and boundary marking

Recommendation: The conservancy may or may not wish to conduct a survey of the preserve.

Rationale: The site has never had an official survey performed of it. However, a survey may be useful due to the yard waste disposal issue and the proximity of the large mowed trail along the boundary to the west.

Estimated Cost: $250-400. It may be more depending on survey stakes placed.

Timeline: At the conservancy's discretion.

Access road maintenance and improvement

Recommendation: No access road maintenance or improvement is needed.

Rationale: The preserve is located on Silver Strand Road, which is a publicly accessible road that will be maintained by either the state or the local homeowner's association.

Estimated cost: $0

Timeline: NA

Parking area (including winter plowing)

Recommendation: No parking area for the preserve should be created.

Rationale: In keeping with the recommended and currently promoted level of use, a parking area would be counterproductive to discouraging general public use of the preserve.

Estimated cost: $0

Timeline: NA

Gates/Fences/Barricades

Recommendation: No fences or barricades be erected.

Rationale: A surveyor would certainly have to be hired to mark the site boundaries, and building the fences would disturb a significant portion of the habitat.

Estimated cost: $0

Timeline: NA

Trash/other site clean-up

Recommendation: Bessey Creek does not need a major cleaning effort although miscellaneous trash does get washed into the preserve on a yearly basis. An old decaying rowboat on the east boundary would be a good target for trash removal efforts.

Rationale: Several pieces of trash (old cans, bottles, and miscellaneous debris) were found throughout the entire preserve. These were located close to the lakeshore and must have washed in from the lake. A clean-up is not necessary for such a relatively minor problem. Removal of the old rowboat, however, would be beneficial.

Estimated cost: $0

Timeline: NA

Building, Old Well, or other Structure Removal/Restoration

Recommendation: No structure removal or restoration is necessary.

Rationale: There are no such structures on the preserve property.

Estimated cost: $0

Timeline: NA

Encroachment or Trespass Issues

Recommendation: As discussed above, a visit to the neighbors on both sides of the preserve is recommended. Also, a boundary marker at the lakeshore may be beneficial.

Rationale: The above-mentioned fishing trail leading to the creek should be addressed with the neighbors, to keep them from encroaching on the preserve. The lawn waste dumping issue should also be addressed with the neighbors to the east (Figure 17). A boundary marker may keep boaters from the lake from entering the creek.

Estimated cost: $0-50

Timeline: Within the next few months would be reasonable.

Trails

Recommendation: No official trails be created.

Rationale: The preserve is small and difficult to walk through. Building trails would require significant clearing and removal of many fallen trees. Since use of the preserve is not being promoted, not having trails is a natural discouragement to trespassers and encroachment.

Estimated cost: $0

Timeline: NA

Bridges

Recommendation: No bridges should be built.

Rationale: As stated above, the dearth of easily accessible paths through the creek helps to prevent use by the general public.

Estimated cost: $0

Timeline: NA

Boardwalks

Recommendation: There is no need for boardwalks to be built.

Rationale: Again, the difficulty of access into the preserve helps to maintain the natural habitat. Boardwalks would be an unnecessary expense.

Estimated cost: $0

Timeline: NA

Scenic viewing site/platform

Recommendation: No platform or special viewing site be created.

Rationale: A viewing site would require trails and other access points for the public to be built as well; it would encourage more use of the preserve which is counteractive to the current management strategy. A platform would be another unnecessary expense.

Estimated cost: $0

Timeline: NA

Benches/tables

Recommendation: No benches or tables be provided at the site.

Rationale: Providing tables or benches would be encouraging more public use of the preserve, which is not recommended.

Estimated cost: $0

Timeline: NA

Interpretative signage

Recommendation: No need for interpretative signage.

Rationale: There is no need for interpretive signage due to its minimal public use.

Estimated cost: $0

Timeline: NA

Brochures

Recommendation: There is no need for brochures.

Rationale: There is no need for brochures due to the site's minimal public use.

Estimated cost: $0

Timeline: NA

Boat Launch/Shoreline Access

Recommendation: No boat launch or shoreline access is permitted.

Rationale: There is a restrictive covenant on the property preventing a boat launch from being built. Also, any other shoreline access will encourage the use of boats in the creek, and this is discouraged because boats may have a negative effect on organisms that live in this tiny preserve. Also, boats may introduce invasive species to this area.

Estimated cost: $0

Timeline: NA

Hunting

Recommendation: Hunting is not recommended but does not need to be actively discouraged.

Rationale: This 0.2023 hectare (0.5-acre) is too small for hunting and would be dangerous for the neighbors.

Estimated cost: $0

Timeline: NA

Camping/fires

Recommendation: No camping or fires should be allowed.

Rationale: The majority part of the Bessey Creek Nature Preserve is a marsh, which is not a proper place for camping or fires. Hence, camping and fires may destroy the biological balance here.

Estimated cost: $0

Timeline: NA

Equestrian use

Recommendation: No equestrian use should be permitted.

Rationale: The property is too small for equestrian use. The terrain is not suitable for horse use. Horses may also cause damage.

Estimated cost: $0

Timeline: NA

Agricultural activities

Recommendation: No agricultural activities should be allowed.

Rationale: The site is only 0.2023 ha (0.5 acres), not to mention is a flooded marsh. The terrain is not appropriate for agriculture.

Estimated cost: $0

Timeline: NA

Brush-hog or mow field

Recommendation: There is no need for mowing or brush removal.

Rationale: The entire preserve area is dominated by native trees and shrubs.

Estimated cost: $0

Timeline: NA

Forest management

Recommendation: It is necessary to check whether fungi or pests have affected the woody species found within the nature preserve, particularly if the Emerald Ash Borer (EAB) is present.

Rationale: Many trunks litter the area, and it needs to be determined if these trees have fallen down naturally, or whether they have been killed by a pest. The majority of the preserve is a black ash swamp, and if the EAB is present it could have a devastating effect on the habitat (see findings of Field Botany forest ecology project included with this plan, Chapter 2).

Estimated cost: The trees can be checked as part of an ecological survey.

Timeline: At the conservancy's discretion. It is not an immediate concern, but it would be desirable to have the trees checked sooner rather than later. The arrival of the EAB is probably inevitable and will greatly alter the character of the site (see Field Botany forest ecology report, Chapter 2).

Habitat restoration

Recommendation: There is no need for habitat restoration.

Rationale: The area is well preserved and not disturbed.

Estimated cost: $0

Timeline: NA

Wildlife nest boxes or food planting

Recommendation: There is no need to have wildlife boxes or food planting put in place at this time. An option may be to have wood duck boxes placed to provide nesting opportunities.

Rationale: Research is needed to determine bird use of this preserve.

Estimated cost: $0

Timeline: At the conservancy's discretion.

Additional land acquisition targeted

Recommendation: There is no need to buy more property for the preserve.

Rationale: Bessey Creek Nature Preserve is located between two private residential properties, and is near the Judson Pike Marsh Preserve. The only opportunity for expansion may be on the northern side of Silver Strand Road to obtain more property along Bessey Creek's approach to Douglas Lake. This property is currently owned as a 56.4 acre parcel by Nicholas Wayne Coatta (D. Fuller, personal communication, 2011).

Estimated cost: $0

Timeline: NA

Preserve monitor

A preserve monitor for BCNP is not known at this time.

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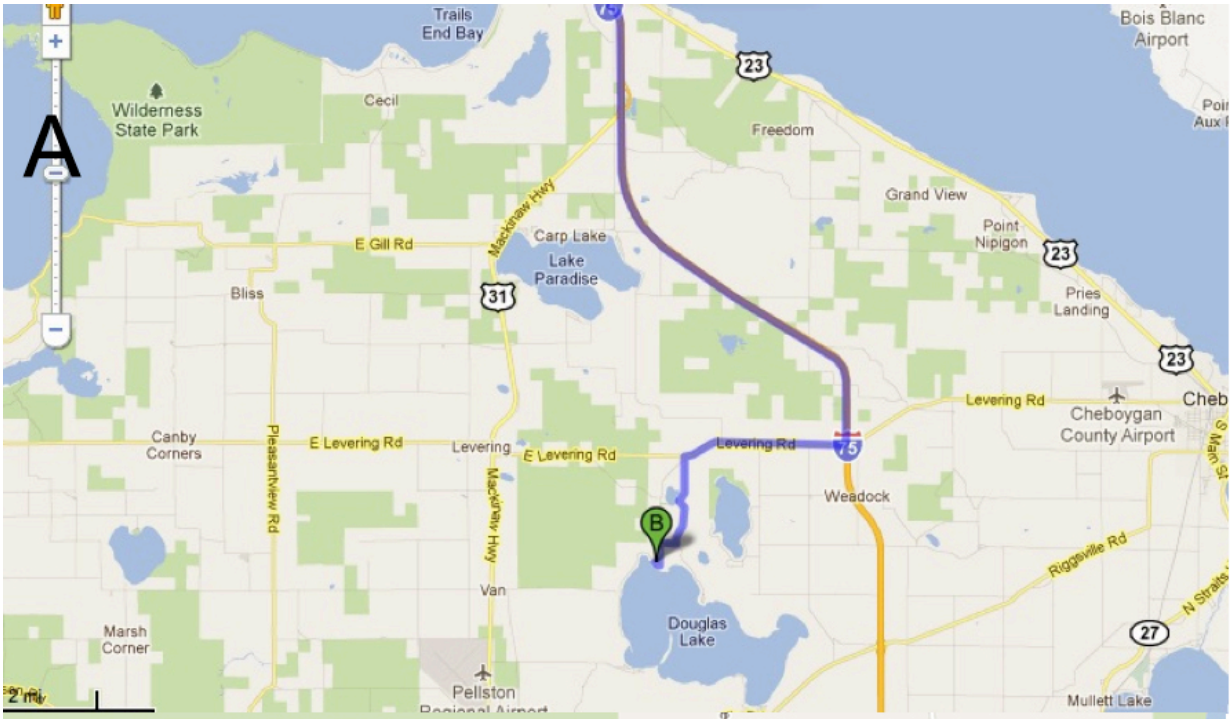

A
Trails End Bay
Bois Blanc Airport
Wilderness State Park
Cecil
Freedom
Grand View
Point Nipigon
Pries Landing
Mackinaw Hwy
Carp Lake
Lake Paradise
E Gill Rd
Bliss
Levering Rd
Cheboygan County Airport
Canby Corners
E Levering Rd
Levering
Pleasantview Rd
Weadock
Riggsville Rd
Van
Douglas Lake
Marsh Corner
Pellston
Mullett Lake
2 mi

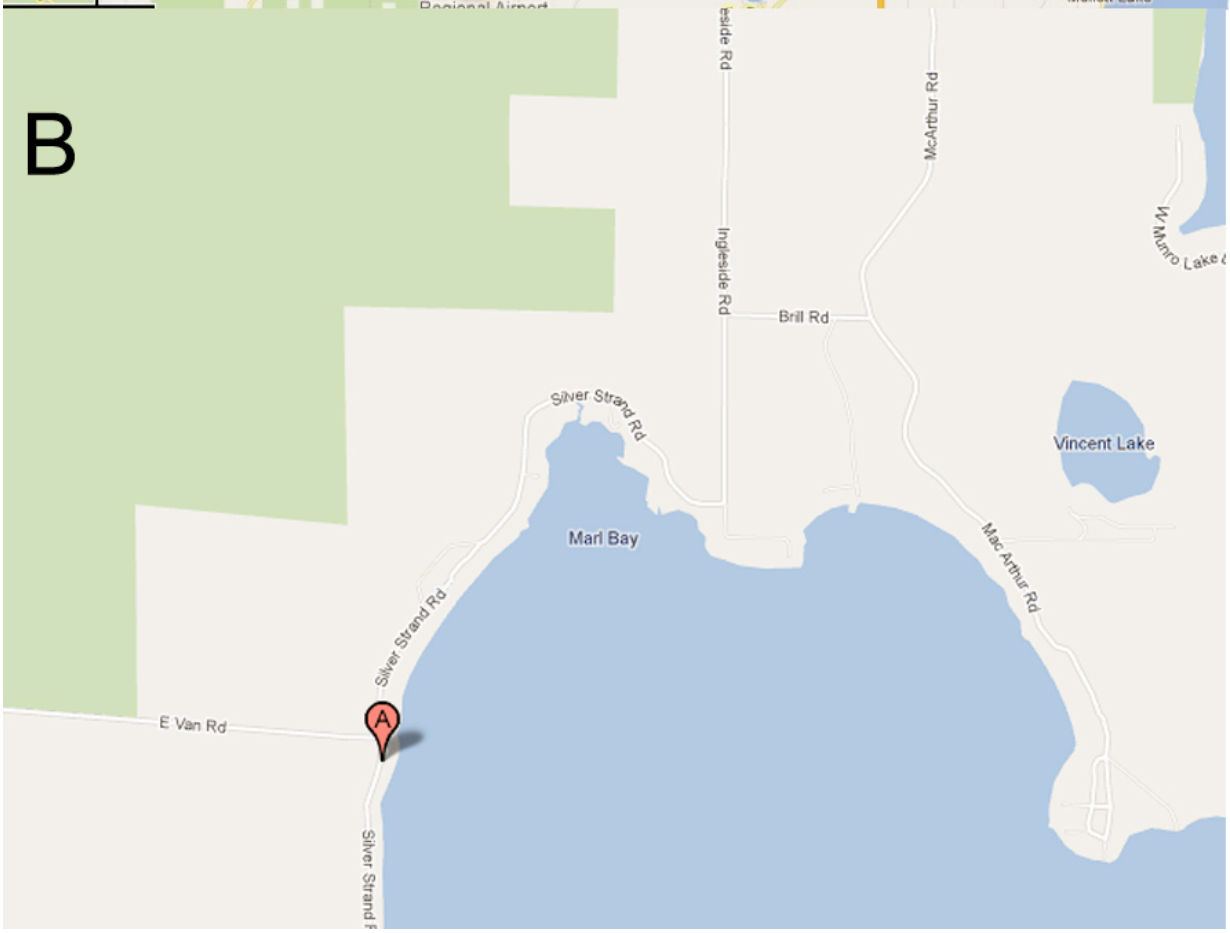

B
Ingleside Rd
McArthur Rd
Brill Rd
Silver Strand Rd
Vincent Lake
Marl Bay
Mac Arthur Rd
E Van Rd
A

Figure 1-A &1-B. Road map for Bessey Creek area. (Google Maps).

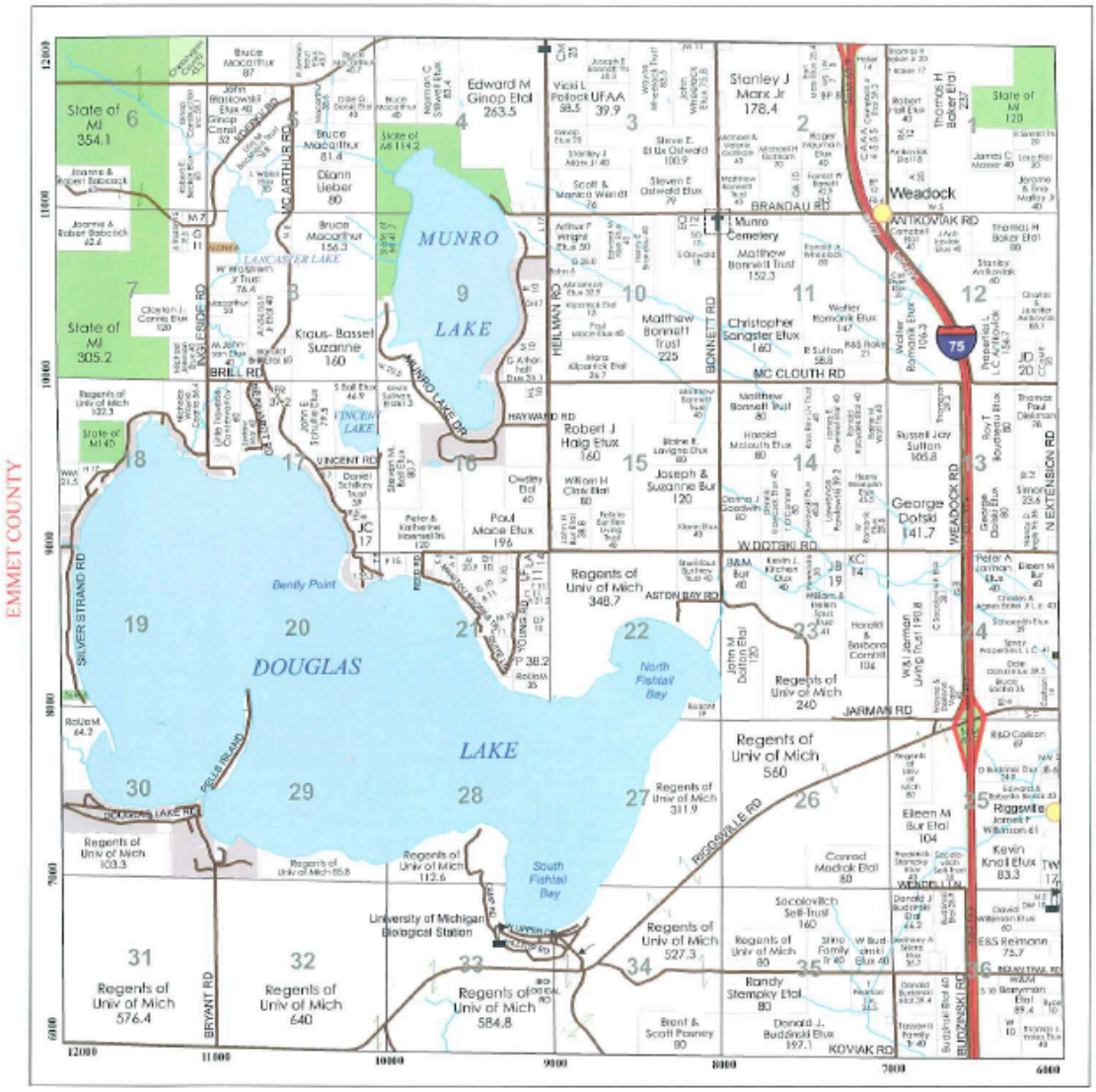
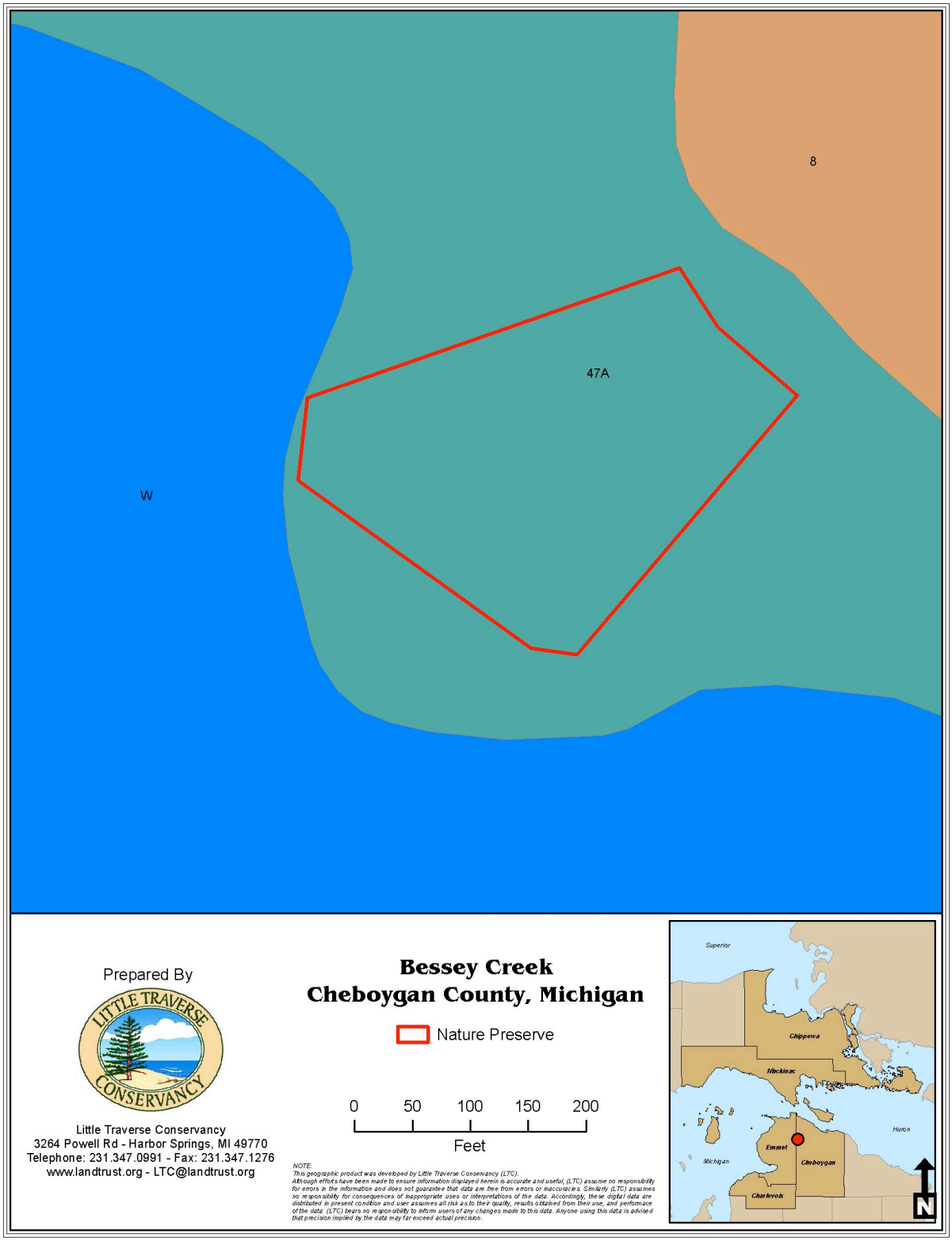


Figure 2. Plat map for Bessey Creek area.(LTC documents)

Figure 3. Aerial photograph of Bessey Creek and surrounding area. The gray highlighting is the area owned by the Conservancy.

Figure 4. Aerial view of Bessey Creek Preserve and surrounding area. BCP is the small trapezoid that the arrow points at. Judson Pike Marsh Preserve is the very large rectangle to the right.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47A
W
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0 50 100 150 200
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Superior
Chippewa
Mackinac
Huron
Michigan
Emmet
Cheboygan
Charlevoix
N

Figure 5. Soils map for Bessey Creek. Explanation of the 47A code can be found in the general information section.

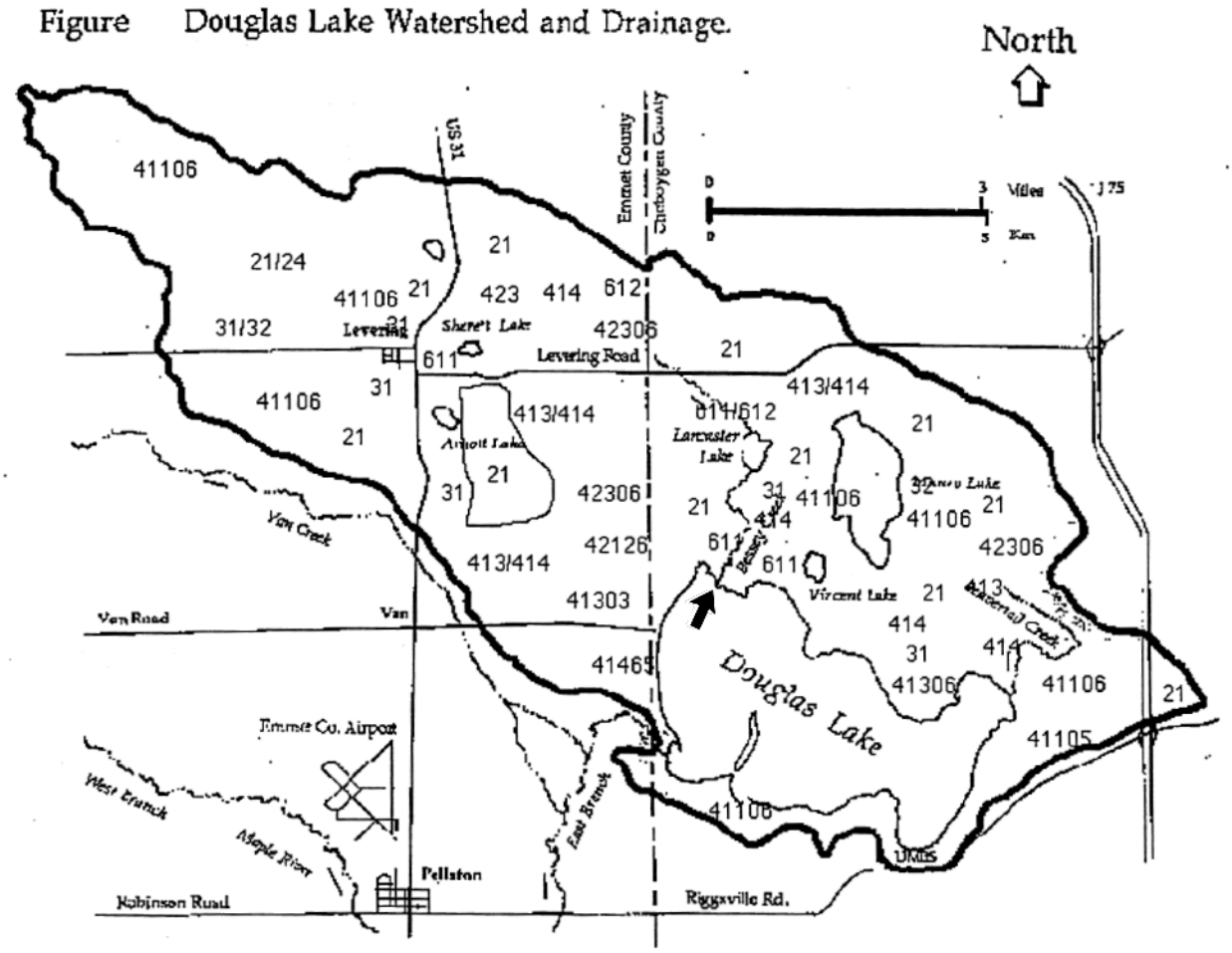

Figure 6. Watershed map for Douglas Lake (Geddes 1997). Note Bessey Creek at the arrow.

Surrounding Photographs of the Bessey Creek Natural Preserve

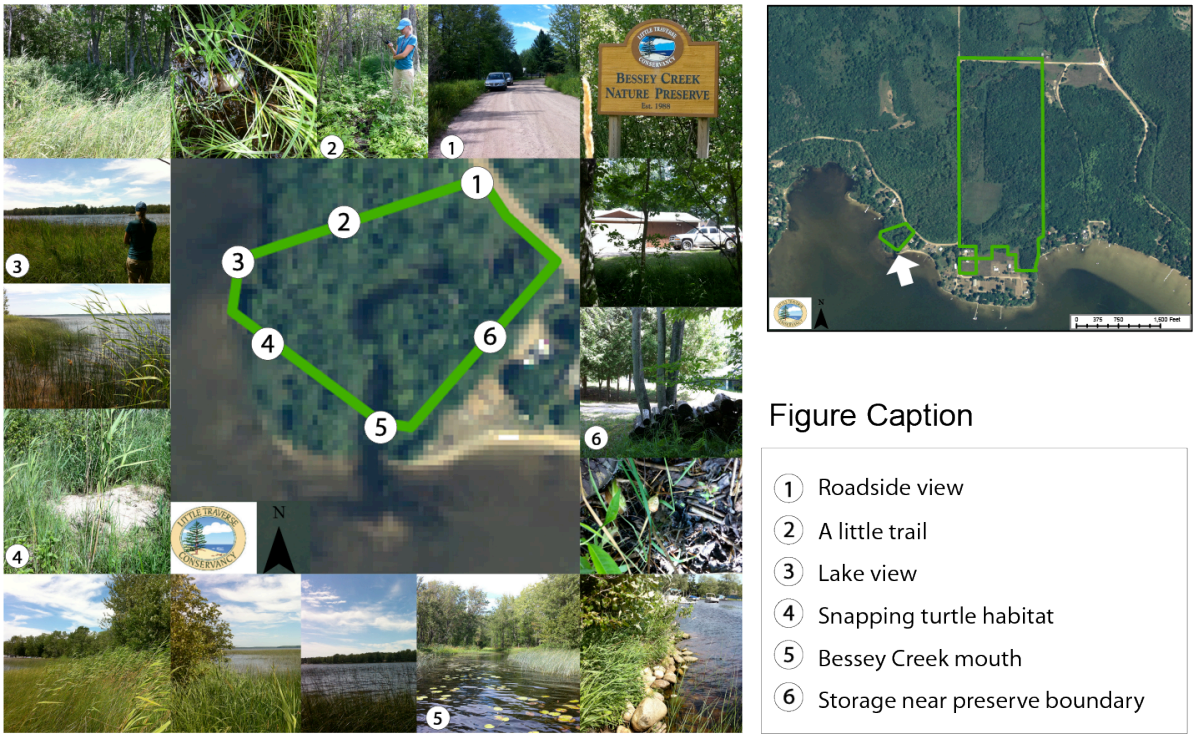

Figure 7. Photographic overview of the habitats and features at the Bessey Creek Nature Preserve.

Figure 8. Roadside view of the Nature Preserve. Along Silver Strand road looking westward.

Photo by Lin Lin July 2011

Figure 9-A. A little trail in the Nature Preserve from the neighboring property on the right to the creek. Photo by Lin Lin July 2011

Figure 9-B. A mowed trail adjacent the Nature Preserve. Photo by Eric Hellquist Aug. 2011

Figure 10. Lake view from east to west.

Photo by Lin Lin July 2011

Figure 11. Turtle nest at the shore of the lake.

Photo by Lin Lin July 2011

Figure 12. Mouth of Bessey Creek with abundant aquatic plant species such as *Nuphor variagata* and *Nymphaea odorata*

Photo by Lin Lin July 2011

Figure 13. Property of neighbor to the left of the preserve.

Photo by Lin Lin July 2011

Figure 14-A. Knee-height water preventing public accessibility to scenic opportunities.

Photo by Lin Lin July 2011

Figure 14-B. Dense vegetation preventing accessibility.

Photo by Lin Lin July 2011

Figure 15. Use of shoreline by neighbors

Photo by Lin Lin July 2011

Figure 16. Trash found within the preserve.

Photo by Lin Lin July 2011

Figure 17. Leaf/lawn waste dumping on East Boundary.

Photo by Eric Hellquist Aug. 2011