

**From:** northcamp@charter.net  
**Sent:** Monday, April 05, 2021 11:33 PM  
**To:** Lt Super; Zone Admin; Monica Diaz; Denise Dunn  
**Subject:** Timber Shores

Hi!

I would just like to let you all know how I feel about Timber Shores. Please feel free to share this.

I've lived here my whole life and the best thing that ever existed in the Northport/Omena area was Timber Shores.

It had no bad effects on the area and it will not in the future.

If you really care about this area please let Timber Shores come back.

I don't understand how a pot shop can exist here but a RV camp ground can't makes absolutely no sense.

No moratorium just let this go through and bring life back to this area.

You can't tell me that you want this area to continue to whittle away to a wasteland where no one wants to or can live. There is so much natural beauty for all to enjoy.

Timber Shores will help with all the things that are said to be important to the vitality of the area.

If only all that are against Timber Shores could have been here back in the day, you'd all want it to be up and running tomorrow, trust me.

Thank you in advance for making the right decision, Timber Shores gets a green light from the Leelanau Township Board, any other decision is just wrong.

Thank you for listening to me and for working for me and making the decision, "Timber Shores is opening as soon as possible" that is best for our area.

RECEIVED  
APR 07 2021  
BY: SP

## Zone Admin

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**From:** David Rhoades <davidrhoades@aol.com>  
**Sent:** Wednesday, April 07, 2021 10:16 AM  
**To:** Zone Admin  
**Subject:** Timber Shires

I wholeheartedly support this project. Working class folks deserve to enjoy this area too! Approve this project now.



## Zone Admin

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**From:** frank ditzler <frankditzler@gmail.com>  
**Sent:** Wednesday, April 07, 2021 12:39 PM  
**To:** Zone Admin; Monica Diaz; lttreasurer@leelanau.org;  
bmittchell@cherryhomeorchards.com; mulvahillk@gmail.com; pcrebori@yahoo.com  
**Subject:** Fwd: Timber Shores Project

----- Forwarded message -----

**From:** frank ditzler <frankditzler@gmail.com>  
**Date:** Wed, Apr 7, 2021 at 12:20 PM  
**Subject:** Timber Shores Project  
**To:** <gina.harder1@gmail.com>



It's disheartening (for me) to hear that there any kind of negative factions presented against the Timber Shores project.

A person who hasn't lived in our village or township for very long would not have experienced the benefits that Timber Shores brought to our area.

Our Family lived above Dame's Market (now Tom's).

With 53 years in the grocery store business my Dad did compare those years and said, "TIMBER SHORES IS THE BEST THING THAT EVER HAPPENED TO NORTHPORT." Do we still want the best for Northport?

Do we want families coming to enjoy what Northport is all about and all the positives of a growing community?

Sincerely,  
Bobbie Dame Ditzler



LEELANAU PENINSULA  
ECONOMIC FOUNDATION



April 7, 2021

Steve Kalchik  
Chairman  
Leelanau Township Planning Commission  
PO Box 338  
Northport MI 49670

C/O Steve Patmore, Zoning Administrator  
VIA EMAIL

Dear Mr. Kalchik,

The Leelanau Peninsula Economic Foundation is a non-partisan nonprofit with a mission to make available all the tools, resources and collaborative opportunities to assist the businesses and communities of Leelanau County, to strengthen and sustain their economic vitality.

We support the Timber Shores application for a special use permit to establish a family-oriented RV park and campground in Leelanau Township. This support is provided on the condition that the developer complies with the requirements of the commercial-resort definition in the township's zoning ordinance, including receiving all necessary permits from county and state agencies, and positive results from the developer's economic impact study.

We appreciate your consideration of this project in view of its economic potential to both Leelanau Township and Leelanau County.

According to the developer's projections the Timber Shores project's expected contributions to the local economy appear entirely positive. With construction costs in excess of \$15 million, an estimated 20 seasonal jobs and four year-round salaried positions resulting in a projected annual payroll of more than \$500,000 per year, and annual operating expenditures above \$1.5 million – including estimated taxes of \$168,000 a year, the project should be a positive impact for the township and the county.

Sincerely,

*James Bardenhagen*      *Patricia Soutas-Little*

James Bardenhagen  
President

Patricia Soutas-Little  
Chairperson

cc: Monica Diaz, Clerk – Via Email

**From:** Mark Luttenton [mailto:luttentm@gvsu.edu]  
**Sent:** Tuesday, April 06, 2021 9:52 AM  
**To:** Zone Admin  
**Subject:** Timber Shores Proposal

Dear Mr. Patmore,

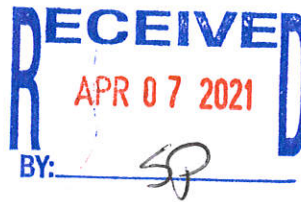
I was asked by a group of residents to review plans for the proposed Timber Shores RV park that would be located in Leelanau Twp., and to comment on the potential for environmental impacts related to the construction and/or operation of the park. I have attached my assessment.

I base my comments on my 40 years of work as an ecologist, having worked in aquatic, terrestrial, and wetland ecosystems.

Please let me know if you have any questions regarding my report.

Sincerely,

*Mark R. Luttenton* Ph.D  
Professor of Biology  
Grand Valley State University  
616-331-2675



**Assessment of Environmental Impacts  
Associated with the Proposed Timber Shores Development**

March 17, 2021

**RECEIVED**  
APR 07 2021  
BY: SP  
18 PAGES

Report prepared by:

Mark R. Luttenton, Ph.D.

14421 96<sup>th</sup> Ave.

Coopersville, MI 49404

This report was developed in response to a proposal to establish an RV/day-use recreational facility with approximately 80 acres of 213 acres (approx. 37.5%) directly modified for use. I have based this report on information that is available through a number of organizations including Leelanau Conservancy, The Watershed Center, Michigan Natural Features Inventory, online Michigan Flora – University of Michigan and references authored by E. Voss, EGLE, Grand Traverse Band of Ottawa and Chippewa Indians, scientific publications (e.g. Claramunt, et al. 2019), and materials submitted by the developer.

Based on my review of the available information specific to the site and the region, and my previous 40 years of work in wetlands, streams, large lakes, and terrestrial ecosystems as an ecologist, this project will or is very likely to cause ecological impacts to the terrestrial environment, stream habitat, wetlands, and the nearshore region of Grand Traverse Bay. In particular, although there are no records of threatened/endangered/special concern (T/E/SC) species for the construction site, it doesn't necessarily mean those species are not present on the site, it is more likely that no one has actually surveyed the area. The MNFI data base includes a substantial list of T/E/SC species for Leelanau, Grand Traverse, and Benzie Counties (Table 1). Similarly, the USFWS has records of T/E species from Leelanau Co. It is clear that a more thorough survey of the site should be completed. A critical group of species to consider is spring and fall migratory bird species. Based on the location of the site and apparent habitat, it is reasonable to assume that the construction site is an import corridor for migratory birds. It is also very likely that this site would support T/E/SC mammals, reptiles, and amphibians. Information from other biological surveys of properties in the same area as the campground provide addition insight into the species that may be or are very likely to be present near or within the construction area (Tables 2 and 3).

In addition to altering the site due to construction, the annual occupancy of the site following construction will, or is very likely to impact the construction site and the adjoining region. Given the proposed number of campsites, and assuming 2 persons/campsite, plus 101 parking spots for day use with 2 persons/car, there would be approximately 918 people using the area on a given day. Based on the 2000 census (The Watershed Center Grand Traverse Bay Watershed Protection Plan, 2005), this would increase the local population by approximately 25 to 30%. This does not include staff (6 staff lodging units) or pets. Finally, The Watershed Center identified the area targeted for construction as an area of High Land Protection Value which indicates the site has substantial ecological value.

I have outlined the basis for my conclusions in greater detail below.

## Terrestrial Systems-

Based on Google Earth imagery, the site obviously exhibits negative impacts resulting from the previous land use, particularly the prior RV park (Fig. 1 and 2, May 15, 2018). These impacts are clear from the pinwheel patterns that were apparently prior recreational vehicle campsites, lagoons, and roads/trails (Fig. 1 and 2, 5-15-2018, project drawings). Many of the RV campsites appear to have been constructed by filling into wetlands. Given that these impacts are still visible even after the previous RV park has been closed for decades clearly indicate that this location is environmentally sensitive and susceptible to significant environmental degradation.

Imagery taken during the growing season (Fig. 3, May 30, 2015) however, shows that the site has a relatively closed and continuous canopy formed by larger deciduous trees. Consequently, the construction site retains value as wildlife habitat, particularly for migratory and nesting bird species. As a wildlife corridor, it is part of a continuous band of forest habitat (Fig. 3). Any activity that removes trees creating disconnections within the corridor or modifies the integrity of the corridor will negatively impact wildlife, particularly migratory species and nesting species. Increased human activities will also disrupt nesting species.

In addition to the existing impacts due to previous site alterations, the construction plan indicates that of the approximately 80 acres within the construction area, nearly 41.2 acres are designated for camp sites, roads, sidewalks, buildings, and brick patios. Of that, 13.64 acres will be converted to hard or compact surface without vegetation. Of that, 12.18 acres is in asphalt and an additional area is covered with brick patios, concrete sidewalk, and facility buildings that collectively represent impervious surface. Consequently, approximately 13.31 acres would be covered with impervious surface, or approximately 16.6% of the total construction site and 32.3% of the area dedicated to vehicular traffic. There are a number of surface alterations that are noted on the site plan but are not included in the drawing plan details such as pickle ball courts, golf cart parking area, mini golf, game plaza, and walking path. These additional facilities would likely increase the amount of non-permeable, or semi-permeable surface area.

## Plants-

I have included the plants listed as threatened, endangered, or special concern (T/E/SC) for Leelanau, Benzie and Grand Traverse Counties (Table 1). I have also included a listing of species identified by B. Scharf (1987) for a comparable site just south of the construction site (Tables 2 and 3). Although it has been suggested that there are no T/E/SC species present at the site, the lack of records may simply be the lack of effort to establish whether these species are present. Given that the construction site extended from the Grand Traverse Bay shoreline to more upland sites, and across a range of moisture content and vegetation types, it is not unreasonable to expect that some T/E/SC species are present on the site.

Based on the available information, it appears that the site has not been thoroughly surveyed for T/E/SC species.



#### Birds-

I have included a list of the birds observed in Leelanau, Benzie, and Grand Traverse Counties and that are listed as threatened, endangered, or special concern (T/E/SC). I have also included a listing of species identified by B. Scharf (1987) for a comparable site just south of the construction site. In addition, ornithological records available on eBird from areas immediately adjacent to the proposed campground report over 80 species of birds that utilize the immediate area including a considerable number of warbler species such as Bay-breasted Warblers.

Given the list of species, it is reasonable to suggest that at least some of these species use the types of habitat that are found within the area that will be impacted due to removal of the herbaceous layer, tree and shrub trimming and complete removal, along with general habitat modifications due to the campground construction and operation. For example, Caspian Terns nest in the Great Lakes and are known to use the same nesting sites for decades. Based on information available through the Michigan Breeding Birds Atlas II period, Leelanau Co. has numerous possible nesting sites, at least one probable nesting site, and one confirmed nesting site. Leelanau Co. was one of five with nesting sites in the lower peninsula. Similarly, there are federal and state records of Piping Plovers in Leelanau Co. Based on the known nesting habitats of both species, it is not unreasonable to question whether these species have nested in the area that is targeted for the RV park.

An increase in human presence will also disrupt bird behavior, including nesting, feeding, and daily movement patterns. The increased presence of pets (e.g., dogs, cats) will likely disrupt ground-nesting species that currently use the site.

In addition, because peninsulas often serve as major migratory pathways, the northern portion of the Leelanau Peninsula very likely serves a similar function for spring and fall bird migrations. The lists of birds identified from adjoining properties strongly suggests this is an important migratory route. Migration routes are critical to a large number of bird species and preserving the ecological integrity of the habitat along the migratory route is essential. Removing habitat elements such as trees, shrubs, herbs, and grasses can negatively impact migratory bird species. Specifically, each of these habitat elements are important because they provide perching, feeding, and refuge from predators.

Based on the available information, it appears that the site has not been thoroughly surveyed for T/E/SC species.

#### Reptiles-

I have included a list of the reptiles reported from Leelanau, Benzie, and Grand Traverse Counties that are listed as threatened, endangered, or special concern (T/E/SC). I have also included a listing of species identified by B. Scharf (1987) for a comparable site just south of the construction site. Although the list for reptiles is relatively short, there is still reason for concern over the loss of habitat associated with construction on this site. In addition to impacts to reptile populations associated with habitat loss, there would be an increased risk of mortality due to vehicle traffic. Last, an increase in human presence on the site would disrupt reptile movement patterns.

Again, the absence of species listed for this site does not lead to a final conclusion that they are absent. A more reasonable explanation is that there has been a lack of effort to complete a thorough survey of the area. Given the range of habitat conditions, it is not unreasonable to expect that some reptile species would be present.

#### Amphibians-

I have included a list of the amphibians reported from Leelanau, Benzie, and Grand Traverse Counties that are listed as threatened, endangered, or special concern (T/E/SC). I have also included a listing of species identified by B. Scharf (1987) for a comparable site just south of the construction site. In addition to impacts to amphibian populations associated with habitat loss, there would be an increased risk of mortality due to vehicle traffic. Last, an increase in human presence on the site would disrupt amphibian movement patterns.

However, based on the available information, it appears that the site has not been thoroughly surveyed for T/E/SC amphibian species.

#### Mammals-

I have included a list of the mammals reported from Leelanau, Benzie, and Grand Traverse Counties that are listed as threatened, endangered, or special concern (T/E/SC). I have also included a listing of species identified by B. Scharf (1987) for a comparable site just south of the construction site. In addition to impacts to mammal populations associated with habitat loss, there would be an increased risk of mortality due to vehicle traffic. An increase in human presence on the site would disrupt mammalian movement patterns.

For example, snowshoe hare is a species that has begun to suffer population declines due to loss of habitat and a disconnection between fur color patterns and local climate conditions. A decrease in habitat in the local region will exacerbate declines in mammal populations such as snowshoe hare.

However, based on the available information, it appears that the site has not been thoroughly surveyed for T/E/SC species.

#### -Aquatic Systems-

Aquatic habitats are driven by the local hydrologic conditions, precipitation, soils, and land use. Activities that alter hydrology will influence aquatic habitats. The amount of surface area converted to hard surface and compacted stone will alter the local hydrology below the site. For example, asphalt will cover approximately 12.18 acres, so precipitation will be inhibited from draining directly into the groundwater and will be rerouted to stormwater collection basins altering groundwater recharge. All other hard surfaces (e.g. roofs on building, travel trailers, etc.) will similarly alter recharge patterns. Any change in vegetation will also influence the dynamics between precipitation and groundwater recharge. Collectively changes to the surface features of the site will influence groundwater recharge patterns, discharge patterns, and basic groundwater flow patterns.

#### Wetlands-

Based on the construction plans, it appears that wetland mitigation will be accomplished primarily by reclaiming historic wetlands that were filled to create campsites when the site was previously a camp ground. However, some previously filled sites appear to be retained for campsites/units and many of the proposed campsites/units are immediately adjacent to existing and/or mitigation wetlands.

The proximity of wetlands to campsite/units will expose the wetlands to elevated levels of disturbance and possible impacts. During the construction phase, wetlands will be subject to increased dust and

physical disturbance, particularly the mitigation wetland sites that are embedded within existing wetlands. The physical disturbance will impact both flora and fauna. If soils are brought in from off-site as part of the construction, there is a very high probability that the soils will be contaminated with seeds and fragments of invasive species such as narrow-leaf cattails, hybrid cattails, and Phragmites. Finally, converting existing wetland to recreational venues will cause obvious harm. This loss likely cannot be offset by mitigation wetland because mitigation wetlands rarely function in the same way that natural wetlands do.

Adding nutrients via surface and groundwater flow may also impact wetland plant communities. Adding nutrients may drive plant communities toward monospecific stands of aggressive plants, particularly invasive species such as hybrid cattails or Phragmites.

#### Ennis Creek-

As is the case with hydrology in general, altered surface features including the removal of vegetation and the addition of hard impermeable surfaces and compacted surfaces will impact the hydrology of Ennis Creek. Proposed changes along Ennis Creek include (minus the 50' buffer; this equals 16.6 yards) constructing SS campsites with compacted surfaces, the parked trailers, and roadway surfaces. These hard/compacted surfaces will alter groundwater recharge dynamics along the stream corridor. The removal of vegetation, including the herbaceous layer, will also alter groundwater recharge dynamics. The plan also shows a road crossing Ennis Creek as part of a Future Phase 2 which would likely have similar impacts if construction occurs within the same distance to the Creek as pictured in the plan for the current proposed project.

It is unclear how stormwater will be managed in this part of the campground. If the site is graded to direct storm water into Ennis Creek and/or the adjoining wetlands, summer precipitation, particularly during warm weather, will enter those surface water features at elevated temperatures, particularly surface runoff from roads. Similarly, the surface runoff will increase sedimentation and deliver elevated concentrations of grease and oils from vehicle traffic. Use of the Emergency Access Road which appears unpaved will increase the rate of sedimentation due to traffic.

Biological communities within Ennis Creek will be impacted by surface runoff. Elevated temperatures will negatively impact stream communities adapted to cold water stream ecosystems, including brook trout populations and sensitive macroinvertebrate species. Sedimentation will eliminate spawning habitat for some fish and reduce habitat for macroinvertebrates. Oil and grease contamination will also have a negative impact on biological communities.

Nutrients (e.g. nitrogen and phosphorus) are primary factors that determine the amount of biomass that may accumulate in a given system. For example, lakes with high nutrient concentrations will have much greater weed and algae growth than a lake with lower nutrient concentrations. Based on historic data, Ennis Creek has had relatively low phosphate concentrations (for 2007-2017, mean = 0.013 ug/l) which is just below the EPA threshold of 0.0153 mg/l. In contrast nitrate+nitrite concentrations ranged from 0.44 mg/l to 1.18 mg/l which is well above the EPA Sub-ecoregion threshold of 0.13 mg/l. Because groundwater background phosphate concentrations are relatively low (likely <0.01 mg/l), the addition of phosphate to local groundwater will result in impacts to the stream and adjoining wetlands. An increase in phosphate along with existing nitrate+nitrite concentrations, plus increasing nitrate+nitrite concentration (see section below on Wastewater Treatment and Groundwater) will likely result in increased algal growth within Ennis Creek and ultimately at the Ennis Creek/Grand Traverse Bay confluence.

An increase in algal growth, especially filamentous algae such as *Cladophora*, will result in a decrease in the quality of the stream habitat and a decrease in the quality of the aquatic invertebrate community. Based on basic ecological principles, a decrease in the quality of the invertebrate community, a primary food source for trout, will result in a decline in trout populations.

The south tributary that is considered a drainage ditch in the project plans is an important hydrologic feature because of its connection to Ennis Creek. The tributary parallels the old Leelanau Transit Railroad grade, is immediately adjacent to the emergency access road, and is within approximately 100' of several SS campsites and a campground road. Disregarding this tributary as a significant hydrologic feature opens Ennis Creek to increased sedimentation and stormwater runoff. Stormwater runoff during the summer months will carry an additional thermal load that will have a negative impact on the tributary and Ennis Creek. Clearing existing vegetation from along the tributary will expose it to direct sunlight which will warm the tributary during daytime, adding additional heat to Ennis Creek. Treating the tributary as a drain increases the likelihood that any obstructions to flow such as woody debris will be removed to increase stormwater runoff. Any modifications to the tributary that removes naturally accumulated wood or organic matter will diminish the value of the tributary to resident organisms and those in Ennis Creek.

#### Wastewater Treatment-

The project plan includes an onsite wastewater disposal system described as an AquaCell MBBR System, produced by Aquapoint Advanced Wastewater Treatment Systems. First, the treatment tank is located west and upslope of the campground, but there are no details include in the construction plan on how the infrastructure will be installed (e.g., pipe connection from the campground to the treatment tank). Obviously, the connection will need to cross Ennis Creek which will likely have an impact on the creek.

The system receives wastewater influent from the campground, provides reaction surfaces supporting biological communities that process the influent waste, and can discharge the effluent to a drain field and ultimately into the groundwater. Based on an estimated 918 people using the campground on a given day (e.g., hot summer weekend), and if everyone flushed once, there would be approximately 2029.8 gal (7,683.6 liters) of wastewater generated via toilets. The effluent characteristics available on the Aquapoint web site indicate that effluent concentrations for ammonia is <3 mg/L, <5 mg/L for nitrate, and average 1.65 mg/L for phosphate. Using 1.5 mg/L for ammonia and 2.5 mg/L for nitrate, effluent loads for a day would be 11,525.4 mg of ammonia and 19,209 mg of nitrate. Phosphate loading would be approximately 12,677.9 mg.

A similar calculation for an average total summer nutrient loading can also be calculated assuming an average of 459 people on sight (an average of 200 occupied campsites and 59 day-time visitors), and the average occupancy rate applies to the three summer months (90 days). This would generate approximately 89,229.6 gallons of effluent or 337,770.8 liters. Using the same nutrient content estimates as above, that would release into the groundwater 506,654.6 mg of ammonia, 844,424.3 mg of nitrate+nitrite, and 557,320.1 mg of phosphate. Because the campground will operate over a period of time, it is simple to see the accumulated impact in terms of nutrient loading.

#### Groundwater-

Over time, nutrient concentrations will rise in groundwater. This pattern is clearly established from work on septic systems located around lake ecosystems with similar geology. Groundwater under Old Mission Peninsula has elevated nitrate levels which has resulted in some residents considering using

GTB water for home use. (The Watershed Center, Grand Traverse Bay Watershed Protection Plan, 2005) Background phosphate concentrations for Grand Traverse Co., and likely for Leelanau Co. is relatively low at <0.01 mg/l, and is partially responsible for the high-water quality of Grand Traverse Bay. Because groundwater in this area will flow toward Grand Traverse Bay, all of the surface water features including Ennis Creek, groundwater fed wetlands, homes with relatively shallow well, and Grand Traverse Bay will all be impacted by this additional nutrient loading. Previous observations of increased algal growth at the Yuba Creek outflow on the East Bay makes it very clear that elevated nutrient concentrations will have a negative impact on surface water features such as Ennis Creek and Grand Traverse Bay. The Watershed Center (2005) listed nutrients as the #1 priority issue for Grand Traverse Bay.

#### Grand Traverse Bay-

The area of Grand Traverse Bay adjacent to the construction site has historically been a critical biological area. Protecting this area from impacts should be a very high priority to help preserve the value of the region, particularly the Grand Traverse Bay fisheries.

As outlined above, increasing nutrient concentrations in groundwater will ultimately result in increased nutrient loading to Grand Traverse Bay. As groundwater flow emerges into the GTB, the nutrients will become available to the biological communities along the shore and to a depth associated with groundwater discharge. Nutrients will initially be utilized by the algal communities resulting in increased algal growth as noted for the area in the East Bay near the outflow of Yuba Creek. The increased algal growth will alter the quality of the sediment/substrate, will likely alter the aquatic invertebrate communities, and will likely alter the habitat available to important fish species such as whitefish and cisco. In this regard, the West shoreline of Grand Traverse Bay has historically been an important spawning area for several fish species including lake whitefish and very likely, for cisco. Adding nutrients that promote algal growth will decrease the overall quality of this area for fish spawning.

One impact to aquatic invertebrate communities may be an increase in organisms that feed on certain algae growing on the lake sediments. In particular, various snail species use algae as a primary food source and may benefit from the additional algal growth and biomass. In this case, my work on Higgins Lake has shown that increased algal growth may support populations of snails that are responsible for producing the parasite responsible for causing swimmer's itch. In addition, when these species of snails have more algal biomass as a food source they produce more of the swimmer's itch parasites. The work of others has shown that the movement of common mergansers from inland lakes to GTB has resulted in an increase in the swimmer's itch parasite in GTB, so the conditions are right for the parasite. Adding nutrients that support the snails that are part of the swimmer's itch parasite lifecycle will increase the potential for cases of swimmer's itch contracted in GTB.

Increased recreational use of the site at the proposed levels will likely result in increased sediment transport to GTB via Ennis Creek and by the redevelopment of the old marina basin. Through these points of discharge fine sediments will likely enter the nearshore area of GTB and will likely cover nearshore fish spawning habitat.

#### Coastal wetlands -

The accumulating literature has clearly established the value and significance of coastal wetlands. The fact that coastal wetlands migrate in response to changing Great Lakes water levels is well documented. As water levels rise, coastal wetlands will retreat upslope to maintain a plant community/water depth relationship. When water levels recede, coastal wetland communities will migrate downslope to reestablish this relationship. The coastal zone adjacent to the proposed campground has experienced

normal water level cycles observed across the Great Lakes and consequently, the associated coastal wetland community has retreated and expanded in response to lake levels. For example, the Great Lakes have been at a relatively high water level for the past few years, including 2018. Because of current high lake levels, the coastal wetland has receded and appears to be non-existent in satellite images. In contrast, the Great Lakes were at a lower water level during 2012, when satellite images captured an expanded coastal wetland totaling approximately 8 acres.

Coastal wetlands are critical to healthy Great Lakes fish communities. They serve as nursery areas for gamefish and forage fish that spawn nearshore, and they harbor a diverse array of invertebrates that are an essential part of aquatic food webs. Coastal wetlands also help protect shorelines from erosion.

Any activities that disrupt the natural cycle of wetland advance and retreat with changing water levels, and/or damages the integrity of the wetland community to the extent that it no longer supports GTB fish communities, will have a lasting negative impact. An increase in motorized water sports will generate physical disturbance due to wave action and add pollutants such as oil and gas residues to the water. Large numbers of swimmers will discourage nearshore juvenile fish use of that area. Beach grooming and removal of vegetation, either submerged, emergent, or shoreline growth, will have lasting negative impacts.

In conclusion, based on my previous work as an ecologist, I believe that the construction of a campground/recreational area at this site will or is very likely to have a long-term negative impact of the physical and biological characteristics of the site, including terrestrial and aquatic features, and migratory species. In addition, the proposed construction and operation of the campground/recreational area will have a long-term negative impact on the adjoining portions of GTB.

I reserve the right to revise this report as new information becomes available.

Sincerely

Mark R. Luttenton, Ph.D.  
14421 96<sup>th</sup> Ave.  
Coopersville, MI 49404



Figure 1. General perspective of the construction site. Date of image is 5/15/2018.



Figure 2. General perspective of the construction site. Date of image is 5/15/2018.



Figure 3. Broader perspective of the proposed construction site and the extent of a wildlife corridor running from South to North along the Grand Traverse Bay shoreline. Image produced on 5/30/2015.



Table 1. Species listed as threatened, endangered, and of special concern for Leelanau, Benzie, and Grand Traverse County. Information source is the MNFI web site.

Species	Leelanau Co.	Benzie Co.	Grand Traverse Co.
<b>Plants</b>			
Walking Fern	T		
Cut-leaved Water Parsnip	T		
Dunewort	T		
Spatulate Moonwort	T		
Fairy-slipper	T		
Broad-leaved Sedge	E		
Hill's Thistle		SC	
Pitcher's Thistle	T	T	T
Showy Orchis	T		
Twin Leaf	SC		
Michigan Monkey Flower	E		E
Broomrape	T		T
Ginseng	T	T	T
Lake Huron Tansy	T	T	
Nodding Pogonia	T		
<b>Amphibians</b>			
Blanchard's Cricket Frog	T		
Pickeral Frog	SC	SC	SC
<b>Reptiles</b>			
Blanding's Turtle		SC	SC
Eastern Box Turtle	SC		SC
Wood Turtle		SC	SC
Eastern Massasauga		SC/T	SC/T
Smooth Green Snake	SC	SC	SC
<b>Birds</b>			
Grasshopper Sparrow	SC		
American Bittern	SC		
Piping Plover	E		
Marsh Wren		SC	SC
Trumpeter Swan	T	T	T
Loon	T	T	T
Bald Eagle	SC	SC	SC

Caspian Tern	T		
Migrant Loggerhead Shrike		E	E
Least Bittern		T	T
Osprey		SC	SC
King Rail		E	
Hooded Warble			
Prairie Warbler	E		E
Golden-winged Warbler		SC	
Northern Goshawk		SC	SC
<b>Mammals</b>			
Woodland Vole	SC		SC
Little Brown Bat	SC	SC	
Northern Long-eared Bat	SC	SC	
Northern Flying Squirrel	SC		
<b>Fish</b>			
Cisco			
Pugnose Shiner	E		
<b>Snails</b>			
Broad Shoulder Physa		T	T
<b>Insects (select species)</b>			
Yellow Banded Bumble Bee	SC		

Table 2. Mammals, birds, and amphibians recorded during a biological survey of properties south of the proposed construction site. Data are from Scharf (1987).

<b>Mammals</b>	<b>Birds</b>	<b>Amphibians</b>
Meadow Vole	Chipping sparrow	American toad
Prairie Deer Mouse	Vesper sparrow	green frogs
Short-tailed Shrew	grouse	garter snakes
Snowshoe hares	Yellow warblers	Wood frogs
Red-backed Voles	Pileated woodpeckers	Tree frogs
Possible uncommon shrews (Sorex)	woodcock	
Weasels	White throated sparrow	
Deer mouse	Wood Pewee	
Shrews (Sorex and Blarina)	Downy woodpecker	
	Hairy woodpecker	
	Pileated woodpecker	
	Ovenbird	
	White breasted nuthatch	
	Least fly catcher	
	Wood Pewee	
	Crested Flycatcher	
	Red-Eyed Vireo	

Table 2. Plant species recorded during a biological survey of properties south of the proposed construction site. Plants were listed for multiple parcels or habitats so some plants are listed more than once since the plant occurred in multiple locations. The report listed plants in scientific nomenclature and by common name. I have transcribed the names as listed in the report. Data are from Scharf (1987).

<b>Plants</b>
white lady-slipper
Crested shield fern
Oak fern
Cinnamon fern
Allium tricoccum
Rilium grandiflorum
Osmorhiza claytoni
Caullophyllum thalictroide
Viola pubescens
Polygonatum pubescens

Galium lanceolatum
Geranium robertianum
Dicentra canadensis
Fagus grandifolia
Acer saccharum
Ulmus americana
Botrychium virginianum
Allium tricoccum
Arisaema atrorubens
Trillium grandiflorum
Mianthemum canadense
Laportea canadensis
Viola pubescens
Geranium robertianum
Fraxinus americanus
Ulmus americana
Ulmus fulva
Marchantia
Sallaginella
Caltha palustris
Nasturtium officinals
Onoclea sensibilis
Osmunda claytonia
Preridium aquilinum
Adiantum pedatum
Iris versicolor
Arisaema atrorubens
Ranunculus septentrinalis
Osmorhiza claytoni
Geum rivale
Impatiens capensis
Eupatorium perfoliatim
Eupatorium purpureum
Phryma leptostachya
Fagus grandifolia
Acer saccharum
Tilia americana
Ostrya virginiana
Fraxinus americanus
Quercus rubra
Acer rubrum

Ulmus americana
Equisetum fluviatile
Osmunda cinnamomea
Botrychium virginianum
Dryopteris disjunctus
Dryopteris spinulosa
Dryopteris cristata
Athyrium pycnocurom
Athyrium theleptroides
Adiantum pedantum
Pteridium aquiculium
Asplenium platyneuron
Habenaria viridis
Trillium grandiflorum
Medeola virginian
Mianthemum canadense
Polygonatum pubescens
Smilacina raccomosa
Spiranthes sp
Allium tricoccum
Uvularia sessilifolia
Clintonia borealis
Arisaema atrorubens
Erythronium Americanu
Caulophyllum thalictroides
Viola pubescens
Viola canadensis
Viola conspensa
Pyrola rotundifolia
Mitchella repens
Sanicula canadensis
Mitella diphylla
Hepatica acutiloba
Phryma leptostachya
Actea rubra
Actea pachypoda
Osmorrhiza claytoni
Geranium robertianum
Galium lanceolatum
Galium triflorum
Aralia nudicaulis

Trientalis borealis
Fraxinus americanus
Betula lutea
Acer rubrum
Populus tremuloides
Populus tuckermahacka
Betula papyrifera
Acer saccharum
Ulmus americana
Sallaginella
Equisetum fluviatile
Evergreen woodfern
Spinulose shield fern
Oak fern
No. Oak fern
Crested shield Fern
Bracken fern
Cinnamon fern
Rattlesnake fern
Nasturtium officinalis
Scirpus atrovirens
Trillium grandiflorum
Mianthemum canadense
Arisaema atrorubens
Clintonia borealis
Smilacina racemosa
Habenaria viridis
Cyrtopodium reginae
Ranunculus septentrionalis
Ranunculus acris
Geranium robertianum
Aralia nudicaulis
Linnaea borealis
Achillea millefolium
Eupatorium purpureum
Eupatorium perfoliatum
Impatiens capensis
Agrimonia gryposepal
Geum rivale
Phryma leptostachya
Actaea rubra

Actea pachypoda
Osmorhiza claytoni
Trientalis borealis
Solarum dulcamara