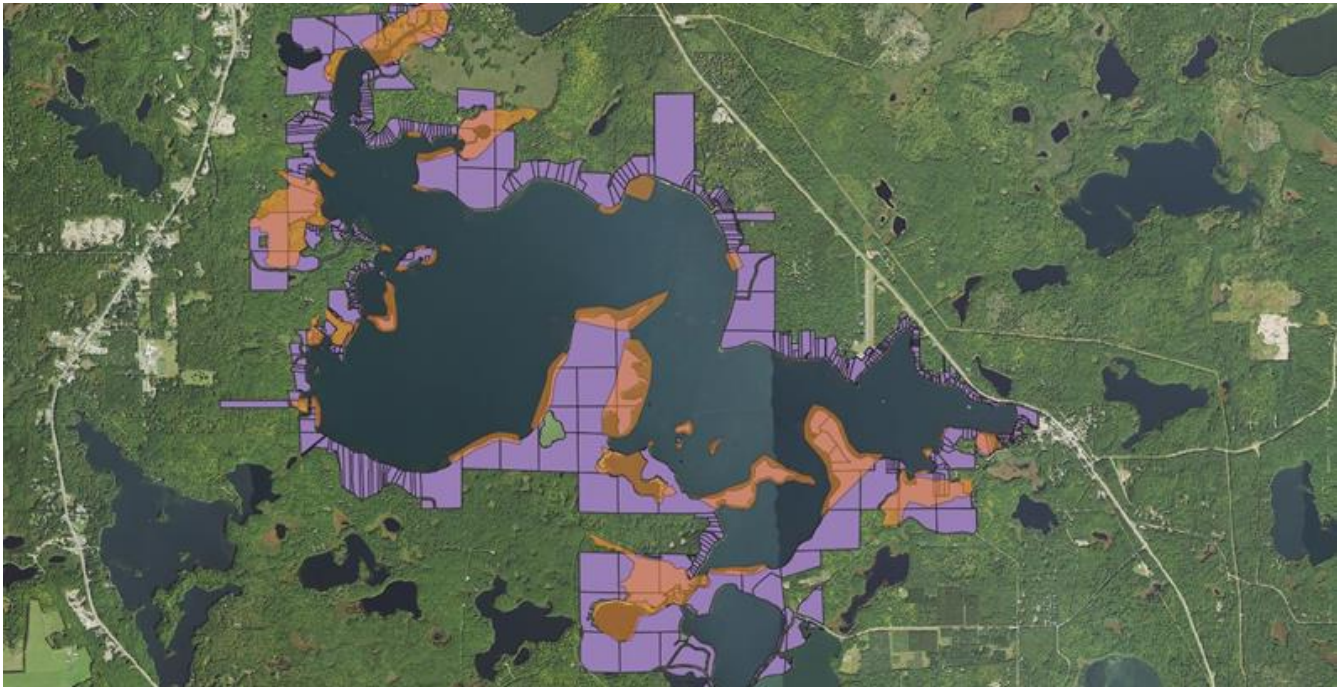


ASSESSING THE STATE OF TOMAHAWK LAKE'S SHORELANDS - 2020



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Nova Ecological Services
Manitowish Waters, WI
August 1, 2020

Introduction

The goal of the Tomahawk Lake Association (TLA) Shoreland GIS project is to encourage private and public landowners to implement shoreland best management practices in ecologically sensitive shoreland regions of Tomahawk Lake where needed. It is our working assumption that by increasing knowledge of Tomahawk Lake's valuable ecological features, we will motivate lake property owners to initiate and continue practices that conserve or restore native shoreland vegetation and minimize erosion and surface water run-off into Tomahawk Lake – thus protecting critical fish and wildlife habitat and maintaining high water quality.

Lakeshore property development and recreational use often leads to degraded fish and wildlife habitat quality as well as increased sediment and nutrient run-off which can increase weed growth and reduce water clarity. Best management practices which reduce run-off and improve habitat quality are available and can repair the impacts of development. As there are over 350 individual property owners on Tomahawk Lake, we will use the results of this project to prioritize education and outreach efforts to target landowners and shoreland areas that will benefit most from shoreland best management practices.

Under contract with TLA, Nova Ecological Services (NES) undertook 3 surveys and GIS mapping projects to accomplish this goal. GIS (Geographical Information Systems) is a computerized mapping program that permits the overlay of many sources of data on one map. First, NES conducted boat surveys along the entire Tomahawk and Mud Lake shorelines and mapped Critical Habitat - sites with high quality fish and wildlife habitat, diverse aquatic plant communities, shorelands with natural scenic beauty that are protective of water quality, and important wetland areas. See companion report titled *"Getting to Know Tomahawk Lake's Special Places"* for results. Second, NES conducted a boat survey on July 4th weekend to identify shoreland areas (commercial, public, and private properties) receiving concentrated human use (boating and recreation) in the shoreland areas. Ten high use areas were identified. Third, NES assessed the shoreland condition at 414 tax parcels adjacent to Tomahawk Lake during July 2019, using the draft WDNR Lake Shoreland & Shallows Habitat Monitoring Field Protocol (Hein et al. 2016). Results of those surveys are found in this report.

Results from all these efforts are used in a GIS project to identify individual Tomahawk Lake properties for shoreland management education and outreach efforts including site assessments and

recommendations for best management practices. We will focus our outreach and education programs on properties that have buffer conditions in need of improvement, have potential erosion and run-off issues, and are near shoreland areas of high ecological value (e.g. Critical Habitat). The project implements several mapping action steps identified in the TLA CLMP Work Plan (2016-2020) with shoreland implications and updates the Tomahawk Lake shoreland inventory.

Project Outcomes

Products from this project are being posted on the Tomahawk Lake Association web page. Information may also be posted on Facebook, YouTube, and contained in printed brochures. The purpose will be to;

- Inform the Tomahawk Lake community of the existing critical habitat features and shoreland conditions on Tomahawk Lake.
- Discuss ways to maintain or improve the lake's water quality, fisheries, wildlife, wetlands, and natural scenic beauty.
- c. Identify projects to enhance or improve shoreland and aquatic habitat through best management practices.
- d. Identify shoreland areas which would lend themselves to neighbor to neighbor shoreland restoration discussion meetings.

Identifying High Concentration Human Use Locations and Relationship to 39 Critical Habitat Sites on Tomahawk Lake

A survey was conducted on Friday July 5 to identify properties on Tomahawk Lake with high concentrations of human activity including beach use, boating, commercial operations, recreation, and presence of 15+ people at properties during the surveys. The locations of these public and private properties are shown in comparison to Critical Habitat sites in the maps below. Operators of these properties should be made aware of important natural features in proximity to their operations and the shoreland best management practices that could be undertaken to minimize sediment and nutrient run-off and maximize the protection and restoration of natural habitat on their properties.



Figure 1. Concentrated Use Sites on Tomahawk Lake - North

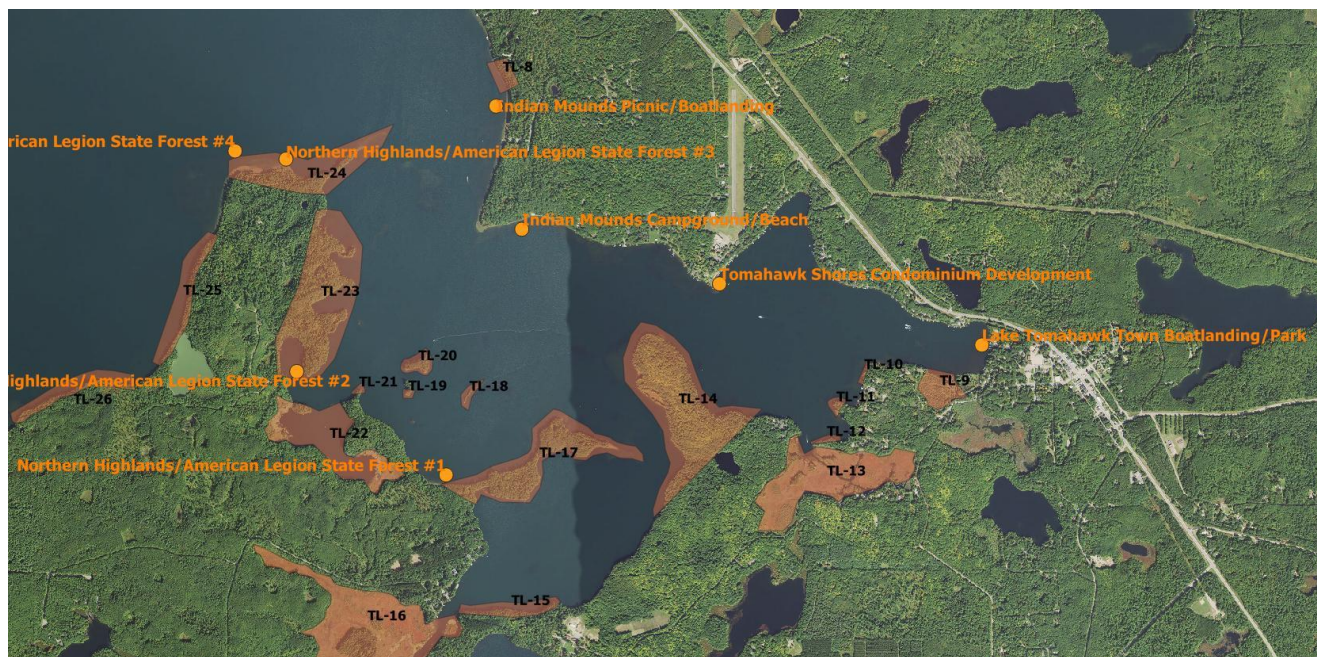


Figure 2. Concentrated Use Sites on Tomahawk Lake - South

Lakeside Grill and Condominium <https://www.facebook.com/lakesidegrillminocqua/>

This popular shoreline restaurant and bar serves customers that arrive by boat and auto. The outside deck is a big draw during warm summer afternoons and evenings. Several condominium units are also on the property. At the time of our survey on July 5th there were 7 boats moored and 65 people at the tables and along the shoreline. Much of the property is covered with pavement and roof tops (impervious surfaces) so practices that minimize run-off to the lake should be employed. Over 50% of the shoreland buffer is impervious surface or manicured lawn but some natural shoreland vegetation remains on the north end of the property and should be maintained. There is little natural habitat on the property shoreline near the restaurant— given its concentrated use it may be difficult to restore or conserve, but an attempt should be encouraged. There were 17 piers and 13 boat lifts present.





Figure 3. Lakeside Grill Photos and Aerial Map

Indian Shores Campground and Cottage Resort

This commercial operation on the north shore of Tomahawk Lake is near critical habitat site TL-7 and our shoreline survey indicated there was evidence of erosion and surface water run-off. Shoreland best management practices should be employed to address these concerns. We also found much of the buffer to be in natural vegetation so a key objective would be to maximize conservation and restoration of natural habitat adjacent to the lake. There are over 30 boat lifts and 5 piers in the Marina so the concentrated boating near the high quality aquatic macrophyte bed (TL-7) is a concern – it would be useful to make boaters aware of this critical habitat which is in close proximity to the marina and boat traffic. See companion Critical Habitat report for more information.

Indian Shores - A Northwoods Campground and Cottage Resort <http://www.indian-shores.com/>



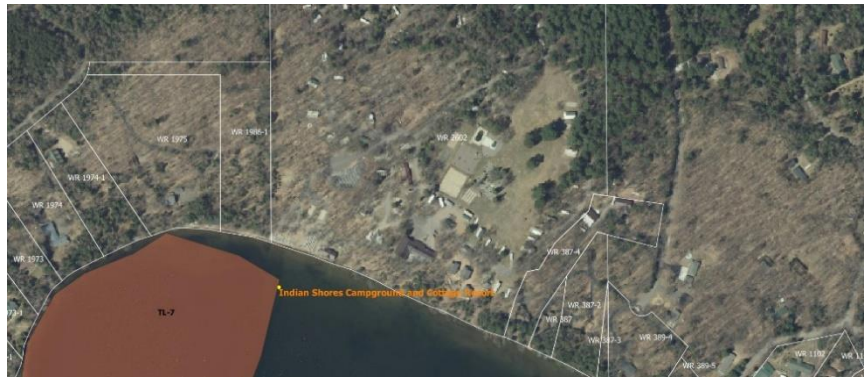


Figure 4. Indian Shores Photos



Tomahawk Shores Condominium Development

There is no publicly available information on the *Tomahawk Shores Owners Association* LTD or other information related to the condominium development via the internet. During our shoreline inventory survey of the property on July 19 the buffer was estimated at 35% lawn and impervious surface and there was about 40' of artificial beach. Thirteen piers were counted along with 15 boat lifts. Approximately 25 people were present at the beach and along the shoreline during our July 5 Concentrated Use survey. There was no evident erosion, channeling or gullying from run-off, or bare soil but because of the concentrated use of the site and steep slopes on the north end of the property, care should be taken to divert any potential run-off from reaching the lake or creating erosion.





Figure 5. Tomahawk Shores Photos

Lake Tomahawk Town Boat Landing Park

The Lake Tomahawk Boat Landing Park is a primary access point for boaters (ice-free seasons) and ice fisherman and snowmobiles (winter). The shoreland buffer adjacent to the park is in natural vegetation while that near the boat landing is primarily impervious surface and lawn. Despite the large amount of impervious surface present there was little sign of channeling or gullies and little bare soil. The potential for run-off does exist so an effort to divert run-off from the access road which has a steep grade would be beneficial.

*“**Boat Landing Park** is in town on the eastern shore of Tomahawk Lake. The boat landing features three concrete launch ramps, floating docks and tie up piers and new in 2016, a handicapped accessible fishing pier. There is parking for dozens of boat trailers as well as autos. Outhouse style toilets, a wheelchair accessible porta-potty, picnic tables, a volleyball pit and grills make this a fun area to take a swim, have a cookout, or do a little fishing. In the winter months this is an access area for ice fishermen and snowmobiles. The hill is used for sledding and snowboarding as well.”*

<http://www.laketomahawkwi.org/government/commissions-and-committees/parks-commission>





Figure 6. Lake Tomahawk Town Boat Landing Park Photos

Concentrated Use Areas on Northern Highland/American Legion State Forest Land

We mapped 6 locations of concentrated use at shoreland properties managed by the State of Wisconsin on the 4th of July weekend – and this pattern of use was evident throughout the summer. The Wisconsin DNR operates the Indian Mounds Campground and Picnic Area on the northcentral portion of the lake shoreline. The state also owns several parcels on the southern shore of the lake – concentrated use by boaters and recreationists was observed at 4 locations throughout the summer (see Northern Highlands/American Legion #1 - #4 below). Significant shoreland run-off and erosion problems were noted at these sites.

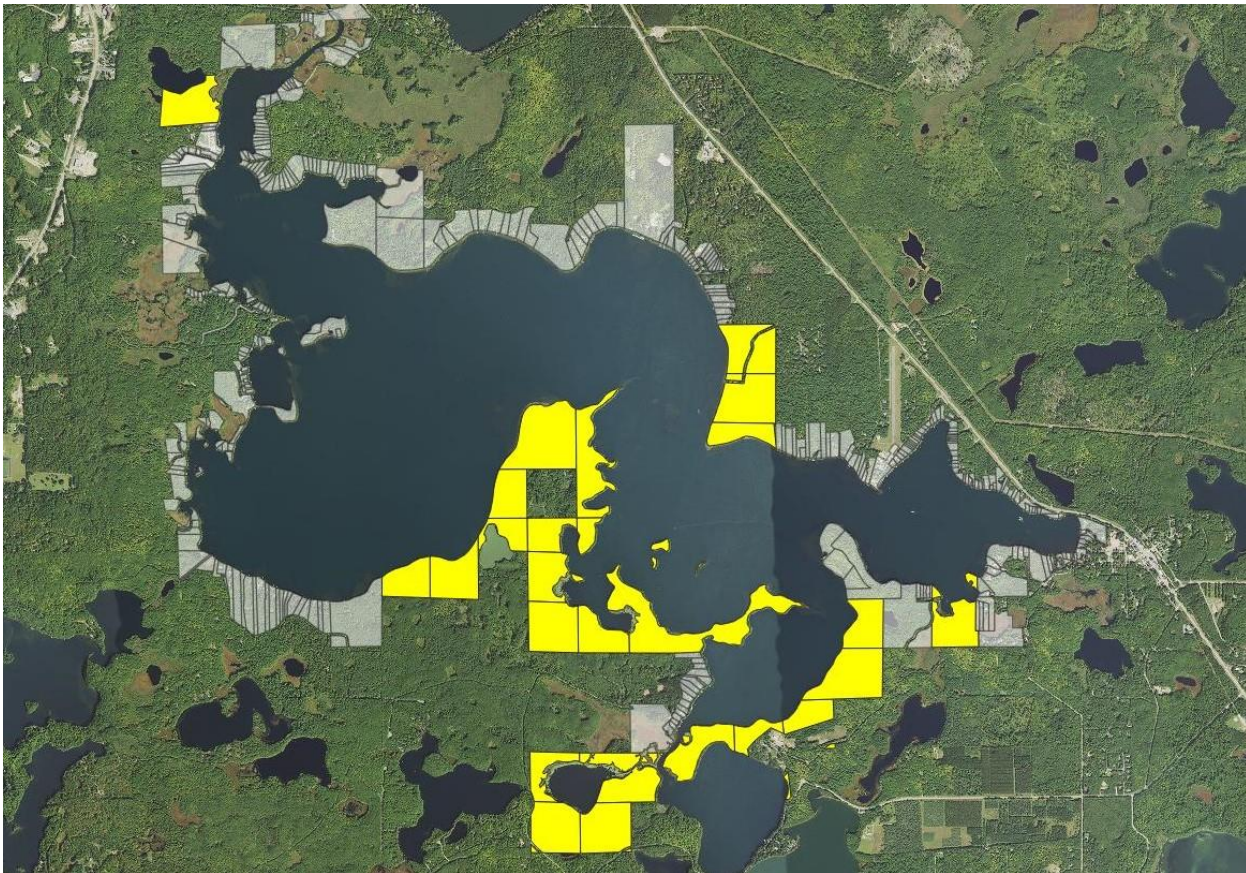


Figure 7. State-owned shoreland parcels on Tomahawk Lake

Indian Mounds Campground

Indian Mounds Campground is in the southern portion of the forest on the northeast corner of the Lake Tomahawk. The campground has three vault toilet buildings, three hand pumps for drinking water, separate trash and recycling dumpsters and access to the water. There is also an adjacent picnic area with tables, grills, a marked swimming area, vault toilet building, changing stalls, ADA accessible picnic area and boat launch. Three of the four vault toilet buildings are designated ADA accessible.

There are 2 concentrations of use on the property – 1) the picnic area and boat landing in the northwest part of the property and 2) the 39 campsites and beach on the south end of the property.

<https://dnr.wi.gov/topic/StateForests/nhal/documents/indianmounds.pdf>

**Northern Highland American Legion State Forest**

Camping Fees

Resident.....	\$20/night
Non-resident	\$25/night

State Parks and Forest Admission Sticker

A State Parks and Forest Admission sticker is **REQUIRED** year-round on vehicles in the campgrounds.

Resident.....	\$28/annual
Resident Senior	
Citizen (+65)	\$13/annual
Non-resident	\$38/annual

State Parks and Forest Admission Sticker

A State Parks and Forest Admission sticker is **REQUIRED** year-round on vehicles in the campgrounds.

Resident.....	\$28/annual
Resident Senior	
Citizen (+65)	\$13/annual
Non-resident	\$38/annual

Campground Address

7490 Tomahawk Road, Woodruff

Amenities

- **Campsites Available:** 39
- **Reservable Sites:** 7-39
- **Non-reservable Sites:** 1-5
- **Walk-to/tent-only Sites:** 20, 24-27, 29-31
- **Double Sites:** 9-10, 17-18
- On-site campground host (Memorial Day thru Labor Day)
- Beach access
- Nearby access to Clear Lake/Indian Mounds Paved Bike Trail
- Boat landing and parking
- Trash and recycling stations
- Three pit toilet buildings
- Three hand pumps for drinking water
- Paved campground roads
- **State Parks and Forest Admission Sticker** required for camping

Reservations

To make online camping reservations, visit CAMIS at: wisconsin.goingtocamp.com or call 1-888-947-2757.

Welcome!

Indian Mounds Campground, sites 1-39, are located in the southern portion of the forest on the northeast corner of Lake Tomahawk. Lake Tomahawk is part of the Minocqua Chain of Lakes and offers excellent fishing and boating. There is a boat landing and parking area near the entrance of the campground. Within the campground, the translucent waters at the sandy, updated beach attracts persons of all ages to enjoy the cool waters. Indian Mounds Campground derives its name from the four historic conical burial mounds built by the Woodland people many years ago. **Please register for camping at the Clear Lake Visitor Station prior to setting up camp.**



Photo courtesy of Beth Feland, WISNR

Entrance to Indian Mounds Campground.

Additional Information

For questions about this property, contact:

- **Clear Lake Visitor Station**
715-356-3668
- **Crystal Lake Visitor Station**
715-542-3923

Local Emergency Contact Information

Oneida County Sheriff's Department: 715-361-5100

Vilas County Sheriff's Department: 715-479-4441

Iron County Sheriff's Department: 715-561-3800

Campground Rules

- Upon availability, all campers must register at a: 1) campground kiosk, 2) visitor station, or 3) with a campground manager.
- **Checkout Time:** Must vacate site by 3 p.m. on the last day of the permit.
- **Campground/Day-use Areas and Closing Time:** Campground closed to nonregistered campers 11 p.m. to 6 a.m.
- **Pets** must be on a leash at all times and not left unattended.
- **Noise** may not interfere with the enjoyment of the forest by others.
- **Generators** may be used from 10 a.m. to 5 p.m.
- **Camping Party:** A "non-family group" may not exceed six persons. A "family" is limited to parents with their dependent children and not more than two guests.
- A **State Parks and Forest Admission Sticker** is required for camping.
- For complete rules and regulations, see Chapter NR 45, Wis. Admin. Code, or contact DNR Law Enforcement.

Indian Mounds Picnic Area and Boat Landing

The Wisconsin DNR operates the Indian Mounds Campground and Picnic Area on the northcentral portion of the lake shoreline. Boats anchor and people picnic and swim at the picnic area north of the boat landing which until recently was also managed as a swimming beach. At the time of the July 5th survey there were 5 boats anchored and 15-20 people using the shore area. At times over the summer there were over 20 boats anchored at this location with 60+ people using the site. The shoreland buffer is primarily in natural vegetation and there was no obvious run-off or erosion concerns (as there is little slope in the beach/boat landing area) though the site should be monitored as concentrated use of the areas will continue and there is a walleye spawning area (TL-8) just to the north of the picnic area where the shoreline slope is steep. The boat landing is a popular boat launching area when lake levels are normal to high but launching is difficult for larger boats during low water periods. There is much prop scouring of the bottom in this area. Several dozen vehicles and trailers were observed during busy summer days in the boat landing parking lot. See companion Critical Habitat report for more information.

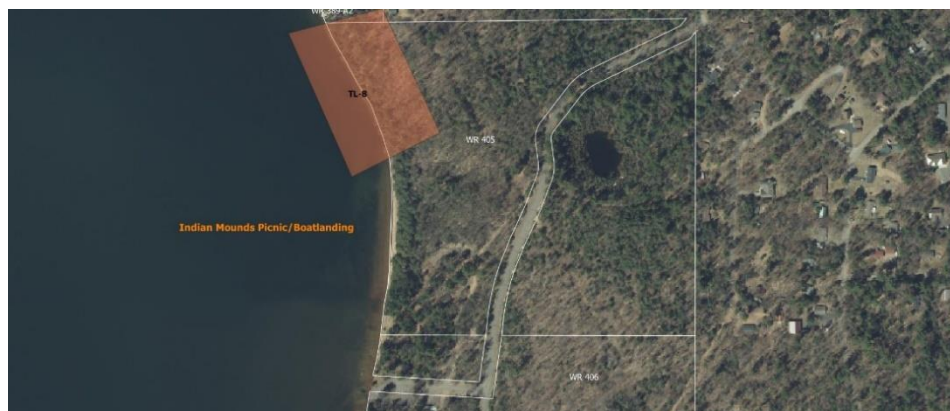




Figure 8. Indian Mounds Picnic Area and Boat Landing Photos

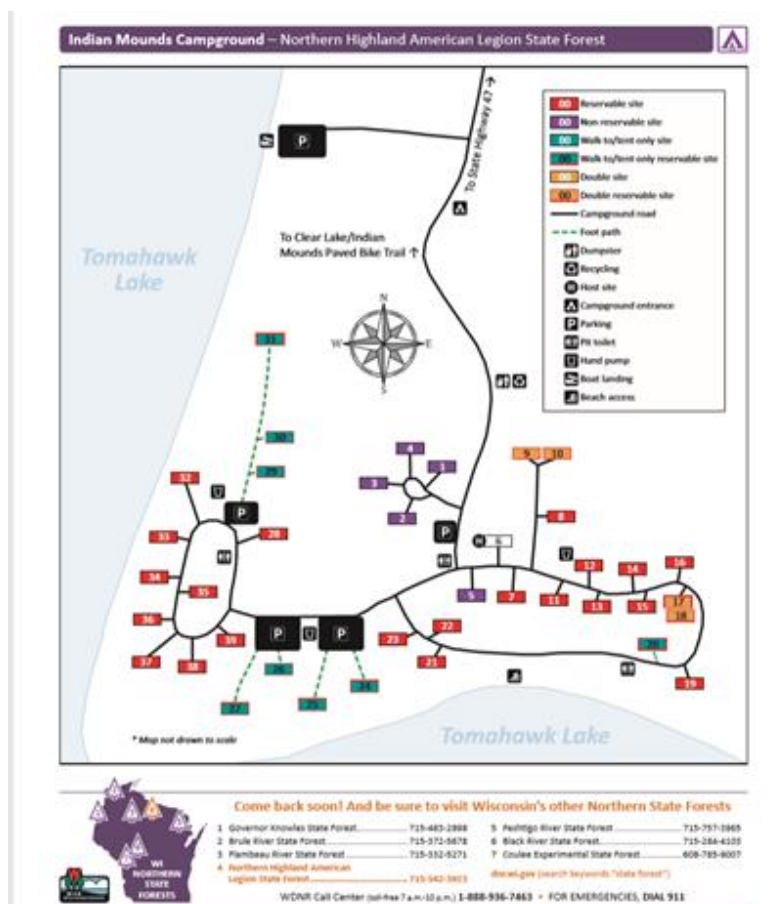
Indian Mounds Campground/Beach

There are 39 campsites at this WDNR property and a beach area. The campground is open for camping when snow-free and generally at capacity during July and August. There are steep slopes along a portion of the northern shore with extensive erosion, gullying/channeling, and surface water run-off due to foot traffic associated with the campsites. Boats are moored along the shoreline as well, without improved docking sites.





Figure 9. Indian Mounds Campground/Beach Photos



Northern Highland/American Legion State Forest #1

There are 4 locations on State of Wisconsin shoreland parcels where we noted large numbers of boats and jet skis anchored or pulled ashore along long stretches of shoreline. These areas are relatively shallow and sandy, offering ideal swimming and water sport (water skiing, waterboarding, jet skiing) staging areas. When we conducted the survey between 1PM and 2PM on July 5 there were 15 boats moored and 62 people enjoying site #1. Despite this high level of use, only 40' of bank erosion was noted – the upland area is level. This area is adjacent to and within Critical Habitat site TL-17 (See companion report on Critical Habitat).

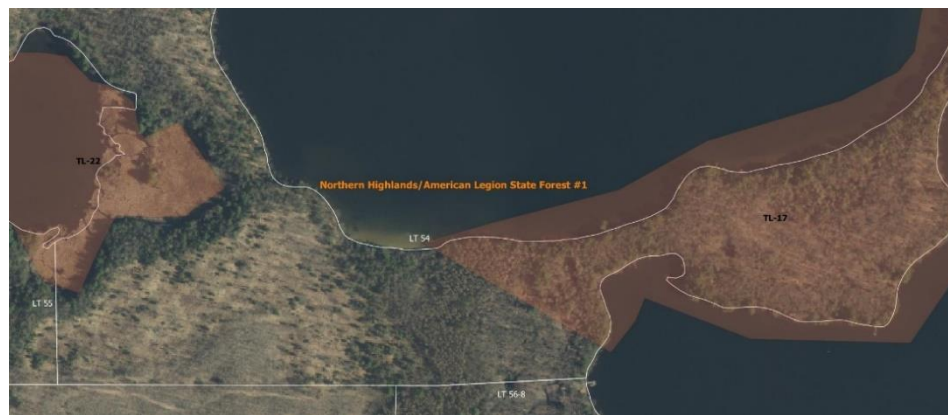


Figure 10. Northern Highland/American Legion State Forest #1 Photos

Northern Highland/American Legion State Forest #2

This peninsula is used by boaters for swimming and picnicking. At the time of the survey there were 5 boats and 20 people present at this site. Approximately 40' of bank erosion was noted. This area is within critical habitat site TL-23. See companion report on Critical Habitat for more information.

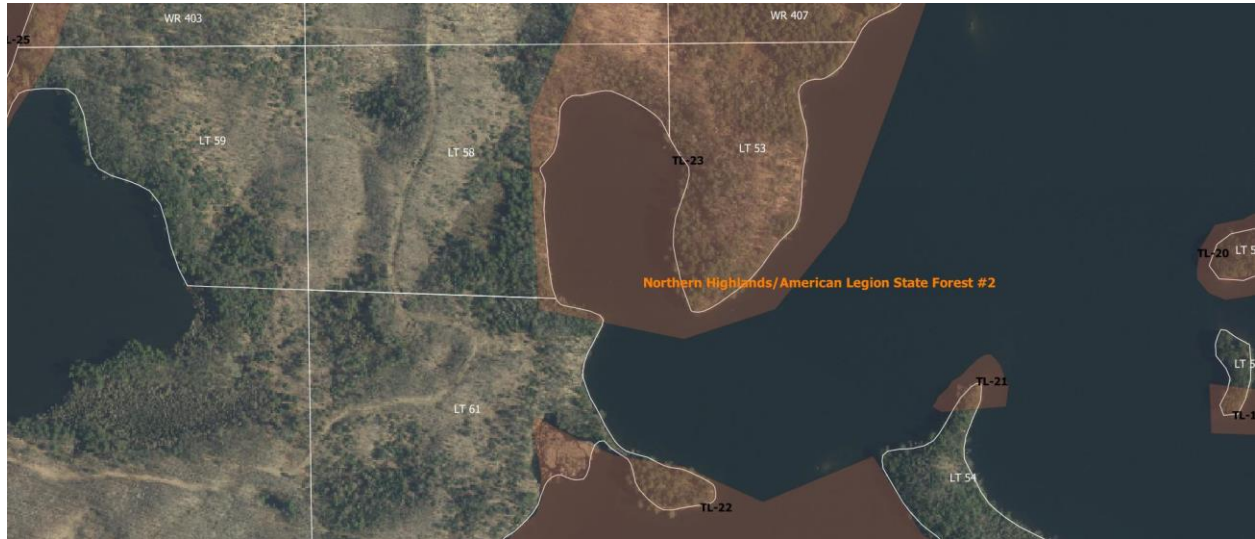


Figure 11. Northern Highland/American Legion State Forest #2 Photos

Northern Highlands/American Legion State Forest #3

Two concentrated use areas were located on the north shoreline of Windy Point. At the time of the July 5th survey there were 25 boats and 3 jet skis at anchor and between 80-100 people present on the shoreline, in anchored boats, or in the water. Several ski boats and jet skis were actively using the area. Extensive gullying and channeling of the adjacent uplands and buffer was associated with the activity as well as bank erosion. These sites have the most severe erosion problems on Tomahawk Lake and are within Critical Habitat site TL-24 (See companion report on Critical Habitat for more information).





Figure 12. Northern Highlands/American Legion State Forest #3 Photos

Northern Highlands/American Legion State Forest #4

This location, often referred to the “otter slide”, had the most severe erosion and run-off problems observed on Tomahawk Lake. Human use of the adjacent steep sandy upland has resulted in over 200’ of gullying and channeling of run-off with >250’ of bank erosion present. Because of the high concentration of use and steep slopes, management of the site could include fencing and signage and perhaps seasonal porta-potty facilities to keep people off the steep upland sites. Again, this location is within Critical Habitat site TL-24 – see Critical Habitat Report for more information.

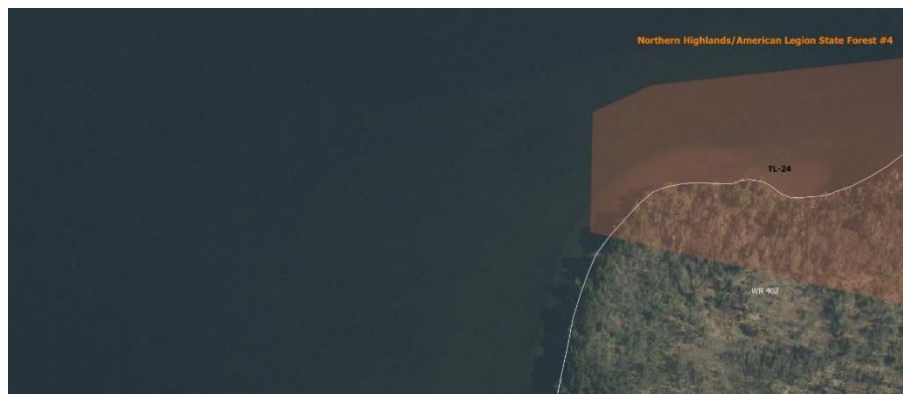


Figure 13. Northern Highlands/American Legion State Forest #4 Photos

3. Tomahawk Lake Shoreland and Shallows Habitat Monitoring Surveys

We conducted boat surveys July – August 2019 of the Tomahawk Lake shoreline and assessed the upland and shoreland buffer condition and identified erosion and run-off issues on 414 tax parcels adjacent to Tomahawk Lake, Oneida County in 2019, using the draft WDNR Lake Shoreland & Shallows Habitat Monitoring Field Protocol (Hein et al. 2016). We identified 38 properties with potential upland and/or buffer gullying and channeling due to surface water run-off, 83 parcels with potential bank erosion, and 144 with buffers that were greater than 40% in manicured lawn and/or impervious (hard, non-porous) surfaces. **As this was a one-time shoreland evaluation done offshore by boat, an actual onsite visit is needed to confirm the survey results (see Recommendations to Property Owners in Section 4).**

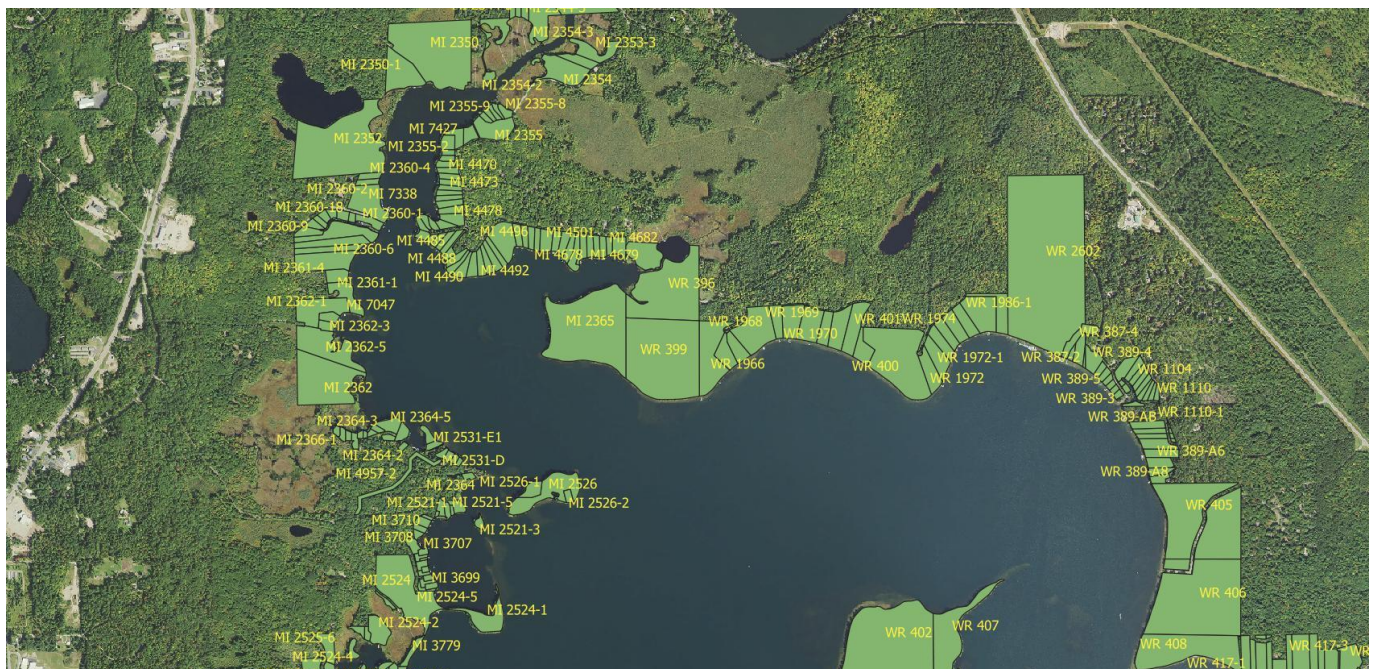


Figure 14. Tomahawk Lake Shoreland Parcels - North



Figure 15. Tomahawk Lake Shoreland Parcels - South

Shoreland Parcels with Erosion Potential (Lawn/Soil Sloping to Lake)

We identified several developed parcels with steep topography in the upland which have lawns, stairways, and soil sloping to the shoreline. These properties should be monitored by owners for erosion or run-off problems. Many of these sites do not have existing run-off or erosion issues but landowners should be made aware of this risk (due to the topography and development) along with preventative steps that can be taken to ensure erosion and run-off does not occur. Property owners should also be made aware of critical habitat sites that are near their development.

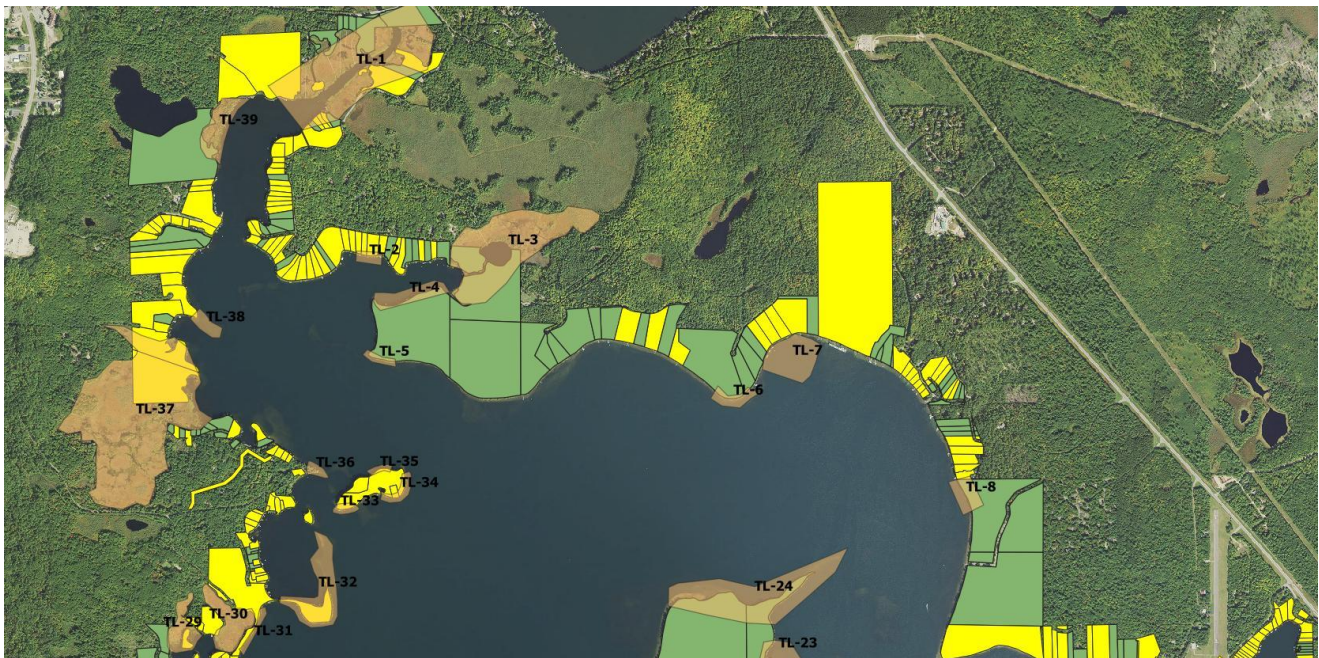


Figure 16. Shoreland Parcels with Erosion Potential (yellow) – North. Critical Habitat sites are in orange.

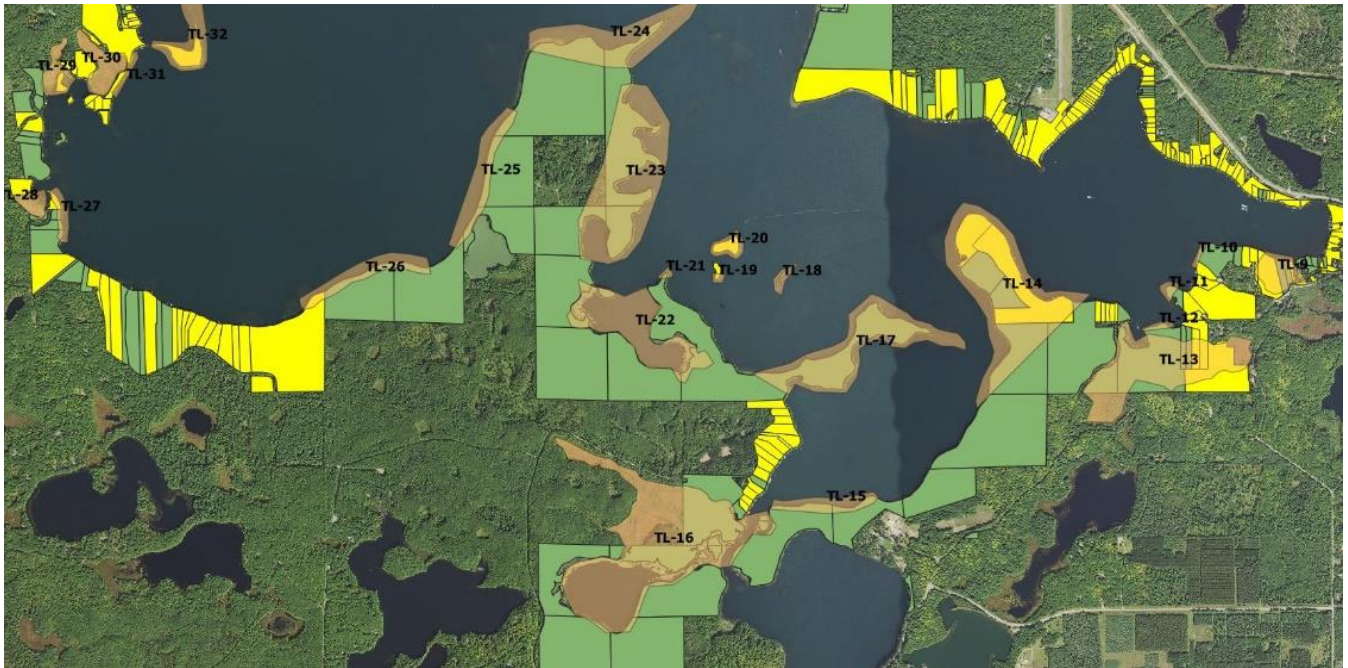


Figure 17. Shoreland Parcels with Erosion Potential (yellow) – South. Critical Habitat sites are in orange

Shoreland Parcels with Potential Gullyng and Channeled Run-off

We identified several shoreline parcels which appeared to have active erosion and run-off conditions leading to gullyng and channeling in the upland and buffer. Corrective actions should be taken to address this as run-off increases nutrient and sediment run-off into Tomahawk Lake. These property owners should be made aware of critical habitat sites near their development.

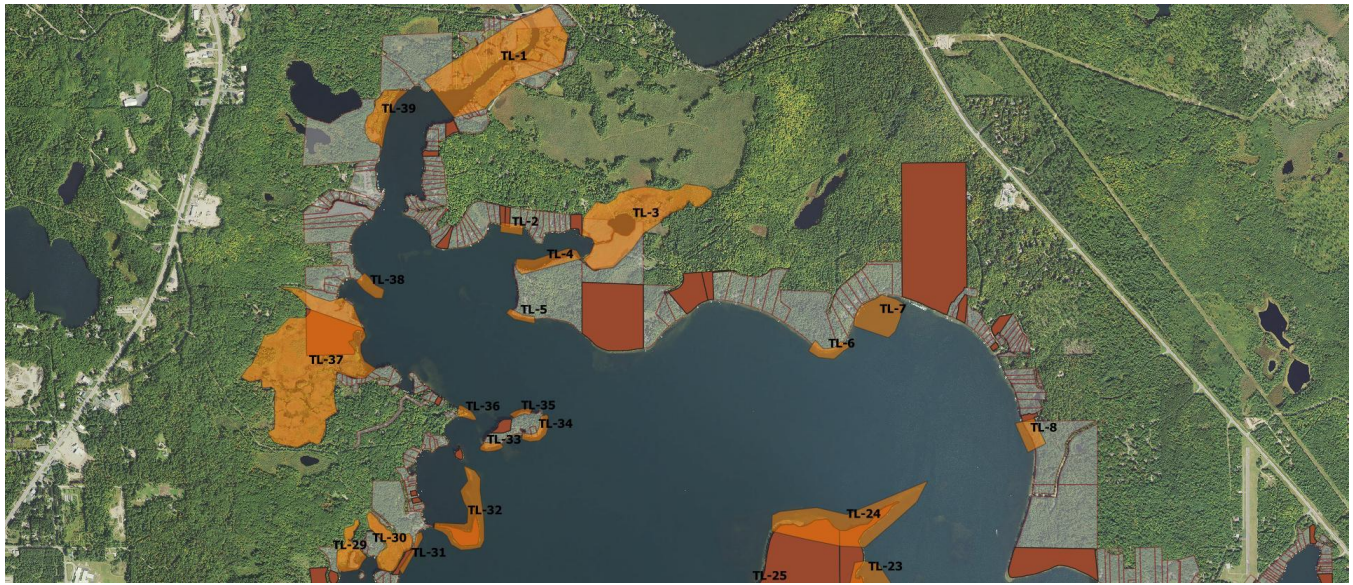


Figure 18. Shoreland Parcels with Gullyng/Channeled Run-off – North (brown)

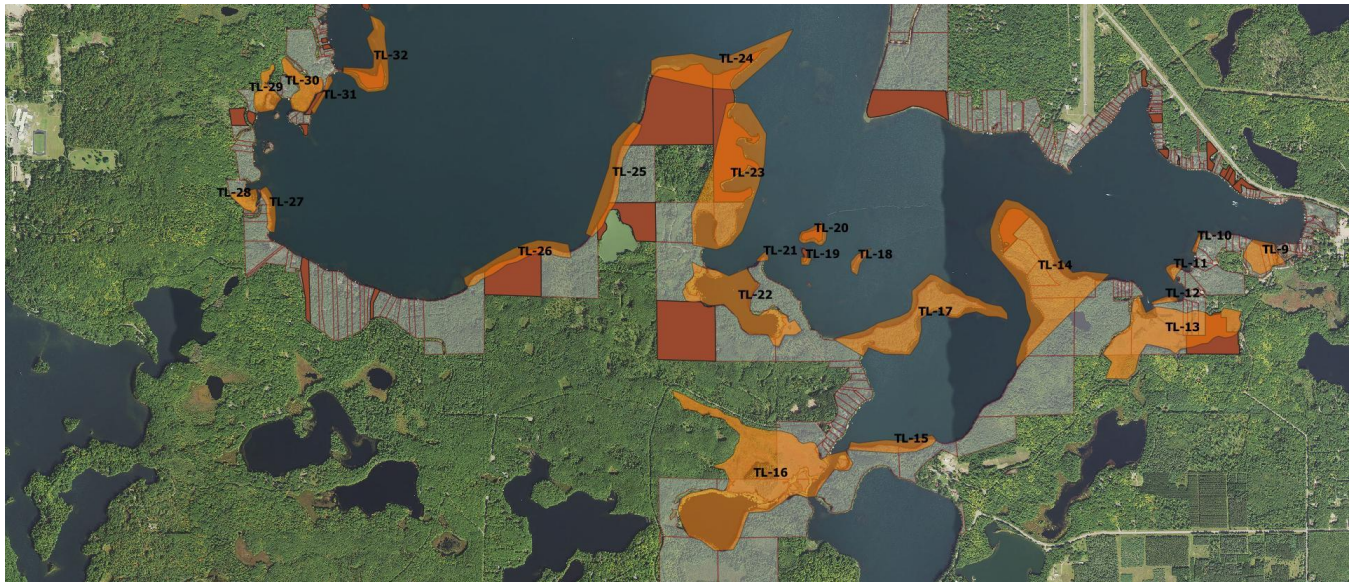


Figure 19. Shoreland Parcels with Gullyng/Channeled Run-off – South (brown)

Shoreland Parcels with Potential Bank Erosion

We identified several shoreline parcels with active bank erosion immediately adjacent to the shoreline. Corrective actions should be taken to address this erosion as it increases nutrient and sediment run-off into Tomahawk Lake. These property owners should also be made aware of critical habitat sites near their development.

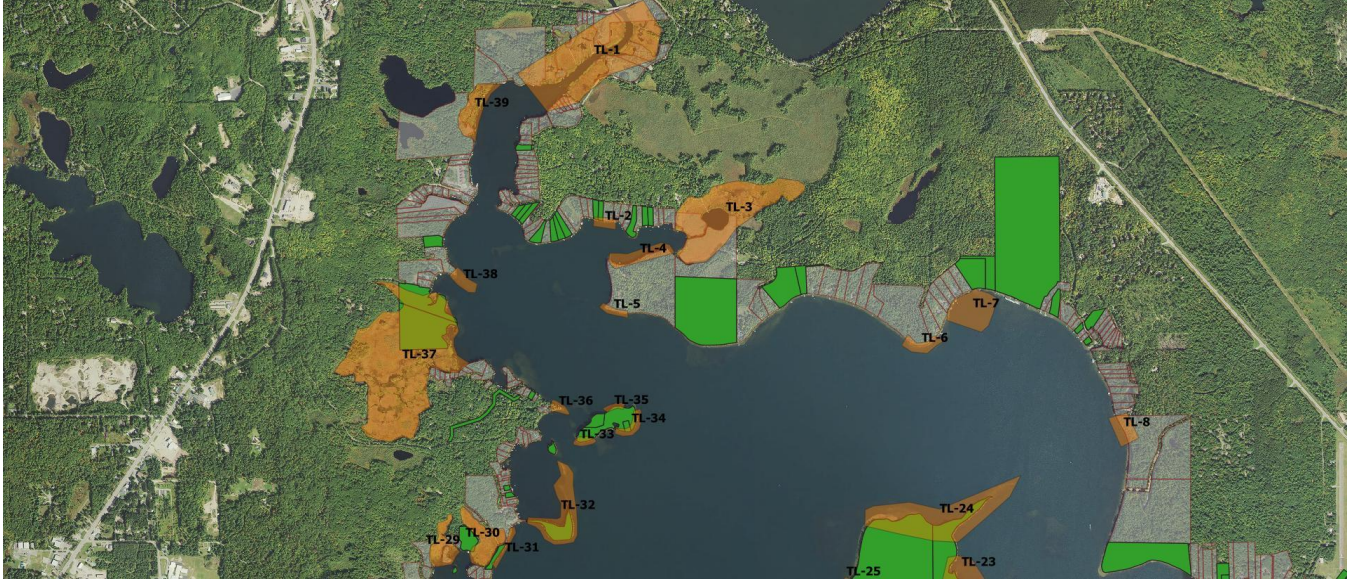


Figure 20. Shoreland Parcels with Observed Bank Erosion – North (dark green)

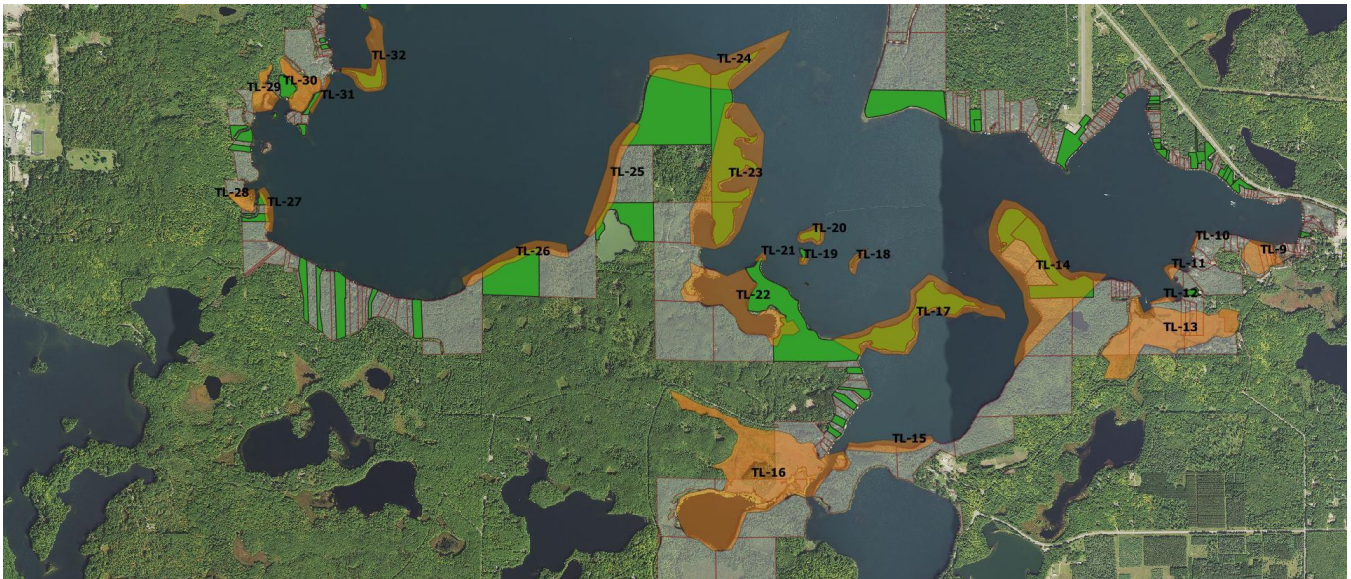


Figure 21. Shoreland Parcels with Observed Bank Erosion – South (dark green)

Shoreland Parcels Needing Buffer Habitat Improvement

Shoreland development often degrades the habitat quality of buffer zones. Manicured lawns reduce wildlife habitat, and impervious surfaces (rooftops, driveways, etc.) increase nutrient and sediment run-off. We identified properties where the buffer zone is greater than 40% manicured lawn and impervious surface and are near critical habitat sites. These landowners should be encouraged via education and outreach to increase native plantings along their lakeshores. Lake managers recommend leaving at least 70% of the buffer in native vegetation.

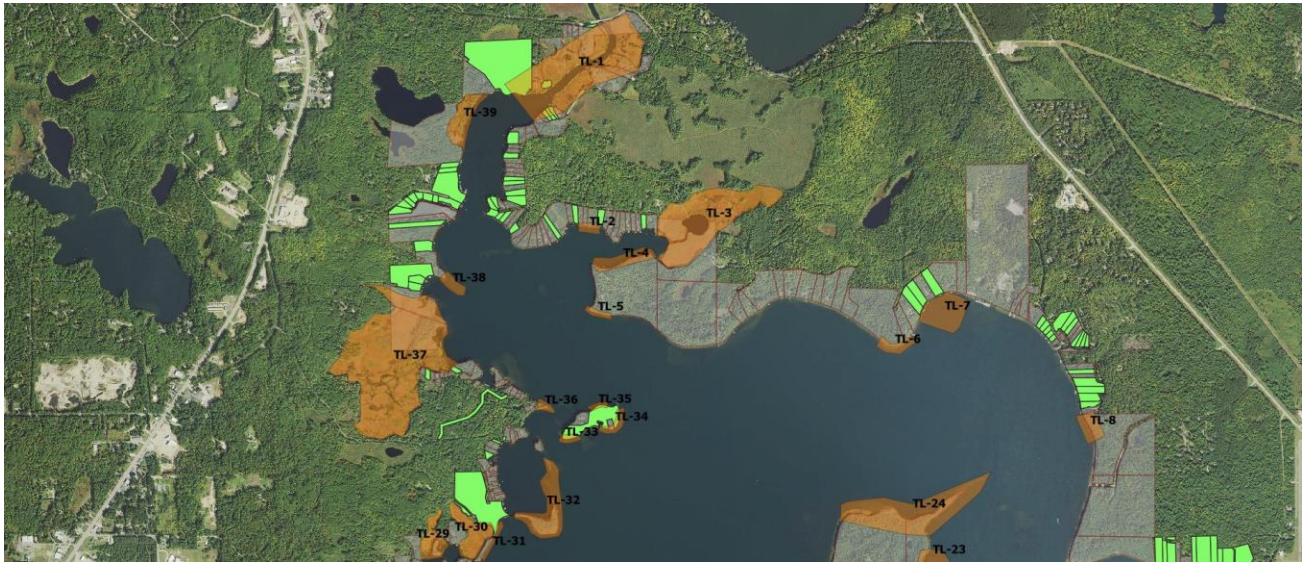


Figure 22. Shoreland Parcels with Degraded Buffer Habitat – North (light green)

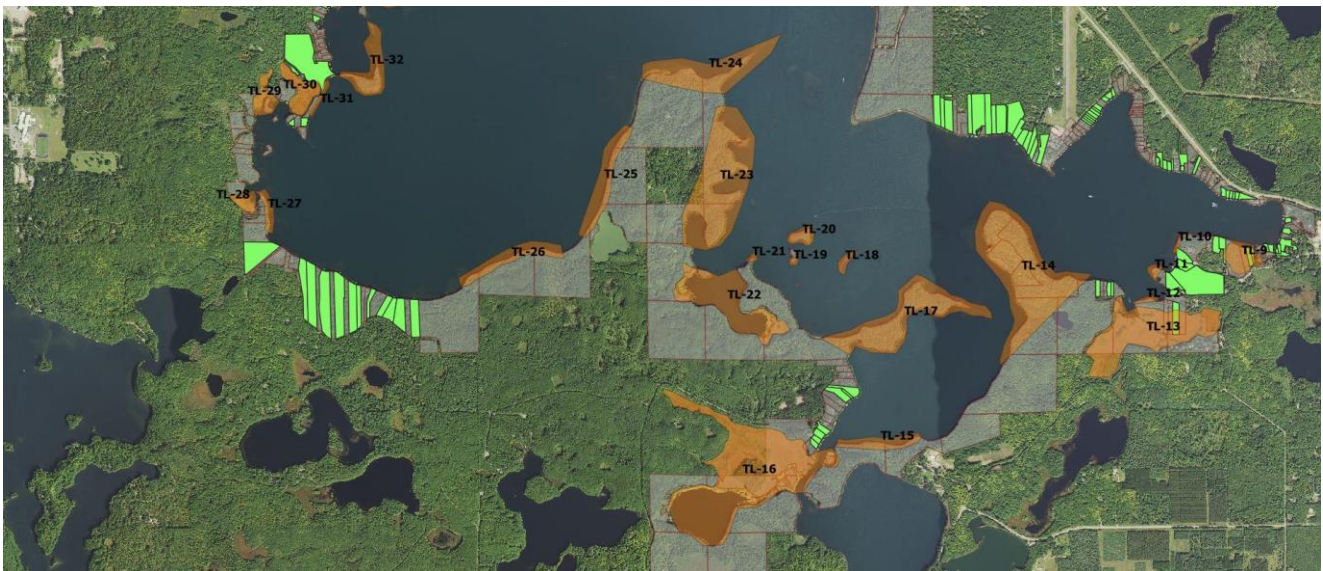


Figure 23. Shoreland Parcels with Degraded Buffer Habitat – South (light green)

4. Recommendations for Tomahawk Lake Property Owners

- Get to know the important fish and wildlife habitat areas on Tomahawk Lake by reading the report “[Getting to Know Tomahawk Lake’s Special Places](#)” Familiarize yourself with areas that are in close proximity to your property. Spend some time in these areas to learn more about the natural communities on Tomahawk Lake.
- Take the Tomahawk Lake Association Rate Your Shoreland Self-Assessment Survey to evaluate how your property is doing as related to Shoreland Best Management Practices (<https://www.tomahawklake.org/rate-your-shoreline>).
- Contact the Tomahawk Lake Association for a free on-site visit to further evaluate your property’s condition and receive an individual property report and recommendations for shoreland best management improvements.
- Become familiar with the Tomahawk Lake Association’s Shoreland Best Management Practices to best manage your property to safeguard fish and wildlife habitat, water quality, and natural scenic beauty of the lake we all love (<https://www.tomahawklake.org/more-shore>).