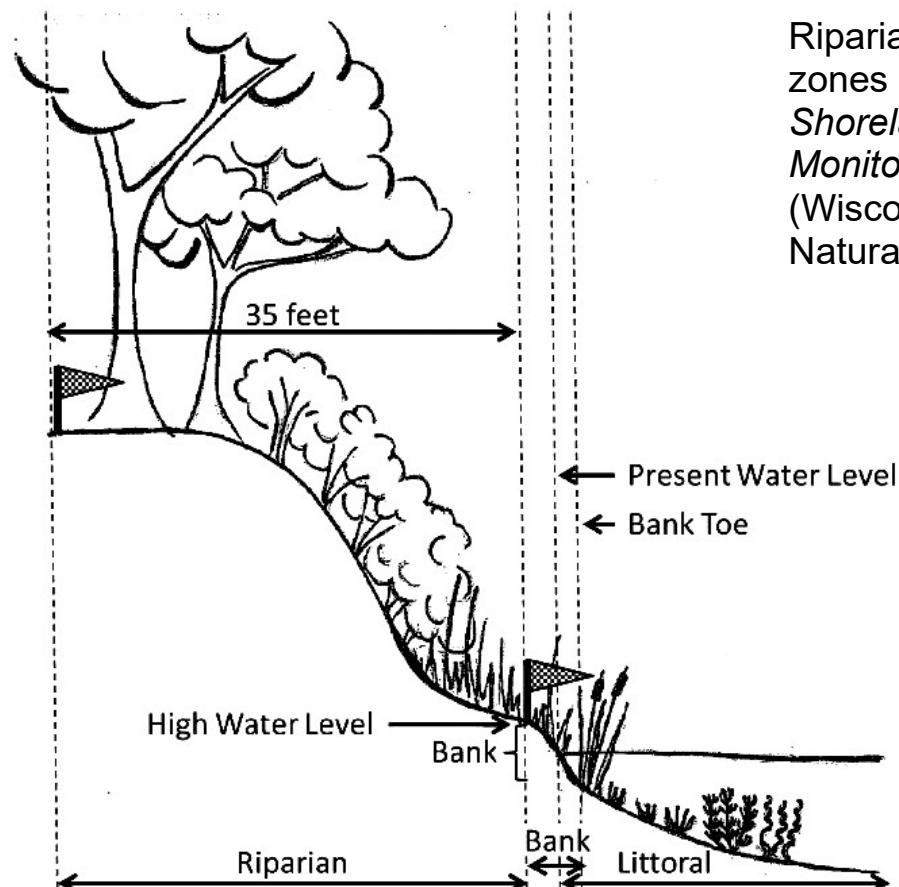

Carlin Lake (Vilas County, Wisconsin)

Shoreland and Shallows Habitat Monitoring Report



Riparian, bank, and littoral zones covered by the
Shoreland & Shallows Habitat Monitoring Field Protocol
(Wisconsin Department of Natural Resources 2016)



INTRODUCTION

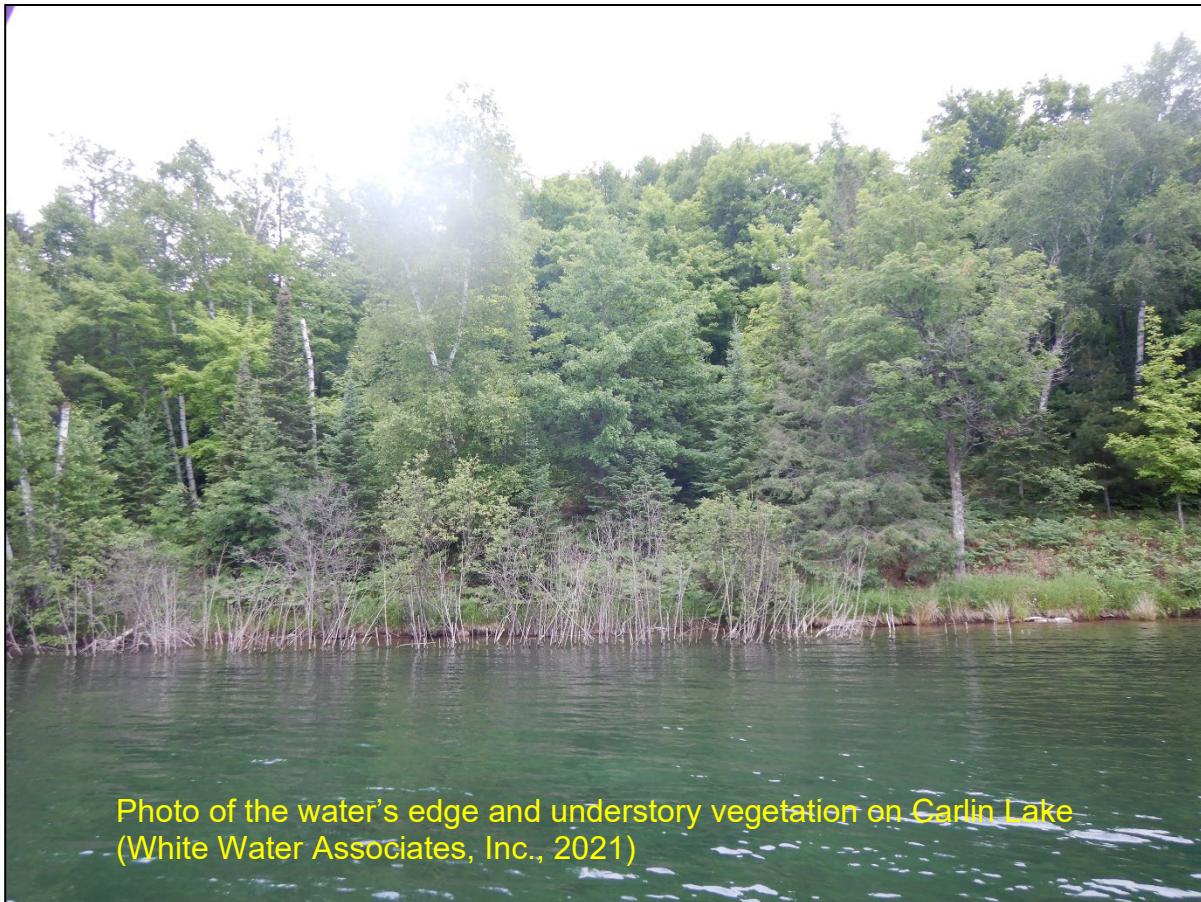
White Water Associates, Inc. is retained by the Presque Isle Town Lakes Committee (PITLC) as a consultant for the *Presque Isle Wilderness Waters Program*. A recent Wisconsin Department of Natural Resources (WDNR) lake planning grant to the PITLC included an assessment of the shoreland area and shallows habitat for Carlin Lake (Vilas County, Wisconsin). The assessment was conducted using the *Lake Shoreland and Shallows Habitat Monitoring Field Protocol* (WDNR 2016)¹. This protocol provides a standard methodology for surveying, assessing, and mapping habitat in lakeshore areas, including the riparian buffer, bank, and littoral zone (WDNR 2016). This information will be useful to local and regional resource managers, community stakeholders, and others interested in protecting and enhancing Wisconsin's lakes and rivers (WDNR 2016).

METHODS

There are three principal components to the shoreland and shallows habitat monitoring: (1) obtain georeferenced photos of the entire lake shoreline area, (2) assess the riparian, bank, and littoral habitat by ownership parcel, and (3) count and map all pieces of large woody material in water less than 2 feet deep. In this section, we describe each of these components.

The photographic component of the monitoring documented shoreland habitat conditions around the lake at the time of the survey. Results may be referred to in future years (WDNR 2016). Digital photos were taken with the intent to slightly overlap, thus capturing the entire shoreline. The survey crew used the boat to circumnavigate the lake at a distance of approximately 50 feet perpendicular from shore where conditions permitted. This standardized relative position on the lake allowed the photos to include the water's edge and understory vegetation 35 feet inland. A digital camera with an internal GPS was used to capture the photos. An example shoreland photograph is shown on next page. In the laboratory, photos were processed, georeferenced, and provided as part of the data package to the WDNR.

¹ Wisconsin Department of Natural Resources. May 27, 2016. *Draft Lake Shoreland & Shallows Habitat Monitoring Field Protocol*. WDNR 2016.



**Photo of the water's edge and understory vegetation on Carlin Lake
(White Water Associates, Inc., 2021)**

The shoreline habitat assessment was conducted for every ownership parcel on the lake. To facilitate this effort, parcel data was obtained March 2020 via the Wisconsin Statewide Parcel Map, which can be found at <https://maps.sco.wisc.edu/Parcels/>. Parcel IDs and shoreline lengths were derived from these spatial data files. Parcel IDs and parcel lines, together with a “riparian buffer” line at 35 feet from the shoreline, were layered onto aerial photography maps saved as a georeferenced image file viewed on the Avenza Maps application on an Apple® iPad Pro 9.7 equipped with GPS for offline navigation. The GPS function of the iPad allowed the survey crew to know their position relative to the shoreline and specific parcels. The map is provided as Exhibit 1. Data sheets were prepared that included parcel ID numbers and frontage feet of each parcel (an example data sheet is shown in Exhibit 2). Exhibit 2 also shows the categories that were documented for each parcel. Back in the laboratory, data recorded on field data sheets were input to a Microsoft Office Excel spreadsheet and later conveyed to the WDNR as part of the data package to be included in a publicly available database.

The woody habitat component of the assessment was conducted on a separate circumnavigation of the lake. Before starting, a Secchi depth was measured. The protocol specifies that if the Secchi depth is less than two feet, no woody habitat survey will be conducted due to poor visibility (WDNR 2016). In addition to the Secchi depth, lake water level was documented relative to the lake's *high water level* (HWL). As the lake was circumnavigated, large wood was enumerated. The protocol defines "large wood" as wood greater than 4 inches in diameter somewhere along its length and at least 5 feet long. Eligible large wood was that which was located between the high water level and the 2 foot depth contour and the large wood section must be in the water or below the high water level. Tree "branchiness" ranking was recorded as "0" (no branches), "1" (few branches), or "2" (tree trunk with full crown). Additional details on eligible large wood are provided in the protocol document (WDNR 2016). A GPS was used to document each eligible piece of large wood. A datasheet entry corresponded to each large wood piece. An example datasheet is provided as Exhibit 3.

FINDINGS

The data and photos for the assessment of shoreland area and shallows habitat for Carlin Lake have been delivered to the WDNR. Any user can view the results in the Wisconsin Department of Natural Resources Lakes and AIS Mapping Tool found at: <https://dnr.wi.gov/lakes/viewer/>. In this section we summarize a few of the data and provide some example maps that illustrate the findings from the assessment.

The assessment was conducted on June 29, 2021. At the time of the survey there were 53 ownership parcels on Carlin Lake. The shoreline perimeter of Carlin Lake is 2.8 miles. Exhibit 4 summarizes some of the Carlin Lake data. Exhibit 5 provides instructions for navigating the WDNR AIS Mapping Tool in order to analyze data and create specific maps. It should be noted that at the time preparing this report, The WDNR had yet included the Carlin Lake data in the active database. As result, we were not able to provide some example maps of selected data in this report.

In general, the assessment shows the shoreland and shallow water habitat of Carlin Lake to be of high quality. There is excellent tree canopy coverage as well as shrub and herbaceous coverage. That being said, there is evidence of human influence in the riparian buffer zone and bank zone. The number of large wood pieces per mile of shoreline is high.

LAKE STRATEGY

Carlin Lake is a high quality lake with good shallow water habitat and intact riparian area. Lake stewardship could primarily be directed toward protection of the current conditions and monitoring to detect changes over time. Although Carlin Lake is in a mostly natural state, there are a few parcels that could undertake some restoration to ameliorate possible runoff and erosion issues. These areas can be identified by investigating the 2021 monitoring data in maps and tables in this report as well as in the WDNR database (link given previously). Landowners can look at their own parcels to see how they were scored on the assessment with regard to impervious surfaces, manicured lawns, human structures, and broad runoff concerns. If their parcel is highlighted with one or more of these issues, stormwater reduction and/or habitat improvement practices could be designed and implemented. The Healthy Lakes program in Wisconsin provides simple, practical, and inexpensive best practices that improve habitat and water quality on lakeshore property (see <https://healthylakeswi.com/> for additional information and guidance on funding projects). Cathy Higley (Vilas County Lake Conservation Specialist) is an expert who can visit properties and provide more detailed assessment and assistance in developing stormwater reduction and/or habitat improvement practices for Healthy Lake Projects. A potential partner for landowners that would be interested in protecting high quality natural shorelines is the Northwoods Land Trust. Carlin Lake large woody habitat is abundant but areas that are sparse could be augmented with the “fish sticks” best practice.

Exhibit 1. Shoreland Parcels.

CARLIN LAKE 2021 SHORELAND



Habitat Assessment Data Sheet (one per parcel)

Date _____ Lake name _____ WBIC _____
 Parcel ID _____ Observers _____

RIPARIAN BUFFER ZONE			
Percent Cover	Percent		
Canopy	<input type="text"/> (0-100)		
Shrub <input type="checkbox"/>	Herbaceous <input type="checkbox"/>		
Shrub/Herbaceous	<input type="text"/>		
Impervious surface	<input type="text"/>		
Manicured lawn	<input type="text"/>		
Agriculture	<input type="text"/>		
Other (e.g. duff, soil, mulch)	<input type="text"/>		
description: _____			
Human Structures		Number	
Buildings	<input type="text"/>		
Boats on shore	<input type="text"/>		
Fire pits	<input type="text"/>		
Other	<input type="text"/>		
description: _____			
Runoff Concerns		Present in Riparian	Present out of Riparian
In Riparian or Entire Parcel			
Point source	<input type="checkbox"/>	<input type="checkbox"/>	
Channelized water flow/gully	<input type="checkbox"/>	<input type="checkbox"/>	
Stair/trail/road to lake	<input type="checkbox"/>	<input type="checkbox"/>	
Lawn/soil sloping to lake	<input type="checkbox"/>	<input type="checkbox"/>	
Bare soil	<input type="checkbox"/>	<input type="checkbox"/>	
Sand/silt deposits	<input type="checkbox"/>	<input type="checkbox"/>	
Other	<input type="checkbox"/>	<input type="checkbox"/>	
description: _____			
Notes: _____			
BANK ZONE		Length (ft)	
Vertical sea wall	<input type="text"/>		
Rip rap	<input type="text"/>		
Other erosion control structures	<input type="text"/>		
Artificial beach	<input type="text"/>		
Bank erosion > 1 ft face	<input type="text"/>		
Bank erosion < 1 ft face	<input type="text"/>		
LITTORAL ZONE		Number	
Human Structures			
Piers	<input type="text"/>		
Boat lifts	<input type="text"/>		
Swim rafts/water trampolines	<input type="text"/>		
Boathouses (over water)	<input type="text"/>		
Marinas	<input type="text"/>		
Other	<input type="text"/>		
description: _____			
Aquatic Plants		Present	
Emergents	<input type="checkbox"/>		
Floating	<input type="checkbox"/>		
Plant Removal	<input type="checkbox"/>		
If Applicable (low water level):			
EXPOSED LAKE BED ZONE			
Plants	Present		
Canopy	<input type="checkbox"/>		
Shrubs	<input type="checkbox"/>		
Herbaceous	<input type="checkbox"/>		
Disturbed			
Plants (mowed or removed)	<input type="checkbox"/>		
Sediment (tilled or dug)	<input type="checkbox"/>		

Exhibit 2. Example habitat assessment data sheet.

Exhibit 3. Coarse woody habitat inventory data sheet.

Date _____ Lake name _____ WBIC _____
 Observers _____
 Present water level is Below At Above the High Water Level Secchi depth _____ ft

ID	Branch	Touch	In	ID	Branch	Touch	In	ID	Branch	Touch	In	ID	Branch	Touch	In
		Shore	Water			Shore	Water			Shore	Water			Shore	Water
1				26				51				76			
2				27				52				77			
3				28				53				78			
4				29				54				79			
5				30				55				80			
6				31				56				81			
7				32				57				82			
8				33				58				83			
9				34				59				84			
10				35				60				85			
11				36				61				86			
12				37				62				87			
13				38				63				88			
14				39				64				89			
15				40				65				90			
16				41				66				91			
17				42				67				92			
18				43				68				93			
19				44				69				94			
20				45				70				95			
21				46				71				96			
22				47				72				97			
23				48				73				98			
24				49				74				99			
25				50				75				100			

Branch: 0 = no branches, 1 = a few branches, 2 = full tree crown

Touch Shore: 0 = entirely below High Water Level (HWL), 1 = crosses HWL

In Water: 0 = less than 5 ft of log is currently underwater, 1 = at least 5 ft of log is currently underwater

Exhibit 4. Summary of shoreland and shallow water habitat for Carlin Lake.			
Date of Survey: June 29, 2021	Miles of shoreline: 2.835		
Number of ownership parcels: 53	Mean parcel frontage feet: 282		
Riparian Buffer Zone	# of parcels	% of parcels	
Impervious surfaces	41	77	
Manicured lawn	20	38	
Agriculture	0	0	
Other (duff, soil, mulch)	10	19	
Human structures (buildings, boats on shore, fire pit, other)	38	72	
Broad runoff concerns (incl. point source; channelized water flow; straight stair, trail, or road to lake; lawn or soil sloping; bare soil; sand/silt deposits; other erosion). Note: Exhibit 10 is less inclusive.	40	75	
Bank Zone	# of parcels	% of parcels	
Concerns in the bank zone (e.g., vertical sea wall, rip rap, other erosion control structures, artificial beach, active erosion)	4	8	
Littoral Zone	# of parcels	% of parcels	
Human structures in littoral zone (e.g., piers, boat lifts, swim rafts, water trampolines, boat houses over water, marinas, other)	39	74	
Emergent and/or floating aquatic plants	23	43	
Evidence of aquatic plant removal	0	0	
Large Wood Habitat			
Total Number of large wood pieces	158		
Number of large wood pieces per mile of shoreline	55.7		

Exhibit 5. Exploring the Wisconsin DNR AIS Mapping Tool for shoreland and shallow water habitat data for specific lakes.

For stakeholders interested in mining the trove of shoreland and shallow water habitat data that has been collected for specific lakes, the Wisconsin DNR AIS Mapping Tool is the portal for entry. The following steps have been outlined to facilitate your experience.

1. <https://dnr.wi.gov/lakes/viewer/>
2. Click on **Proceed** – it will take a while to load.
3. Click on **I Accept**
4. On top grey menu go to **Find Location**
5. Right below grey menu **Find Locations** click on **Find Locations**
6. Bottom Left – Click on **Lakes and Open Waters** then scroll down click on **Find**
7. Search Type – you can put **Name of Lake** or **WBIC** (Water Body Identification Code)
8. **Value** – put **Lake Name** or **WBIC** then click on **Find**
9. If using **Lake Name** then also select the **County**
10. If you know where your lake is you do not need to use the tool above; you can just go on the map and find your location by holding the left button on your mouse and scrolling to the location you want to view. You can use the Zoom In and Zoom Out on the menu bar or use your mouse.
11. The lake should show up – Then on the white menu bar click on **Show Layers**
12. Under Layers - Uncheck all boxes that have a black check mark except **surface waters** and **basemap**
13. Check (click on) the **Shoreland Habitat Monitoring** box
14. Click on the grey + symbol next to it
15. All of the categories that were mapped show up here.
16. Check (click on) the box you want to view. For example, check the box in front of the category **Riparian Coverage**
17. Then check (click on) the sub category **Percent Canopy**. The display will show up on the map to the right.
18. Each Heading there is a + sign on you need to click on the + sign to make it a – sign to see the categories underneath. The Main Sub Heading needs to be checked to see the sub categories. To go onto the next category, you need to uncheck the one you were just on. If there are no colors that show up on the map that would indicate it wasn't indicated on the data sheet and entered. So, if you click on Rip Rap and the map is clear then there is no rip rap by definition of the protocol.
19. If you want to find more info on a certain section on the top menu under basic tools click on **Get Info**. Then go to the parcel you want information on and click once- to the left you will see information on this parcel. You then have to click on the > to find the info and you may have to > again. To close out of the info use the < back arrow. To close out of that click on the X to right of **Identify Results**.
20. You can use your mouse to hold and move the **Lake Map** or use it to scroll in or out to make the map smaller or larger.