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Thursday, August-02-12

Jack Russel
Percy Lake Ratepayers Association
1657 Percy Lake Road
Haliburton, ON
K0M 1S0

Dear Mr. Jack Russel

RE: Percy Lake Spit Assessment

Further to your request for an environmental assessment of the Percy Lake Spit I visited the site on July 30th, 2012 and I have detailed my findings below.

I hope you find everything in order, however if you have any questions please do not hesitate to contact me. I have also attached an invoice for the services provided thus far and in accordance with our agreement.

Sincerely,

Paul C. Heaven
Senior Wildlife Biologist

Percy Lake Spit Environmental Assessment

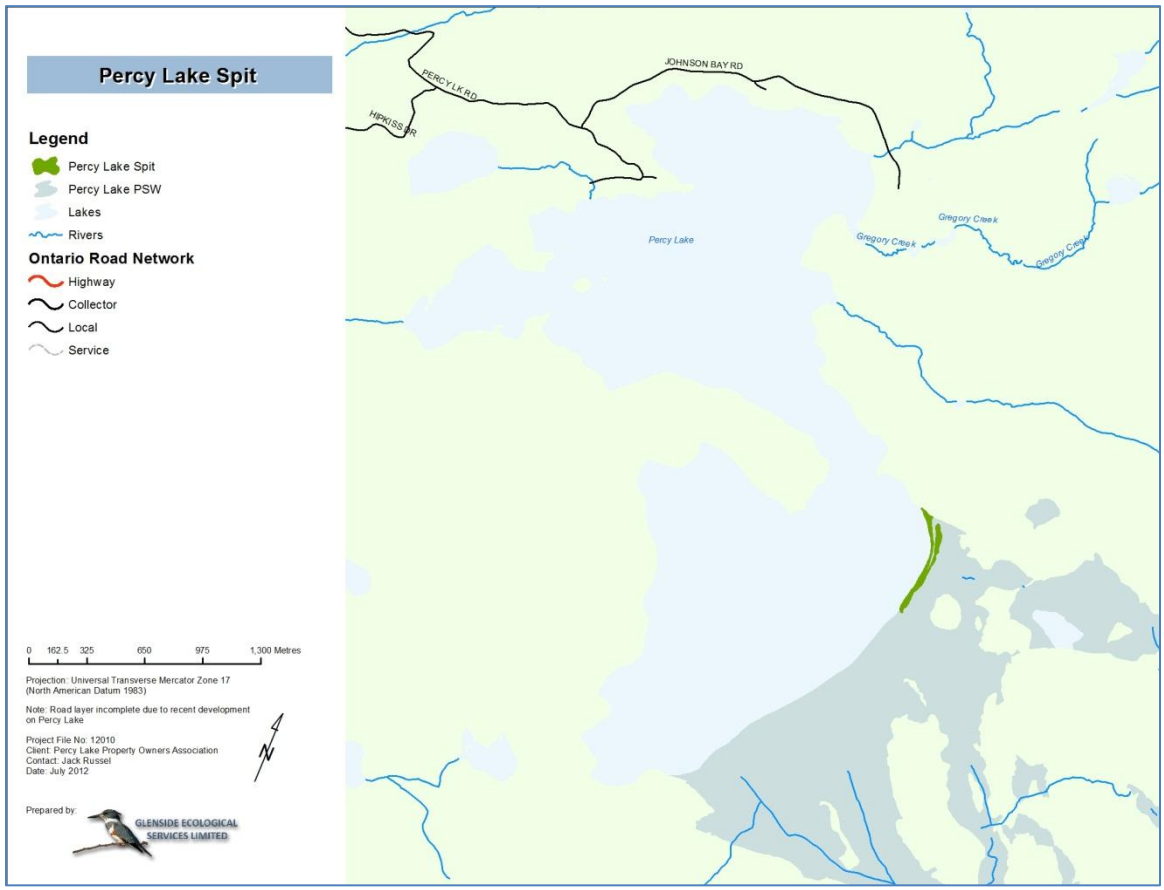
Introduction

The Percy Lake Spit is located at the south eastern end of Percy Lake, extending from the eastern shore approximately 625 m into the lake (See Figure 1). To the south of the spit and within the spit itself are portions of the Percy Lake Provincially Significant Wetland. The spit contributes to the stagnancy of the waters to the south and east and therefore is partially responsible for the maintenance of this Provincially Significant Wetland.

The ownership of the spit has recently been transferred to the Municipality of Dysart et al. Traditionally the spit has been used for public recreation, specifically swimming and picnicking. Periodically, overnight camping occurs on the spit however camping is prohibited and prohibitive signs addressing this activity have recently been posted.

The Percy Lake Ratepayers Association (PLRA) has expressed concern about the degradation of the spit. Glenside Ecological Services was retained to conduct an assessment of the spit and provide a brief summary of the findings.

Figure 1: Location of Percy Lake Spit



Assessment

Description

The Percy Lake Spit is composed of sandy soils covered by a thin mat of vegetation. The width of the spit at its widest breadth of upland is 30m. The periphery of the spit represents a sandy beach to the north and mineral marsh to the south. The size of the sandy beach to the north is dependent on the water levels and disappears entirely at the high water level.

The Percy Lake Spit is primarily forested with a tree species composition of 68% Red Pine (*Pinus resinosa*) and 32% White Pine (*Pinus strobus*). The average tree diameter at breast height ranges from 20-40cm. The shrub layer consists of tall shrubs such as Smooth Serviceberry (*Amelanchier laevis*), Mountain Holly *(Nemopanthus mucronatus*) and Bush Honeysuckle (*Diervilla lonicera*); and low shrubs such as Blueberry (*Vaccinium angustifolium*), Wintergreen (*Gaultheria procumbens*) and Twinflower (*Linnaea borealis*). Herbaceous plants consist of Bunchberry (*Cornus canadensis*), Starflower (*Trientalis borealis*), Canada Mayflower (*Maianthemum canadense*), Cow Wheat (*Melapyrum lineare*) and Bracken Fern (*Pteridum aquilinum*). Cow Wheat is considered uncommon in the County of Haliburton. Moss and lichen also represent a significant component of the ground cover (See Immediately adjacent to the lake, Sweet Gale (*Myrica gale*), Meadowsweet (*Spiraea alba*), Speckled Alder (*Alnus incana*) and Northern Wild Raisin (*Viburnum nudum var. cassinoides*) dominate the shrub community.

Photograph 1, Photograph 2 & Photograph 3).

Immediately adjacent to the lake, Sweet Gale (*Myrica gale*), Meadowsweet (*Spiraea alba*), Speckled Alder (*Alnus incana*) and Northern Wild Raisin (*Viburnum nudum var. cassinoides*) dominate the shrub community.

Photograph 1: Percy Lake Spit showing forested cover.

Photograph 2: Forest composition on Percy Lake Spit

Photograph 3: Ground cover on the Percy Lake Spit

Environmental Damage

Glenside noted 3 types of environmental damage:

- Shoreline erosion resulting from lake dynamics;
- Soil erosion resulting from human traffic; and
- Camping/picnicking damage

Soil erosion resulting from lake dynamics

Soil erosion resulting from wave action has detrimentally impacted the Percy Lake Spit and is by far the most threatening. Glenside Ecological Services noted severe undercuts on the south western side of the spit. These undercuts occurred primarily within the last 160m of the spit where the spit is elevated 1-2m above the water level. The undercuts often extended 2-3m into the spit and under the overlying vegetation. As a result the stability of many Red and White Pine trees found along this edge has been compromised. Many of the trees are now leaning into the spit, or have fallen and peeled up the vegetative mat associated with the root mass (See Photograph 4).

Erosion is also occurring along the western side of the spit, from the mainland up to approximately 425m from the mainland, however the spit is not as elevated in this area and therefore rather than undercuts occurring the entire spit is eroding away as evidenced by the bare roots of trees in this area (See Photograph 5).

The spit is a barrier beach that has succeeded into a mature coniferous forest indicating a relatively long history. In order for this level of erosion to occur either the processes impacting the spit or the protection surrounding the spit have changed. One of the processes that could cause the type of erosion as described would be higher water levels. The water levels are managed by the Trent Severn Waterway and it has not been determined as to whether the water levels have been maintained at a higher level, or if the frequency of higher water phenomena has increased.

Boat traffic can also increase the size and frequency of waves on Percy Lake. Waves can be damaging to shorelines, particularly shorelines comprised of sandy soils. It has not been determined as to whether the boat traffic has increased on Percy Lake to a level that would contribute to the degradation of the Percy Lake Spit.

The decline of debris along the shoreline may be compromising the protection of the Percy Lake Spit. It has been reported that the amount of debris, in the form of logs and root masses, was once much higher than what it is now (Jim Richert, pers. Comm. 30/07/2012). The logs and root masses would have buffered the shoreline from wave action, which in turn would have decreased the rate of erosion and allowed plants to become established. The roots of the plants would have contributed to the stability of the shoreline, thereby further protecting the shoreline from erosion.

Photograph 4: Undercuts and toppled trees along south-western edge of Spit

Photograph 5: Exposed root mass along western edge of Spit

Soil erosion resulting from human traffic

Two localized areas of soil erosion resulting from human traffic were noted. These areas are distinctly associated with traffic accessing the upper flat picnic/camping areas from the beach. The erosion resulting from the traffic has cut into the spit 1-2 m and broken down the vegetative matt and root structure of adjacent trees (See Photograph 6).

Photograph 6: Localized soil erosion resulting from human traffic

Camping/Picnicking Damage

On the spit there appears to be two primary Camping/Picnicking areas, with fire pits, and characterized as the flatter areas of the spit. Within a radius of approximately 25m of these areas, there is a loss of ground cover and woody debris, and many trees have been cut or damaged (See Photograph 7 and Photograph 8). In one instance a 25cm diameter, live Red Pine tree has been cut, presumably for the provision of firewood. Along the shoreline much of the debris buffering the shoreline has been removed or cut (See Photograph 9).

Photograph 7: Loss of ground cover at picnic area

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Photograph 8: Axe damage to live trees

Photograph 9: Buffering debris along shoreline harvested for firewood

Recommendations

The development of a restoration plan is beyond the scope of this project; however Glenside provides the following general recommendations:

Soil erosion resulting from lake dynamics

Glenside Ecological Services recommends considering a soft approach to stabilizing the western shoreline of the Percy Lake Spit. A soft approach combines shoreline planting with natural materials such as logs and brush bundles to stabilize the shoreline (See Appendix 1: Fish Habitat and Shoreline Stabilization Fact Sheet, Department of Fisheries and Oceans). This would help restore the spit to its earlier form, provide fish habitat as well as maintain the natural look of the spit. As the length of the spit is extensive other methods such as a hard approach (i.e. rock rubble, retaining walls, gabions etc.) would be costly.

Glenside Ecological Services recommends utilizing shrub species that are native to the spit for shoreline restoration, specifically Sweet Gale (*Myrica gale*), Meadowsweet (*Spiraea alba*) and Speckled Alder (*Alnus incana*).

Glenside Ecological Services recommends purchasing shrubbery from a nursery to avoid degradation to other shoreline area.

Glenside Ecological Services recommends obtaining the necessary permits from the Ontario Ministry of Natural Resource (OMNR) and Department of Fisheries and Oceans (DFO) before commencing any of the shoreline restoration. The OMNR is actively engaged in the fish management of Percy Lake and it is important to ensure that these efforts are not compromised.

Soil erosion resulting from human traffic

Glenside Ecological Services recommends constructing a staircase down to the beach in both areas of high human traffic. Raised wooden staircases built on posts are recommended as alternative methods can encourage erosion. The staircase should be relatively wide and easy to use (i.e. not too steep) to appeal to the traffic.

Camping/Picnicking Damage

Glenside Ecological Services recommends considering implementing an education plan focussed on low impact camping/picnicking. The education plan should highlight key messages such as the following:

- Bring firewood rather than harvest firewood
- Protect the health of the natural vegetation (i.e. no nails, no axe)
- Pack out all garbage
- Walk lightly (focussed on recognizing the sensitivity of the forest floor)
- Utilize designated picnic areas and access points (i.e. stairs)
- Avoid large groups
- Pack out toilet paper and hygiene products
- Utilize camp stoves instead of fires

Key messages could be delivered through a PLRA workshop, on site signage, or pamphlets/ brochures delivered via the annual information package.

Appendix 1: Fish Habitat and Shoreline Stabilization Fact Sheet, Department of Fisheries and Oceans

Fish Habitat
& SHORELINE STABILIZATION

FACT SHEET C-4

Shoreline areas provide habitat for a variety of aquatic organisms including fish. The nearshore area is where many fish species lay their eggs, feed and seek protection from predators. Changes or disruptions to these areas can threaten their survival. If you own or lease waterfront property, you can help protect the fish populations in your lake or river by protecting fish habitat along your shoreline. By using appropriate materials and designs for shoreline stabilization, fish habitat can be protected.

Be aware of the *Fisheries Act* and other legislation

The federal *Fisheries Act* provides for the protection of fish habitat. Under this Act, no one may carry out any work or undertaking that results in the harmful alteration, disruption or destruction of fish habitat (HADD), unless authorized by the Minister of Fisheries and Oceans Canada. The Act also states that no one is permitted to deposit a deleterious (harmful) substance into water containing fish.

Violations to the *Fisheries Act* can result in substantial fines, and/or the risk of imprisonment. If found guilty, then the violator may also be required to cover the costs of restoring the habitat at the site and/or be required to fulfill other court ordered remedies. Other legislation that may also be relevant is outlined in the introductory Fact Sheet: *Working Around Water? What you should know about Fish Habitat.*

Contacts and approvals

If your project involves building or modifying shoreline stabilization structures, the table on the next page will help you to determine which agency you should contact. In some instances, you may have to contact more than one agency. Keep in mind that approval from one government agency does not guarantee that you will be able to obtain approval from another agency. Remember you must obtain all approvals before starting work. Early consultation can save you from designing shoreline structures that will not be approved.

Information you will need to submit

When seeking approvals or permits you will need to submit the following information:

- Your name, address, telephone number, and if available, a fax number and e-mail address
- Rationale for the stabilization and the method you have chosen
- Waterbody name and location of the work site including the lot and concession numbers, county, township, municipality, and if known, latitude and longitude
- Proof of ownership for each of the properties where the work will be done and the most recent legal survey(s)
- Detailed description of the work site including a signed and dated map or sketch with dimensions indicating the location and distances to the average annual high-water mark of existing buildings, shoreline structures and property lines
- Plan view (top down) sketch or drawing of the shoreline to be stabilized showing length (m) of the work area, existing shoreline, proposed works and the distances to the average annual high-water mark
- Cross-sectional (side view) drawing (with dimensions) of proposed structures, indicating the current water level, original unstable slope, proposed slope and distances to the average annual high-water mark
- List of heavy equipment to be used
- Proposed start and completion dates
- Description of the substrate at the work site indicating approximate percentages of sand, silt, clay, rock, gravel and aquatic vegetation, etc.
- Any sediment and erosion control plan for construction
- Information you have about fish use of the site
- Photographs of the work site and surrounding shoreline during ice-free conditions
- Other agencies contacted.

A site visit by agency staff may be necessary before your proposal can be approved.

Best practices

There are many ways to limit or avoid shoreline erosion. These methods range from "soft" to "hard" approaches. Soft methods are preferred and include stabilizing the shoreline by planting native deep-rooted vegetation along with bioengineering (the use of plants with natural materials such as logs, live stakes, live brush bundles). Harder, less preferable methods include installing armoured embankments, gabion baskets, and retaining walls.

Soft approaches

Preserve the natural shoreline: Shoreline stabilization can be as simple as not mowing the grass or not cutting the trees and shrubs on the shoreline. This allows natural vegetation to grow or become re-established. A naturally vegetated shoreline has many benefits such as preventing

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Construction

contaminants or excess nutrients from entering the water; preventing erosion caused by rain, wind, wave and ice action; and supplying food, shade and cover for fish in the shallow water. If some vegetation must be removed, limit the amount. Try to prune trees and shrubs back instead of removing them.

Shoreline planting: Planting native deep-rooted species (check with your local federal and provincial regulatory authority(ies) for suggestions) will help accelerate shoreline stabilization. Many low growing species are available that will not block the waterfront view. Some species of common shrubs have roots that extend deep into the soil, helping to keep the soil and shoreline together. When damage occurs to a natural shoreline, plants can easily re-establish themselves.

Bioengineering (Soft structures): Where planting native species may not be sufficient to stop erosion, a bioengineering approach may be more appropriate. Bioengineering incorporates plants in combination with natural materials (e.g. logs, live stakes, live brush bundles) creating a natural appearance and habitat for fish. A bioengineering design can lead to the long-term stabilization of a shoreline, reducing the need for future works.

Hard approaches

Rock rubble: In general, rock rubble or rip-rap embankments are constructed so that the final slope is at least 1:2 ratio (vertical:horizontal); that is, for every one metre in height, the rock should extend out two metres. Where possible, a 1:3 ratio is preferred as it is more stable. By designing rock embankments with slopes, waves hitting the slope will "roll-up" the slope rather than crashing into it. To maximize the life of an embankment, the appropriate slope and rock size are needed so wave and current action will not damage it. A filter cloth placed under the rock prevents the slope from being eroded away and releasing sediments which may harm fish and their eggs. In many cases, only the toe or bottom of the slope may need to be rip-rapped and the remainder may be planted. The planting of vegetation, especially deep-rooting species, above and immediately behind the rock will greatly increase the stability of the slope. A combined rock rip-rap and natural shrub shoreline will greatly increase the stability of the slope and provides additional habitat, food supply and hiding spaces for a greater variety of fish species. Rock rubble or rip-rap must be clean and free of silts and organic debris and must not be removed from the waterbody. Removing rock rubble from the waterway is considered destruction or harmful alteration of fish habitat and is not permitted.

Gabion baskets: The use of gabion baskets involves the placement of baseball to football-sized rock into closed wire cages. The durability of these baskets is questionable when they are exposed to the elements. Gabion baskets provide marginal fish habitat and their use is not encouraged.

Retaining walls: In a few instances, retaining walls are the only option to protect the shoreline, essentially where building foundations have been built too close to the water and are threatened by shoreline erosion. The use of sheet steel, concrete or large armour stone in retaining walls produces a sterile, vertical, flat-faced object, which is of little use for fish or other aquatic organisms. Vertical walls tend to deflect energy rather than dissipating it, usually resulting in erosion problems elsewhere. The use of vertical retaining walls for shoreline stabilization is not encouraged and generally not approved. Where vertical retaining walls are the only option, they are more stable if rock rubble/rip-rap is placed at the foot of the wall at a 45 degree angle to prevent erosive forces from cutting under the wall.

Protect water quality

If your work cannot be done in the dry (out of the water), a sediment or silt screen around the entire work area may be required. The screen should be carefully removed after the work is completed and all of the sediment has settled on the bottom. Only work in the water on calm days. This will help prevent the suspension of fine sediment particles into the water and will ensure the silt screen is not disturbed by wave action. Sediment or silt screens should be inspected daily and maintained to prevent the spread of suspended sediments to adjacent water and fish habitat.

In all cases, the chosen stabilization method should follow the natural contour of the shoreline.

Other tips for a healthy shoreline

- Avoid using fertilizers, herbicides and pesticides on your property. Rainwater will transport these chemicals into the water, impairing water quality. Nutrients entering the water from the use of fertilizers cause an increase in the growth of algae and aquatic plants. When these plants die and rot, the process uses up dissolved oxygen in the water, reducing the supply of oxygen needed by fish.
- Use soaps and detergents that are low in phosphates. Excessive phosphate levels cause increased growth of aquatic plants and algae.
- Protect your investment and your environment. Make sure your septic system is maintained and the tank is pumped out on a regular basis.
- Maintain shrubs or trees in the area between your septic system and the water. Plants help absorb some of the nutrients that pass through your septic system.

Working together to protect fish habitat

Help maintain the quality and quantity of fish habitat in our lakes and streams. For more advice on how to construct an environmentally friendly shoreline stabilization structure, contact your local agency staff directly.

Contact information – Ontario

If the shoreline stabilization work . . .	Your first contact should be . . .
is in the Rideau Canal or Trent-Severn Waterway	Parks Canada Agency
is in a federally owned small craft harbour	Fisheries and Oceans Canada (DFO) - Small Craft Harbours
includes construction of structures or placement or removal of materials below the average annual high-water mark in a public (Crown) land or on a private water lot	Your local Conservation Authority (CA). Where there is no designated CA contact your local Ontario Ministry of Natural Resources office
may affect boat navigation	DFO - Canadian Coast Guard - Navigable Waters Protection Program
involves the use of explosives in or near water	DFO - Fish Habitat Management Program
includes construction of structures or placement of materials above the average annual high-water mark but within a regulatory flood plain	Your local CA
includes construction of structures or placement of materials above the average annual high-water mark and is on private property	Approvals may be required from your local CA if the structure is within the flood plain or fill regulated area

For more information, see the electronic version of *The Shore Primer* on our Web site listed below under "Contact Information", under "Infocentre", then "Guidelines and Factsheets".

Contact information

www.dfo-mpo.gc.ca/canwaters-eauxcan

Canada

Cette publication est également disponible en français

Working together to protect and conserve Ontario's aquatic resources

Fisheries and Oceans Canada / Pêches et Océans Canada — www.dfo-mpo.gc.ca/canwaters-eauxcan

Parks Canada / Parcs Canada — www.pc.gc.ca

Ontario — www.mnr.gov.on.ca

www.conservation-ontario.on.ca