STEWARDS' GUIDE SERIES

MUSKOKA HERITAGE FOUNDATION

Muskoka WATERSHED COUNCIL

Credit: Muskoka Heritage Trust
Photo by Mike Foster

BUILDING A TRAIL

On Private Land in Parry-Sound Muskoka

"In every walk with nature one RECEIVES far more than he SEEKS." ***~John Muir***

The smell of fallen leaves, wet areas loaded with animal tracks, birds singing, that special tree – what do you enjoy about your woods?

Parry Sound-Muskoka is an area full of scenic beauty that provides physical and emotional rewards. What better way is there to connect with the land and reap these rewards than by building a trail?

The major stages involved in a project like this are **PLAN**, **DESIGN**, **BUILD** and **MAINTAIN**. This guide provides an overview of planning, designing and building your trail.

Trail Building is a complicated topic. Refer to the resources section for more extensive information on trail building. Words in *italics* are defined in the **GLOSSARY**.

1. PLAN

Before you begin, know your property boundaries and *mark* them to make sure you don't cross onto your neighbour's property. Decide what your trail will be used for – walking, skiing, biking, ATVs and/or snowmobiles, etc., as trail standards vary depending on the use. Guidelines suggested in this document are for walking trails.

Consider the environment when planning your trail. Proper design will assist in conserving natural vegetation and wildlife, prevent environmental hazards such as erosion, and preserve the area for future generations to enjoy.

Use topographic maps and aerial photographs to map the potential route. A well-designed trail takes advantage of natural drainage features and natural land features. Locate key points on a map such as boundaries, scenic views, water crossings, cliffs, large trees, dangerous trees, and forest openings.

2. DESIGN

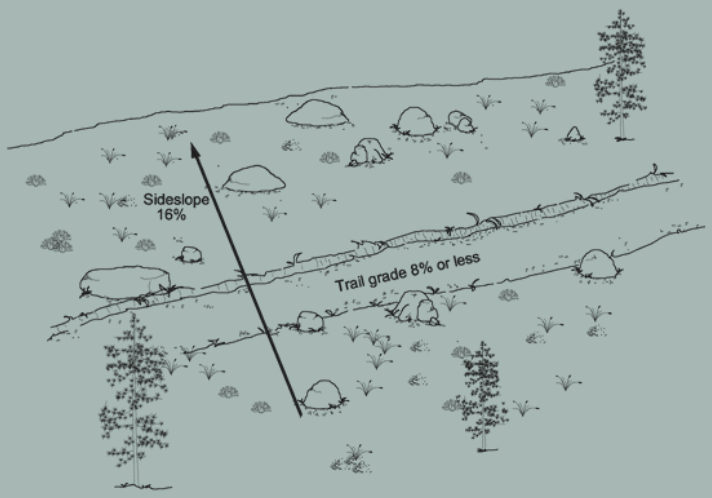
Once you have a trail route mapped out, go out on the land and conduct a trail inventory. It is best to design and build your trail in the spring or fall when visibility is high and bugs are low.

Begin by flagging the proposed trail, using one colour of flagging tape for the original trail and another colour of tape for variations and changes. Once you have decided on the path of your trail, take GPS coordinates.

- Verify the key points you identified on the map in Step 1 and identify additional features. Flag these features so they are easier to relocate later.
- Walk the proposed route and make adjustments if a turn feels too sharp, a section has too much straight-away, or the trail is too steep, slippery, or too wet in some sections. Don't forget to look up to avoid placing your trail near dead or dangerous trees.
- Verify that the route is feasible for walking, constructing and maintaining.

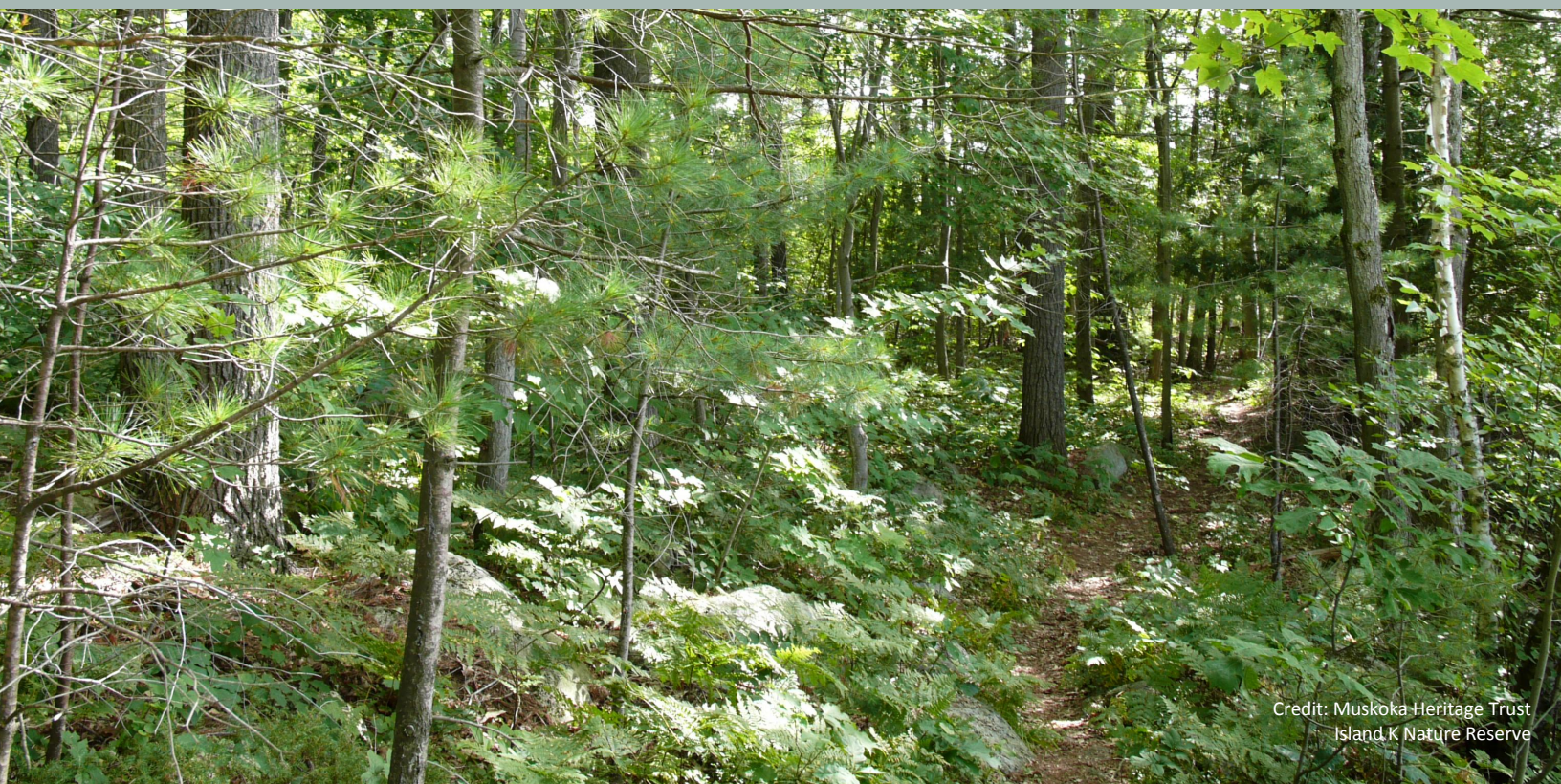
Design Guidelines

- Follow paths already created by wildlife as these are likely the easiest route.
- Avoid impassable or very difficult terrain.
- Locate your trail on the uphill side of large trees to avoid damaging the tree and its root system.



The trail grade shouldn't be more than half the grade of the sideslope. This is the half rule.

- Trail grade should be no more than half the sideslope grade. If it is slippery, then the trail is too steep and steps should be used.
- Cross ravines at an angle.
- Avoid valley bottoms that are wet for part of the year. Instead, keep your trail on the upper elevation of the valley bottom.
- Don't lay your trail out on flat terrain where water has no place to drain.
- Leave roots that are perpendicular to the *tread*, fairly flush, and not a tripping hazard.
- Avoid locating your trail where tree roots run parallel with the tread as this will funnel water down the trail and create erosion issues.

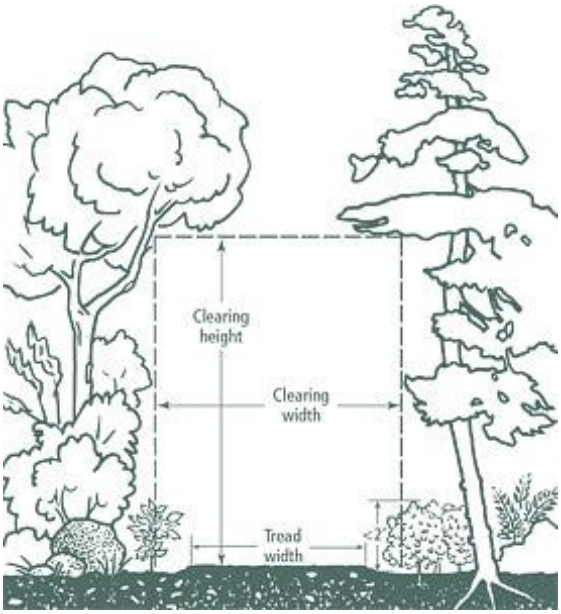


Credit: Muskoka Heritage Trust
Island K Nature Reserve

3. BUILD

Trim vegetation back and remove obstacles, such as boulders and fallen trees, within the *trail corridor*.

- Cut vegetation even to the ground, leaving no stub that can trip or puncture you.
- Cut side branches as close to the main stem as possible to reduce the potential for re-growth and to prevent eye damage.
- Pile the cut branches to create wildlife habitat.



The trail corridor includes the trail's tread and the area above and to the sides of the tread.

In level terrain, clear the corridor an equal distance on either side of the tread's centreline. Within 0.3 metres of the edge of the tread, plant material and debris should be cleared all the way to the ground. Farther than 0.5 metres from the trail edge, plants do not need to be cleared unless they are taller than 0.5 m high.

On moderate to steep sideslopes, leave rocks, limbed trees, downed logs, etc. near the lower edge of the tread to guide people back to the centre of the trail, provided that this guide material does not prevent water from draining off the trail. On the uphill side of the trail, cut and remove material farther from the centreline, i.e., 2 m instead of 1.

For trails used in the winter, increase the clearing height to account for snow fall.

Dealing With Wet Areas

Construct structures that do not alter existing water channels or natural drainage patterns. Prior to the start of construction, it is essential that **all necessary approvals and permits have been obtained**.

For small, shallow water crossings, spaced rocks can be used as stepping stones. To cross wet or mucky areas, wood planks or cut firewood can be used as steps.

Culverts

Culverts are the best way to move small volumes of water under a trail. Culverts can be metal, plastic, or constructed out of rock. Aluminum or plastic are preferred over steel in acidic soils. Culverts should be at least 9" in diameter.

To prevent sediment build-up from blocking your culvert, construct a settling basin at the inlet at least 0.3 m deeper than the base of the culvert to allow sediment to settle out where it is much easier to shovel away.

Elevated Tread Structures

Boardwalks and *bridges* are the most common structures used to elevate the tread. Use rough sawn hemlock or cedar 2x4, 2x6 or 2x8 lumber for decking on boardwalks and bridges as it provides a tread with more grip.

Dealing With Hills

Climbing turns and steps are used to gain elevation quickly. Climbing turns are used in areas where the slope is less that 15%. Anything steeper should incorporate steps.

Climbing Turns should have *grade reversals* at both approaches to keep water off the turn. To prevent shortcutting, wrap the turn around natural obstacles such as boulders.

Steps should be 6 to 8 inches high and 10 to 12 inches deep. Build stairways from the bottom up, at a break in the grade. Bury the first rock to act as an anchor.

The bottom step should be constructed on a solid, excavated footing. If it is constructed on top of exposed rock, it should be well pinned to the footing. Each successive step is placed atop the previous step. Wood steps are usually pinned to each other and to the footing.

Glossary

Boardwalk - a walkway that is close to the ground (<0.3 m above surrounding terrain). It can either be constructed on sills that sit on the natural terrain (Puncheon Design) or on posts drilled or dug deep into the ground (Post Design).

Bridge - a walkway that is elevated above the ground and is constructed on anchor posts, cribs or abutments that are drilled or dug deep into the ground.

Climbing Turn - a reversal in direction that maintains the existing grade going through the turn without a constructed landing. They have a wide turn radius (generally 4-6 m) and are used on gentle slopes, typically 15% or less.

Grade Reversal - takes advantage of natural dips in the terrain. The grade of the trail is reversed for about 3 to 5 metres, then rolled back over to resume the descent. Grade reversals should be placed every 5 to 15 metres and can be incorporated when curving up and around large trees or large boulders.

Marking – tying flagging tape on trees at eye level and/or painting a 6"x2" white mark on the front and back of a tree's trunk. A combination of paint and flagging is useful - white paint shows up well in the dark and flagging tape is more visible if you accidentally stray from the trail.

Trail Corridor - includes the trail's tread and the area above and to the sides of the tread. For hiking, the corridor is usually 2 m wide and 2.5 m high.

Tread - the actual travel surface of the trail. The best soil type for tread is a mixture of clay, silt and sand. Tread, whenever elevated, should be slightly crowned (higher in the centre than on either side) to drain better.

Resources

Guidelines and Best Practices for the Design, Construction and Maintenance of Sustainable Trails for All Ontarians - http://74.91.226.186/Library/Trails/Ontario_Guidelines_BMP_Design_Construction_Maintenance_Sustainable_Trails.pdf

US Department of Agriculture: Trail Construction and Maintenance Notebook - http://74.91.226.186/Library/Trails/FS_Trail_Constrction_and_Maintenance_Handbook_2007.pdf

The Bruce Trail Association: Guide for Trail Workers - http://brucetrail.org/system/downloads/0000/0107/GTW3_Indexed.pdf

Professional Trailbuilders Association (PTBA) - www.trailbuilders.org

American Trails - www.americantrails.org

Nova Scotia Trails Federation: Trail Construction Manual - www.novascotiatrails.com/page.cfm?pid=1067&tid=10&hid=3

US National Park Service: Trails Management Handbook - http://hdl.handle.net/2027/umn.31951002963142z

The Stewards' Guide Series is a collaborative project

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