

Spring 2007 survey for rare bryophytes at proposed management sites, W.A. Switzer Provincial Park, Alberta¹

Agreement no.: 08-WCA-204

Report date: June 30, 2007

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1.0 Survey objectives and methods

A series of sites at W.A. Switzer Provincial Park, Alberta, were surveyed for rare bryophytes from June 2-3, 2007. A total of 18 hours of survey time was conducted between these two days. Rare bryophytes included those species currently found on the ANHIC tracking and watch lists, at the following web address <<http://tprc.alberta.ca/parks/heritageinfocentre/plants/vascularbryophytes/default.aspx>>. The main objective of the spring bryophyte survey was to document the occurrence of rare species and mitigate possible damage as a result of trail maintenance activities, including the creation of new trail segments, mechanical brushing and gravelling, and site clearing.

¹ This report should be cited as: Caners, R.T. 2007. Spring 2007 survey for rare bryophytes at proposed management sites, W.A. Switzer Provincial Park, Alberta. Final report to Alberta Tourism, Parks, Recreation and Culture, Edmonton, Alberta.

Sites were selected on the basis of recommendations from Janet Marsh and Joan Williams who conducted lichen and vascular plant surveys, respectively, the previous week. Time restrictions limited the bryophyte surveys to 7 sites (out of 10) with the highest priority ranks. Prior to the commencement of surveys, previously documented occurrences of rare bryophytes at W.A. Switzer Provincial Park were obtained from ANHIC for reference in the field, which consisted of 5 occurrences (2 liverworts and 3 mosses). Also, maps, photographs, and other documentation for the visited sites were obtained from Ksenija Vujnovic (Heritage Protection Specialist; Parks, Conservation, Recreation and Sport Division; Alberta Tourism, Parks, Recreation and Culture) before the surveys were conducted.

Bryophyte surveys were conducted with reference to Doubt and Belland (2000) and, when appropriate, using a Floristic Habitat Sampling (Newmaster et al. 2005) approach, where important microhabitats were systematically sampled at each location for the presence of rare species. Specimens were collected when identification was not possible in the field (**Appendix 1**) and to document the occurrence of other common species at the survey sites. Please note that the collection locations depicted in **Appendix 1** do not represent the full extent of areas surveyed. Taxonomic keys used for species identification include BFNA (2007), Crum and Anderson (1981), and Lawton (1971) for mosses, and Schuster (1966-1992) for liverworts. Specimens are currently held in the author's personal herbarium and are to be deposited at the Devonian Botanic Garden.

The following is a list of surveyed sites and the types of activities undertaken at each site over the two day period (as outlined in the contract terms of reference):

Kettle trail

Surveyed up to 1m of forest on each side of the 3.5km trail;
Surveyed a 90m long segment which will be disturbed for a new connector trail;
Surveyed approximately 1.5m on each side of the proposed trail's centre line.

Trout Lake trail

Surveyed approximately 30m of new backcountry trail to be developed along the base of a side slope;
Surveyed approximately 1.5m on each side of the proposed trail's centre line.

Beaver Ranch-Graveyard trails

Surveyed up to 1m of forest on each side of the trail (approximately 1km in length).

Kelly's Bathtub loop

Surveyed up to 1m of forest on each side of the trail (less than 1km in length);
Surveyed 'potholes' that may be filled with gravel to level the trail surface;
Surveyed two small proposed realignments (bypasses) (approximately 50m each).

Jarvis Lake Day Use Area

Surveyed a small forested area (approximately 20 x 20m) that will be cleared to connect the entrance road and the gravel area.

Jarvis Lake campground

Surveyed a small undisturbed area (approximately 5 x 20 m) adjacent to campsite number 8.

Jarvis Lake trails (wide cross-country ski trails)

Surveyed up to 1m of forest on each side of the 13km trail, focusing on mesic sites along the trail that may be filled with gravel.

PLEASE NOTE: The following sites were not surveyed because of time limitations and their lower priority status:

Pine Bay group camp

Survey areas of undisturbed ground adjacent to the existing parking stalls (approximately 2 x 30m + 5 x 30m + 10 x 20m).

Beaver Ranch group camp

Survey the perimeter of an old gravel pit (approximately 100 x 200m);

Survey a 10m buffer zone of native vegetation around the pit area.

Halfway campground

Survey 1.5 m of forest on each side of the existing informal trail (approximately 200m in length) between south portion of halfway group use area and a beaver ranch ruins;

Survey up to 1m of forest on each side of the existing 'formal' trail in the same area (approximately 300m in length).

2.0 Summary of survey results

Kettle trail, access from N (surveyed June 2, 2007)

This trail is fairly open, with high ground-level insolation (**Photo 1, Appendix 2**). There are few well decayed logs and stumps adjacent the trail, which are important microhabitats for mosses and liverworts. The majority of logs found along the trail are in the earliest stages of decomposition as a result of trees that were cut and removed after falling across the trail. The most important microhabitats along this trail are areas of exposed mineral soil on the trail surface and wet humus along the edge of Kettle pond (**Photo 2, Appendix 2**). Care should be taken when brushing and managing this trail in order to maintain these important microhabitats.

The moss *Atrichum selwynii* (S2) was observed at two locations along the trail (**collection number SPP-10, Appendices 1 and 3**), both growing on mineral soil on the trail surface (**Photos 3 and 4, Appendix 2**).

Trout Lake trail (surveyed June 2, 2007)

Surveys were conducted along the established trail and segments adjacent to the trail that may be developed. The most important microhabitats at this site are the areas of exposed mineral soil along the trail and tree bases and roots. No rare bryophytes were found at this location.

Connector trail to Kettle trail (near the south trailhead) and southern loop of Kettle trail (surveyed June 2, 2007)

The southern portion of the Kettle trail appears to contain more structural diversity than the northern loop. Although the trail is open and appears relatively dry and exposed, there appear to be more mesic areas (wetlands adjacent to trail), larger trees, and decayed logs and stumps along the trail. Exposed mineral soil and rocks found along the trail are also important microhabitats for bryophytes. Although no rare bryophytes were found at this location, care should be taken when brushing and managing this trail in order to maintain these important microhabitats.

The proposed connector trail between Trout Lake and the southern trailhead of the Kettle trail is dominated by aspen and spruce, and is characterized by an open canopy and exposed forest floor with a high abundance of graminoids (**Photo 5, Appendix 2**). Because this site has not been developed, there exist numerous tree bases and logs and stumps, which provide many potential microsites for bryophytes. Although no rare bryophytes were found at this location, care should be taken when brushing and managing this trail in order to maintain these important microhabitats.

Beaver Ranch-Graveyard trails (surveyed June 2, 2007)

The start of this trail is dominated by a heavy cover of shrubs and graminoids, and has a relatively poor bryophyte flora (**Photo 6, Appendix 2**). The forested segment of the trail contains a greater number of species; however, the trail is relatively open (**Photo 7, Appendix 2**) with few decayed logs and stumps to provide important microsites. The most important microhabitats along this trail are patches of exposed mineral soil, tree bases and roots, and small rocks. Although no rare species were found along this trail, care should be taken not to disturb these microhabitats when brushing and managing the trail.

Kelly's Bathtub loop (surveyed June 3, 2007)

This trail is forested except for a small segment adjacent to open water. The most important microhabitats along the trail are areas of exposed mineral soil, decayed logs and stumps, large rocks, wet mineral soil and humus along the lake ('bathtub') margin, as well as mineral soil, roots, and rocks exposed by large tree tipup mounts. Although no rare species were found along this trail, care should be taken not to disturb these microhabitats when brushing and managing the trail.

Jarvis Lake Day Use Area (surveyed June 3, 2007)

This forested site lies between a gravel road leading to the Day Use Area and the day use parking lot (**Photo 8, Appendix 2**). There are relatively few microhabitats important for rare bryophytes at this location, and no rare species were encountered.

Jarvis Lake campground (surveyed June 3, 2007)

This forested site at the Jarvis Lake campground is situated along a gravel road adjacent to camping stall #8 (**Photo 9, Appendix 2**). There are few microhabitats important for rare bryophytes at this location, and no rare species were encountered.

Jarvis Lake trails (surveyed June 3, 2007)

This trail system is lengthy, passing through several different forest canopy types, and containing a large number of microhabitats important for bryophytes. The most important microhabitats encountered are patches of exposed mineral soil, large rocks, tree tipup mounds (**Photo 10, Appendix 2**), moist vertical soil embankments immediately adjacent to the trail (**Photo 11, Appendix 2**), decayed logs and stumps, and tree bases and roots. Care should be taken not to disturb these microhabitats when brushing and managing the trail, especially the soil embankments which often contain a large number of common and sensitive or rare species.

The moss *Atrichum selwynii* (currently ranked as S2 by ANHIC) was observed at several locations at this site: on mineral soil on the trail surface (**collection number SPP-46, Appendices 1 and 3**) (**Photo 12, Appendix 2**), and an exposed mineral soil embankment adjacent to the trail (**collection number SPP-53, Appendix 1 and 3**) (**Photo 13, Appendix 2**). The moss *Aloina rigida* (currently ranked as S2) was observed at a single location, on a sandy embankment adjacent to the trail (**collection number SPP-55,**

Appendices 1 and 3) (Photos 14 and 15, Appendix 2). The moss *Splachnum sphaericum* (currently ranked as S2) was observed at a single location, on dung in the middle of the trail (**collection number SPP-59, Appendices 1 and 3) (Photo 16, Appendix 2).**

3.0 Mitigation of potential damage to rare species

None of the rare species encountered in the park were relocated to adjacent habitats because of 1) the large size of some of the populations (*Atrichum selwynii*) and 2) the lack of suitable microhabitats near the occurrences. Instead, populations were marked with flagging tape and locations recorded using GPS. Also, concerns about the effects of trail maintenance and development on the populations were discussed with Bruce Duffin (see terms of reference for contact information) immediately after the spring survey on June 3, 2007. The conversation focused on populations that are situated middle of the trail (*Atrichum selwynii* and *Splachnum sphaericum*), which may leave them susceptible to trail maintenance activities including mechanical brushing, clearing of debris, and deposition of gravel along trail segments. In addition, the conversation addressed populations situated immediately adjacent to the trail on mineral soil embankments (*Atrichum selwynii* and *Aloina rigida*), which may also be susceptible damage.

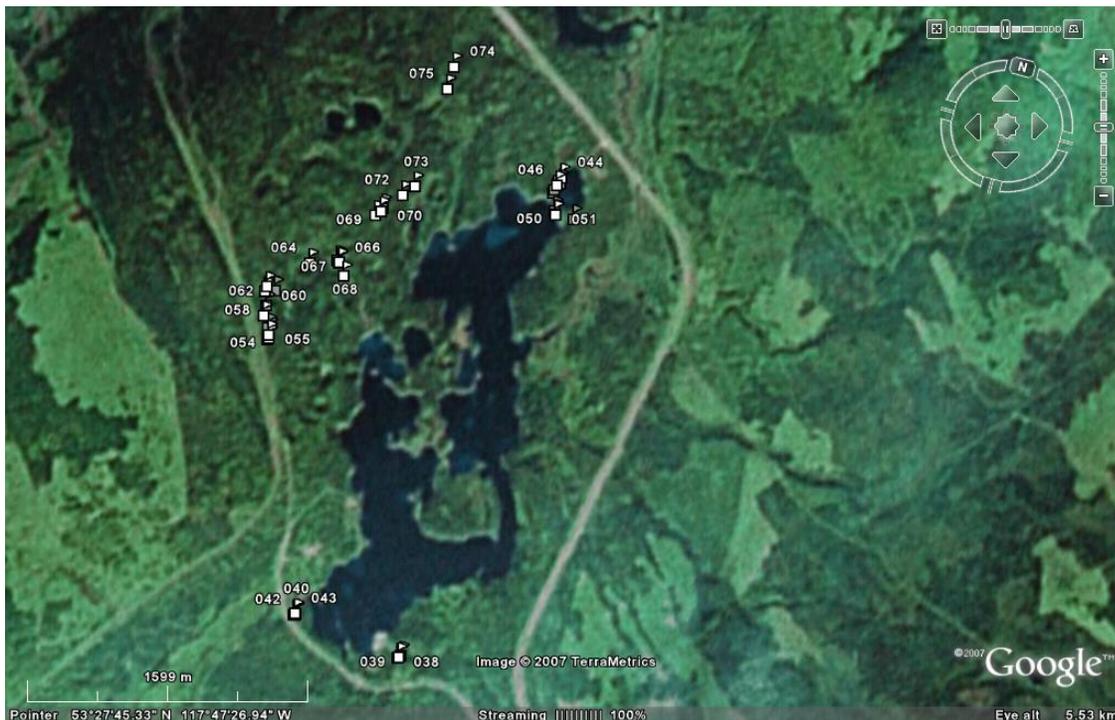
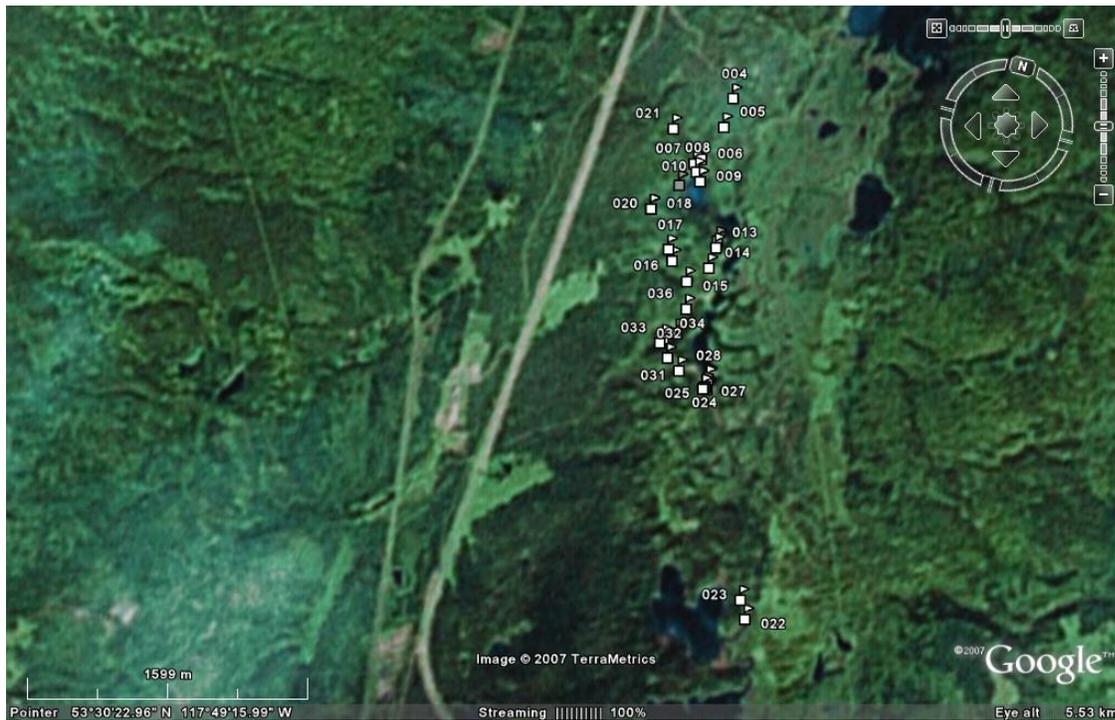
According to Bruce, the height of the brushing machine is elevated by several inches and does not disturb the trail surface, suggesting that the populations growing on the trail will be at minimal risk of mechanical damage. Also, the brushing machine apparently does not disturb the mineral soil embankments found adjacent to the trails, which should alleviate damage to populations growing at these microsites. However, the removal of woody plants emerging from (or growing immediately adjacent to) mineral soil embankments may destabilize the soil and alter the microclimate of these important sites.

Tree tipup mounds and other patches of exposed moist mineral soil (including trail surfaces), tree bases, decayed logs and stumps, and boulders are important microhabitats for bryophytes along trail systems in the park. These habitats often contain a large number of common (and occasionally rare) bryophytes, and are important for the maintenance of bryophyte diversity in the park, and their damage or removal should be avoided or carefully considered.

4.0 References

- BFNA. 2007. The treatments: descriptions, keys, illustrations, and maps. Available at: <http://www.mobot.org/plantscience/bfna/TREATments.htm>. Bryophyte Flora of North America. Accessed June 2007.
- Crum, H.A. and L.E. Anderson. 1981. Mosses of Eastern North America. 2 Vols. New York, New York.
- Doubt, J. and R. Belland. 2000. Monitoring protocols for elements of non-vascular plant diversity in Alberta's forested zones. Devonian Botanic Garden, Edmonton. 129 pages.
- Lawton, E. 1971. Moss Flora of the Pacific Northwest. Nichinan, Japan.
- Newmaster, S.G., R.J. Belland, A. Arsenault, D.H. Vitt, and T.R. Stephens. 2005. The ones we left behind: Comparing plot sampling and floristic habitat sampling for estimating bryophyte diversity. Diversity and Distributions 11:57-72.
- Schuster, R.M. 1966-1992. The Hepaticae and Anthocerotae of North America East of the Hundredth Meridian. 6 vols. New York, London, and Chicago.

Appendix 1 – Map of W.A. Switzer Provincial Park with collection locations



Appendix 1. Location of species collections made during the spring bryophyte survey at W.A. Switzer Provincial Park. **Top:** collections made in the north portion of the park. **Bottom:** collections made in the south portion of the park. Please note that not all collection numbers are depicted in the above images (some text is hidden), and that these locations do not represent the full extent of areas surveyed.

Appendix 2 – Photos of surveyed sites and rare species



Photo 1. Kettle trail near the north trailhead. Note the relatively open canopy and low abundance of woody debris (logs and stumps) along the trail margins.



Photo 2. Moist organic matter along the margin of Kettle Pond adjacent to the Kettle trail. These moist microsites contain a large number of species and may be disturbed by trail maintenance activity.



Photo 3. *Atrichum selwynii* (S2) growing on exposed mineral soil on the Kettle trail, approximately 50m south of the interpretive sign overlooking Kettle pond.



Photo 4. *Atrichum selwynii* (S2) growing on exposed mineral soil on the Kettle trail, approximately 50m south of the interpretive sign overlooking Kettle pond.



Photo 5. The proposed connector trail between the Trout Lake trail and the southern trailhead of the Kettle trail is characterized by an open canopy dominated by aspen and spruce, and a relatively exposed forest floor with a high abundance of graminoids.



Photo 6. Start of the Beaver Ranch – Graveyard trail, dominated by a heavy cover of shrubs and graminoids.



Photo 7. Forested portion of the Beaver Ranch – Graveyard trail, which is characterized by a relatively open canopy with few decayed stumps and logs along the trail.



Photo 8. This forested site at the Jarvis Lake Day Use Area lies between the main gravel road leading to the Day Use Area and the day use parking lot. No rare species were encountered at this location.



Photo 9. This forested site at the Jarvis Lake campground is situated along a gravel road adjacent to camping stall #8. No rare species were encountered at this location.



Photo 10. An example of a tree tipup mound along the Jarvis Lake trail, which serves as an important microsite for bryophytes.



Photo 11. An example of a moist mineral soil embankment along the Jarvis Lake trail, which serves as an important microsite for bryophytes.



Photo 12. *Atrichum selwynii* (S2) growing on mineral soil on the Jarvis Lake trail.



Photo 13. *Atrichum selwynii* (S2) growing on an exposed mineral soil embankment along the Jarvis Lake trail.



Photo 14. *Aloina rigida* (S2) (in association with *Ceratodon purpureus*) growing on an exposed, sandy mineral soil embankment along the Jarvis Lake trail.



Photo 15. *Aloina rigida* (S2) growing on an exposed, sandy mineral soil embankment along the Jarvis Lake trail (see photo 14, above).



Photo 16. *Splachnum sphaericum* (S2) growing on dung on the Jarvis Lake trail.

Appendix 3 – ANHIC rare plant survey forms



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Information from these rare plant survey forms is available by request from:

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