Notes on the Vascular Plants of the dunes at White Beach, Great Slave Lake, Northwest Territories

Paul M. Catling
Brenda J. Kostiuk

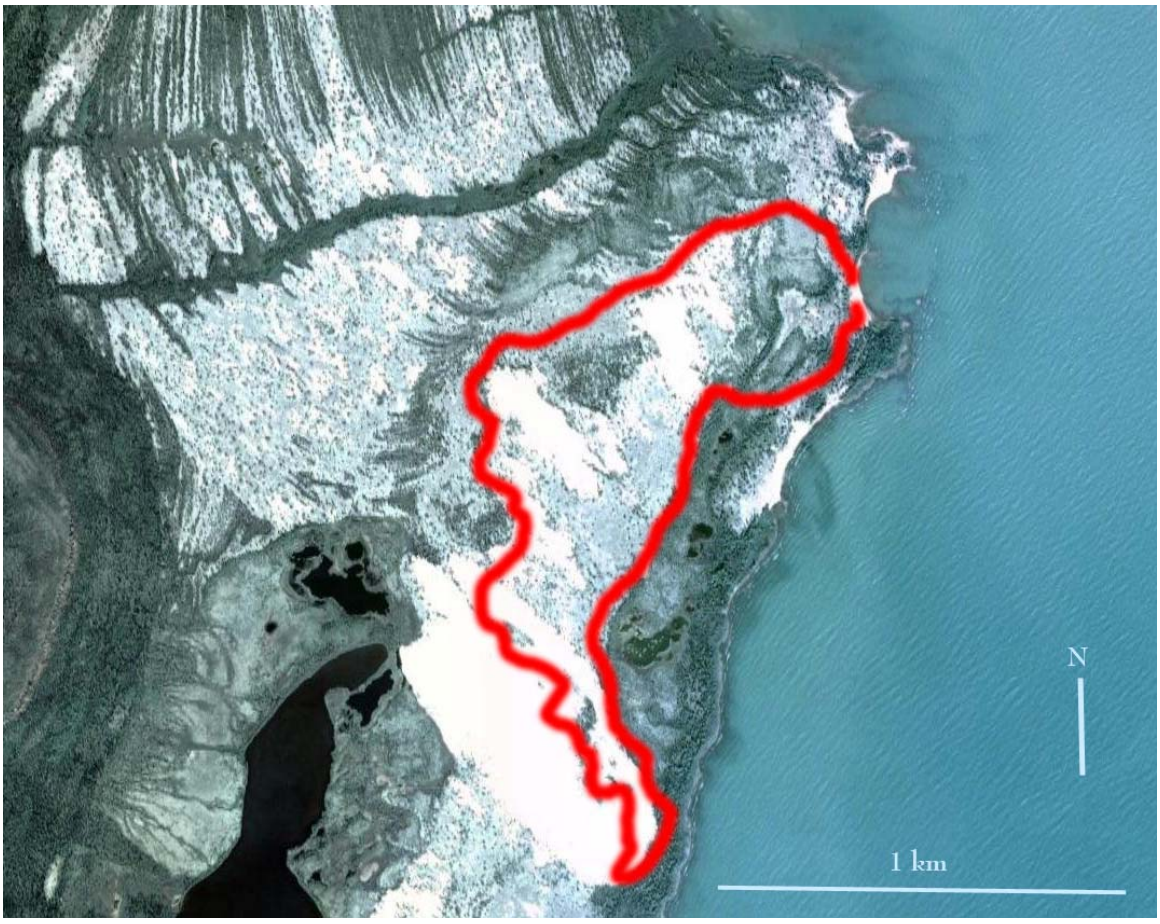
Above: Looking south across the tip of the erosion path. *Betula* x *uliginosa* and *Empetrum nigrum* in the foreground. Left: *Stellellaria longipes*, found near the middle of the upper photo, is probably referable to subsp. *longipes* but is immature and lacking the purplish-black capsules that would separate it from the Athabasca endemic subsp. *arenicola*.

This report may be referenced as follows:

Catling, P. M and B. J. Kostiuk. 2012. Notes on the vascular plants of the dunes at White Beach, Great Slave Lake, Northwest Territories. Report to the Government of the Northwest Territories. 16 pp.

Figure 1. Great Slave Lake showing the location of White Beach. The most extensive sand deposits near the shore are on the west side of North Arm. East Arm has granite islands and shores and generally deep water. The lake is about 500 km long and the western part is shallower. It is the deepest lake in North America, and the 9th largest lake in the world. A knowledge of the flora of its shorelines remains incomplete.

Figure 2. The main erosion path (lower centre of the photo) and the route (red) of a brief botanical survey (4 hours) in the White Beach area. The wind has eroded sand from the northwest to the southeast culminating in a steep dune crest 100 m from the shore in the south centre of the photo. The upper left of the photo indicates a series of beach ridges established as the water level of Great Slave Lake receded likely due to isostatic rebound (gradual rise of the land due to removal of compression by the continental glacier).



Notes on the vascular plants of the dunes at White Beach, Great Slave Lake, Northwest Territories

Paul M. Catling and Brenda Kostiuk
170 Sanford Ave., Ottawa, Ontario K2C 0E9
catlingp@agr.gc.ca

For four hours in the early afternoon of 25 June 2008 we conducted a reconnaissance of the flora of open sandy habitats in the general area of White Beach (Figures 1 and 2) including the one kilometre long and up to 0.4 kilometre-wide erosion path of sand and associated dunes centred at 62.43229 and -115.29545. This region had not been visited by a botanist and its flora was unknown. One of the exciting aspects of this visit was a possibility that some of the unusual floristic elements (Table 1) of the Athabasca dunes occurred there. All photos here were taken by B. Kostiuk and P. Catling during the reconnaissance.

Figure 3. Narrow-leaved and Common Labrador Tea growing with lichen in a lower boggy area beside open sand areas at White Beach.

The erosion path of drifting sand and associated dunes near White Beach is a consequence of erosion of inland sand deposits rather than sand deposited along shorelines, as is the case with the Athabasca dunes 500 km to the south-southwest. At White Beach northwest winds carry sand toward the shore terminating in an active dune that is infilling forest within one hundred metres of the shoreline. Other much smaller areas of erosion with blowing sand dunes occur in the vicinity. While active sand at the Athabasca dunes may be a relict process that has continued since early postglacial times, the active sand at White Beach may be more recent. If so, the recent nature and more limited occurrence of open sand at White Beach may preclude the occurrence of endemic species.

Figure 4. Collecting the hybrid Birch (*Betula* x *uliginosa*) that has accumulated sand forming a small mound.

As well as being of short duration, our survey covered a limited area (Figure 2) yet the area of open sandy habitats is extensive. In addition our survey was early in the season and undoubtedly some species were overlooked as a result of limited growth. However, our observations provide some useful information on the flora of the area, and may provide a useful basis for future work.

Vegetation and vascular plants

Open areas of accumulating sand were dominated by widespread and locally common species including *Empetrum nigrum*, *Carex aquatilis* (which was present locally in a variety of open habitats), *Betula neoalaskana*, *Salix alaxensis, S. glauca, S. planifolia*, and *S. scouleriana*. Higher areas of open, stabilized sand were dominated by lichens and *Vaccinium vitis-idaea* with scattered *Festuca saximontana* and occasional *Carex deflexa, C. siccata, Calamagrostis stricta* and *Saxifraga tricuspidata*.

None of the endemic species that occur on the Athabasca dunes (Table 1) were found in the vicinity of White Beach. A special effort was made to sample the variation in willows which were identified by G.W. Argus, but none of the species encountered were unusual. With the exception of *Hudsonia tomentosa*, which is listed as "sensitive" (Carrière 2011), all species listed in Appendix Table 1 are "secure."

Figure 5. Wooly Beach-Heath (*Hudsonia tomentosa*) growing in open sand. This species is widespread but uncommon in Canada and listed as "sensitive" in NWT.

The area had an interesting admixture of species from a phytogeographic viewpoint. Some of the plants are widespread elements of the boreal forest such as *Salix bebbiana* and *S. scouleriana*. Both *Empetrum nigrum* and *Saxifraga tricuspidata* are widespread in boreal and arctic regions. Northern species that reach their southern limits around 59 ° include *Calamagrostis purpurascens* and *Vaccinium uliginosum*. A few of the species present, including *Piptatherum pungens* are widespread in the south reaching a northern limit around Great Bear Lake. *Leymus mollis* is restricted to seashores and inland shorelines of major rivers and lakes. *Rumex salicifolius* subsp. *triangulivalvis* is more frequent but similarly restricted. *Carex siccata* and *Festuca saximontana* are abundant in the prairie region as well as in the sandy, open habitats

around Great Slave Lake. *Carex albonigra* is Beringian (occurring in the ice-free areas of Alaska, Yukon and NWT) and Cordilleran (in the mountains), and a number of species are mainly western and Beringian, but extend sparingly eastward to Hudson Bay or beyond including *Salix alaxensis* , *S. glauca*, and *Betula neoalaskana*. *Amelanchier alnifolia* is a species of the prairies and Beringia.

Figure 6. Alaska Willow (*Salix alaxensis*), a largely Beringian species that becomes less common eastward. It occurs on open dunes with accumulating sand at White Beach.

References

Cody, W.J. 1996. Flora of the Yukon Territory. NRC Press. 643 pp.

Porsild, A. E. and W. J. Cody. 1980. Vascular plants of the continental Northwest Territories. National Museum of Natural Sciences. 667 pp.

Raup, H. M. and G. W. Argus. 1982. The Athabasca sand dunes of northern Saskatchewan and Alberta, Canada, 1. The land and the vegetatioin. National Museums of Canada, Publications in Botany No. 12: 96 pp.

Carrière, S. 2011. 6.15 Vascular Plants. Pp. 98-134 in Working Group on General Status of NWT Species, eds., NWT species 2011-2015 – general status ranks of wild species in the Northwest Territories. Dept. Environment and Natural Resources. Government of the Northwest Territories, Yellowknife, NT. 172 pp.

Figure 7. Bunchberry (*Cornus canadensis*) was occasional in open sandy areas.

Table 1. Endemic plant taxa in the Athabasca Dunes and SARA listing http://www.sararegistry.gc.ca/species/default_e.cfm .

Achillea millefolium var. *megacephala* (Raup) Boivin, **Large-Headed Wooly Yarrow**, SPECIAL CONCERN
Tanacetum huronense Nutt. var. *floccosum* Raup, **Floccose Tansy**, SPECIAL CONCERN
Stellaria longipes Goldie subsp. *arenicola* (Raup) C.C. Chinappa and J.K. Morton, **Sand Stitchwort**, NOT AT RISK
Lechea intermedia Leggett ex Britt. var. *depauperata* Hodgdon, **Impoverished Pinweed**, NO LISTING
Armeria maritima (P. Mill.) Willd. subsp. *interior* (Raup) Pors., **Athabasca Thrift**, SPECIAL CONCERN
Deschampsia mackenzieana Raup, **Mackenzie Hairgrass**, SPECIAL CONCERN
Salix brachycarpa Nutt. var. *psammophila* Raup, **Sand-Dune Short-Capsuled Willow**, SPECIAL CONCERN
Salix salicola Raup, **Felt-Leaf Willow**, SPECIAL CONCERN
Salix turnorii Raup, **Turnor's Willow**, SPECIAL CONCERN
Salix tyrrellii Raup, **Tyrrell's Willow**, NOT AT RISK

Figure 8. Prickly Rose (*Rosa acicularis*), occurred with willows in lower areas of open, blowing sand.

Figure 9. Advancing dune with willows burying forest.

Appendix Table 1. List of species collected with habitat and location data. The order is that of recent northern manuals such as Porsild and Cody (1980) and Cody (1996). The collectors are always P.M. Catling and B. Kostiuk. The date is 25 June 2008. The specimens are deposited in the AAFC National Collection of Vascular Plants (DAO). Some names are updated using recent sources such as "Flora of North America." Common names are mostly from Carrière (2011). References to more than 1 specimen refers to different plants collected in the same area to sample local variation.

Elymus trachycaulus (Link) Gould *ex* Shinners (*Agropyron trachycaulon*)**,** SLENDER WILD RYE
open sandy area beside blowout, 62.4341, -115.296.

Calamagrostis stricta (Timm) Koeler (*C. neglecta*)**,** SLIM-STEM REED GRASS
open sandy area with lichen beside blowout , 62.43597, -115.29; open sandy area beside blowout , 62.4341, -115.296.

Calamagrostis purpurascens R. Rr.**,** PURPLE REED GRASS
open sandy area beside blowout, 62.43597, -115.29.

Leymus mollis (Trin.) Pilg. subsp. mollis**,** AMERICAN LYME GRASS
open sandy areas on upper beach, 62.4446, -115.2785.

Piptatherum pungena (Torr.) Dorn**,** SLENDER SHORT-AWN MOUNTAIN-RICE
open sandy area beside blowout, 62.4341, -115.296.

Festuca saximontana Rydb.**,** ROCKY MOUNTAIN FESCUE
White Beach, open sandy areas of upper beach, 62.4446, -115.2785; open sandy area beside blowout , 62.43597, -115.29; higher stabilized sand back from the beach, 62.4412, -115.281.

Carex albonigra Mack.**,** BLACK-AND-WHITE-SCALE SEDGE
boggy area, 62.4422, -115.2822.

Carex aquatilis Wahlenb.**,** WATER SEDGE
boggy area, 62.4422, -115.2822; open sandy areas of upper beach, 62.4446, -115.2785; open slope of accumulating sand, 62.4352, -115.298; open sand in recently created dune hollow, 62.4352, -115.298; low area in open sand beside blowout, 62.43597, -115.29.

Figure 10. Triangular-Valved Dock (*Rumex salicifolius* subsp. *triangulivalis*) on open sand.

Carex brunnescens Poir. subsp. ***brunnescens,*** BROWNISH SEDGE
boggy area, 62.4422, -115.2822.

Carex deflexa Hornem.**,** NORTHERN SEDGE
open sandy area with lichen beside blowout, 62.43597, -115.29.

Figure 11. Rock Cranberry (*Vaccinium vitis-idaea* subsp. *minus*), shown here with fruit from the previous year, was dominant in some areas of stabilized sand.

Carex siccata Dewey (*C. foenea* misapplied)**,** DRY-SPIKE SEDGE
open sandy area beside blowout, 62.43597, -115.29; on dry sandy ground with lichen behind the beach - rare , 62.4391, -115.2895.

Salix alaxensis (Anderss.) Cov. var. ***alaxensis*****,** ALASKA WILLOW
on the upper beach, common, severely browsed , 62.4455, -115.2803 (3 specimens); on dry open sand on downwind crest of 1 km long blowout, 62.4290, -115.2897 (3 specimens).

Salix bebbiana Sarg. , BEBB'S WILLOW
on dry open sand on downwind crest of 1 km long blowout, 62.4290, -115.2897 (2 specimens).

Salix glauca L., GRAY WILLOW
on dry open sand on downwind crest of 1 km long blowout, 62.4290, -115.2897 (3 specimens).

Salix planifolia Pursh, DIAMOND-LEAVED WILLOW
on the upper beach, North Arm, Great Slave Lake, - rare, - severely browsed , 62.4455, -115.2803 (4 specimens); on dry open sand on downwind crest of 1 km long blowout, North Arm, Great Slave Lake, 62.4290, -115.2897 3 specimens).

Salix scouleriana Barratt, SCOULER WILLOW
on dry open sand on downwind crest of 1 km long blowout, North Arm, Great Slave Lake, 62.4290, -115.2897 (3 specimens).

Alnus viridis (Chaix) de Candolle in Lamarck and de Candolle subsp. ***crispa*** (Aiton) Turrill**,** GREEN ALDER
open sandy areas of upper beach, 62.4446, -115.2785.

Figure 12. Much of the stabilized sand is dominated by lichen with patches of Rock Cranberry.

Betula glandulosa Michx.**,** DWARF BIRCH

open slope of accumulating sand, 62.4352, -115.298; open sandy areas on upper beach, 62.4446, -115.2785; open slope of accumulating sand, 62.4352, -115.298.

Betula neoalaskana Sarg.**,** ALASKA PAPER BIRCH
major sand binder on crests of active blowouts , 62.43529, -115.297; 7 m tall groves on high dunes, 62.44404, -115.282.

Betula papyrifera Marsh var. ***commutata*** (Regel) Fernald**,** PAPER BIRCH
open sandy areas of upper beach, 62.4446, -115.2785.

Betula x ***uliginosa*** Dugle (***Betula glandulosa*** Michx. X ***B. neoalaskana*** Sarg.)**,**
MARSHLAND HYBRID BIRCH
White Beach, open sandy crest in blowout area, 62.4341, -115.296; a weeping form to 3 m tall, common in open areas dominated by lichen, 62.43597, -115.29.

Rumex salicifolius Weinm. subsp. ***triangulivalvis*** Danser**,** TRIANGULAR-VALVED DOCK
open sandy area beside blowout , 62.43597, -115.29.

Stellaria longipes Goldie cf. subsp. ***longipes,*** LONG-STALKED STITCHWORT
White Beach, open sandy areas near the beach, 62.4412, -115.281; open sandy areas of upper beach, 62.4446, -115.2785. The material was without mature capsules due to the early time of year so could not be separated with certainty from subsp. *arenicola*.

Barbarea orthoceras Ledeb.**,** AMERICAN WINTERCRESS
open sandy areas of upper beach, 62.4446, -115.2785.

Saxifraga tricuspidata Rottb.**,** PRICKLY SAXIFRAGE
higher stabilized sand back from the beach, 62.4412, -115.281.

Amelanchier alnifolia (Nutt.) Nutt.**,** SASKATOON
open sandy crest in blowout area, 62.4341, -115.296.

Rosa acicularis Lindl.**,** PRICKLY ROSE
White Beach, open sandy areas of upper beach, 62.4446, -115.2785; open sandy crest in blowout area, 62.4341, -115.296.

Rubus arcticus L. subsp. ***acaulis*** (Michx) Focke**,** ARCTIC RASPBERRY
boggy area, 62.4422, -115.2822.

Rubus chamaemorus L.**,** CLOUDBERRY
boggy area, 62.4422, -115.2822.

Empetrum nigrum L. subsp. ***hermaphroditicum*** (Lge.) Bocher**,** BLACK CROWBERRY
open sandy area beside blowout , 62.4341, -115.296.

Hudsonia tomentosa Nutt.**,** WOOLY BEACH-HEATH
open sand in partially stabilized areas of a dune slope, 62.4341, -115.296; on dry open sand in blowout - rare - 15 plants , 62.4313, -115.2919.

Cornus canadensis L.**,** BUNCHBERRY
open sandy area with lichen beside blowout , 62.43597, -115.29.

Andromeda polifolia L.**,** BOG ROSEMARY
boggy area, 62.4422, -115.2822.

Rhododendron tomentosum Harmaja (*Ledum decumbens*)**,** NARROW-LEAVED LABRADOR TEA
boggy area, 62.4422, -115.2822.

Rhododenron groenlandicum (Oeder) Kron & Judd (*Ledum groenlandicumr*)**,**
COMMON LABRADOR TEA
boggy area, 62.4422, -115.2822.

Vaccinium uliginosum L.**,** ALPINE BILLBERRY
low places in open sandy areas near the beach, 62.4412, -115.281.

Vaccinium vitis-idaea L. ssp***. minus*** (Lodd.) Hultén**,** ROCK CRANBERRY
dominant in higher stabilized sand back from the beach, 62.4412, -115.281.

Figure 13. Wood Bison wallow in an area of dry stabilized sand.