Special Section

SCIENCE AND HISTORY OF SABLE ISLAND CONFERENCE

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Photos of Sable Island by Friends of the Green Horse Society
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SCIENCE AND HISTORY OF SABLE ISLAND CONFERENCE, 2015

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This issue of the Proceedings of the Nova Scotian Institute of Science includes six papers that derive from a conference held at University of Kings College (Halifax, Nova Scotia) on May 1st and 2nd, 2015. The conference was titled The Science and History of Sable Island and was planned as the first of a series of such conferences designed to assist with building a sound foundation for the management of the island as a national park. The conference was organized by a non-profit organization, Friends of Sable Island Society, and co-sponsored by the Nova Scotian Institute of Science and the School for Resource and Environmental Studies at Dalhousie University, Halifax. Sable Island was legally defined as a National Park Reserve on December 1st, 2013, following a series of formal agreements between the Government of Canada and the Province of Nova Scotia, beginning in January 2010. The designation process had involved substantial public consultations.

Sable Island, as its name suggests, is a crescent-shaped island built almost entirely of sand, approx. 40 km in length and up to about 1.3 km in width. It lies about 300 km east of Halifax Regional Municipality in the province of Nova Scotia. The island is noted for several unusual features. It is dynamic because sand is continuously transported from the marine bank on which the island sits to the island's surface exposed above salt water. Once on the island the sand is temporarily trapped in the dune system, aided by marram grass (*Ammophila breviligulata*). Over most of the island the sand is frequently displaced again by wind, although there are a few places where more complex plant communities have arisen and have stabilized the sand, mostly around freshwater ponds. The island is also famed for its numerous shipwrecks, a long-established population of feral horses, many thousands of grey seals, and as the world's only breeding site for the

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Ipswich Sparrow (Stobo and McLaren 1975). Less well known to the general public, though of considerable scientific interest, is the issue of how the island came to exist and of its remarkable persistence (King 2001), having not disappeared beneath the waves despite earlier predictions that this was imminent (Macdonald 1886). The island sits atop Sable Island Bank and progress in understanding sand movement processes that occur on the bank beneath the ocean surface has been instrumental in understanding the island's persistence (Dalrymple and Hoogendoom 1997; Li and King 2007). Wind-driven sand movement on the island's dunes above water is also now better understood (McCann and Byrne 1994).

Sable Island has been of interest to the scientific community for many years, as illustrated in Ian McLaren's paper (History of the natural history of Sable Island) in this Issue of the Proceedings. Scientific inquiry about the island has become more sophisticated and has expanded enormously since the 1950s, the terminus of McLaren's historical report. Nevertheless, because access to Sable Island is difficult and expensive, the island's researchers have tended to be a determined breed, none less so than Zoe Lucas who is sometimes counted as the island's only permanent human resident in contemporary times. Working over several decades, she has reported scientifically on a wide range of Sable Island environmental topics: horses (Plante *et al*. 2007), birds (Smith *et al*. 2003; Bond *et al*. 2014), seals (Lucas and Stobo 2000), lichens (Richardson *et al*., 2009), beach litter (Lucas 1992), ecology (Freedman *et al*. 2011), and several others. Her collaborative work with Bill Freedman, a Dalhousie University biology professor (e.g. Catling *et al*. 2009; Freedman *et al*. 2011), is a poignant reminder of Bill's contributions, both to Sable Island science and to the conference reported here.

Following announcement of the intention of federal and provincial governments to create a national park, Freedman was asked by Parks Canada to provide an ecological and biodiversity assessment of the island. Bill went about this vigorously, as always, and called together a wide range of people with specialist expertise who had conducted studies on Sable Island. Each was asked to write a chapter for the final assessment. Through a workshop in February, 2014, Bill eventually created a thorough, 400-page Final Report having 18 chapters (Freedman 2014) that would be helpful to Parks Canada as it moves forward in its management of Sable Island National Park Reserve. Later in 2014, Bill met with the Board of the Friends of Sable Island

Society, whereupon it was agreed that a planned conference would coincide, if possible, with the release of his report in book form. The conference date of May, 2015, was set at that meeting.

The conference was organized by the Friends of Sable Island Society. Previously, there had never been a conventional scientific conference on Sable Island with a 'call for papers', nor had there been a focused attempt to bring together historians and natural scientists at an open academic conference about the island. The conference was suitably planned to complement Freedman's work and the announcement of the new national park reserve. Sadly, by the time the conference was held, Bill had become seriously ill and was unable to participate. His passing in September, 2015, was a great loss for Sable Island, the national park, the conservation movement in Canada, and his many colleagues.

The conference opened on the evening of Friday, May 1st, with four historical presentations: Jill Martin (Martin-Bouteillier 2015, 2016) and Sharon O'Hara (O'Hara 2014) focused on social history, Ian McLaren on science history (this volume), and Kevin McNamee of Parks Canada on creation of the new national park. McNamee's presentation from the perspective of the administrative side of government was enhanced by the political perspective provided by Megan Leslie, the region's Member of Parliament at the time. On Saturday, May 2nd, there were 21 presentations: geomorphic evolution (E.L. King), marine sedimentation (R.W. Dalrymple), shoreline dynamics (R.B. Taylor), position monitoring (J. Bond), mapping (D. Colville), dune morphology (M.L. Byrne), ocean tracking (F. Whoriskey), hydrogeology (T.W. Hennigar), seabirds (R.A. Ronconi), migratory songbirds (Z.J. Crysler; see Crysler *et al*. 2016), seal ecology (W.D. Bowen; see Bowen 1997), seal biology (N. den Heyer), horse population dynamics (S. Medill; see, for example, Debeffe *et al*. 2015), horse genetics toolbox (J. Poissant), shipwrecks (A. Mior), historical maps (A. Ruffman), settlement history (A. Mior), archaeology (D. Finamore), visitor experience (P.T. Maher), archaeological resource inventory (C.A. Burke) and ecological assessment (J. Sheppard). There were also four posters, one of which (D.H. Gray) is presented as a paper in this Issue of PNSIS.

Papers derived from the conference presented in this Issue of PNSIS fall within the disciplines of the history of biology (McLaren), historical archiving (Mior), geographical methods (Bond and Colville), mapping (Gray), and hydrogeology (Hennigar). McLaren's work is

based on long experience as a biologist and natural historian with expertise in marine ecology (e.g. McLaren 1967), ornithology (e.g. Stobo and McLaren 1975), and other fields of biology. Mior, who studied maritime archaeology at Flinders University in Australia, wrote a thesis on the shipwrecks of Sable Island. Bond is expert in Nova Scotia's system for referencing geographical coordinates, including coordinate markers on Sable Island (Bond 2015). Colville, a geomatics expert with experience in biogeography, has provided assistance to Parks Canada to improve their geomatic capacity for Sable Island (Goodale *et al*. 2007; van Beest *et al*. 2014). Similarly, Hennigar's work on the freshwater resources of Sable Island (see also Hennigar 1976), and Gray's work on overlaying historical maps will be valuable for long term management of the island as a national park (also see Colville *et al*. in this Issue). The importance of tracking changes in the morphology of the island is illustrated by the loss of Wallace Lake in 2011. This brackish water body existed for more than 200 years on Sable Island but was lost during storms and has not yet reformed. Barrier beaches and their associated lagoons in eastern Canada are highly dynamic (Carter *et al*. 1989) and the loss of Wallace Lake is a good example of this dynamism.

As the conference ended, it was agreed that future meetings should be held annually, or semi-annually, at which academic experts and students would be able to share their research findings and assist Parks Canada in further developing the knowledge base on which sound park management decisions can be made. Some of these meetings could be focused on specific areas of need, such as developing useful tools for research. Other meetings would bring together diverse expertise, with the goal of mixing academic disciplines to fertilize new approaches to solving the complex problems of managing and conserving Sable Island, a unique and precious island in the Canadian offshore marine environment.

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REFERENCES

Bond, A.L., Provencher, J.F., Daoust,P-Y., & Lucas, Z.N. (2014). Plastic ingestion by fulmars and shearwaters at Sable Island, Nova Scotia, Canada. *Mar. Pollut. Bull*. 87:68-75.

Bond, J. (2015). Modernization of the Nova Scotia coordinate referencing system through active control technology. *Geomatica* 69: 419-431.

Bowen, W.D. (1997). Role of marine mammals in aquatic ecosystems. *Mar. Ecol. Prog. Ser*. 158:267-274.

Carter, R.W.G., Forbes, D.L., Jennings, S.C., Orford, J.D., Shaw, J., & Taylor, R.B. (1989). Barrier and lagoon coast evolution under differing relative sea-level regimes: examples from Ireland and Nova Scotia. *Mar. Geol*. 88:221-242.

Catling, P., Lucas, Z., & Freedman, B. (2009). Plants and insects new to Sable Island, Nova Scotia. *Can. Field-Naturalist* 123:141–145.

Crysler, Z.J., Ronconi, R.A., & Taylor, P.D. (2016.) Differential fall migratory routes of adult and juvenile Ipswich Sparrows (*Passerculus sandwichensis princeps*. *Movement Ecol*. 4:3 doi: 10.1186/s40462-016-0067-8.

Dalrymple, R.W., & Hoogendoom, E. L. (1997). Erosion and deposition of migrating shoreface-attached ridges, Sable Island, eastern Canada. *Geosci. Can*. 24:25-36.

Debeffe, L., Richard, E., Medill, S.A., Weisgerber, J.N., & McLoughlin, P.D. (2015). Costs of social dispersal in a polygynous mammal. *Behav. Ecol*. 26:1476-1485.

Freedman, B. (2014). Final Report to Parks Canada: An Ecological and Biodiversity Assessment of Sable Island. 400 p. Unpublished manuscript, available from Parks Canada.

Freedman, B., Catling, P.M., & Lucas, Z. (2011). Effects of feral horses on vegetation of Sable Island, Nova Scotia. *Can. Field-Naturalist* 125:200-212.

Goodale, R., Hopkinson, C., Colville, D., & Amirault-Langlais, D. (2007). Mapping piping plover (*Charadrius melodus melodus*) habitat in coastal areas using airborne lidar data. *Can. J. Remote Sensing* 33:519-533.

Hennigar, T.W. (1976). Water resources and environmental geology of Sable Island, Nova Scotia. Nova Scotia Department of the Environment, Water Planning and Management Division. 62 p.

King, E.L. (2001). A glacial origin for Sable Island: ice and sea-level fluctuation from seismic stratigraphy on Sable Island Bank, Scotian shelf, offshore Nova Scotia. Geological Survey of Canada, Current Research, 2001-D19, 18 p.

Li, Z.M., & King, E.L. (2007). Multibeam bathymetric investigation of the morphology of sand ridges and associated bedforms and their relation to storm processes, Sable Island Bank, Scotian Shelf. *Mar. Geol.* 243:200-228.

Lucas, Z. (1992). Monitoring persistent litter in the marine environment on Sable Island, Nova Scotia. *Mar. Pollut. Bull.* 24:192-199.

Lucas, Z., & Stobo, W.T. (2000). Shark-inflicted mortality on a population of harbour seals (*Phoca vitulina*) at Sable Island, Nova Scotia. *J. Zool.* 252:406-414.

Macdonald, S.D. (1886). Sable Island, No. 3 - Its probable origin and submergence. *Proc. N.S. Inst. Sci.* 6:265-280.

Martin-Bouteillier, J. (2015). Return to Sable. AuthorHouse, Bloomington, Indiana.

Martin-Bouteillier, J. (2016). Sable Island in Black and White. Nimbus, Halifax, Nova Scotia.

McCann, S.B., & Byrne, M.L. (1994). Dune morphology and the evolution of Sable Island, Nova Scotia, in historic times. *Phys. Geog.* 15: 342-357.

McLaren, I.A. (1967). Seals and group selection. *Ecology* 48:104-110.

O'Hara, S. (2014). Our Sable Island Home. Pottersfield Press, Lawrencetown Beach, Nova Scotia

Plante, Y., Vega-Pla, J.L., Lucas, Z., Colling, D., de March, B., & Buchanan, F. (2007). Genetic diversity in a feral horse population from Sable Island, Canada. *J. Heredity* 98:594-602.

Richardson, D.H.S., Lucas, Z., & Anderson, F. (2009). The lichen flora of Sable Island, Nova Scotia: its past, present and likely future. *The Bryologist* 112(3):558-571.

Smith, S.J., Lucas, Z., & Stobo, W.T. (2003). Estimate of the Ipswich Sparrow population on Sable Island, Nova Scotia, in 1998, using a random-transect survey design. *Can. J. Zool.* 81:771-779.

Stobo, W.T., & McLaren, I.A. (1975). The Ipswich Sparrow. *Proc. N.S. Inst. Sci.* 27 (Suppl. 2), 105 p.

van Beest, F.M., Uzal, A., Vander Wal, E., Lafarge, M.P., Constanti, A.L., Colville, D., & McLoughlin, P.D. (2014). Increasing density leads to generalization in both coarse-grained habitat selection and fine-grained resource selection in a large mammal. *J. Animal Ecol.* 83:147-56.