NATIONAL CONSERVATION PLAN

Sand Pond National Wildlife Area Management Plan

Government of Canada Gouvernement du Canada

Canada

Acknowledgements
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About Environment Canada's Protected Areas and Management Plans

What are Environment Canada protected areas?

Environment Canada establishes marine and terrestrial National Wildlife Areas for the purposes of conservation, research and interpretation. National Wildlife Areas are established to protect migratory birds, species at risk, and other wildlife and their habitats. National Wildlife Areas are established under the authority of the *Canada Wildlife Act* and are, first and foremost, places for wildlife. Migratory Bird Sanctuaries are established under the authority of the *Migratory Birds Convention Act, 1994* and provide a refuge for migratory birds in the marine and terrestrial environment.

What is the size of the Environment Canada Protected Areas Network?

The current Protected Areas Network consists of 54 National Wildlife Areas and 92 Migratory Bird Sanctuaries comprising more than 12 million hectares across Canada.

What is a management plan?

A management plan provides the framework in which management decisions are made. They are intended to be used by Environment Canada staff to guide decision making, notably with respect to permitting. Management is undertaken in order to maintain the ecological integrity of the protected area and to maintain the attributes for which the protected area was established. Environment Canada prepares a management plan for each protected area in consultation with First Nations and other stakeholders.

A management plan specifies activities that are allowed and identifies other activities that may be undertaken under the authority of a permit. It may also describe the necessary improvements needed in the habitat and specify where and when these improvements should be made. A management plan identifies Aboriginal rights and allowable practices specified under land claims agreements. Further, measures carried out for the conservation of wildlife must not be inconsistent with any law respecting wildlife in the province in which the protected area is situated.

What is protected area management?

Management includes monitoring wildlife, maintaining and improving wildlife habitat, periodic inspections, enforcement of regulations, as well as the maintenance of facilities and infrastructure. Research is also an important activity in protected areas; hence, Environment Canada staff carries out or coordinates research at some sites.

The series

All of the National Wildlife Areas are to have a management plan. All of these management plans will be initially reviewed 5 years after the approval of the first plan, and every 10 years thereafter.

To learn more

To learn more about Environment Canada's protected areas, please visit our website at www.ec.gc.ca/ap-pa or contact the Canadian Wildlife Service.

Sand Pond National Wildlife Area

Established in 1978, Sand Pond National Wildlife Area (NWA) was the first NWA to be designated in Canada. Sand Pond NWA is located 22 km east of the town of Yarmouth in southwestern Nova Scotia, adjacent to the Tusket River basin. This area of Nova Scotia supports rare plants collectively known as Atlantic Coastal Plain Flora, a group of 90 species of uncommon or rare wetland plants found nowhere else in Canada. Eleven of these plant species are designated as species at risk and are particularly vulnerable to human disturbance. Sand Pond NWA supports a large number of species of Atlantic Coastal Plain Flora.

This area was first proposed for acquisition in 1966 by the Canadian Wildlife Service (CWS) because of the importance of the area's wetlands to staging and migrant waterfowl. Sand Pond NWA is situated just inland from a diverse matrix of rich coastal estuaries and islands that support a variety of staging and wintering waterfowl. Freshwater lakes such as Sand Pond (Figure 1) that are close to the coast are particularly important habitat for American Black Ducks (*Anas rubripes*).

The acquisition of land around Sand Pond was mostly complete by 1968. Administration and control of 96 hectares was transferred by the province of Nova Scotia to CWS while the remaining 427 acres was purchased from 19 private landowners. Sand Pond NWA is administered by Environment Canada.

For greater certainty, nothing in this management plan shall be construed so as to abrogate or derogate from the protection provided for existing Aboriginal or treaty rights of the Aboriginal peoples of Canada by the recognition and affirmation of those rights in section 35 of the *Constitution Act, 1982*.

Figure 1: Sand Pond, the namesake of Sand Pond NWA
Photo: C. MacKinnon © Environment Canada, 2012

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1 DESCRIPTION OF THE PROTECTED AREA

Sand Pond National Wildlife Area (NWA) is situated in southwestern Nova Scotia (43º48'N, 65º49'W), adjacent to Argyle in Yarmouth County (Figure 2). The larger municipality of Yarmouth is 22 km away. Sand Pond NWA encompasses an area of 532 hectares, of which 21% consists of vegetated wetlands and open water at Sand Pond, and 79% heath barrens and forest. The area is relatively remote and can only be accessed seasonally by Boyd Road. A portion of this road terminates within the NWA at an abandoned house site. A smaller trail extends from this point to a boat landing at the pond. Much of the habitat surrounding Sand Pond consists of dense woods, ericaceous bogs and meadows.

The area is important as a fall staging area for waterfowl, especially the American Black Duck (*Anas rubripes*). In fall, waterfowl that congregate along the coastal marshes and estuaries frequent this inland lake for food, grit and fresh water. Sand Pond NWA also provides protection to a diversity of Atlantic Coastal Plain Flora.

Sand Pond was designated the first NWA in Canada on April 27, 1978, and is administered under the *Wildlife Area Regulations* of the *Canada Wildlife Act*.

Table 1: Sand Pond NWA summary information

Protected area designation	National Wildlife Area
Province or territory	Nova Scotia
Latitude and longitude	43º48'N, 65º49'W
Size	532 ha (1315.5 acres)
Protected area designation criteria	Criteria 1(a), where the site supports significant concentrations of staging and migrating waterfowl. The site also supports Atlantic Coastal Plain Flora.
Protected area classification system	Category A – Conservation of species or critical habitat
International Union for Conservation of Nature (IUCN) Classification	IV
Order-in-Council number	PC 1978-1439
Directory of Federal Real Property (DFRP) number	DFRP number 2357
Gazetted	April 27, 1978
Additional designations	None
Faunistic and floristic importance	Important staging area for waterfowl. Significant concentration of Atlantic Coastal Plain Flora.
Invasive species	None recorded
Species at risk	None recorded
Management agency	Environment Canada – Canadian Wildlife Service
Public access and use	Public use is minimal. Day recreation is allowed within the NWA, including hiking, hunting and fishing.

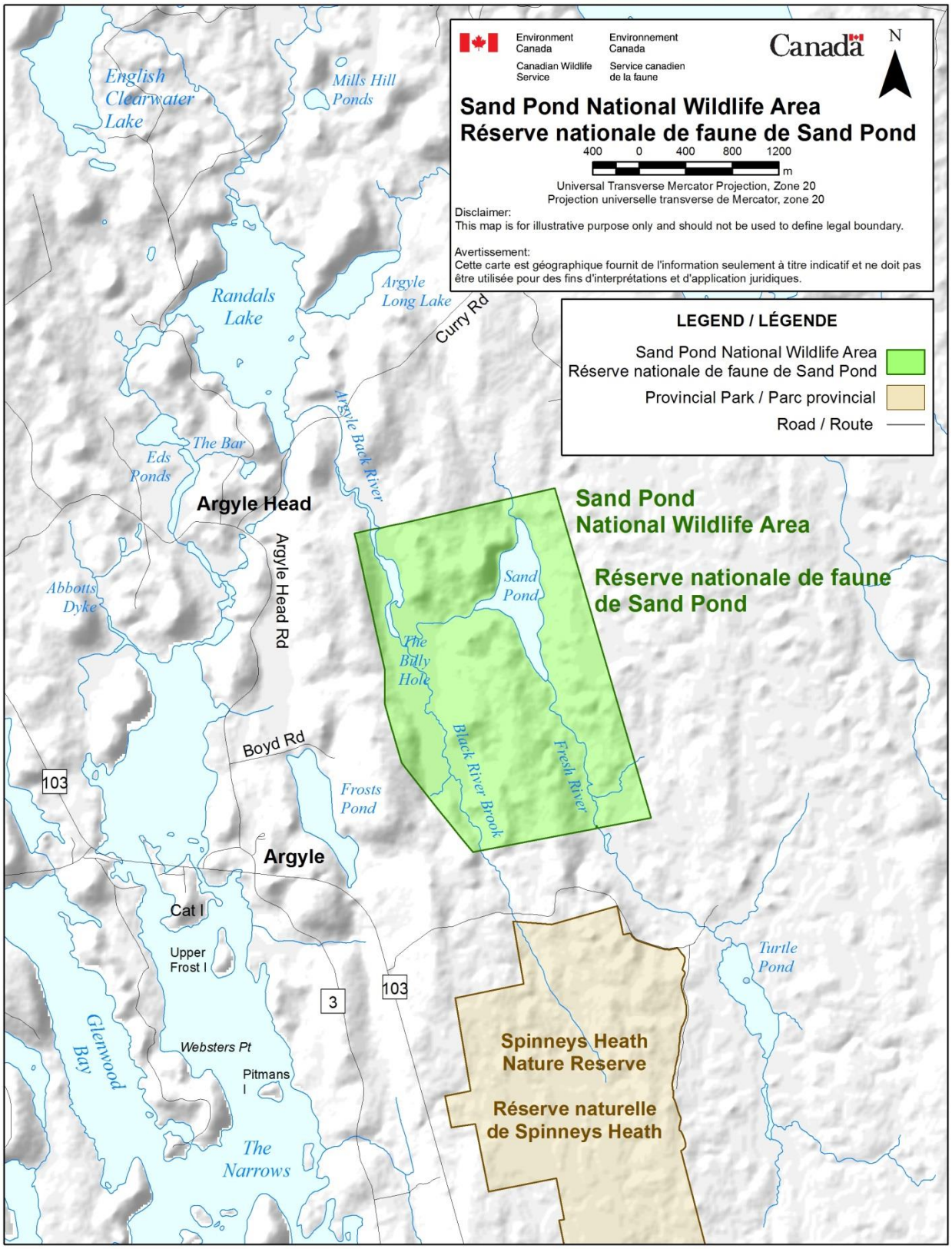

Figure 2: Sand Pond NWA, Yarmouth County, Nova Scotia

1.1 REGIONAL CONTEXT

Sand Pond, named for its sandy bottom, is a small freshwater lake situated 22 km due east of the town of Yarmouth, Nova Scotia, and 1.5 km inland from the tidal waters of the Argyle River. The adjacent coastal area consists of extensive tidal flats, inlets and coastal islands. This area, including nearby East River, Tusket Island and Goose Bay, is one of the more important fall staging and wintering areas for Black Ducks and Canada Geese (*Branta canadensis*) in Nova Scotia (Van Zoost 1969; MacKinnon *et al*. 1994).

Southwestern Nova Scotia, including Sand Pond, is important ecologically for its diversity of Atlantic Coastal Plain Flora (Crowley and Beals 2011), a unique group of unrelated plants that are mainly restricted to the flat lands along the Atlantic coast from Florida to Nova Scotia. Besides the inlets and coastal islands to the west and south, the NWA is bounded by the open barrens known locally as the Great Heath to the northeast, and Spinney's Heath Nature Preserve to the south. Spinney's Heath is a 640-hectare protected area administered by the Province of Nova Scotia under the *Special Places Protection Act*. This site was identified in 1971 under the International Biological Program as an excellent example of an undisturbed open *Sphagnum* bog.

The many bays and inlets along the coast of southwestern Nova Scotia, and close proximity to fishing grounds around the mouth of the Bay of Fundy and Gulf of Maine, make these coastal resources a significant driving force for the local economy. The region's interior geography consists of generally rugged terrain unsuitable for larger farming operations; as a result, the majority of communities are coastal, with only a few small settled areas in the hinterland.

Sand Pond is situated within the Atlantic Maritime Ecozone (Figure 3). One of 15 terrestrial ecozones in Canada, the Atlantic Maritime Ecozone includes all of New Brunswick, Prince Edward Island, Nova Scotia and Quebec's Gaspé Peninsula. Within this ecozone, the NWA is situated in the Southwest Nova Scotia Uplands Ecoregion (124), between the Tusket River (513) and Rossignol (514) ecodistricts (Webb and Marshall 1999).

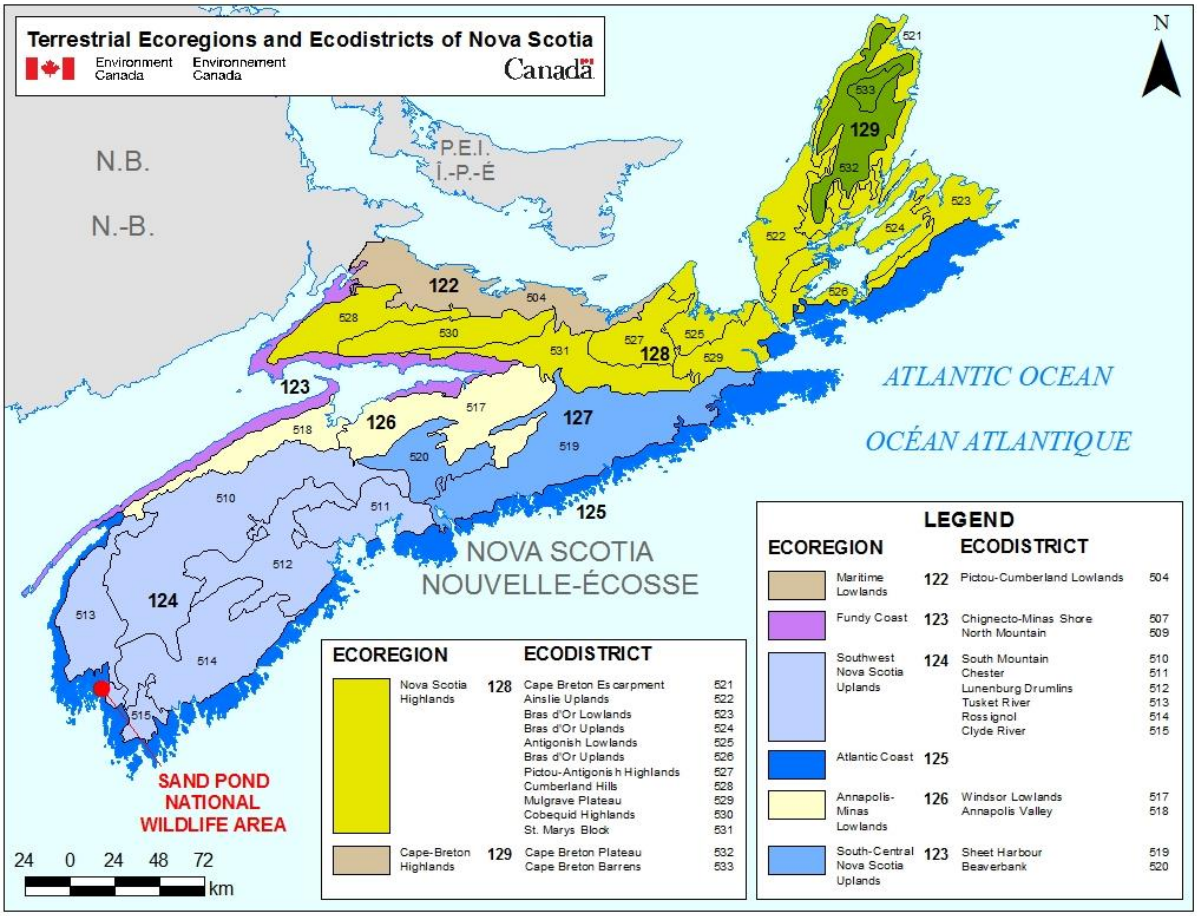

Figure 3: Terrestrial ecoregions and ecodistricts of Nova Scotia

1.2 HISTORICAL BACKGROUND

It was around 1895 that the first farms appeared on the uplands around Sand Pond. Forests were cleared, leaving significant stone walls around the remnant old fields that are a lasting legacy to this work. A flooding and drainage system was constructed to optimize cranberry production and harvest. On completion, most of Sand Pond was drained, and 25 acres were cultivated as a cranberry bog. A control structure was also built at the outflow of the lake so that cranberries could be flooded. A more complete account of historical land use at Sand Pond is contained in Appendix I.

1.3 LAND OWNERSHIP

The wetlands and entire uplands of Sand Pond NWA are owned by the Government of Canada and administered by the Canadian Wildlife Service of Environment Canada. The property is rectangular in shape and the linear boundaries are clearly delineated.

The access road (Boyd Road) to the site of the former homestead at Sand Pond is under the administration and control of the Province of Nova Scotia.

The federal government does not hold the subsurface mineral rights for Sand Pond NWA.

1.4 FACILITIES AND INFRASTRUCTURE

There are no buildings and only minimal public use facilities within Sand Pond NWA. Boyd Road, the designated road connecting the old homestead to Sand Pond, is seasonally accessible by high-clearance vehicles and requires minor maintenance for EC employees, that are primarily the periodic removal of encroaching vegetation. Annual visits include site inspections and repairs and replacement of regulatory signage, such as boundary signs, public notices and 2′ x 4′ NWA identification signs (Van Zoost 1969; Hounsell 1974; MacKinnon *et al.* 2010; MacKinnon and MacPherson 2011).

Table 2: Facilities and infrastructure in Sand Pond NWA

Type of facility or infrastructure	Approximate size (m, m², km, km² or linear m) or number	Responsibility holder or owner
Property boundary	9.7 km	Environment Canada – Canadian Wildlife Service (EC-CWS)
Boundary signs	200	EC-CWS
NWA entry signs	1	EC-CWS
Public notice signs	5	EC-CWS
Trail (Sand Pond)	900 m	EC-CWS
Trail (unimproved)	900 m	EC-CWS
Designated public road	800 m	Province - Nova Scotia
Bridge	1	Province - Nova Scotia
Boat landing (<10 hp)	1	EC-CWS
Maintenance access points	1	EC-CWS
Water control structure	1	Ducks Unlimited Canada

2 ECOLOGICAL RESOURCES

2.1 TERRESTRIAL AND AQUATIC HABITATS

The soils of Sand Pond NWA are generally comprised of thin layers of sand and gravel material overlain in places by peat. A spruce/fir forest dominates most upland sites. Red Spruce (*Picea rubens*) and Balsam Fir (*Abies balsamea*) are particularly prevalent on areas bordering heath-covered uplands. Typical forest ground cover includes Bunch Berry (*Cornus canadensis*), Blue-bead Lily (*Clintonia borealis*), Star Flower (*Trientalis borealis*), and Wild Lily-of-the-valley (*Maianthemum canadense*). Bracken Fern (*Pteridium aquilinum*) is common in open patches throughout these woodlands. Larch (*Larix laricina*) and White Pine (*Pinus strobus*) also occur. Deciduous species, including White Birch (*Betula papyrifera*) and Red Maple (*Acer rubrum*), occupy better-drained sites. Red Oak (*Quercus rubra*) and Sugar Maple (*Acer saccharum*) occur along the area's northwest boundary (Van Zoost 1969; Barkhouse 1986; Newell 2002).

Ericaceous plants include Crowberry (*Empetrum nigrum*), Bearberry (*Arctostaphylos uva-ursi*), Lambkill (*Kalmia angustifolia*) and Sweet Gale (*Myrica gale*). Reindeer Moss (*Cladonia rangiferina*) and Ground Pine (*Lycopodium obscurum*) provide the principal ground cover of large non-forested areas in Sand Pond NWA. These heath-covered uplands are largely well-drained sites that also support varying amounts of Alder (*Alnus* spp.) and Willow (*Salix* spp.) shrub cover (Figures 4 and 5).

Poor drainage has resulted in the development of two discrete bogs in the southeast section of Sand Pond NWA. Both bogs are characterized by expansive carpets of sphagnum moss, likely *Sphagnum rubrum*.

The site also supports an interesting diversity of Atlantic Coastal Plain Flora where nineteen species have been recorded (Newell 2002). Within Sand Pond, two plants are provincially "Yellow ranked" species while the status of the remaining are "Green ranked", or secure, are not believed to be at risk (Table 3). Of the 90 Atlantic Coastal Plain Flora (ACPF) species in Nova Scotia, 11 of these are listed as species at risk under the federal *Species at Risk Act and* the *Nova Scotia Endangered Species Act*. And 25 are listed as 'at risk' (Red ranked) by the Nova Scotia General Status listing (Crowley and Beals, 2011). In Canada, ACPF species are at the northern limit of their range; the Canadian distribution for the 11 listed ACPF species is restricted to the province of Nova Scotia although none of these are presently known to occur within the Sand Pond National Wildlife Area. A recovery strategy and action plan was developed to address the recovery of all 11 provincially and federally listed ACPF species at risk (Environment Canada and Parks Canada Agency 2010). Additional information can be found in the Atlantic Coastal Plain Flora in Nova Scotia Identification and Information Guide available for download at www.speciesatrisk.ca/coastalplainflora/guide.

Table 3: ACPF occurring at Sand Pond NWA (Newell 2002)

Scientific name	Common name	Provincial general status rank*	Habitat(s) where found within Sand Pond NWA
Bartonia paniculata	Screw-stem	Green	Bogs, fens, lake shoreline, barrens
Calopogon tuberosus	Grass Pink		Bogs, fens
Carex atlantica ssp. *atlantica*	Prickly Bog Sedge	Green	Bogs
Carex bullata	Button Sedge	Green	Bogs, fens, lake shoreline, wooded river edge
Euthamia caroliniana	Narrow Leaf Fragrant Goldenrod	Green	Lake shoreline
Gaylussacia dumosa	Bog Huckleberry	Green	Bogs
Glyceria obtusa	Blunt Manna-grass	Green	Fens, red maple floodplain
Ilex glabra	Inkberry	Green	Bogs, barrens, fens, wooded river edge
Juncus militaris	Bayonet Rush	Green	Lake
Juncus subcaudatus var. *planisepalus*	Woods Rush	Yellow	Damp wooded areas
Myrica pensylvanica	Northern Bayberry	Green	Bogs, lake shoreline
Panicum spretum	Eaton's Witchgrass	Green	Lake shoreline
Platanthera blephariglottis	White-fringed Orchid	Green	Bogs, lake shoreline
Sisyrinchium atlanticum	Eastern Blue-eyed-grass	Green	Lake shoreline
Smilax rotundifolia	Cat Brier	Green	Wooded river edge
Thelypteris simulata	Massachusett's Fern	Green	Red maple floodplain
Triadenum virginicum	Marsh St. John's-wort	Green	Lake shoreline, wooded river edge
Viola lanceolata	Lance-leaved Violet	Green	Lake shoreline
Woodwardia areolata	Netted Chainfern	Yellow	Red maple floodplain

***** Green – Secure, species that are not believed to be at risk
Yellow – Sensitive, species that are not believed to be at risk of immediate extinction/extirpation but may require protection to prevent them from becoming at risk.

2.1.1 Wetlands

The freshwater wetlands of Sand Pond NWA include Sand Pond, Fresh River and Back River, and their associated ponds and bordering marshes. These waters are highly coloured by tannins, are naturally acidic, and have been impacted by acid precipitation (Clair *et al.* 2011). In 1969, Ducks Unlimited Canada, in cooperation with the Canadian Wildlife Service, installed a water-level control structure on the outlet stream of Sand Pond to restore the 34-hectare wetland that had been drained by the past cranberry operation. This structure was frequently blocked by beavers (*Castor canadensis*), and the stop logs were removed in 1988. The lake level is now maintained by beaver dam building and associated sedimentation at the lake's outflow. This natural fluctuation of water levels may be beneficial to some species of ACPF (Keddy and Wisheu, 1989).

The perimeter of the pond is bordered by a narrow fringe of Alder (*Alnus* spp.), Sweet Gale (*Myrica gale*), Blue-joint (*Calamagrostis canadensis*) and Meadowsweet (*Spiraea alba*). The lake is vegetated by sparse emergent cover, comprised mainly of Bayonet Rush (*Juncus militaris*), Pickerelweed (*Pontederia cordata*), Three-way Sedge Rush (*Dulichium arundinaceum*) and Creeping Spikerush (*Eleocharis palustris*). White Water Lily (*Nymphaea odorata*) and Yellow Water Lily (*Nuphar lutea*) are also common (Newell 2002).

Fresh River empties into Sand Pond from the southeast. Sand Pond drains into Back River through a human-modified channel. Back River develops into a large area of slow-moving water situated in the northwest corner of the NWA. Known locally as the Billy Hole, this and other ponds along the Fresh and Back rivers support both white and yellow water lilies. These wetlands are fringed by broad ericaceous meadows dominated by Bog Laurel (*Kalmia polifolia*) and Leatherleaf (*Chamaedaphne calyculata*).

Poor drainage has resulted in the development of two discrete bog communities in the southeast section of Sand Pond NWA. Both bogs are dominated by sphagnum moss, Cotton Grass (*Eriophorum* sp.) and ericaceous shrubs. The smaller of the two bogs has scattered Black Spruce and Larch, while the large bog has virtually no tree cover.

2.1.2 Heath uplands

The northern and eastern shores of Sand Pond connect to a vast area of rocky upland, known as "the Barrens," extending into the interior of the province. This area supports large tracts of very low shrub cover, including Low-bush Blueberry (*Vaccinium myrtilloides*), Inkberry (*Ilex glabra*), Bearberry and Sheep Laurel (*Kalmia angustifolia*), as well as large areas dominated by Bracken Fern (*Pteridium aquilinum*). This low vegetative cover is punctuated by scattered taller shrubs, including Speckled Alder (*Alnus rugosa*), Huckleberry (*Gaylussacia baccata*) and Larch. The edge of this area tends to be populated with taller shrubs, such as Rhodora (*Rhododendron canadense*) and Sheep Laurel.

2.1.3 Wooded areas

Woodlands constitute 50% (261 hectares) of Sand Pond NWA. The drier areas are covered in mixed coniferous and deciduous forest, with Red Maple, Balsam Fir, Larch, Red Spruce and White Spruce being the most common. Less common species are White Birch (*Betula papyrifera*), Grey Birch (*Betula populifolia*) and American Mountain Ash (*Sorbus americana*). Fires have passed through these woodlands periodically over many years, and areas in early succession tend to fill in with Largetooth Aspen (*Populus grandidentata*) and Trembling Aspen (*Populus tremuloides*). Numerous Red Maple swamps are scattered throughout the property. Red Oak and Sugar Maple occur along the northwest boundary of the NWA.

Common herbaceous species on the forest floor include Wild Sarsaparilla (*Aralia nudicaulis*), Goldthread (*Coptis trifolia*), Bunchberry (*Cornus canadensis*), Twinflower (*Linnaea borealis*), Creeping Snowberry (*Gaultheria hispidula*), Cinnamon Fern (*Osmunda cinnamomea*), Wild Lily-of-the-valley (*Maianthemum canadense*), New York Fern (*Thelypteris noveboracensis*) and Bracken Fern.

2.1.4 Old fields

The field remnants, demarcated by the remains of low-lying stone walls, are now in various stages of plant succession. Open areas are being replaced by thickets of wild rose (*Rosa* sp.) and thick stands of White Spruce. No human structures remain in the fields, but a small number of garden escapes occur among the vegetation surrounding the old homesteads, including Wild Parsnip (*Pastinaca sativa*), Quaking Grass (*Briza media*) and Tawny Day-lily (*Hemerocallis fulva*). Other species include Knapweed (*Centaurea nigra*), Old-field Goldenrod (*Solidago nemoralis*), Orchard Grass (*Dactylis glomerata*) and Timothy (*Phleum pratense*). Early succession wood species include Chokecherry (*Prunus virginiana*), Pin Cherry (*Prunus pensylvanica*), Downy Alder (*Alnus crispa*) and Blackberry (*Rubus allegheniensis*).

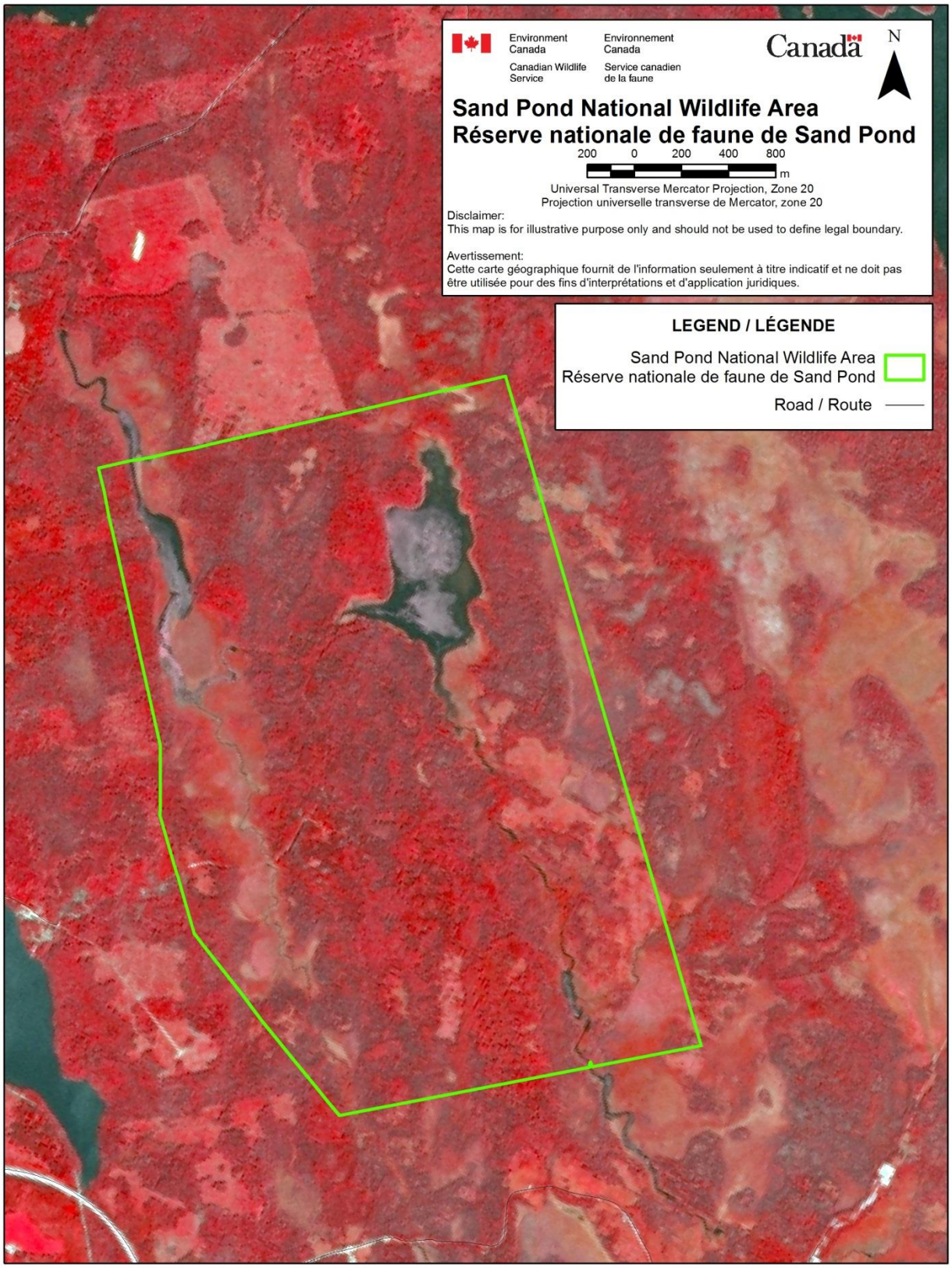

Figure 4: SPOT satellite image of southwest Nova Scotia showing boundaries of Sand Pond NWA (2007). The shallow Sand Pond is in the northeast corner.

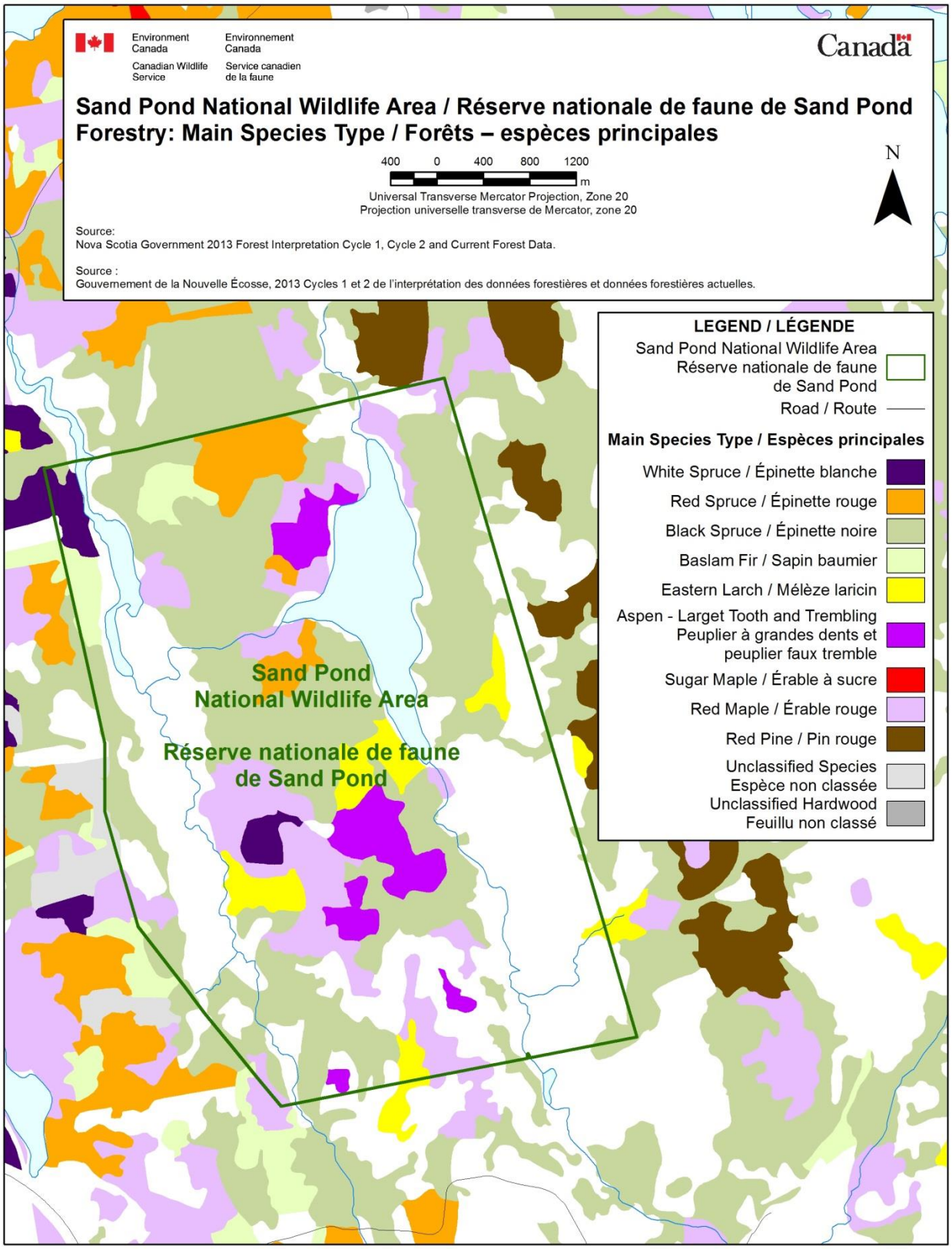

Figure 5: Nova Scotia Forest Resource Inventory land cover mapping for Sand Pond NWA (2005)

2.2 WILDLIFE SPECIES

2.2.1 Birds

For many years, Sand Pond has been known principally for its use by large numbers of Black Ducks during fall migration. Depending on tidal and weather conditions, Black Ducks leave the nearby salt marshes for this freshwater lake, which serves primarily as a rest area. On October 14, 1969, an estimated 6000 Black Ducks were observed on Sand Pond; however, typical fall numbers are in the hundreds. Other waterfowl that frequent the wetlands and breed here include Ring-necked Duck (*Aythya collaris*) and Green-winged Teal (*Anas crecca*). The adjacent uplands support an abundance of American Woodcock (*Scolopax minor*) and Ruffed Grouse (*Bonasa umbellus*).

2.2.2 Mammals

Large mammal species common to southwestern Nova Scotia can be found within Sand Pond NWA, such as White-tailed Deer (*Odocoileus virginianus*), Porcupine (*Erethizon dorsatum*), Eastern Coyote (*Canis latrans*), Mink (*Mustela vison*), Red Squirrel (*Tamiasciurus hudsonicus*), Snowshoe Hare (*Lepus americanus*), Bobcat (*Lynx rufus*), Muskrat (*Ondatra zibethicus*) and Short-tailed Weasel (*Mustela erminea*).

Small mammals known to the area include Masked Shrew (*Sorex cinereus*) and Meadow Vole (*Microtus pennsylvanicus*). Smokey Shrew (*Sorex fumeus*), Water Shrew (*Sorex palustris*), Short-tailed Shrew (*Blarina brevicauda*), Woodland Jumping Mouse (*Napaeozapus insignis*) and Red-backed Vole (*Clethrionomys gabberi*) would be expected to occur (Dawe 2004).

2.2.3 Reptiles and amphibians

Nine species of reptiles and amphibians have been observed within Sand Pond NWA (Table 4). Potential habitat for six additional species exists within the NWA. Surveys east and west of Sand Pond NWA recorded the following species: Pickerel Frog (*Rana palustris*), Ringneck Snake (*Diadophis punctatus*), Smooth Green Snake (*Opheodrys vernalis*), Redbelly Snake (*Storeria occipitomaculata*), Eastern Painted Turtle (*Chrysemys picta*) and Snapping Turtle (*Chelydra serpentina*) (Brannen 2004).

Table 4: Reptiles and amphibians found within Sand Pond NWA

Common name	Species	Global (G-) rank[1]	Regional (S-) rank[2]
Green Frog	*Rana clamitans*	G5	S5
Northern Spring Peeper	*Hyla crucifer*	G5	S5
Yellow Spotted Salamander	*Ambystoma maculatum*	G5	S5
Bullfrog	*Rana catesbeiana*	G5	S5
Wood Frog	*Rana sylvatica*	G5	S5
American Toad	*Bufo americanus*	G5	S5
Redback Salamander	*Plethodon cinereus*	G5	S5
Northern Leopard Frog	*Rana pipiens*	G5	S5
Maritime Garter Snake	*Thamnophis sirtalis*	G5	S5

1. G-ranks are defined as follows: G1 = Critically Imperiled; G2 = Imperiled; G3 = Vulnerable; G4 = Apparently Secure; G5 = Secure. For more detailed definitions of G-ranks, see www.natureserve.org/explorer/ranking.htm#globalstatus.
2. S-ranks are defined as follows: S1 = Critically Imperiled; S2 = Imperiled; S3 = Vulnerable; S4 = Secure with Some Cause for Concern; S5 = Secure; M = Migrant; B = Breeding. For more detailed definitions of S-ranks, see www.natureserve.org/explorer/ranking.htm#globalstatus.

2.2.4 Fish

Sand Pond and associated waterways are a popular area for Brook Trout (*Salvelinus fontinalis*) fishing. Other common fish include Yellow Perch, White Perch and Golden Shiner (Table 5).

Table 5: Fish species observed within Sand Pond NWA

Common name	Species	Global (G-) rank	Regional (S-) rank
Golden Shiner	*Notemigonus crysoleucas*	G5	S5
Brown Bullhead	*Ameiurus nebulosus*	G5	S5
Yellow Perch	*Perca flavescens*	G5	S5
White Perch	*Morone americana*	G5	S5
Brook Trout	*Salvelinus fontinalis*	G5	S5

2.3 SPECIES AT RISK

No SARA-listed or COSEWIC-reviewed species at risk have been observed within Sand Pond NWA in recent years (MacKinnon and Vickruck, 2014). However, some bird species, such as Barn Swallow and Common Nighthawk were recorded in 1968 and 1974, respectively, and as the habitat has remained relatively unchanged, they may still frequent the area (Table 6). Although no listed species of ACPF have been observed within the NWA, it should be noted that all species of ACPF are rare in Canada (Newell 2002).

Table 6: Species at risk that may frequent Sand Pond NWA

Common and scientific names of species	Status			Presence or potential of presence[4]
	Canada		Nova Scotia	
	SARA[1]	COSEWIC[2]	Provincial ranking[3]	
Birds				
Barn Swallow *Hirundo rustica*	No Status	Threatened	S3	Potential
Common Nighthawk *Chordeiles minor*	Schedule I	Threatened	S3B	Potential

1. *Species at Risk Act*: Extinct, extirpated, endangered, threatened, special concern, not at risk (assessed and deemed not at risk of extinction) or no status (not rated).
2. Committee on the Status of Endangered Wildlife in Canada: the same as the SARA status.
3. Provincial Ranking using provincial codes.
4. "Confirmed," "probable" or "potential".

2.4 INVASIVE SPECIES

No invasive species have been recorded at Sand Pond NWA.

Figure 6: Near the outflow of Sand Pond, Sand Pond NWA
Photo: C. MacKinnon © Environment Canada, 2011

Figure 7: Fresh Creek, Sand Pond NWA
Photo: A. Macpherson © Environment Canada, 2011

3 MANAGEMENT CHALLENGES AND THREATS

A number of potential issues that threaten the ecological integrity of Sand Pond NWA are related to inappropriate recreational activities. Much of the area is composed of wetlands, which are especially sensitive and are frequent targets of illegal off-road vehicle use. Such use can damage vegetation and result in stream siltation, and it often leaves long-lasting scars on the landscape. The remoteness of the site increases the opportunity for such illegal activities, and periodic inspection visits often only record damage already done. More specific issues are discussed below.

3.1 OFF-ROAD VEHICLES

Illegal use of off-road vehicles (ORV), such as motorbikes and all-terrain vehicles (ATVs), especially in regions abundant in wetlands, is a problem for protected area managers and landowners in general. ORV use leads to the degradation or destruction of plant cover (Hosier and Eaton 1980; Kutiel *et al.* 2001) and seed banks (Wisheu and Keddy 1991). It can also lead to soil compaction, removal of the top layer of soil and alterations to drainage (Prose *et al.* 1987), which in turn may degrade or destroy plant cover and the habitat of local animal species. Large mammals such as Elk (*Cervus elaphus*) have been shown to be scared by ORV use, exhibiting a “flight response” over distances of more than a kilometre (Preisler *et al.* 2006). ORV use may have a similar effect for the large ungulates of Nova Scotia, namely White-tailed Deer and Moose.

The use of ORVs in streams and wetlands results in habitat destruction and loss. Portions of the sphagnum bog and ericaceous heath wetlands within Sand Pond NWA show such scars (Mitchell 2002). Often, the worst damage is in the form of “braiding,” where successive operators, in order to bypass a wet area, make a series of new and parallel trails adjacent to an existing one (Figure 8). Use of ORVs is prohibited within Sand Pond NWA. It should be noted, however, that the old road to the boat landing at Sand Pond is marked as a designated road, and use by licensed and registered highway vehicles is permitted. This road covers rough ground, and access by high-clearance vehicles is recommended.

3.2 TOURISM

Unmanaged visitation to the NWA by a large number of people would likely have negative impacts on its ecological integrity. Sand Pond NWA is not currently used or advertised as a tourism destination. Although public visitation is allowed, no public use facilities are planned, and this area will not be actively promoted by the Canadian Wildlife Service as a tourist or recreational destination.

3.3 REFUSE DISPOSAL

The closure of local dump sites and centralization to regional landfills have resulted in illegal dumping of garbage in some rural areas during the past two decades. Dead-end roads and

backcountry areas often become used as illegal dump sites. Some limited dumping has occurred within the Sand Pond NWA, and officers within the Wildlife Enforcement Division of Environment Canada have responded as appropriate.

3.4 AGRICULTURAL CONTAMINANTS

As part of cranberry operations carried out until the late 1960s, dichloro-diphenyl-trichloroethane (DDT) was used as a pesticide. An environmental site assessment of Sand Pond NWA revealed the presence of elevated DDT concentrations as well as dichloro-diphenyl-dichloroethane (DDD) and dichloro-diphenyl-dichloroethylene (DDE) in one sediment sample from the edge of the lake, closest to the outflow (SNC Lavalin 2002). These levels “exceeded the CCME [Canadian Council of Ministers of the Environment] probable effect level for freshwater sediments” (SNC Lavalin 2002).

Figure 8: Off-road vehicle damage to bog habitat within the Sand Pond NWA in 2002
Photo: A. Kennedy © Environment Canada

3.5 PREDICTED CLIMATE CHANGE CONTEXT

Anticipated climate change, including warming trends over the upcoming century, is likely to have an effect on local flora and fauna. As southwestern Nova Scotia has coastal plain flora that are more common or abundant in southern climates, any increase in average daily temperatures, including milder winters, is likely to be beneficial to these plants.

Some insects that are currently uncommon and possibly damaging may become more abundant following warmer winters. Such climate changes may be responsible for the increased occurrence in Nova Scotia of the Black-legged Tick (*Ixodes scapularis*), a carrier of Lyme disease.

3.6 LAKE WATER LEVELS

Water levels at Sand Pond have been historically stabilized by way of a water control structure. This control structure is no longer operational, and it is desirable for the Atlantic coastal plain flora (ACPF) that water levels continue to fluctuate in response to natural conditions, such as precipitation, temperature and snow pack.

3.7 FOREST FIRES

The area has a history of illegally set fires that could impact surrounding forests, private property and infrastructure. These illegal fires ranged in size from campfires to wildfires that burned large tracts of land. For example, a significant portion of the bog south of the Boyd Road was burned in the spring of 2012. Some of these fires are believed to have been intentionally set to promote the growth of blueberry plants.

4 GOALS AND OBJECTIVES

4.1 VISION

The long-term vision for Sand Pond NWA is to maintain and enhance habitat for native wildlife and plants and to minimize human disturbance.

4.2 GOALS AND OBJECTIVES

Sand Pond NWA was initially established to provide habitat protection for a variety of migratory birds with a focus on waterfowl. More broadly, this site protects a unique diversity of wetland and upland habitat in accordance with the document *A Wildlife Policy for Canada* (Environment Canada 1990), the goal of which is:

> *"… to maintain and enhance the health and diversity of Canada's wildlife, for its own sake and for the benefit of present and future generations*."

At the international level, Sand Pond NWA is classified under the International Union for the Conservation of Nature criteria for protected areas as a Category IV protected area. The site is protected for the preservation of species and genetic diversity and for scientific monitoring and research. It is not actively promoted as a tourism destination, and no public use facilities are maintained on the site. Public visitation, although not promoted, is currently not restricted. Subject to applicable federal and provincial regulations, some traditional activities, such as recreational fishing, hunting and trapping, are allowed.

The primary management goal for Sand Pond NWA is *to ensure that the wildlife habitat is protected from human disturbances such that the potential for natural biological processes is maximized*.

To ensure that this goal is attained, more specific goals and objectives have been established so that the Sand Pond NWA will maintain the quantity, quality and diversity of its natural habitats, while permitting non-conflicting human use.

Sand Pond NWA is a remote site where active management of habitat or human visitors is not required. Management activities are limited to responding to specific incidents as they may arise and planned site inspection visits. The goals and objectives listed below reflect a management approach of responding only to negative human activities as they may arise and within limitations related to financial and staff resources. The discussion of monitoring activities provides additional information on how the overall management goals will be addressed.

Specific goals and objectives are as follows:

Goal 1: Habitat necessary for staging, feeding and resting waterfowl is conserved and managed.

a. Objective: Water levels within Sand Pond will be allowed to fluctuate according to natural conditions (including beaver activity).
b. Objective: Aquatic ecosystems are protected from negative impacts of human activities, such as use of pesticides.

Goal 2: Atlantic Coastal Plain Habitat is conserved.

a. Objective: Atlantic Coastal Plain Habitat is protected from negative impacts of human activities, such as off-road vehicle use, use of pesticides and illegal dumping of garbage.
b. Objective: Water levels within Sand Pond will be allowed to fluctuate according to natural conditions (including beaver activity).

Goal 3: Habitat necessary for breeding and migrating migratory birds is conserved and maintained.

a. Objective: Existing forested lands will be allowed to follow natural processes; timber harvesting will not be permitted.
b. Objective: Terrestrial ecosystems are protected from negative impacts of human activities, such as use of ORV and pesticides.

4.3 EVALUATION

Annual monitoring will be performed within the limits imposed by the availability of financial and human resources. The management plan will be reviewed 5 years after its initial approval, and reviewed and updated every 10 years thereafter. The evaluation will take the form of an annual review of monitoring data obtained from the monitoring and research projects outlined below. This monitoring will be used to establish priorities for action and to allocate resources.

5 MANAGEMENT APPROACHES

This section and the following table contain a description of all the possible approaches that could be used in the management of the Sand Pond NWA. However, management actions will be determined during the annual work planning process and will be implemented as human and financial resources allow.

Currently, the most immediate threat to Sand Pond NWA is unauthorized use of off-road vehicles throughout the wetland habitat.

Table 7: Management approaches for Sand Pond NWA

Management challenge or threat	Goal and objective(s)	Management approach (actions, including level of priority)[1]
ORVs cause extensive and long-lasting damage to the fragile wetland habitats within Sand Pond NWA.	**Goal 2: Atlantic Coastal Plain Habitat is conserved.** **Objective 2.a:** Atlantic Coastal Plain Habitat is protected from negative impacts of human activities, such as ORV use, use of pesticides and illegal dumping of garbage.	• Communications are maintained with ORV rider associations regarding the regulations pertaining to Sand Pond NWA and damage caused by inappropriate use of ORVs. **(2)** • Regulatory signs are maintained. **(1)** • Contribute to communication products highlighting the impact of indiscriminate ORV use. **(2)** • The existing designated road from the Sand Pond house site to the lake for vehicle access is maintained. **(2)**
Tourism and visitor activities such as camping, open fires, damage to vegetation and abandoned refuse present disturbance to nesting birds.	**Goal 3: Habitat necessary for breeding and migrating migratory birds is conserved and maintained**. **Objective 3.a:** Existing forested lands will be allowed to follow natural processes; timber harvesting will not be permitted.	• The number and nature of incidents involving evidence of illegal activities within the NWA is documented and reported to Wildlife Enforcement Division. **(1)** • Regulatory signs are maintained. **(1)** • Annual inspections are conducted to monitor site conditions. **(1)**

Management challenge or threat	Goal and objective(s)	Management approach (actions, including level of priority)[1]
Illegal dumping of household garbage results in site safety concerns and potential contamination issues. Residual agricultural pesticides within the food chain Predicted climate change	**Goal 1: Habitat necessary for staging, feeding and resting waterfowl is conserved and managed.** **Objective 1.b:** Aquatic ecosystems are protected from negative impacts of human activities, such as use of pesticides. **Goal 2: Atlantic Coastal Plain Habitat is conserved.** **Objective 2.a:** Atlantic Coastal Plain Habitat is protected from negative impacts of human activities, such as ORV use, use of pesticides and illegal dumping of garbage. **Goal 3: Habitat necessary for staging, feeding and resting waterfowl is conserved and managed.** **Objective 3.b:** Terrestrial ecosystems are protected from negative impacts of human activities, such as use of ORV and pesticides.	• The number and nature of incidents involving evidence of illegal activities within the NWA is documented and reported to Wildlife Enforcement Division. **(1)** • Regulatory signs are maintained. **(1)** • Existing refuse is removed. **(1)** • Continue with contaminated site assessment process to evaluate level and extent of residual pesticides, and initiate appropriate site remediation activities if required. **(2)** • Conduct periodic botanical and bird studies and reviews to track changes in abundance and distribution of endangered species, ACPF and migratory birds, and initiate appropriate site remediation activities if required. **(2)**
Lake water levels (Sand Pond)	**Goal 1: Habitat necessary for staging, feeding and resting waterfowl is conserved and managed.** **Objective 1.a.:** Water levels within Sand Pond will be allowed to fluctuate according to natural conditions (including beaver activity). **Goal 2: Atlantic Coastal Plain Habitat is conserved.** **Objective 2.b.:** Water levels within Sand Pond will be allowed to fluctuate according to natural conditions (including beaver activity).	• Ensure natural flow of water through Sand Pond's non-operational control structure. **(2)**

Management challenge or threat	Goal and objective(s)	Management approach (actions, including level of priority)[1]
Forest fires	**Goal 3: Habitat necessary for staging, feeding and resting waterfowl is conserved and managed.** **Objective 3.b:** Terrestrial ecosystems are protected from negative impacts of human activities, such as use of ORV and pesticides.	• The number and nature of incidents involving evidence of illegal activities within the NWA is documented and reported to Wildlife Enforcement Division. **(1)** • Regulatory signs are maintained. **(1)** • Annual inspections are conducted to monitor site conditions. **(1)**

1. Level of Priority: 1 (from 0 to 3 years); 2 (from 4 to 6 years); 3 (from 7 to 10 years)

5.1 HABITAT MANAGEMENT

5.1.1 Forests

Undisturbed forested areas will allow natural succession and events to occur. Exceptions would be made for the control of forest fires that could threaten adjacent properties and communities. Small sites in later stages of old-field succession, dominated by White Spruce, may be targeted for upland habitat management for selected wildlife species.

5.1.2 Alien and invasive plants

No management or control activities are required or anticipated at this time.

5.2 WILDLIFE MANAGEMENT

No management for wildlife is anticipated at this time. To maintain habitat conditions for Atlantic Coastal Plain Flora, the water level of Sand Pond will be allowed to fluctuate in response to natural conditions, and the abandoned control structure at the outlet of Sand Pond will remain open.

5.3 MONITORING

Annual inspection visits, including periodic surveys of target species by Environment Canada – Canadian Wildlife Service Atlantic, is a keystone of the monitoring program within Sand Pond NWA. The data obtained will be shared and incorporated into larger questions respecting the status of the various species over their ranges (for example, Bird Conservation Region planning).

Effective and efficient monitoring requires careful planning and a coordinated approach. Monitoring will also be carried out in a manner that contributes to meeting species at risk recovery strategy and action plan objectives, should such species become present in the NWA. Ongoing monitoring needs are as follows:

1. Regional habitat changes, including adjacent land use using aerial photography or satellite imagery
2. Human use (habitat damage, camping, open fires, soil disturbance and garbage left on site)

3. Documenting and reporting evidence of illegal activities within Sand Pond NWA to the Wildlife Enforcement Division, therefore reducing or eliminating their occurrence in the NWA
4. Water quality, especially for pesticides and organochlorines
5. Contaminant residues from past agricultural activities (blueberry and cranberry production)
6. Detailed bird survey

5.4 RESEARCH

Research activities will be considered for permitting when the results obtained through research have the potential for the following:

1. Protecting, maintaining, restoring or enhancing naturally occurring habitats, especially those of ACPF
2. Recovering species at risk or conserving migratory birds
3. Identifying and reducing the ecological risk of pesticides
4. Maintaining wetlands in a state most beneficial to wetland-dependent wildlife

To obtain a permit in order to conduct research in Sand Pond NWA and to receive instructions on guidelines for research proposals, please contact:

National Wildlife Area – Research Request
Environment Canada
Canadian Wildlife Service
17 Waterfowl Lane, P.O. Box 6227
Sackville NB E4L 1G6

Permit applications should be directed to: Permi.Atl@ec.gc.ca

5.5 PUBLIC INFORMATION AND OUTREACH

Information pertaining to Sand Pond NWA is available on the Environment Canada website at www.ec.gc.ca/ap-pa. There are no on-site public education facilities within the NWA.

The unique character of Sand Pond NWA, its significance as habitat for ACPF, and the lack of visitor amenities or infrastructure encourage public education and awareness of the site through off-site means. The Canadian Wildlife Service Protected Areas website provides written information on this NWA as well as visual representations of the ecological resources and physical character of the site. Specific public information and outreach will be targeted to the local and provincial ORV associations.

6 AUTHORIZATIONS AND PROHIBITIONS

In the interest of wildlife and their environment, human activities are minimized and controlled in NWAs through the implementation of the *Wildlife Area Regulations*. These regulations set out activities that are prohibited [subsection 3(1)] in wildlife areas and provide mechanisms for the Minister of the Environment to authorize certain activities in NWAs that are otherwise considered prohibited. The regulations also give the Minister the authority to prohibit entry into NWAs.

Activities within an NWA are authorized where notices have been posted at the entrance to or along the boundaries of the NWA or when notices have been published in local newspapers. All activities in an NWA are prohibited unless a notice has been posted or published authorizing the activity to take place. However, in addition to notices, certain activities may be authorized by obtaining a permit from the Minister of the Environment.

6.1 PROHIBITION OF ENTRY

Under the *Wildlife Area Regulations*, the Minister may publish a notice in a local newspaper or post notices at the entrance of any wildlife area or on the boundary of any part thereof prohibiting entry to any wildlife area or part thereof. These notices can be posted when the Minister is of the opinion that entry is a public health and safety concern or when entry may disturb wildlife and their habitat.

For Sand Pond NWA, entry is not prohibited. Authorized activities and those activities that will be considered for permitting are described below. The use of off-road vehicles and ATVs is prohibited in order to protect wildlife species and their habitats.

6.2 AUTHORIZED ACTIVITIES

For Sand Pond NWA, the notice authorizing the following non-commercial activities will be posted at the main entrance on Boyd Road, together with a 2′ x 4′ sign identifying the NWA. Other public notices are posted at remote boundary crossings and at the boat landing at Sand Pond.

Authorized activities **without** special restrictions:

1. Wildlife observation
2. Hunting, fishing and trapping[1]
3. Hiking
4. Photography
5. Canoeing[2]
6. Skiing
7. Skating
8. Snowshoeing

[1] Subject to federal and provincial regulations.
[2] Outboard motors must be less than 10 horsepower.
[3] Non-commercial berry picking only.

9. Berry picking[3]

Note: If there is a discrepancy between the information presented in this document and the notice, the notice prevails as it is the legal instrument authorizing the activity.

The use of off-road vehicles and ATVs is prohibited in order to protect wildlife species and their habitats.

6.3 AUTHORIZATIONS

Permits and notices authorizing an activity may be issued only if the Minister is of the opinion that the activity is scientific research relating to wildlife or habitat conservation; or the activity benefits wildlife and their habitats or will contribute to wildlife conservation; or the activity is not inconsistent with the purpose for which the NWA was established and is consistent with the most recent management plan.

The Minister may also add terms and conditions to permits in order to minimize the impact of an activity on wildlife and wildlife habitat.

All requests for permits or authorizations must be made in writing to the following address:

National Wildlife Area – Permit Request
Environment Canada
Canadian Wildlife Service
17 Waterfowl Lane, P.O. Box 6227
Sackville NB E4L 1G6

For further information, please consult the *Policy when Considering Permitting or Authorizing Prohibited Activities in Protected Areas Designated Under the Canada Wildlife Act and Migratory Birds Convention Act, 1994* (December 2011). This Environment Canada policy document is available on the protected areas website at www.ec.gc.ca/ap-pa.

6.4 EXCEPTIONS

The following activities will be exempt from the requirements of permitting and authorizations:

- Activities related to public safety, health or national security that are authorized by or under another Act of Parliament or activities under the *Health of Animals Act* and the *Plant Protection Act* for the health of animals and plants;
- Activities related to routine maintenance of NWAs and to implementation of management plans, and enforcement activities conducted by an officer or employee of Environment Canada.

6.5 OTHER FEDERAL AND PROVINCIAL AUTHORIZATIONS

Depending on the type of activity, other federal or provincial permits may be required to undertake an activity in this NWA.

Contact your regional federal and provincial permitting office for more information.

National Wildlife Area – Permit Request
Environment Canada
Canadian Wildlife Service
17 Waterfowl Lane, P.O. Box 6227
Sackville NB E4L 1G6

Province of Nova Scotia
Department of Natural Resources
Fish and Wildlife Division
136 Exhibition Street
Kentville NS B4N 4E5

7 HEALTH AND SAFETY

In the case of environmental emergencies, contact will be made with the Canadian Environmental Emergencies Notification System at the following address:

Maritimes Regional Office

Canadian Coast Guard

Fisheries and Oceans Canada

Tel.: 902-426-6030 or 1-800-565-1633

Non-emergency issues related to security or health and safety issues for Sand Pond NWA should be reported to:

National Wildlife Area Program

Environment Canada

Canadian Wildlife Service

17 Waterfowl Lane, P.O. Box 6227

Sackville NB E4L 1G6

Tel.: 506-364-5044

Fax: 506-364-5062

All reasonable efforts will be made to protect the health and safety of the public, including adequately informing visitors of any known or anticipated hazards or risks. In addition, Environment Canada staff will take all reasonable and necessary precautions to ensure their own health and safety and that of their co-workers. However, visitors (including researchers and contractors) must make all reasonable efforts to inform themselves of risks and hazards and must be prepared and self-sufficient. Natural areas are inherently dangerous, and proper precautions must be taken by visitors, recognizing that Environment Canada staff neither regularly patrol nor offer services for visitor safety in NWAs.

In the case of health and safety emergencies in Sand Pond NWA, refer to Table 8 for contact numbers.

Table 8: Emergency contact information for Sand Pond NWA

Emergency contacts for Sand Pond NWA, Yarmouth County, Argyle, Nova Scotia 43º48'N, 65º49'W (Note that there is no civic address for Sand Pond NWA)	
Emergency	**Contact**
Any life-threatening emergency	911
Police-Fire-Ambulance	911
Royal Canadian Mounted Police (RCMP), Yarmouth Detachment	1-902-742-9106
Rescue Coordination Centre to report air and marine emergencies	1-800-565-1582
Environmental emergencies (Oil, pesticide, chemical spills)	1-800-565-1633
Environment Canada – Wildlife Enforcement Division	1-506-364-5036
Environment Canada – Canadian Wildlife Service	1-506-364-5044
Nova Scotia Department of Natural Resources	1-800-565-2224

8 ENFORCEMENT

The management of NWAs is based on three Acts:

- *Migratory Birds Convention Act, 1994,* and *Migratory Bird Sanctuary Regulations*
- *Canada Wildlife Act* and *Wildlife Area Regulations*
- *Species at Risk Act*

Canadian Wildlife Service and Wildlife Enforcement Division staff monitor compliance with the *Canada Wildlife Act* and the *Wildlife Area Regulations* on an ongoing basis and will initiate investigations as required. NWA program staff will provide specific details from site inspections that may require enforcement action. Charges pertaining to ORV use have been laid regarding Sand Pond NWA under the *Wildlife Area Regulations*.

9 PLAN IMPLEMENTATION

The management plan will be implemented over a 10-year period. Annual work plans will be developed in accordance with priorities and budgets, and the details of management plan implementation will be developed through Environment Canada's annual work planning process and implemented as human and financial resources allow. An adaptive management approach will be favoured for the implementation of the management plan. The implementation of the plan will be evaluated 5 years after its publication, on the basis of the actions identified in Table 9.

The major action component of this plan consists of site monitoring and review. Inspection visits every year will provide required monitoring data to assess the status of migratory bird populations, status of ACPF and overall ecological integrity of the NWA.

Table 9: Implementation strategy timeline for Sand Pond NWA

Activity	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Site inspections	x	x	x	x	x	x	x	x	x	x
Trail/road maintenance	x	x	x	x	x	x	x	x	x	x
Botanical survey (with a focus on ACPF)										
NWA poster	x									
Forest bird inventory		x								
Contaminated site assessment follow-up			x							
Site inventory for species at risk				x						
Detailed bird surveys					x					
Develop and monitor Tree Swallow colony at the Sand Pond (contaminated sites monitoring)	x	x	x	x	x	x	x	x	x	x

9.1 MANAGEMENT AUTHORITIES AND MANDATES

The responsibility for management of Sand Pond NWA resides with the Canadian Wildlife Service – Environment Canada.

9.2 MANAGEMENT PLAN REVIEW

This management plan will be reviewed 5 years after initial approval, and every 10 years thereafter.

10 COLLABORATORS

There are no formal collaborative agreements regarding the administration of Sand Pond NWA. Some volunteers with a strong community interest have provided valuable assistance with site maintenance and biological monitoring, but no formal agreement is in place.

11 LITERATURE CITED

Barkhouse, H.P. 1986. Sand Pond National Wildlife Area Management Plan. Environment Canada, Canadian Wildlife Service, Sackville, New Brunswick.

Brannen, Dennis. 2004. A Herpetofaunal and Fish Survey of Seven National Wildlife Areas in Nova Scotia and New Brunswick. Contract report for Canadian Wildlife Service, Sackville, New Brunswick.

Clair, T.A., I. Dennis, and R. Vet. 2011. Water chemistry and dissolved organic carbon trends in lakes from Canada's Atlantic Provinces: no recovery from acidification measured after 25 years of lake monitoring. Can. J. Fish. Aquat. Sci. Vol. 68.

Crowley, M. and L. Beals. 2011. Atlantic Coastal Plain Flora in Nova Scotia. Mersey Tobeatic Research Institute. www.speciesatrisk.ca/coastalplainflora/guide.

Dawe, Kimberly. 2004. Mammal Survey of National Wildlife Areas in Nova Scotia and New Brunswick. Contract report for Environment Canada, Canadian Wildlife Service, Sackville, New Brunswick.

Environment Canada. 1990. A Wildlife Policy for Canada. Minister of Public Works and Government Services Canada. Ottawa, Ontario.

Environment Canada and Parks Canada Agency. 2010. Recovery Strategy and Management Plan for Multiple Species of Atlantic Coastal Plain Flora in Canada. *Species at Risk Act* Recovery Strategy Series. Environment Canada and Parks Canada Agency, Ottawa, Ontario.

Fyfe, Richard W. 1966. Proposed Sand Pond National Wildlife Area, Yarmouth County, Nova Scotia. Environment Canada, Canadian Wildlife Service, Sackville, New Brunswick.

Hosier, P.E. and T.E. Eaton. 1980. The impact of vehicles on dune and grassland vegetation on a south-eastern North Carolina barrier beach. Journal of Applied Ecology 17: 173-182.

Hounsell, Ronald G. 1974. Management Plan Sand Pond National Wildlife Area, Yarmouth County, Nova Scotia. Environment Canada, Canadian Wildlife Service, Sackville, New Brunswick.

Keddy, P.A. and I.C. Wisheu. 1989. Ecology, biogeography and conservation of coastal plain plants: some general principles from the study of Nova Scotia wetlands. Rhodora 91: 72-94.

Kutiel, P., Z. Eden, and H. Zhevelev. 2001. The impact of motorcycle traffic on soil and vegetation of stabilized coastal dunes, Israel. Journal of Coastal Conservation 7: 81-90.

MacKinnon, C.M., D.L. Amirault, and R.J. Hicks. 1994. A Review of Federal Migratory Bird Sanctuaries in South-western Nova Scotia. Technical Report Series No. 206. Environment Canada, Canadian Wildlife Service, Sackville, New Brunswick.

MacKinnon, C.M., A.C. Kennedy, A. MacPherson, M. Horsman, and V. Singh. 2010. Sand Pond NWA Inspection Visit. Internal Report, Environment Canada, Canadian Wildlife Service, Sackville, New Brunswick.

MacKinnon, C.M. and A.A. MacPherson. 2011. Sand Pond NWA Inspection Visit. Internal Report, Environment Canada, Canadian Wildlife Service, Sackville, New Brunswick.

MacKinnon, C.M. and M. Vickruck. 2014. Species at Risk occurring within National Wildlife areas in the Atlantic Region. Internal Report, Environment Canada, Canadian Wildlife Service, Sackville, New Brunswick.

Mitchell, A. 2002. ATV's rev through nature preserve. Globe and Mail, Toronto, September 23, 2002, p. A5.

Murray, R.A. 2001. Nova Scotia Cranberry History and Development 1872–2000, Nova Scotia Cranberry Growers Association, Nova Scotia.

Newell, R.E. 2002. A Botanical Survey of the Sand Pond National Wildlife Area, Internal Report, Environment Canada, Canadian Wildlife Service, Sackville, New Brunswick.

Preisler, H., A.A. Ager, and M.J. Wisdom. 2006. Statistical methods for analysing responses of wildlife to human disturbance. Journal of Applied Ecology 43: 164-172.

Prose, D.V., S.K. Metzger, and H.G. Wilshire. 1987. Effects of substrate disturbance on secondary plant succession: Mojave Desert, California. Journal of Applied Ecology 24: 305-313.

SNC Lavalin. 2002. Phase I/II Environmental Site Assessment Sand Pond (LDU# 02357 00), Canadian Wildlife Service, Yarmouth. Report prepared for Public Works and Government Services Canada and Canadian Wildlife Service, SNC Lavalin Project No. 014704-0009.

Van Zoost, Jonathan. 1969. Sand Pond National Wildlife Area. Internal report, Environment Canada, Canadian Wildlife Service, Sackville, New Brunswick.

Webb, K.T. and Marshall, I.B. 1999. Ecoregions and ecodistricts of Nova Scotia. Crops and Livestock Research Centre, Research Branch, Agriculture and Agri-Food Canada, Truro, Nova Scotia; Indicators and Assessment Office, Environmental Quality Branch, Environment Canada, Hull, Quebec.

Wisheu, I. and P.A. Keddy. 1991. Seed banks of a rare wetland plant community – distribution patterns and effects of human-induced disturbance. Journal of Vegetation Science 2: 181-188.

APPENDIX I: HISTORICAL LAND USE AT SAND POND NWA

The higher land around Sand Pond was first homesteaded around 1895 by the Frost family (Figure AI-1). Forests were cleared, leaving significant stone walls around the remnant old fields which are a lasting legacy to this work. The Frost family was from nearby Argyle area, and they recognized the potential for commercially producing cranberries at Sand Pond. They acquired a grant to the lake and immediately set about constructing a flooding and drainage system to optimize cranberry production and harvest. On completion, they succeeded in draining most of the Sand Pond and cultivated about 25 acres as a cranberry bog. A control structure was then built at the outflow of the lake so that cranberries could be flooded if there was danger of an early frost (Figure AI-2). Despite the considerable amount of work and planning that went into it, the cranberry operation was not successful, and the Frosts were unable to continue the venture (Fyfe 1966).

The bog was sold to Hebert Oyler of Kentville, Nova Scotia, and again cultivated for cranberries. Mr. Oyler marketed his cranberries under the “OYLER brand – Pure Cranberry Sauce” label (Figure AI-3). Mr. Oyler had a diversity of agricultural interests and was more successful in the enterprise; he reportedly harvested several excellent crops. In a good year, as many as 1500 crates of cranberries were shipped from the Sand Pond property alone. Mr. Oyler later diversified his operation to include the marketing of blueberries and, as part of this expansion, purchased the adjoining upland and buildings of the original homestead. Again, Mr. Oyler was successful, and harvesting 1000 crates of blueberries annually. During those years, a considerable investment was put towards improvements to the Sand Pond property. A sturdier control structure was placed in the original canal, and a small causeway and bridge were constructed. Drainage ditches were built across the old lake bottom, and a bunk house/storage building was erected for the farming operation (Figures AI-4 and AI-5). Frank Frost was the site manager and later the property caretaker of the Oyler operation at Sand Pond for many years (Figure AI-6).

In the late 1950s, Mr. Oyler suffered a series of crop failures in the area, and after these losses his property gradually deteriorated. As cranberry and blueberry production declined, he considered divesting the property, and at least two groups of sportsmen expressed interest in acquiring the parcel and establishing a hunting preserve. Around this time, Mr. Oyler was approached by the Canadian Wildlife Service regarding the importance of the area to waterfowl, resulting in the acquisition of his Sand Pond holdings.

Figure AI-1: Old Frost homestead, no longer present, Sand Pond NWA
Photo: C. MacKinnon © Environment Canada, 1985

Figure AI-2: Stone control structure in the Sand Pond canal circa 1965
Photo: © Environment Canada

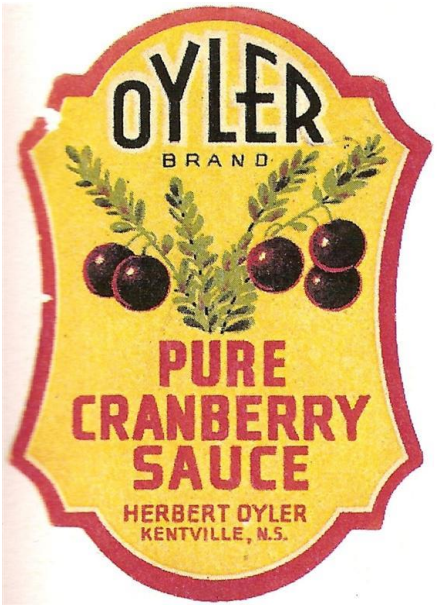

Figure AI-3: "Oyler Brand" cranberry sauce label. Around 1950, Mr. Hebert Oyler operated a cranberry farm at Sand Pond, Yarmouth County, Nova Scotia (Murray 2001).
Photo: Courtesy John Oyler

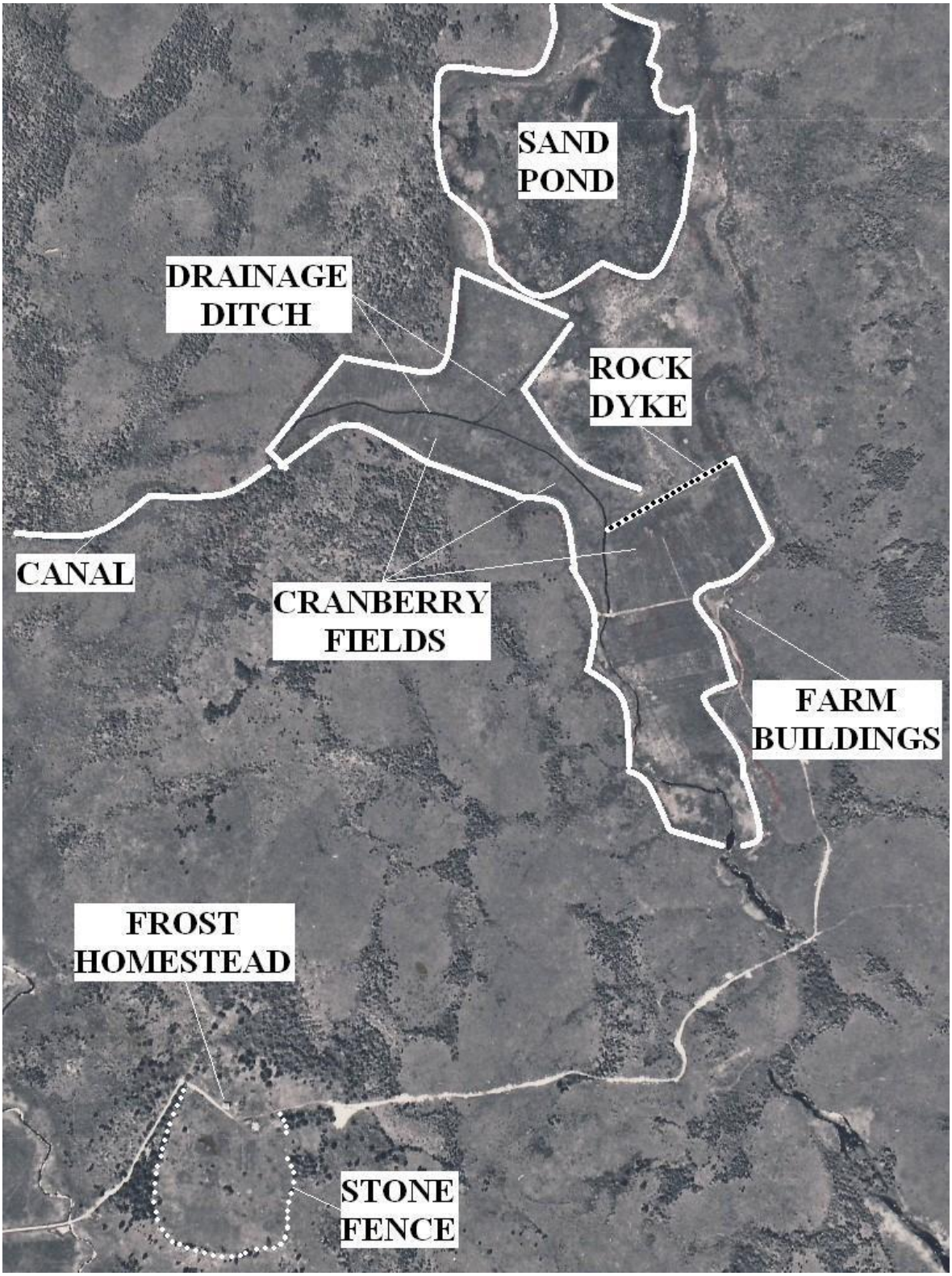

Figure AI-4: Maximum extent of the cranberry farming operation at Sand Pond, circa 1960. The lake (Sand Pond) was drained to create the cranberry fields, outlined in white in the photograph.

Figure AI-5: Bunkhouse for the Oyler cranberry operation at Sand Pond; the building is no longer present. Sand Pond NWA, circa 1965.
Photo: © Environment Canada

Figure AI-6: Frank Frost, caretaker and site manager for the cranberry farm at Sand Pond, circa 1965 (attributed to R. Fyfe)
Photo: © Environment Canada