

John Lusby Marsh National Wildlife Area Management Plan



Acknowledgements

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About Environment and Climate Change Canada's Protected Areas and Management Plans

What are Environment and Climate Change Canada protected areas?

Environment and Climate Change 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 and Climate Change Canada Protected Areas Network?

The current Protected Areas Network consists of 54 National Wildlife Areas and 92 Migratory Bird Sanctuaries comprising close to 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 and Climate Change 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 and Climate Change Canada prepares a management plan for each protected area in consultation with First Nations, the public 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 of facilities, enforcement of regulations, as well as the maintenance of facilities and infrastructure. Research is also an important activity in protected areas; hence, Environment and Climate Change Canada staff carries out or coordinates research in 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 and Climate Change Canada's protected areas, please visit our website at www.ec.gc.ca/ap-pa or contact the Canadian Wildlife Service in Ottawa.

John Lusby Marsh National Wildlife Area

The 600 ha John Lusby Marsh National Wildlife Area (NWA) is the largest continuous salt marsh in the Bay of Fundy. With the majority of salt marsh habitat in the Bay of Fundy lost to infilling and coastal development or dyked for agriculture, John Lusby Marsh NWA represents close to 10% of the total area of salt marsh in the Bay of Fundy. This triangular-shaped NWA is located 1 km southwest of Amherst, Nova Scotia. It is bounded to the west by Cumberland Basin, to the northeast by the La Planche Marsh, and to the southeast by the Amherst Point Ridge, an elongated peninsula of uplands. The upland parcels bordering on John Lusby Marsh NWA consist predominantly of woodlands, rural dwellings and small farms that border the marshes.

The John Lusby Marsh NWA was, until recently, very important as one of the principal early-spring staging areas for migrant North Atlantic Population of Canada Geese in the Atlantic Region, with over 5000 birds recorded in the mid-1900s (Watson 1965; Barkhouse 1985; Barrow 1985). During the period 1990–2010, the number of Canada Geese using the NWA has dwindled considerably, although the regional breeding population of “Giant” Canada Geese has markedly increased. It is believed that the migrant Canada Geese have altered their traditional migratory pathways in favour of stopping grounds on Prince Edward Island where more farmlands and more abundant food sources can be found. However, the NWA holds significant value to other waterfowl and shorebird species. A diversity of duck species use the area for spring and fall staging. Shorebirds congregate on the marsh from late July until September during their fall migration.

This area was dyked, ditched and drained for over two centuries until a series of storms in the late 1930s and early 1940s destroyed much of this infrastructure and repairs were not considered economical. Much of the land was abandoned, no longer used as farmland, and quickly reverted back to its original salt marsh habitat. As such, this wetland is a significant source of nutrients to the adjacent aquatic system as the turbid waters of the macro-tidal Cumberland Basin limit phytoplankton production.

The importance of this area to wildlife, together with the nearby Chignecto NWA and wetlands on the Chignecto Isthmus, led to the site’s being proposed for protection as an NWA in 1966.

John Lusby Marsh NWA was established to protect the wetland habitat within the John Lusby Marsh NWA through protected area designation. Biological and geological processes will be allowed to develop through natural means within the salt marsh.

John Lusby Marsh NWA was established to provide secure protection for the largest remaining tract of salt marsh in the Bay of Fundy. This goal is in accordance with the document *A Wildlife Policy for Canada*. This policy states that the goal for an NWA 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, John Lusby Marsh NWA is classified under the International Union for the Conservation of Nature criteria for protected areas as a Category IV protected area. The protected area is managed mainly for conservation of habitat and species. The primary focus of this site is to ensure the maintenance of native species, their habitats and biotic communities. Active management may not be required for the sustainability of John Lusby Marsh NWA.

The site is not promoted as a tourism destination or for on-site public education. Public visitation, although not promoted, is not restricted. Traditional activities such as wildlife viewing, hunting and trapping are allowed and are subject to applicable federal and provincial regulations.

For greater certainty, nothing in this management plan shall be construed 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*.

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1 DESCRIPTION OF THE PROTECTED AREA

John Lusby Marsh National Wildlife Area (NWA) (45°49'N, 64°15'W) is located 1 km west of the town of Amherst, Cumberland County, Nova Scotia, and lies along the foot of the north slope of the Amherst Point Ridge (Figures 1 and 2). The wetlands of this 600 ha NWA border the crescent-shaped southern shore of Cumberland Basin for over 5 km. The NWA consists almost entirely of salt marsh with the exception of two small, controlled water level brackish impoundments adjacent to the uplands.

From a distance, the wetland at John Lusby Marsh NWA appears to be a uniform expanse of low-lying vegetation (Figure 3). This perception masks the hidden diversity that is driven by variations in the water levels across the marsh. As a macro-tidal system, the upper Bay of Fundy has an average tidal range of 11 m (Gordon *et al.* 1985). The difference of a few centimetres in tide levels, combined with periods of tidal inundation, salinity and soil drainage, can result in a markedly different association of plants (Desplanque and Mossman 2004). While generally the channels flooded daily by the tides are dominated by the cord grass *Spartina alterniflora*, higher regions of the marsh may also support a greater diversity of halophytes such as *Spartina patens* and *Puccinellia maritime*, with occasional interspersions of *Limonium nashii*. Those areas less influenced by the tides contain the grasses *Hordeum jubatum*, *Hordeum vulgare* with *Spartina pectinata*, and *Solidago sempervirens* on or above the higher high-water mark (Flanary and Chmura 2007).

John Lusby Marsh NWA is recognized as an important breeding, staging and migration area for waterfowl and shorebirds (Van Zoost 1970; Hall and Jones 1971; Hall 1972; MacKinnon *et al.* 1985; Hanson 2004). This NWA is an International Union for Conservation of Nature Category IV protected area and, in association with the nearby Chignecto NWA, is recognized as a wetland of international importance under the Ramsar convention of 1971.

Table 1: John Lusby Marsh National Wildlife Area Summary Information

Protected area designation	National Wildlife Area
Province or territory	Nova Scotia
Latitude and longitude	45°49'N, 64°15'W
Size (ha)	600 ha
Protected area designation criteria	Historic: Protecting an area with concentrations of birds. Current: Criteria 1(a), where “the area supports a population of a species or subspecies or a group of species that is concentrated for any portion of the year”. The area also satisfies criteria 2(b), where “the area has special value for maintaining the genetic and ecological diversity of a region because of the quality and uniqueness of its fauna and flora”.
Protected area classification system	Site is important for species and habitat conservation (Environment Canada 2005)
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 3197
Gazetted	27 April 1978
Additional designations	Designated as a Ramsar site on 16 October 1985.
Faunistic and floristic importance	Largest single tract of salt marsh in the Bay of Fundy. Important habitat for migrating waterfowl and shorebirds.
Invasive species	None recorded.
Species at risk	Peregrine Falcon (<i>Falco peregrinus</i>) breeds in the vicinity, and the marshes are used as foraging area.
Management agency	Canadian Wildlife Service
Public access and use	Waterfowl hunting is allowed. The area has been the focus of numerous salt marsh and sea-level rise studies.
Other appropriate information	The site is predominantly tidal and intertidal salt marsh.

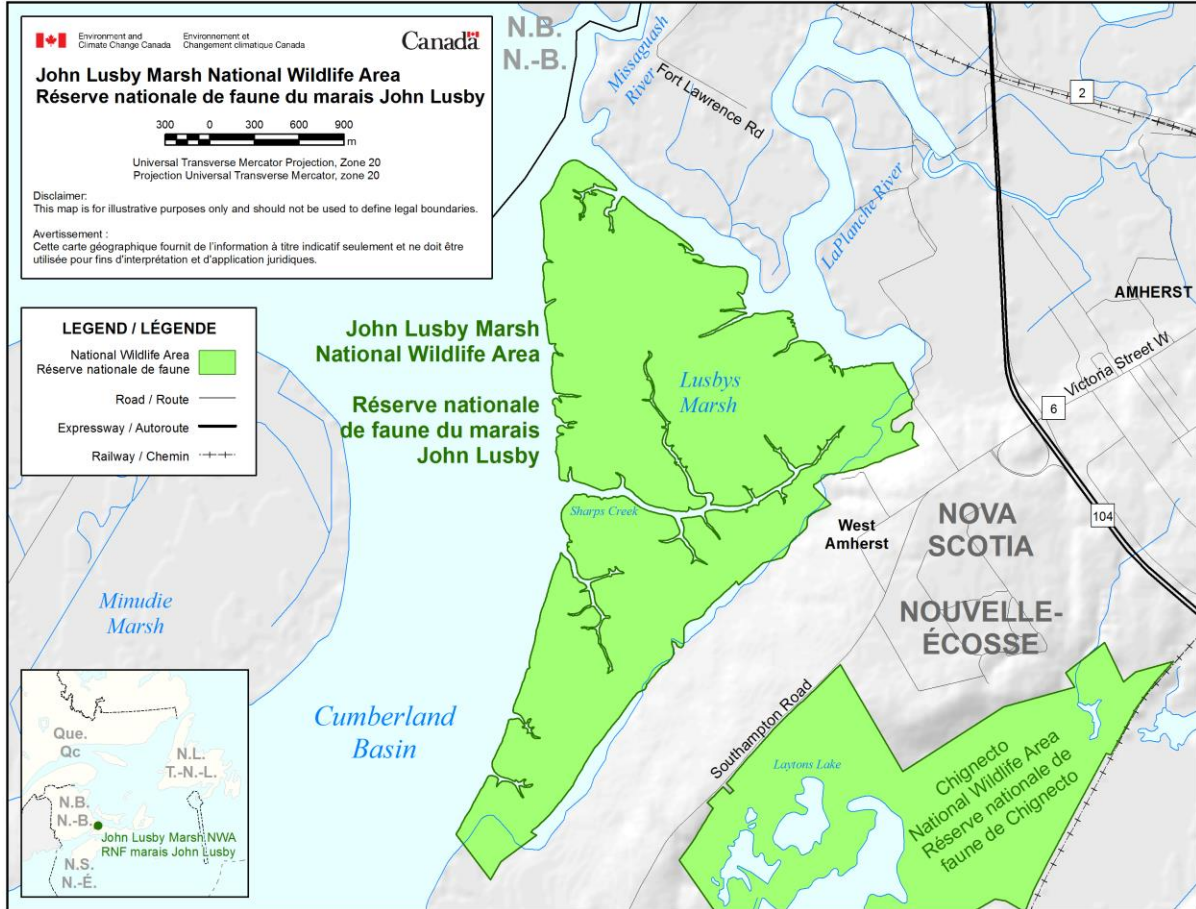


Figure 1: Location of the John Lusby Marsh National Wildlife Area, Cumberland County, Nova Scotia



Figure 2: The expansive salt marsh of the 600 ha John Lusby Marsh National Wildlife Area. The Laplanche River can be seen at bottom right, Cumberland Basin at top right, and the Amherst Point Ridge at left.

Photo: A. Macfarlane © Environment and Climate Change Canada

1.1 REGIONAL CONTEXT

John Lusby Marsh NWA is situated in Cumberland County, Nova Scotia, 1 km west of the town of Amherst. The NWA is bordered to the west by the gentle curve of Cumberland Basin, La Planche Marsh is to the northeast and Amherst Point Ridge to the southeast.

The underlying geology consists of sedimentary formations laid down during the Carboniferous and Permian periods over 300 million years ago (Roland 1982). The marshes were formed by tidal erosion of ancient sedimentary sandstone deposited over thousands of years from the silt-laden waters of the bay. Besides the gypsum beds underlying west Amherst, there are also extensive subsurface salt deposits that are commercially extracted south of the NWA.

This region at the head of the Bay of Fundy is known as the Chignecto Isthmus, an area famous for its flat, prairie-like agricultural dykelands. This narrow stretch of land separates the Bay of Fundy to the west and Baie Verte, part of the Northumberland Strait, to the east. Except

for the nearby Shepody marshes to the west and Grand Pre dykelands in Minas Basin to the south, this region is unique in the Atlantic provinces. Before the arrival of European settlers, the John Lusby Marsh NWA, together with the Tantramar, Missaguash, Nappan and LaPlanche dykelands, was part of a larger association of wetlands at the head of the Bay of Fundy. These wetlands comprised a rich mosaic of lakes, bogs, fens and salt marshes (Ganong 1903; Hanson and Calkins 1996). Intensive land use over the past 300 years, predominantly for agriculture, has resulted in the dyking, ditching and draining of much of this land. John Lusby Marsh NWA is one of only a few areas that have reverted back to salt marsh habitat (Hustvedt 1987) (Figure 3).



Figure 3: John Lusby Marsh National Wildlife Area, with large salt marsh ponds situated far from the uplands

Photo: C. MacKinnon © Environment and Climate Change Canada, 2011



Figure 4: Old hunting cabin (no longer existing) at John Lusby Marsh National Wildlife Area, built on legs to allow higher tides to flow underneath

Photo: File photo © Environment and Climate Change Canada, circa 1970

John Lusby Marsh NWA is situated within the Atlantic Maritime Ecozone. 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 within the Fundy Coast Ecoregion (123) and the Chignecto-Minas Shore Ecodistrict (507) (Figure 5) (Webb and Marshall 1999).

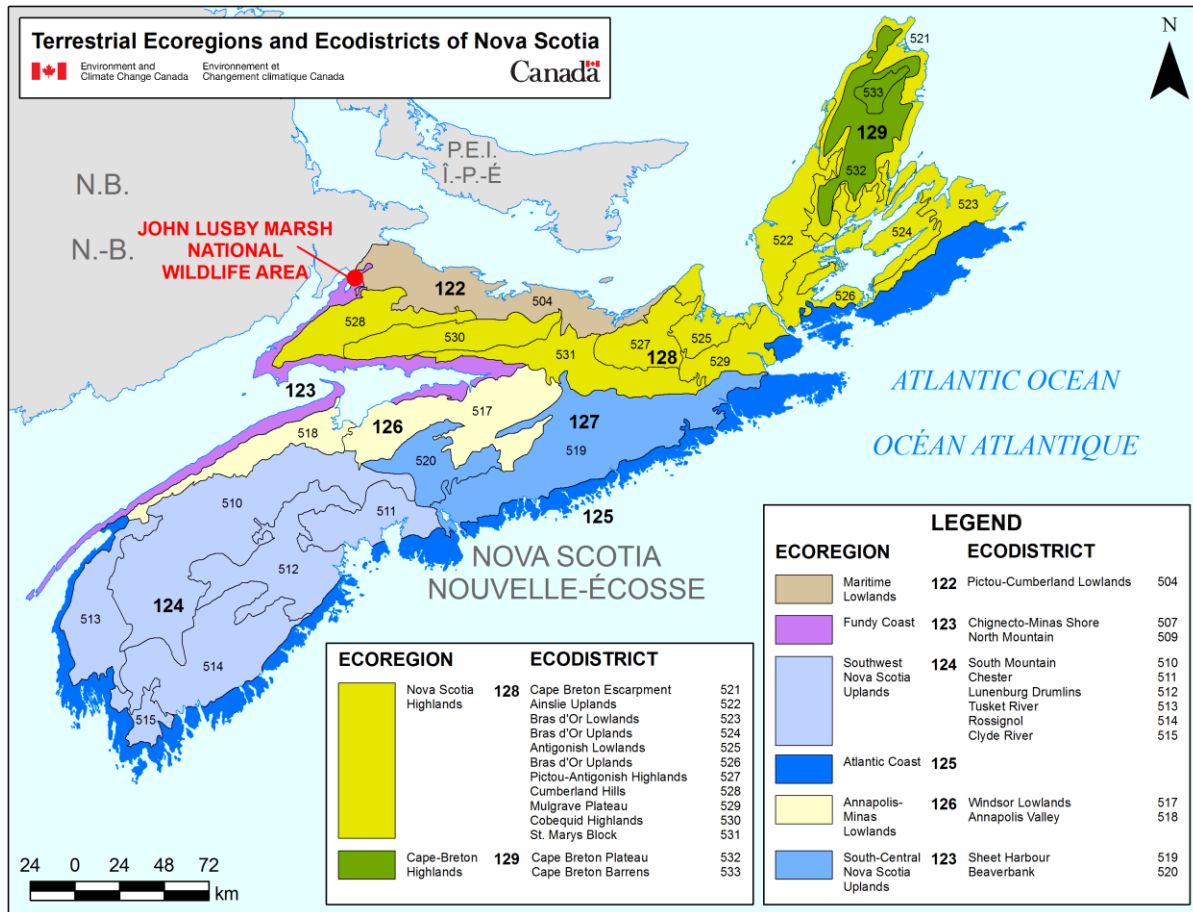


Figure 5: Terrestrial Ecoregions and Ecodistricts of Nova Scotia. John Lusby Marsh National Wildlife Area falls within Ecoregion No. 123 (Fundy Coast) and Ecodistrict No. 507 (Chignecto-Minas Shore)

1.2 HISTORICAL BACKGROUND

The early 18th-century Acadian settlement on Amherst Point Ridge was known as “Wehekage,” a word presumably derived from an Aboriginal name for the area, although the actual meaning is now lost. The entire Chignecto Isthmus was likely important to the area’s Aboriginal peoples. Some of the earliest archaeological sites bordering Cumberland Basin date back nearly 4000 years (MacKinnon 2003a and 2003b). The abundance of waterfowl on the expansive marshes and fish stocks in nearby rivers would likely have made this an attractive hunting area.

By the later 1600s, French Acadian settlers from the village of Beaubassin on the Fort Lawrence Ridge radiated outward to numerous sites bordering the Chignecto Isthmus. Much Acadian farming was centred on the dyking and draining of salt marshes using one-way sluice gates known as aboiteau. The wetlands around Amherst Point, including the John Lusby Marsh

NWA, were a logical focal point for this activity. It is unknown how much of the John Lusby Marsh NWA was dyked during the Acadian period, although the area was likely considerable based on contemporary maps. Following the Acadian deportation of 1755, New England planters settled the region. Amherst was one of three townships established in the 1760s on the Chignecto Isthmus. Many farms were scattered along the west Amherst Point Ridge by the mid-19th century, and descendants of many of those settlers reside there today (Figure 6).

The marsh lands were traditionally divided into lots associated with upland farms, and by the end of the 18th century much of the area at John Lusby Marsh NWA was probably dyked and drained. The John Lusby Marsh NWA is bisected east to west by Sharpe's Creek, a large tidal creek that runs through the centre of the NWA (Figure 1). The dykelands were managed as two marsh bodies protected within one dyke complex: the Embree Marsh Body to the north of the creek and the nearly equally sized McGowan Body of lowlands to the south. This intensive dykeland agriculture continued into the 20th century, until external factors including the Great Depression, followed by the Second World War, made dyke maintenance on some marshes no longer economically feasible. As the dykes deteriorated, storms and tidal action did a considerable amount of damage to this abandoned infrastructure. In a few short years, marsh roads were either buried in sediment or eroded away. Most buildings, including possibly as many as 32 marsh barns, were quickly lost to this assault (Figure 7). Hay was last cut on the site of John Lusby Marsh NWA in a limited amount in 1947.

The marsh was also the site of a short-lived shipping port where a small log and rock wharf was connected to the uplands by a rail line. This short railroad spur connected the Amherst Point gypsum quarry to its terminus at the shore (Figure 8). This wharf operated primarily during the early 1900s and was frequented by small sailing vessels such as the three-masted schooner "Phoenix." Remnants of this later-abandoned rail bed form part of the public walking trail within the nearby Chignecto NWA.

In 1966, the Canadian Wildlife Service recognized the significance of the marsh for waterfowl and proposed its protection (Watson 1965). In honour of the site's past history, this new NWA on the Amherst Marsh was named after Mr. John Starr Lusby (1868–1947), a prominent local farmer and historian. The Appendix I provides a brief account of his life.



Figure 6: The 19th-century uplands adjacent to the John Lusby Marsh National Wildlife Area. At this time, the entire salt marsh (the area immediately right of the main channel) was likely dyked and drained for agriculture (Ambrose F. Church map, 1873).



Figure 7: Marsh barn on the John Lusby Marsh National Wildlife Area circa 1949, after the dykes broke. Note the high-tide line partway up the outer walls of the barn (Dept. of Agriculture, Maritime Marshland Rehabilitation Branch, First Annual Report, 1950, page 10).

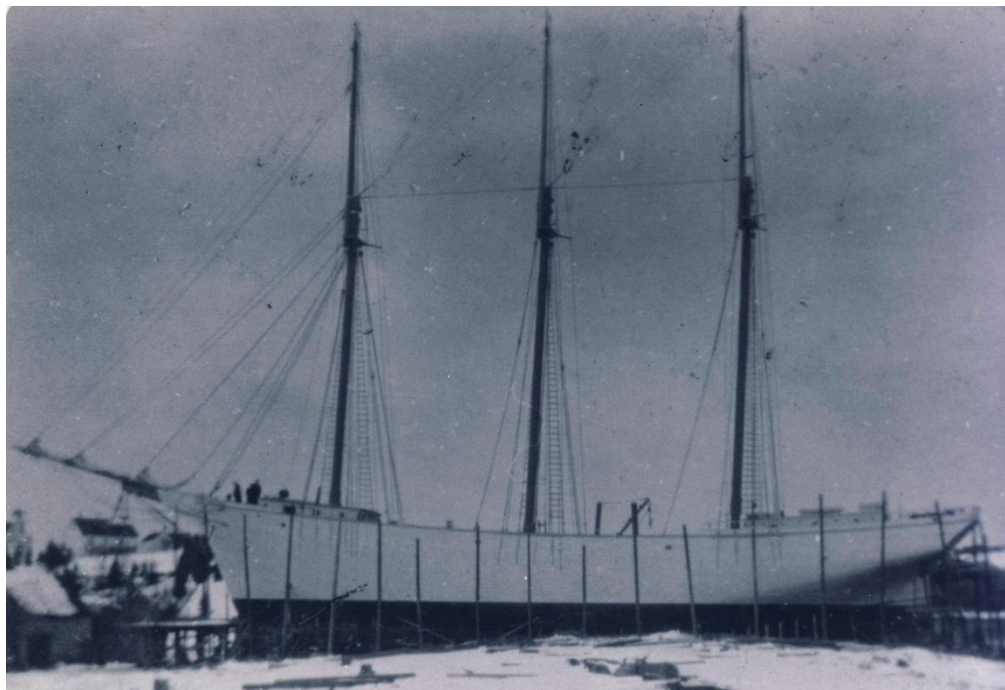


Figure 8: The three-masted schooner “Phoenix” regularly sailed from the gypsum wharf at what is now the John Lusby Marsh National Wildlife Area
Photo: File photo © Environment and Climate Change Canada, circa 1905

1.3 LAND OWNERSHIP

The entire John Lusby Marsh NWA is owned and administered by the Government of Canada. The property boundary generally follows the shore of Cumberland Basin to the north, the mid-channel of the La Planche River to the east, and the toe of the upland to the south (Figure 1). Included along this upland fringe are a small (less than 1 hectare) strip of upland adjacent to the Russell Impoundment and a larger (2.8 hectare) block of wooded upland adjacent to the Burgess Impoundment.

The federal government does not hold the sub-surface mineral rights for John Lusby Marsh NWA (Fisher and Wenning 2009).

1.4 FACILITIES AND INFRASTRUCTURE

There are no roads, trails or buildings within the John Lusby Marsh NWA. Maintenance requirements are predominantly directed towards boundary signage and impoundment management. Annual visits include boundary inspections and repairs and replacement of the regulatory signs (Tables 2 and 3). Impoundment infrastructure management is conducted in collaboration with Ducks Unlimited Canada (Figure 9).

Table 2: Facilities and Infrastructure in John Lusby Marsh National Wildlife Area

Type of Facility or Infrastructure	Approximate Size or Number	Responsibility Holder or Owner
Property boundary	12.1 km	Environment and Climate Change Canada's Canadian Wildlife Service (ECCC-CWS)
Boundary signs	100	ECCC-CWS
Public notice signs	4	ECCC-CWS
Entrance signs	1	ECCC-CWS
Access right-of-way	2	ECCC-CWS (in part)
Impoundments	2	Ducks Unlimited Canada (DUC)

Table 3: Ducks Unlimited Canada Controlled Water Level Impoundments in John Lusby Marsh National Wildlife Area

DUC Project Name	DUC Project Number	CWS Project Name	Year Built	Size (ha)
Amherst Point 1	6113	Russell Impoundment	1982	7
John Lusby 1	6112	Burgess Impoundment	1982	13



Figure 9. Two controlled water level impoundments, Burgess (top) and Russell (bottom), within the John Lusby Marsh National Wildlife Area

Photo: A. Macfarlane © Environment and Climate Change Canada, 1996

1.5 SOCIO-ECONOMIC ASSESSMENT

Although no specific socio-economic studies have been conducted regarding this NWA, more general surveys have highlighted the value that the Canadian public places on habitat set aside for wildlife (Environment Canada 1991).

It is noteworthy that the dykes protecting the former hay lands of the John Lusby Marsh NWA have been breached for more than 60 years. When hay was in high demand in the late 19th and 20th centuries, these agricultural lands would have been of high value to local farmers. As the demand for hay declined, many dykelands were not economically feasible to maintain, and the dykes were allowed to deteriorate and were eventually destroyed by high tides and storms. In the early 1950s, area landowners and officials of the Maritime Marshland

Rehabilitation Administration, which then administered the dykelands, deemed the dykes and aboiteau too costly to rebuild and made the decision to allow the site to revert back to salt marsh (Hustvedt 1987; Papadopoulus 1995).

2 ECOLOGICAL RESOURCES

2.1 TERRESTRIAL AND AQUATIC HABITATS

The plant cover of the marsh is an assemblage of different communities ranging from almost pure stands of a single species to associations of several species (Figures 10 and 11). The community arrangement is generally controlled by the height of the tides (Olsen *et al.* 2005). Each species responds to a specific flooding regime (the frequency and duration of salt water inundation), soil drainage and salinity. The most prominent species are the cordgrasses (*Spartina patens* and *S. alterniflora*), Goose Grass (*Puccinellia maritime*), Samphire (*Salicornia europaea*), and Seablite (*Suaeda maritime*). Lower sections of the marsh, dominated by *Spartina alterniflora*, are flooded twice daily. The entire marsh including the upper elevations (*S. patens* marsh) is usually flooded only during the highest “spring” tides; the height of these tides can vary considerably throughout the year and during the 18-year tidal cycle (Van Zoost 1970; Desplanque and Mossman 2004; Flanary and Chmura 2007).

There are no reports of sudden vegetation dieback in Bay of Fundy or Atlantic Canada salt marshes. The causes of sudden vegetation dieback, where *Spartina alterniflora* suddenly dies and does not grow back, are not definitively known, but several correlates, such as eutrophication, have been identified in the reported cases throughout the Atlantic and Gulf coasts (Alber *et al.* 2008; Elmer *et al.* 2012). *Phragmites sp.* is present in Atlantic Canada salt marshes, but *Phragmites sp.* has not had a negative impact on salt marshes in the John Lusby Marsh NWA or other salt marshes in Atlantic (Hanson 2004; Hanson and Shriver 2006; Saltonstall 2003; Weinstein *et al.* 2003). In contrast, freshwater moist soil locations have seen expansive growth of *Phragmites sp.* in recent years (Hanson pers. obs.) and may be related to the more invasive form of *Phragmites sp.*, which has been confirmed to be present in Atlantic Canada (Saltonstall 2003; Hanson pers. obs.).

Two small impoundments totalling 20 ha were developed in collaboration with Ducks Unlimited Canada along the upland fringe of the marsh (MacKinnon *et al.* 1985). These are shallowly flooded by brackish water and vegetated predominantly by Widgeon grass (*Ruppia maritima*) and cordgrass.



Figure 10: The noticeably flat expanse of the salt marsh at John Lusby Marsh National Wildlife Area consists of habitats whose plant composition can change based on differences as little as a few centimetres of elevation

Photo: C. MacKinnon © Environment and Climate Change Canada, 2012



Figure 11: The John Lusby Marsh National Wildlife Area, facing west towards Cumberland Basin

Photo: C. MacKinnon © Environment and Climate Change Canada, 2012

2.2 WILDLIFE SPECIES

2.2.1 Birds

The principal importance of the John Lusby Marsh NWA is as a staging and migration site for waterfowl (Bateman 1973; Bateman 1974; Barkhouse 1985; Barrow 1985). The two freshwater and brackish impoundments, particularly the Burgess Impoundment, are also important to migrating shorebirds (MacKinnon *et al.* 1985). Within the impoundments, waterfowl such as Black Duck (*Anas rubripes*), Northern Pintail (*Anas acuta*), Green-winged Teal (*Anas carolinensis*), Blue-winged Teal (*Anas discors*) and American Wigeon (*Anas americana*) are the most abundant. The many tidal pools and salt marsh ponds are also valuable habitat for a variety of migrating shorebirds. A few species, such as the Willet (*Tringa semipalmata*), are summer residents. Other species observed over the marshes include Bald Eagle (*Haliaeetus leucocephalus*), Osprey (*Pandion haliaetus*), Rough-legged Hawk (*Buteo lagopus*) in winter, Red-tailed Hawk (*Buteo jamaicensis*), Northern Harrier (*Circus cyaneus*), Peregrine Falcon (*Falco peregrinus*) and Short-eared Owl (*Asio flammeus*).

The Burgess Impoundment supports a variety of migrant shorebird species from late July to August each year (MacKinnon *et al.* 1985), particularly if a dry summer exposes the mudflats within the shallow impoundment (Table 3). Common species within the NWA include Willet (*Tringa semipalmata*), Common Snipe (*Gallinago gallinago*), Spotted Sandpiper (*Actitis macularius*), Lesser Yellowlegs (*Tringa flavipes*), Greater Yellowlegs (*Tringa melanoleuca*), Short-billed Dowitcher (*Limnodromus griseus*), Black-bellied Plover (*Pluvialis squatarola*), Semipalmated Plover (*Charadrius semipalmatus*), Semipalmated Sandpiper (*Calidris pusilla*) and Least Sandpiper (*Calidris minutilla*).

2.2.2 Mammals

Few mammal species are found regularly on John Lusby Marsh NWA, which is comprised predominantly of salt marsh habitat. Meadow Voles (*Microtus pennsylvanica*) are abundant on the higher ground and upland fringe. Most of the typically common species for mainland Nova Scotia would be expected to at least frequent the area. Particularly common species would be Eastern Coyote (*Canis latrans*), Red Fox (*Vulpes vulpes*), Muskrat (*Ondatra zibethicus*), Raccoon (*Procyon lotor*), Striped Skunk (*Mephitis mephitis*), Mink (*Neovison vison*) and White-tailed Deer (*Odocoileus virginianus*) (Banfield 1974; Gilhen and Scott 1981; Dawe 2004).

2.2.3 Reptiles and Amphibians

As the NWA is predominantly salt marsh, no reptile or amphibian species have been documented at this site, although common species such as Garter Snake (*Thamnophis sirtalis*) would be expected along the upland fringe (Brannen 2001).

2.2.4 Fish

Numerous tidal creeks cut their way through the salt marsh portion of John Lusby Marsh NWA. As well, tidal pools exist in the salt marsh at low tide. Typical salt marsh tidal pool species expected to occur are Mummichog (*Fundulus heteroclitus*) and Fourspine Stickleback (*Apeltes quadracus*).

2.3 SPECIES AT RISK

No species at risk breed within John Lusby Marsh NWA, although Peregrine Falcons are common spring and fall transients. There are three active Peregrine nests within 50 km of the NWA.

2.4 INVASIVE SPECIES

Generally, salt marshes are an environment where only specialist salt-tolerant plants can survive. The majority of this NWA is populated by plants such as *Spartina alterniflora*, *S. patens* and *S. pectinata*. At present, there are no recognized invasive species within the John Lusby Marsh NWA.



Figure 12: The brackish Burgess Impoundment, John Lusby Marsh National Wildlife Area
Photo: C. MacKinnon © Environment and Climate Change Canada, 1980

3 MANAGEMENT CHALLENGES AND THREATS

Activities that occur outside of the boundary of the NWA are beyond the scope of this management plan. However, many of these factors have direct bearing on the successful management of John Lusby Marsh NWA (Table 4). A summary of the more salient issues follows.

3.1 ECOTOURISM

There is little casual visitation to the John Lusby Marsh NWA due to its being 3 km from a paved road, and the prevalence of salt marsh mosquitoes during the summer months. There is some hunting activity in the NWA during the months of October through December.

3.2 WIND POWER

The Chignecto Isthmus is recognized as an important area for birds. The development of nearby wind turbine farms to generate electricity has the potential to harm birds directly, but a greater unknown is the impact on flight paths of birds around such farms. In effect, the birds avoid the area, and this important habitat set aside for wildlife loses its value and potential. A wind farm has been developed east of the NWA, and other wind farms are being proposed in the area. Further study is likely required, as some birds, such as the Common Eider (*Somateria mollissima*), are known to fly into existing human-made structures on the nearby Tantramar dykelands (MacKinnon and Kennedy 2011).

3.3 TIDAL POWER

Energy demand is likely to increase interest in tidal power production in the Bay of Fundy. Biological research in the 1970s raised concerns about this technology, as earlier plans included full tidal barriers (Smith and Hicklin 1984). Current proposals are considered to have less potential impact compared with earlier technologies, but the actual impacts on the mudflats and adjacent wetlands are largely unknown.

3.4 SEA-LEVEL RISE

The salt marshes at the head of the Bay of Fundy have developed over the past 4000 years by deposition of marine silts at the head of the bay in a fine balance between sea-level rise and coastal subsidence. For the past four millennia, this accumulation has been, on average, 30 cm per century. Anticipated sea-level rise caused by climate change may increase levels of silt accumulation to 100 cm over the next century. How these changes may impact the salt marsh at John Lusby Marsh NWA is uncertain. Increased coastal erosion is anticipated

along the outer rim of Cumberland Basin, on the border of John Lusby Marsh NWA. This shoreline loss would result in a significant reduction in the size of the salt marsh at John Lusby Marsh NWA. These concerns are driving ongoing research initiatives focused on the John Lusby Marsh NWA and other salt marshes in the area (Morantz 1976; Graff 2004; Chmura and MacDonald 2006; Flanary and Chmura 2007; Olsen *et al.* 2006; Byers and Chmura 2007; MacDonald *et al.* 2010).

3.5 OFF-ROAD VEHICLE USE

Off-road vehicle use is on the increase and has been demonstrated to be particularly damaging to wetlands. Such activity within John Lusby Marsh NWA is prohibited, and intrusions are not frequent. Fortunately, the treeless landscape of this NWA, coupled with a number of elevated upland vantage points, makes such activities relatively easy to identify and control. Vigilance and collaboration with the Wildlife Enforcement Division is ongoing.

3.6 URBAN EXPANSION

The upland ridge west of Amherst, Nova Scotia, has become an attractive residential area close to town. As a result, large farm properties around the NWA are being subdivided, with a gradual increase in housing along the west Amherst portion of the South Hampton Road. As land use changes, the forested upland buffer on private lands adjacent to the NWA becomes more susceptible to loss.

4 GOALS AND OBJECTIVES

4.1 VISION

The long-term vision for John Lusby Marsh NWA is conservation of the salt marsh habitat for the benefit of migratory birds. Natural processes, such as marine sediment deposition or loss (accretion or erosion), will be allowed to continue.

4.2 GOALS AND OBJECTIVES

Specific goals and objectives are as follows:

Goal 1: Conservation of salt marsh habitat so that populations of migratory birds and resident flora and fauna are sustained.

- a. Objective: The overall composition and relative abundance of flora within the NWA does not change significantly over time.
- b. Objective: Illegal activities are identified and prevented within the NWA.

Goal 2: Controlled water level impoundments mimic an ecosystem driven by shallow but relatively stable water levels, so that populations of migratory birds and resident flora and fauna are sustained.

- a. Objective: The composition and relative abundance of flora in controlled water level impoundments does not change significantly over time.
- b. Objective: There is an even ratio of open water to emergent vegetation in the impoundment with a high degree of interspersion.

Goal 3: Acadian forests are conserved and maintained within the NWA so that populations of migratory birds and resident flora and fauna are sustained.

- a. Objective: The extent of Acadian forests in the NWA will be between 2 and 5 ha.

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 some of the possible approaches that could be used in the management of the John Lusby Marsh NWA. However, management actions will be determined during the annual work planning process and will be implemented as human and financial resources allow.

A potential threat to the John Lusby Marsh NWA is coastal erosion and sea-level rise, especially if sea-level rise increases the rate of coastal erosion and sediment accretion does not compensate for rising water levels. Any on-site protection against this coastal erosion is significantly cost-prohibitive and would not likely be practical. Furthermore, such actions may not allow natural processes to occur.

Table 4: Management Approaches for John Lusby Marsh National Wildlife Area

Management Challenge or Threat	Goal and Objective(s)	Management Approaches (Actions, Including Level of Priority)¹
<p>Tourism activities (some activities being illegal within the NWA) such as recreational beach use, camping and open campfires may become a cumulative environmental effect and present significant disturbances to nesting birds.</p>	<p>Goal 1: Conservation of salt marsh habitat so that populations of migratory birds and resident flora and fauna are sustained.</p> <p>Objective 1.b: Control prohibited activities in the NWA.</p>	<ul style="list-style-type: none"> • Communicate with local tourism operators, which use the area for recreation, and the provincial tourism department in order to inform them of the protected status of John Lusby Marsh NWA and of possible cumulative environmental impacts that this aspect of the industry has on sensitive habitats. (1)
<p>Wind power farms are expanding.</p>	<p>Goal 1: Conservation of salt marsh habitat so that populations of migratory birds and resident flora and fauna are sustained.</p> <p>Objective 1.a: Understand and, where possible, mitigate potential conflicts with wildlife.</p>	<ul style="list-style-type: none"> • Provide expert advice through the Environmental Assessment process. (1)
<p>Tidal power production is an anticipated activity in the Bay of Fundy that could change tidal dynamics. Although current proposals are considered less invasive, actual impacts on the mud flats and adjacent wetlands are largely unknown.</p>	<p>Goal 1: Conservation of salt marsh habitat so that populations of migratory birds and resident flora and fauna are sustained.</p> <p>Objective 1.a: Understand and, where possible, mitigate potential conflicts with wildlife.</p>	<ul style="list-style-type: none"> • Monitor changes to the John Lusby Marsh NWA through annual aerial photography interpretation. (1) • Support academic research on impacts of new technologies on coastal habitat. (2)
<p>Increased rates of sea-level rise could put additional pressures on coastal habitats, particularly unprotected salt marshes.</p>	<p>Goal 1: Conservation of salt marsh habitat so that populations of migratory birds and resident flora and fauna are sustained.</p> <p>Objective 1.a: Understand and, where possible, mitigate potential conflicts with wildlife.</p>	<ul style="list-style-type: none"> • Monitor changes to the John Lusby Marsh NWA through annual aerial photography interpretation. (1) • Support academic research on impacts of new technologies on coastal habitat. (2) • Periodic aerial photography over the past 65 years allows for comparison and evaluation of the rate of change due to erosion of John Lusby Marsh NWA. (2)

Management Challenge or Threat	Goal and Objective(s)	Management Approaches (Actions, Including Level of Priority)¹
Fragile wetlands can be irreparably damaged by off-road vehicle use.	<p>Goal 1: Conservation of salt marsh habitat so that populations of migratory birds and resident flora and fauna are sustained.</p> <p>Objective 1.b: Control prohibited activities in the NWA.</p>	<ul style="list-style-type: none"> • Document and report the number and nature of incidents where evidence of illegal activities exists within the NWA to the Wildlife Enforcement Division. (1)
Urban expansion may result in habitat loss and landscape fragmentation.	<p>Goal 1: Conservation of salt marsh habitat so that populations of migratory birds and resident flora and fauna are sustained.</p> <p>Objectives 1.a: Understand and, where possible, mitigate potential conflicts with wildlife.</p>	<ul style="list-style-type: none"> • Liaise with private landowners and private and public programs that support habitat improvements (such as the Ducks Unlimited Canada small wetland development programs). (1) • Maintain a clearly defined border for the protected area. (1) • Support maintenance of wildlife habitat on private lands. (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

There are only two tiny forest blocks (2 ha) within the John Lusby Marsh NWA. Each patch of woods is located immediately upland of the Burgess and Russell impoundments. This forested habitat provides a valuable buffer to the adjacent wetlands. No management is presently required within these existing forest parcels. Reforestation of adjacent land will be initiated on areas not providing habitat for grassland birds.

5.1.2 Impoundments

The two controlled water level impoundments (7 and 13 ha, Table 3) maintained by Ducks Unlimited Canada, and jointly managed by Ducks Unlimited Canada and the Canadian Wildlife Service, provide important freshwater and brackish water habitat adjacent to the salt marsh. These wetlands provide habitat for waterfowl and shorebird species not always associated with salt marsh habitat. To monitor habitat change, aerial photographs of these wetlands is carried out annually. Regular maintenance of dykes and control structures will be continued on this infrastructure.

5.2 WILDLIFE MANAGEMENT

No wildlife population management activities are required at John Lusby Marsh NWA.

5.3 MONITORING

Annual site inspections record the conditions of the boundary line, access points, and evidence of trespassing and encroachments. Recent wildlife monitoring is lacking, and the reduction in spring use by Canada Geese is largely anecdotal. A new survey of bird use within the two impoundments, as well as a survey of staging spring and fall waterfowl numbers, is recommended, especially with the development of existing and proposed wind farms in the vicinity.

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. Ongoing monitoring needs are as follows:

1. Bird distribution and abundance within the salt marsh and brackish impoundments;
2. Staging spring and fall waterfowl numbers within the NWA;

3. Habitat change (the distribution and size of ecological communities) should be monitored using aerial photography and field-based vegetation surveys collected annually.

5.4 RESEARCH

Research activities will be considered for permitting when the results obtained through research have the potential to provide data and information on the following topics of interest:

1. Waterfowl and shorebird distribution and abundance;
2. Habitat use and habitat selection studies for key species and habitats;
3. The effects of climate change and variability on water level management;
4. The effects of wind energy (turbine) development on the behaviour, distribution and survivorship of migratory birds.

To obtain a permit to conduct research within the John Lusby NWA and to receive instructions on guidelines for research proposals, please contact:

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

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

5.5 PUBLIC INFORMATION AND OUTREACH

The unique character of John Lusby Marsh NWA (and nearby Chignecto NWA) and its significance as a Wetland of International Importance are featured under the national Heritage to Protect poster series. A limited number will be available to educators, students and the general public on request.

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 the wildlife area and provide mechanisms for the Minister of the Environment to authorize certain activities to take place in NWAs that are otherwise considered prohibited. The regulations also provide the authority for the Minister 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 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 and when entry may disturb wildlife and their habitat.

For John Lusby Marsh NWA, entry is allowed.

6.2 AUTHORIZED ACTIVITIES

For John Lusby Marsh NWA, public notices authorizing the following non-commercial activities have been posted at all designated access points.

Authorized activities **without** special restrictions:

1. Wildlife observation
2. Hiking
3. Photography
4. Skiing
5. Skating
6. Snowshoeing

Authorized activities **with** special restrictions:

1. Hunting, fishing and trapping¹
2. Canoeing²
3. Food plant picking for personal use (e.g., berries, goose tongue, samphire greens)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.

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 or online) to the following address:

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

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

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 and Climate Change Canada policy document is available on the protected areas website at www.ec.gc.ca/ap-pa.

¹ Subject to federal and provincial regulations, waterfowl hunting is permitted only within the salt marshes. No upland hunting is allowed.

² Outboard motors must be less than 10 horsepower.

³ Non-commercial picking only.

6.4 EXCEPTIONS

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

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

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

National Wildlife Area – Permit Request

Environment and Climate Change Canada, Canadian Wildlife Service, Atlantic Region

17 Waterfowl Lane, P.O. Box 6227

Sackville NB E4L 1G6

Province of Nova Scotia

Department of Natural Resources, Fish and Wildlife Division

Fish and Wildlife Division

136 Exhibition Street

Kentville NS B4N 4E5

Telephone: 902-679-6091

www.gov.ns.ca/natr/wildlife

7 HEALTH AND SAFETY

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

1-800-565-1633

Non-emergency issues related to security or health and safety issues for John Lusby Marsh NWA should be reported to:

National Wildlife Area Program

Environment and Climate Change Canada, Canadian Wildlife Service

17 Waterfowl Lane, P.O. Box 6227

Sackville NB E4L 1G6

Telephone: 506-364-5044

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. Further, Environment and Climate Change Canada staff will take all reasonable and necessary precautions to protect their own health and assure safety as well as 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 contain some inherent dangers, and proper precautions must be taken by visitors, recognizing that Environment and Climate Change Canada staff neither regularly patrol nor offer services for visitor safety in NWAs.

Table 5: Emergency Contact Information

Emergency Contacts for John Lusby Marsh NWA, Nova Scotia (45°49'N, 64°15'W)	
Any life-threatening emergency	911
Police/Fire/Ambulance	911
Royal Canadian Mounted Police (RCMP), Amherst detachment 217 Victoria Street, Amherst NS B4H 1Y8	1-902-667-3859
Environmental emergencies (oil, pesticide, chemical spills and other environmental emergencies)	1-800-565-1633
Environment and Climate Change Canada — Wildlife Enforcement Division	1-506-364-5044
Environment and Climate Change Canada — Canadian Wildlife Service, 17 Waterfowl Lane, P.O. Box 6227, Sackville NB E4L 1G6 (Fax: 506-364- 5062)	1-506-364-5044
Nova Scotia Department of Natural Resources	1-800-565-2224
Nova Scotia Department of Natural Resources – Cumberland County Office, 4197 Main Street, Oxford, Nova Scotia (general inquiry)	1-902-447-2115

8 ENFORCEMENT

The management of NWAs is based on three acts:

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

To promote compliance with the *Canada Wildlife Act* and *Wildlife Area Regulations*, Environment and Climate Change Canada's Canadian Wildlife Service posts signs along the NWA boundaries and at main access points that identify which activities are authorized within each NWA and any conditions on those activities.

Environment and Climate Change Canada's Wildlife Enforcement Division (ECCC–WED) is responsible for enforcement of federal and provincial wildlife laws, and will perform on-site inspections and investigations, patrol the NWA to promote compliance, and prevent prohibited uses within the NWA.

ECCC–WED officers monitor compliance with the *Canada Wildlife Act*, *Wildlife Area Regulations*, the *Migratory Birds Convention Act, 1994*, the *Species at Risk Act* and the provincial *Wildlife Act* (1989) on an ongoing basis and will initiate investigations when required. ECCC–WED officers will respond to violations and take appropriate enforcement actions. Canadian Wildlife Service Atlantic staff provide details from site inspections that may require investigation.

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 and Climate Change Canada’s annual work planning process and will be 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 6.

Table 6: Implementation Strategy Timeline

Activity	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Site inspection	x	x	x	x	x	x	x	x	x	x
Boundary line maintenance	x	x	x	x	x	x	x	x	x	x
Salt marsh research*	x	x	x	x	x	x	x	x	x	x
Spring and fall waterfowl survey					x					
Shorebird surveys	x	x	x	x	x	x	x	x	x	x
Waterfowl banding	x	x	x	x	x	x	x	x	x	x

* University collaboration

9.1 MANAGEMENT AUTHORITIES AND MANDATES

The Canadian Wildlife Service of Environment and Climate Change Canada, Atlantic Region, is responsible for the administration of John Lusby Marsh NWA.

9.2 MANAGEMENT PLAN REVIEW

This management plan will be reviewed 5 years after its formal approval by Environment and Climate Change Canada, Canadian Wildlife Service and every 10 years thereafter.

Additions of new information may be appended to the document as required to aid in site management and decision making.

10 COLLABORATORS

The John Lusby Marsh NWA provides a unique research opportunity to study the history and development of these wetlands. As the past history of these marshes is well documented, the biological mechanisms that resulted in a rapid change from dyked agricultural lands to wetlands are of interest. Thus, John Lusby Marsh NWA has been the ongoing focus of a collaborative study, with university researchers looking at these changes.

The Chignecto Naturalist Club has frequently expressed the desire of its members to be kept advised of rare or uncommon bird sightings. As an example, a Ruff (*Philomachus pugnax*), a rare Eurasian visitor, was observed within the Burgess Impoundment in 1984.

There are no formal arrangements pertaining to the overall management or administration of the John Lusby Marsh NWA. However, there are two controlled water level impoundments (Burgess and Russell) within the NWA that are collaboratively managed by Ducks Unlimited Canada and Environment and Climate Change Canada's Canadian Wildlife Service under a land use agreement. Ducks Unlimited Canada is responsible for the maintenance of these two impoundments (Table 3). In collaboration with Ducks Unlimited Canada, within the next three years, a 30-year plan for the maintenance of infrastructure (dykes and water control structures) and for habitat management within controlled water level impoundments will be developed.

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APPENDIX I: AN ACCOUNT OF THE LIFE OF MR. JOHN STARR LUSBY:

Mr. Lusby through the years had travelled extensively in all parts of Canada and the United States. He spent some time in British Columbia, and had a wide knowledge of the Pacific Province, and kept in touch with many of the residents, particularly those who had former Maritime connections.

A farmer by profession, Mr. Lusby had a great interest in the marshlands and was known as one of the authorities on the histories connected with the different marsh bodies in this locality. He was an expert in the construction and repair of aboteau and dykes, and had charge of many operations of this type on other marsh areas throughout the Maritime Provinces.

Well informed on the history of this locality, Mr. Lusby's marvellous memory and his collection of records were of frequent assistance to newspapermen and writers seeking background information for different articles. For that matter Mr. Lusby was himself a fluent writer, and articles from his pen which often appeared in the Amherst Daily News aroused great interest.

– Amherst Daily News, 15 April 1947

