This Management Plan and the enclosed engineering drawings prepared by Ducks Unlimited Canada comprise Schedules "A" and "B" referred to in the attached agreement made between The Minister and the Permittee this 4th day of APRIL, 1986.

Management Plan: Chignecto National Wildlife Area

August 1984

Environment Canada
Canadian Wildlife Service

Environnement Canada
Service canadien de la faune

Chignecto National Wildlife Area

Management Plan

Peter Barkhouse
Canadian Wildlife Service
Sackville, New Brunswick
August, 1984

This Management Plan of Chignecto National Wildlife Area, Cumberland County, Nova Scotia is approved by the following:

Chignecto National Wildlife Area Management Committee

Fred Payne, Nova Scotia Department of Lands & Forests

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Regional Director, Canadian Wildlife Service, Atlantic Region

August, 1984
Date of Approval

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1.0 INTRODUCTION

Chignecto National Wildlife Area comprises two sections located on and near Cumberland Basin at the head of the Bay of Fundy in Northwestern Nova Scotia (Figure 1). The 600 ha John Lusby Section is the largest remaining tract of saltmarsh along the Bay of Fundy. It represents about 12 percent of the present saltmarsh area of the bay, which is only 35 percent of the original area prior to settlement by Europeans. Because of that ecological importance it is one of the principal early spring staging areas for Canada Geese in the Atlantic Region. The Amherst Point Sanctuary Section is located 1.5 km southeast of the John Lusby marsh and comprises 495 ha of upland and freshwater wetland, much of which formerly had been tidal. The site provides valuable habitat for many species of birds and other widlife and is particularly important as marshbird breeding and waterfowl production and migration habitat. However, the special features, which distinguish it relative to other sites in the Atlantic Region, include an ecologically unusual and aesthetically appealing upland landscape and wetlands attractive to several uncommon bird species.

Including Chignecto, there are 11 National Wildlife Areas (NWA) in the Atlantic Region (four Atlantic Provinces) and more than 40 in Canada that have been established since the program was begun by the Canadian Wildlife Service in 1966. The objectives of that program and the purposes of all National

Wildlife Areas are to protect and maintain important wildlife habitat, particularly for migratory birds, and to afford opportunities to improve habitat when necessary for wildlife use.

Each National Wildlife Area has its own individual characteristics and must be managed according to its own specific requirements. The purpose of this document is to provide a plan which addresses those management considerations specific to Chignecto NWA. Many management considerations and requirements are similar to those of Shepody and Tintamarre NWA's, also located along the Upper Bay of Fundy coast and Wallace Bay NWA located on the Northumerland coast. The principal similarity among those four sites is that they incorporate formerly tidal dikeland that has been developed into shallowly flooded freshwater wetland. In addition, three of those areas protect and preserve natural coastal habitat.

Chignecto NWA is managed by the Canadian Wildlife Service (CWS) in collaboration with the Department of Lands and Forests, Nova Scotia and with the co-operative assistance of Ducks Unlimited. This document updates 1973 and 1974 plans for the John Lusby and Amherst Point Sanctuary Sections respectively.

2.0 OWNERSHIP AND STATUS

Amherst Point Migratory Bird Sanctuary was established by order-in-council P.C. 3966 on October 1, 1947. Hunting on the 600 ha site (then privately owned) was thereby prohibited by Sanctuary Regulations established under the Migratory Birds Convention Act. That special status gave recognition to its unusual importance to waterfowl and other water birds and appreciation of those values by local residents.

In 1967, 495 ha of the Amherst Point Sanctuary were proposed for acquisition through the National Habitat Protection Program administered by the CWS. Subsequently 211 ha were obtained by fee simple purchase, and 84 ha by transfer from the Nova Scotia Government (on October 13, 1971). The other 200 ha include 180 ha of unknown ownership, and 20 ha that could not be purchased (Domtar Chemical Company).

The boundary of the Amherst Point Migratory Bird Sanctuary was amended on September 12, 1980 to coincide with the boundary of the 1967 proposed acquisition site. The same site (20 ha Domtar property excluded) was scheduled as a section of Chignecto NWA under the Canada Wildlife Act on September 23, 1982 by order-in-council P.C. 1982-2854. The Amherst Point Sanctuary Section therefore consists of 475 ha which has both National Wildlife Area and Migratory Bird Sanctuary Status and 20 ha which has sanctuary status only.

The Nova Scotia Power Corporation maintains Rights-of-way across the Amherst Point Sanctuary for a

steel-towered power line (60 m) and a wooden-poled power line (30 m). The Rights-of-way are kept open and the corporation is entitled to entry and access for maintenance or repair work.

The 600 ha John Lusby Section was proposed for acquisition through the National Habitat Protection Program in 1966. An expropriation plan of the site was filed in March 1967, and 421 ha were subsequently acquired by fee simple purchase. The other 179 ha were of undetermined ownership. The John Lusby Section was scheduled under the Canada Wildlife Act on April 27, 1978 by order-in-council P.C. 1978-1439. The CWS has two Rights-of-way to the John Lusby Section from the Amherst Point highway (Figure 1).

Section 1

Objectives, Goals and Management Policies

3.0 OBJECTIVE AND GOALS

Chignecto National Wildlife Area will be managed to preserve and enhance habitat and wildlife values of the site according to the following goals. Active habitat manipulation will be conducted where appropriate to achieve those goals.

3.1 Management Goals

1. To provide productive freshwater wetlands at the Amherst Point Sanctuary Section.
2. To preserve and maintain special ecological values and aesthetic qualities of upland habitats at Amherst Point Sanctuary Section.
3. To protect and preserve the saltmarsh habitat and associated wildlife values of the John Lusby Section.
4. To develop and maintain a limited amount of brackish water habitat at the John Lusby Section.
5. To provide the basis for sound management of Chignecto NWA by undertaking monitoring programs and biological studies.
6. To promote increased public awareness and appreciation of the wildlife resources of Chignecto NWA.

4.0 BIOLOGICAL MANAGEMENT POLICIES

4.1 Habitat Development and Improvement

4.1.1 Freshwater Wetlands

Shallowly-flooded freshwater wetlands will be developed where appropriate at the Amherst Point Sanctuary Section to provide production and migration habitat for waterfowl, breeding habitat for marshbirds and habitat for other wildlife. Manipulation of those wetlands will be undertaken to maintain productive habitat.

4.1.2 Brackish Water Impoundments

Impoundment development at the John Lusby Section will be limited to two small wetland units. Those units will be managed to provide shallow brackish water habitat, principally for waterfowl staging and migration.

4.1.3 Oldfields

Habitat manipulation will be conducted to maintain some of the oldfield habitat (abandoned agricultural upland) at the Amherst Point Sanctuary Section in various stages of oldfield vegetational succession. That will provide habitat values that complement those of the wetlands (such as waterfowl nesting sites) and maintain a high degree of habitat diversity which contributes to the faunal diversity and aesthetic qualities of the area.

4.1.4 Woodlands

Active habitat manipulation of woodlands at the Amherst Point Sanctuary Section will not be necessary for the immediate future (next 15-20 years) as many stands are presently undergoing a "natural" thinning and regeneration process. During the past 10 years many mature spruce trees have been killed by a local infestation of the Japanese bark beetle. At some future time it may be desirable to implement management to maintain or enhance the importance of the woodlands to wildlife.

4.2 Biological Studies

Biological studies will be an integral aspect of the management of Chignecto NWA. The CWS will undertake studies and will encourage others to conduct studies designed to provide a sound biological basis for the area's management. Other approved biological activities including waterfowl banding and research programs also will be conducted.

All study proposals and other activities must first receive approval from the committee responsible for the management of Chignecto NWA and those by persons other than CWS staff and its contractors must be submitted along with a complete study outline at least three months in advance of commencement of the study.

5.0 PUBLIC USE MANAGEMENT POLICIES

The principal purpose of Chignecto NWA is to protect and manage wildlife and wildlife habitat; however, providing opportunity for public use of those resources is also an important function of the area. Various public activities will be permitted by authority of the Wildlife Area Regulations established under the Canada Wildlife Act. The public will be advised of permitted activities by notices posted at access points to the wildlife area.

Hunting and trapping will be permitted on the John Lusby Section. Trapping and fishing will be permitted on the Amherst Point Sanctuary Section; however, hunting is prohibited by the Migratory Birds Sanctuary Regulations. Those activities are permitted according to relevant federal and provincial regulations. Trapping must be conducted according to standards recommended by the federal-provincial committee on humane trapping.

Other public activities including wildlife observation, hiking and photography will be permitted. Increased public awareness of the area's habitat and wildlife resources will be promoted.

Section II

Description and Summary of Biological Resources

6.0 DESCRIPTION AND HISTORICAL BACKGROUND

The two sections of Chignecto NWA are located on and near the Cumberland Basin at the head of the Bay of Fundy. Together they incorporate a variety of wetlands ranging from tidal saltmarsh to man-made freshwater marsh. The John Lusby Section is a 600 ha tract of saltmarsh which in addition to various plant communities comprises several prominent tidal creeks, numerous smaller channels and ponds, and two man-made ponds or impoundments.

The plant cover of the marsh is a patchwork of different communities ranging from almost pure stands of single species to associations of several species. The community arrangement is rigidly controlled by the extent to which the various marsh sections are flooded by the tides. Each species responds to a specific flooding regime for which it is most adapted. The most prominent species are cordgrasses (Spartina alterniflora, S. patens), goose grass (Puccinellia maritima), samphire (Salicornia europaea) and seablite (Suaeda maritima). Lower sections of the marsh are flooded twice daily, but the entire marsh is flooded only during the highest spring tides and that occurs only a few times a years.

Two small impoundments totalling 20 ha were developed by Ducks Unlimited along the upland edge of the marsh following acquisition of the site by the CWS in the late 1960's. They are shallowly flooded by brackish water and are vegetated by widgeon grass (Ruppia maritima) and cordgrass.

The John Lusby marsh is now a "wild saltmarsh", but signs are still evident of the period when it was almost completely controlled by man. That had its beginning with the arrival of the first French settlers at the head of the Cumberland Basin in the 1670's. Gradually through a laborous dike-building and ditching process the large expanses of saltmarsh were claimed from the sea and used for agricultural purposes. It is believed that the John Lusby marshes were first diked around the mid-1700's.

That work, begun by the French settlers, was later continued by English settlers, until virtually all the saltmarshes along the Bay of Fundy were diked. The principal value of the "dikeland" was the hay it produced, and as time passed the sale of that hay became very profitable. As many as 32 hay barns were present on the John Lusby marsh during the early 1900's.

A series of events including the increasing use of the automobile and the production of cheaper beef in western Canada brought the hay market crashing down during the 1930's. Abandonment of dikeland followed and with declining use it was more difficult to maintain the dikes and aboiteaux. The last hay was cut on the John Lusby marsh around 1946 and since then tidal waters have regained control of the marsh.

The Amherst Point Sanctuary Section is located 1.5 km southeast of the John Lusby marsh and incorporates 495 ha of upland and freshwater wetlands. Its varied landscape comprises

several wetland types including natural ponds and bogs and shallow man-made marshes, wooded uplands and various oldfield plant communities ranging from open fields of grasses and forbs to dense thickets of shrubs and young trees.

The most interesting feature of the landscape, however, is its topography, characterized by steep-sided depresssions of various sizes and depths called "sinkholes". These are typical of locations where deposits of gypsum lie close to the surface of the land, as is the case at Amherst Point. Water seepage through those deposits first created underground caves and eventually, when the land surface above them collapsed, sinkholes were formed. Many of the ponds and small lakes in the sanctuary occupy sinkholes and consequently they receive an additional mineral richness from the underlying gypsum.

The total wetland area of the Amherst Point Sanctuary Section is 322 ha of which 109 ha are natural ponds, small lakes and bog. The remaining wetlands are shallowly-flooded impoundments which were developed with the assistance of Ducks Unlimited during 1972 to 1976. Those wetlands comprise three separate units and are situated on abandoned agricultural marshland that formerly had been tidal. Their waters are enriched by marine silts that comprise their soils and by underlying gypsum deposits.

Cattails and burreeds are the most plentiful emergent aquatic plants occurring around the margins of ponds and lakes

and throughout the marshes. Water milfoil, pondweeds and other submergents grow primarily in the deeper waters.

The wooded uplands of the Amherst Point Sanctuary are dominated by conifers, particularly spruce, balsam fir and larch. Eastern hemlock is prevalent on the slopes and ridges surrounding some of the sinkholes and white birch on sites recently cut over. A few sugar maple and yellow birch are all that remain of a formerly more prominent hardwood stand. Hawthorns and wild apple trees occur commonly along the woodland edges, and a few ornamentals including silver maple, Manitoba maple and scotch pine were added around the former farmsteads.

The Amherst Point Sanctuary Section includes 52 ha of oldfield habitats (abandoned agricultural upland) which are in various stages of succession back to woodland. Some are vegetated by goldenrods and other pioneering forbs, and wild rose, spiraea, speckled alder and young conifers are taking over where succession is more advanced. An additional 10 ha of grassland is leased to farmers for pasturing livestock.

The Amherst Point area was first intensively settled during the early and mid-1700's. The former tidal marshes of the present sanctuary which are now impounded freshwater wetlands were probably first diked during that time and farmed up to the 1940's. Unlike the John Lusby marsh, the dikes and aboiteaux have been maintained and tidal waters have not re-entered the marsh.

Early settlers also cleared the uplands for farming, planted orchards, and cut logs for timber. The last homestead in the present sanctuary burned in 1929 and the uplands have not been farmed for several years.

For many years local residents mined gypsum at Amherst Point for the home manufacture of wall plaster and from 1905 to 1912 a commercial mine was operated near the sanctuary. A railway was used to haul the gypsum from the mine across the sanctuary to a dock on Cumberland Basin. The railbed is still present and is used as a nature trail.

7.0 ANIMAL RESOURCES

7.1 Waterfowl

Several waterfowl species including Mallard, Black Duck, Northern Pintail, Green-winged Teal, Blue-winged Teal, American Wigeon, Northern Shoveler and Ring-necked Duck regularly breed at Chignecto NWA. Those species commonly occur in the Atlantic Provinces, but other species, including Canada Goose, Gadwall, Wood Duck, Redhead and Ruddy Duck which are of limited distribution and occurrence in the region, also regularly breed in small numbers on the wildlife area. The attractiveness of Chignecto NWA to so many waterfowl species, particularly those of the latter group, is an exceptional feature of the area's wildlife resource.

The present level of waterfowl production, about 100 broods annually, has been achieved through habitat development at both the John Lusby and Amherst Point Sanctuary Sections. Waterfowl production on the John Lusby Section has increased from a few broods annually to some 20 broods with the development of two small (20 ha total) brackish impoundments. Similarly, annual production on the Amherst Point Sanctuary has increased from some 30 broods to 80 broods with the development of 213 ha of freshwater wetland. Table 1 shows an approximation of the species and numbers of waterfowl broods produced at Chignecto NWA in a "typical" year, in comparison with pre-impoundment numbers.

The principal importance of the John Lusby Section to waterfowl is as a staging and migration site, particularly for Canada Geese. It is one of the first locations in the region to be frequented in spring by Canada Geese as they begin moving northward from their wintering areas. The first arrivals usually appear around the second week of March. The earliest recorded arrival was March 6 and the latest was March 17.

The length of time geese remain on the marsh and the maximum number present are greatly influenced by spring conditions. The more favourable the conditions, the more quickly birds move through. Maximum numbers vary between 2,000 and 5,000 and normally most have left by the end of April. Goose grass (Puccinellia maritima) is the principal food eaten by geese on the John Lusby marsh.

Many other waterfowl also frequent both sections of the NWA during the spring and late summer-fall periods. Black Ducks, Northern Pintails, Green-winged and Blue-winged Teal, American Wigeons and Ring-necked Ducks are the most abundant. Peak numbers of those species encountered during the spring and late summer-fall periods are given in Table 2. Several other waterfowl including many uncommon species also occur regularly during those periods; those species and an indication of their occurrence and numbers are presented in Table 2. Some of the more unusual species that frequently occur at Chignecto NWA include Snow Goose, Eurasian Green-winged Teal, European Wigeon, Lesser Scaup, Bufflehead, Black Scoter and Hooded Merganser.

7.2 Marshbirds

Various marshbird species including Pied-billed Grebe, Least Bittern, American Bittern, Virginia Rail, Sora, Common Moorhen, American Coot, Black Tern and Marsh Wren regularly breed at Amherst Point Sanctuary. Pied-billed Grebes are the most numerous; a study in 1983 reported a density of 1.7 nests per ha on a 35 ha impoundment, the highest nesting density so far reported for this species which breeds widely throughout North America. Notable numbers of American Coot also nest on the freshwater impoundments. That species is of very limited distribution and occurrence in the Atlantic Provinces as are most of the other species; only Soras and American Bitterns as well as Pied-billed Grebes are widely occurring. Black Terns nest only at a few other locations in the region and the only confirmed nesting records of Least Bittern and Common Moorhen in Nova Scotia are at Amherst Point Sanctuary.

7.3 Other Birds

An impressive variety of birds, in addition to waterfowl and marshibrds discussed above, occurs at Chignecto NWA. A total of 228 species has been recorded there in recent years, and more than 100 species breed on or near the wildlife area (Appendix 1).

7.4 Mammals

A list of mammals known to occur at Chignecto NWA is presented in Appendix II. Many of those are present only at

the Amherst Point Sanctuary Section as the mammal population of the John Lusby marsh is limited to a few species of voles and shrews. Other mammals including red fox, raccoon and white-tailed deer occasionally visit the John Lusby Section. Muskrats are abundant on all of the shallowly-flooded wetlands at Amhest Point Sanctuary and are important for their role in the ecology of the marshes and as a commercially harvestable fur-bearer. All of the mammals found within the wildlife area are common and widely occurring throughout Nova Scotia and New Brunswick with the exception of the Arctic Shrew. That species is very abundant in some of the sanctuary's oldfield habitats, which is significant as its occurrence in the Maritime provinces is restricted to a few locations.

7.5 Fish, Amphibians and Reptiles

A list of fish, amphibian and reptile species known or suspected to occur at Chignecto NWA is presented in Appendix III. Mummichog are particularly abundant in the tidal creeks of the John Lusby Marsh and ninespine sticklebacks are very abundant in the saltmarsh ponds as well as in the freshwater wetlands of Amherst Point Sanctuary. They appear to be the principal food of Pied-billed Grebe at Amherst Point Sanctuary and their abundance may be responsible for the notably large grebe population. White perch are plentiful in Layton's Lake and provide recreational fishing as well as a food source for other wildlife.

Section III

Operational Management Plan

8.0 HABITAT MANAGEMENT

8.1 Wetlands

Six management marsh units totalling 246 ha were developed with the cooperation of Ducks Unlimited at Chignecto NWA during 1975 to 1983. The locations of those units are given in Figures 1 and 2 and their area and initial flooding year in Table 3. Details of control structure and dike designs, dimensions and elevations as well as dike alignment and structure locations are shown on plans prepared by Ducks Unlimited from 1975 aerial photography (Appendix IV).

Habitat conditions and wildlife values of each marsh unit are assessed every third year and on the basis of that information operational management plans are developed for the following three year period. The next assessment is scheduled for 1984 and no wetland habitat manipulation events are planned for that year. A wetland operational plan for the 1985 to 1987 period will be appended to this document following the 1984 assessment and a new plan every third year thereafter.

8.2 Oldfields

Locations and designations of oldfields at Amherst Point Sanctuary are shown in Figure 3. A program to maintain a diversity of oldfield habitats was begun in 1982. Fields 1 and 10 will be moved to maintain them as open fields vegetated by grasses and other herbaceous plants. Fields 2, 3, 4, 6, 8 and 9 will be manipulated through selective hand-thinning and mowing to provide an interspersion of trees, shrubs and

herbaceous plant cover. Fields 5 and 7 will be maintained as open stands of young-growth conifers including white spruce and larch through selective hand-thinning. The proposed schedule of oldfield habitat manipulation is presented in Table 4.

8.3 Woodlands

Locations of woodland habitats at the Amherst Point Sanctuary Section are shown in Figure 2. It is unlikely that any manipulation of those habitats will be undertaken during the next 15 to 20 years. Investigations will be conducted to assess wildlife use, habitat characteristics and ways of improving woodland habitats for wildlife use.

9.0 BIOLOGICAL STUDIES

9.1 Monitoring

Monitoring of habitat conditions and wildlife use of the managed wetlands at Chignecto NWA is scheduled for 1984 and every following third year. That program consists of a schedule of events including marshbird and waterfowl brood surveys, muskrat house counts, invertebrate, vegetation, water quality and substrate sampling and water depth measurements. That assessment of habitat conditions and wildlife use provides the basis for the formulation of management strategies and the development of operational management plans.

Canada Goose use of the John Lusby Marsh has been monitored on several previous occasions and will be monitored periodically. Regular counts will be conducted during spring 1984 and every following third year.

9.2 Inventories

Collection of data to update or fill in gaps in information on the biological resources of Chignecto NWA will be conducted on an ongoing basis. Information is particularly required on the habitat features and wildlife resources of the Amherst Point Sanctuary's woodland habitats. That information and others will be collected and updated as resources permit.

9.3 Research

A two-year study on the breeding ecology of Pied-billed Grebes at Amherst Point Sanctuary was completed in 1983, and research on the ecology and Canada Goose utilization

of the John Lusby Marsh have also been conducted. Research of that nature improves our ability to manage the wildlife and habitats with which we are principally concerned. Other possibilities for research of a similar nature exist at Chignecto NWA, but there are no plans to become engaged in those in the near future.

10.0 MAINTENANCE

Maintenance of section boundaries, entrance and regulatory signs, access roads, and public use facilities is an annual requirement. The 17 km of boundary at Chignecto NWA are inspected annually and where necessary the lines are cleared and boundary signs replaced. Entrance signs are maintained at conspicuous sites and regulation signs at all main access points. Public use facilities including a parking lot, information display and trails at Amherst Point Sanctuary are maintained.

CWS Habitat Staff and Ducks Unlimited personnel conduct regular inspections of wetland developments including dikes, water control structures and water levels. Ducks Unlimited conducts repairs and necessary maintenance of water control structures and dikes. CWS habitat staff are responsible for conducting inspections to enforce the wildlife area regulations.

11.0 PUBLIC ACTIVITIES

Amherst Point Sanctuary is used intensively for various activities including hiking, wildlife observation, fishing, outdoor education, skiing and trapping. Muskrat trapping pressure and harvest have been monitored during the past few fall seasons and will continue to be monitored annually. Other public activities which are permissible are for the most part unregulated.

Public use facilities including parking lot, trails and an information display have been developed at the Amherst Point Sanctuary. A preliminary interpretation plan has been drafted for Chignecto NWA and further facilities are being developed as resources permit. The finalized interpretation plan will be appended to this document. It is essential that public use of the wildlife area and development of facilities for such use be compatible with the area's habitats and wildlife resources.

12.0 RESOURCE REQUIREMENTS

Chignecto NWA is managed by CWS habitat staff located at the Atlantic Regional office in Sackville, N.B. Resources appropriated to the management of Chignecto NWA from the habitat program have been in the order of 0.15 PY and $2,000 O&M annually for the past five years. Other resources including seasonal employees, special employment programs, and Ducks Unlimited have made possible many activities undertaken at Chignecto NWA.

Resources are principally required for maintenance, biological studies and habitat management. Annual resource requirements will vary; however, averaged estimates are as follows:

	PY	O&M
a) Maintenance	0.10	$2,000
b) Biological Studies	0.20	$3,000
c) Habitat Management	0.10	$3,000
	0.40	$8,000

The above are very preliminary estimates, but are believed to be basic requirements for the management of Chignecto NWA as proposed in this document. It will be possible to use this as a functional operational plan only if increased resources to at least that level are made available.

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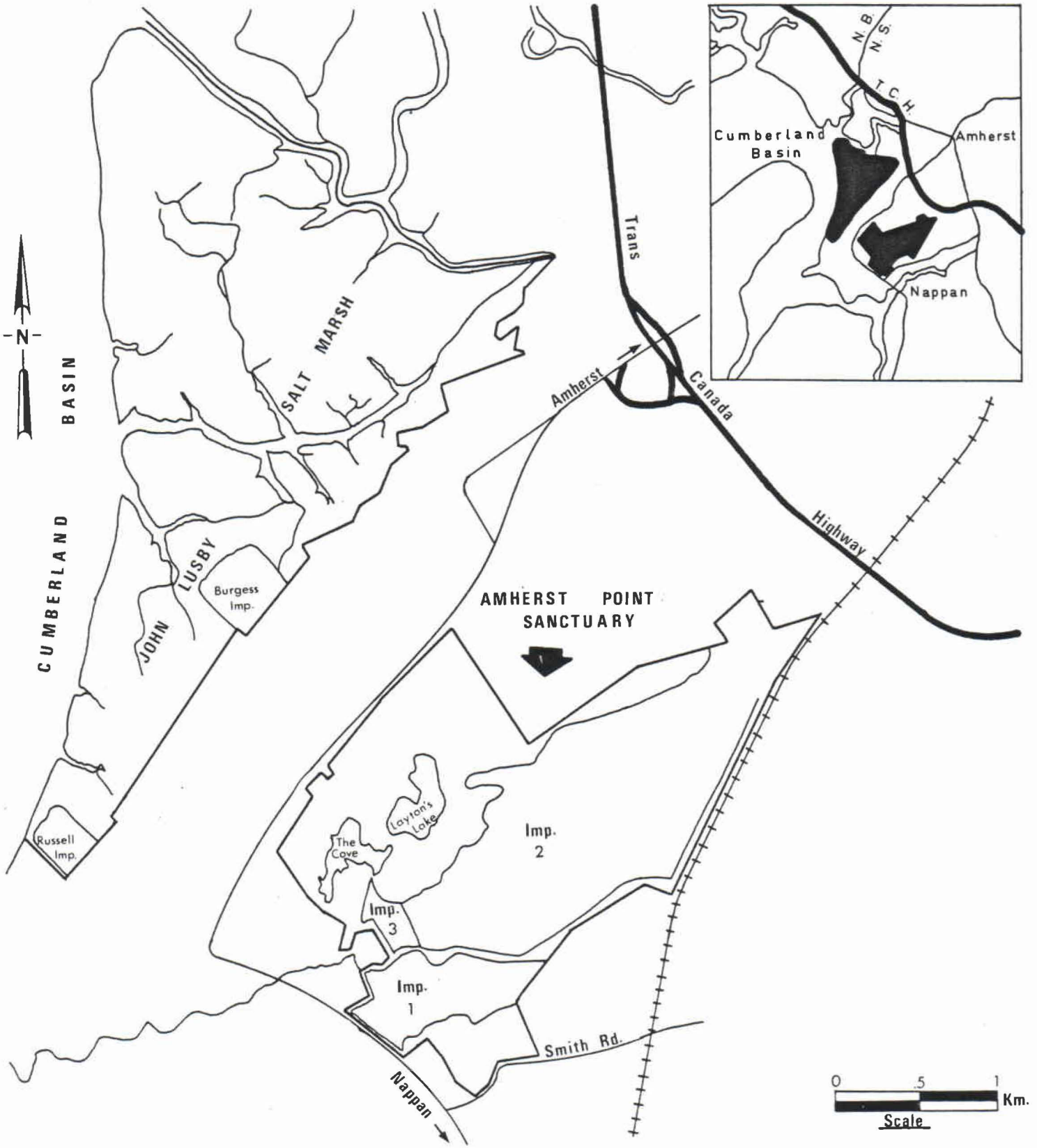


Figure 1. Location and extent of John Lusby and Amherst Point Sanctuary Sections and developed wetlands (Impoundment - Imp.)

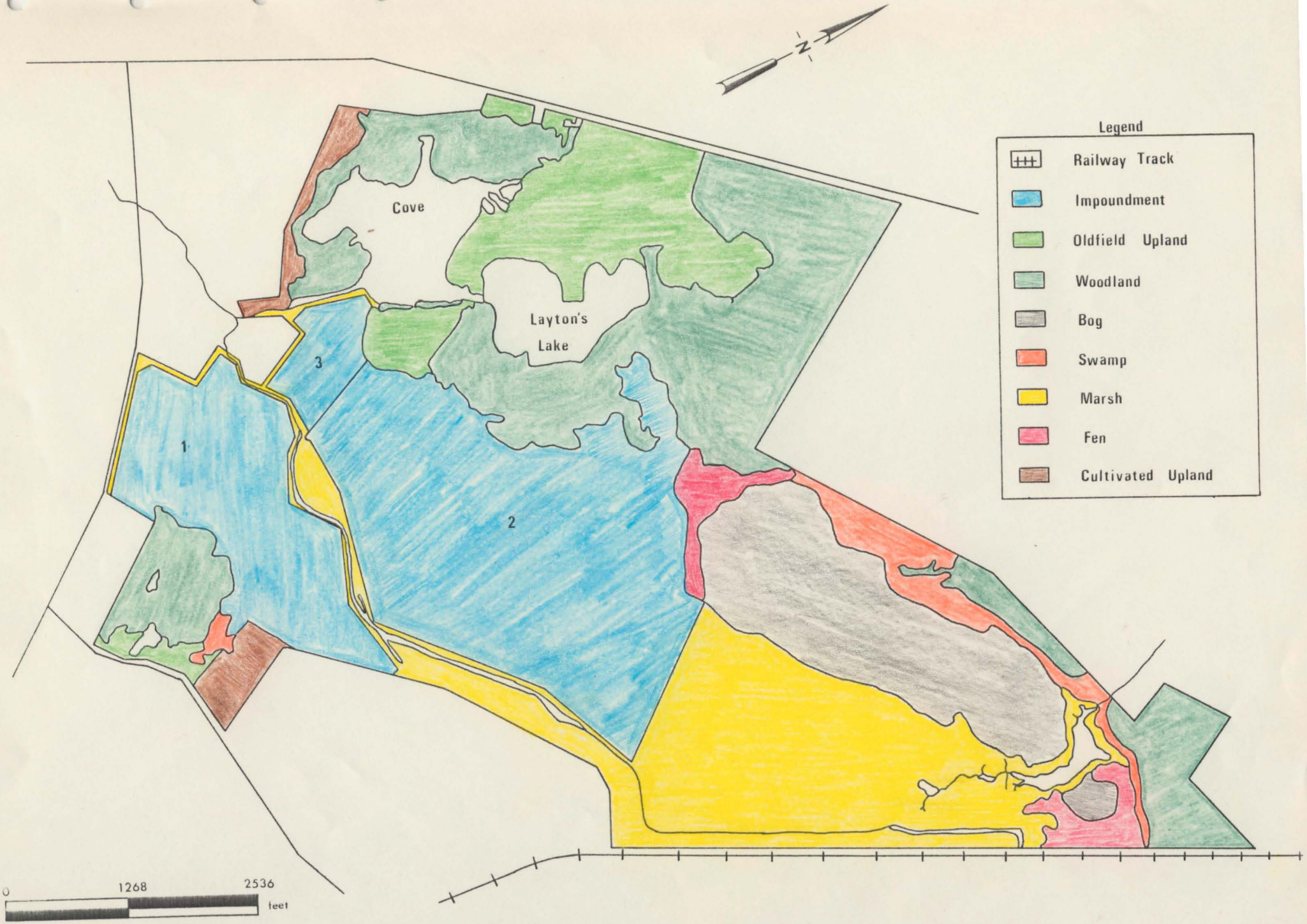


Figure 2. Location and extent of major habitat-types of Amherst Point Sanctuary Section

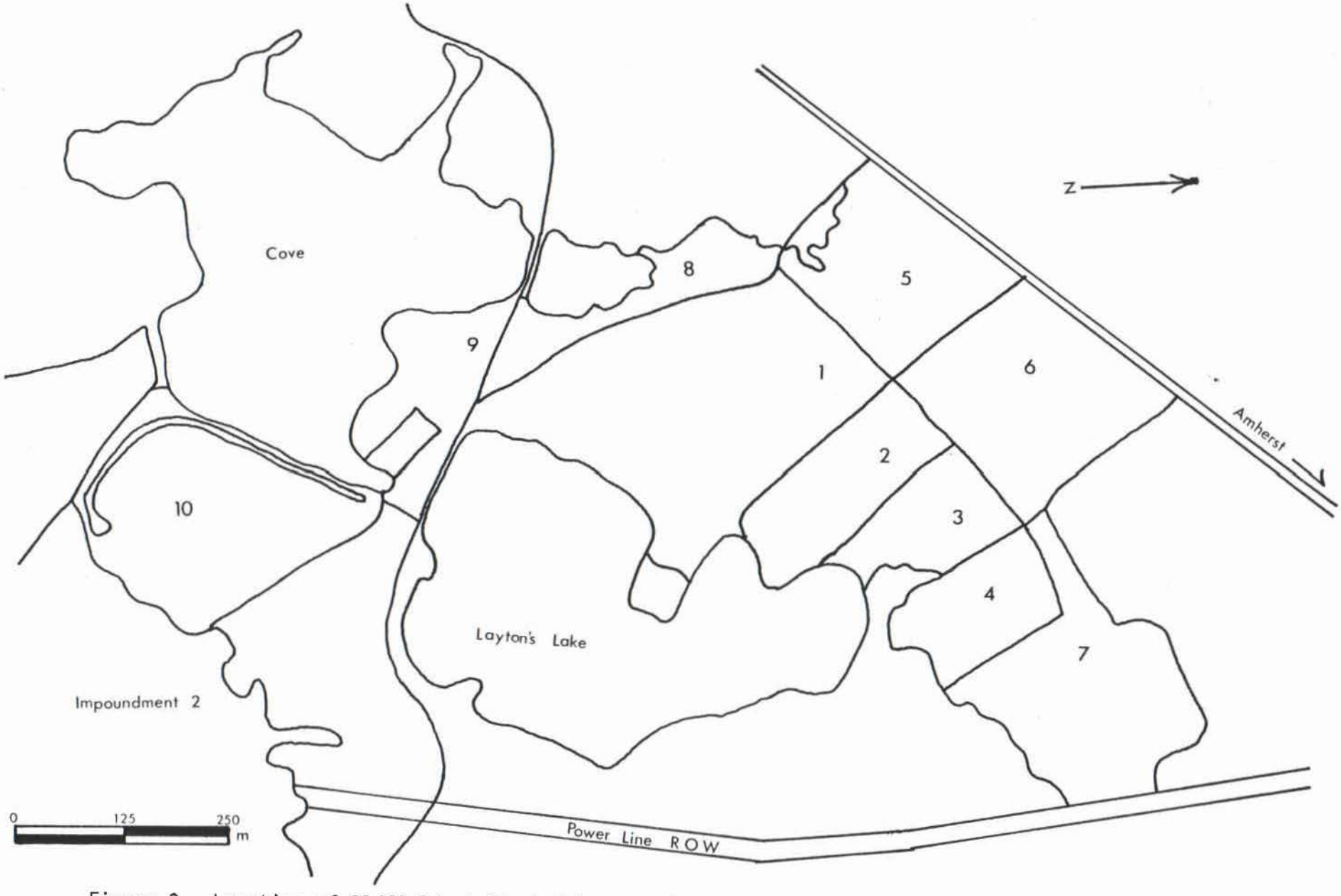


Figure 3. Location of Oldfields 1-10 at Amherst Point Sanctuary Section.

Table 1. Approximation of Species and Numbers of Waterfowl Broods Produced at Chignecto NWA during a Typical Year and Comparison with Pre-developed Production.

Species	Post-development	Pre-development
Canada Goose	1	-
Mallard	1	-
Black Duck	35	8
Gadwall	1	-
Northern Pintail	8	2
Green-winged Teal	14	3
Blue-winged Teal	16	7
American Wigeon	5	3
Northern Shoveler	1	1
Wood Duck	1	-
Redhead	1	-
Ring-necked Duck	15	6
Ruddy Duck	1	-
TOTAL	100	30

Table 2. a) Peak Numbers of Most Common Waterfowl (C. Goose excluded) Recorded at Chignecto NWA during Spring and Late Summer-Fall Periods.
b) Occurrence and Numbers of Other Waterfowl Recorded at Chignecto NWA during Spring and Fall Periods.

a)

Species	Spring	Late Summer-Fall
Black Duck	600	400
Northern Pintail	300	200
Green-winged Teal	500	350
Blue-winged Teal	75	300
American Wigeon	40	400
Ring-necked Duck	60	250

b)

Species	Occurrence	Number
Snow Goose	Approx. every 2nd year in spring	1-11
Mallard	Annually spring and fall	5-10
Gadwall	Annually spring and fall	4-8
Eurasian Green-winged Teal	Almost annually in spring	1-2
European Wigeon	Amost annually in spring and early summer	1-2
Northern Shoveler	Annually spring and fall	10-20
Wood Duck	Annually, spring, moult in summer	1-3
Redhead	Almost annually in spring	2-5
Lesser Scaup	Annually spring and fall	4-8
Common Goldeneye	Annually spring and fall	5-30
Bufflehead	Almost annually spring, annually fall	1-6
Surf Scoter	Approx. every 2nd year in spring	1-4
Black Scoter	Almost annually in spring	1-3
Ruddy Duck	Annually in fall	2-25
Hooded Merganser	Annually spring and fall	5-10
Red-breasted Merganser	Annually in spring	10-150

Table 3. Area and Initial Flooding Year of Wetland Management Units at Chignecto NWA.

Management Unit	Area (ha)	Initial Flooding Year
Amherst Point Sanctuary Section		
1	35.6	1973
2	171.2	1973
3	7.3	1977
Cove	12.4	1983*
John Lusby Section		
Burgess	12.0	1974
Russell	8.0	1972

*Partially natural and man-made wetland. New dike and water control structure installed in 1983.

Table 4. Habitat Manipulation Program for Oldfields at Amherst Point Sanctuary.

Field Number	Operation	Year[1]
1	Cut with bush mower	1983
2	Selective thinning & mowing	1984
3	Selective thinning & mowing	1982
4	Selective thinning & mowing	1984
5	Selective thinning & mowing	1983
6	Selective thinning & mowing	1985
7	Selective thinning	1984
8	Selective thinning	1986
9	Selective thinning	1986
10	Cut with bush mower	1985

1/
Repeat operations every five years

Appendix I. List of Birds Recorded at Chignecto NWA

The status of each species is indicated as follows:

B-breeding confirmed; b-breeding suspected; W-winter; R-permanent resident; M-migrant; V-visitor; S-summer. *denotes uncommon species

Species	Status	Species	Status
Common Loon	M,V	American Wigeon	B
Red-throated Loon	M	Northern Shoveler	B
Red-necked Grebe	M	Wood Duck	B
Horned Grebe	M	Redhead	B
Pied-billed Grebe	B	Ring-necked Duck	B
Double-crested Cormorant	V, S	Greater Scaup	M
Great Blue Heron	V	Lesser Scaup	M
Green-backed Heron	V*	Common Goldeneye	M
Little Blue Heron	V*	Barrow's Goldeneye	M*
Cattle Egret	V*	Bufflehead	M
Great Egret	V*	Oldsquaw	M
Snowy Egret	V*	Common Eider	M
Black-crowned Night Heron	V	White-winged Scoter	M
Least Bittern	B	Surf Scoter	M
American Bittern	B	Black Scoter	M
Glossy Ibis	V*	Ruddy Duck	B
White Ibis	V*	Hooded Merganser	M
Canada Goose	B	Common Merganser	M
Brant	M	Red-breasted Merganser	M
Snow Goose	M	Goshawk	M, V
Mallard	B	Sharp-shinned Hawk	M
Black Duck	B	Cooper's Hawk	M*
Gadwall	B	Red-tailed Hawk	M
Northern Pintail	B	Broad-winged Hawk	M
Green-winged Teal	B	Rough-legged Hawk	W
Eurasian Green-winged Teal	V	Bald Eagle	V
Blue-winged Teal	B	Northern Harrier	B
European Wigeon	V	Osprey	B

Appendix I. (continued)

Species	Status	Species	Status
Gyrfalcon	M	Semipalmated Sandpiper	M
Peregrine Falcon	M	Western Sandpiper	M
Merlin	M	Sanderling	M
American Kestrel	B	Short-billed Dowitcher	M
Spruce Grouse	V	Long-billed Dowitcher	M
Ruffed Grouse	B, R	Stilt Sandpiper	M
Ring-necked Pheasant	B, R	Buff-breasted Sandpiper	M*
Virginia Rail	B	Hudsonian Godwit	M
Sora	B	Ruff	V*
Yellow Rail	V	Red Phalarope	M*
Common Moorhen	B	Wilson's Phalarope	M, V
American Coot	B	Northern Phalarope	M*
Semipalmated Plover	M	Glaucous Gull	M
Killdeer	B	Iceland Gull	M
American Golden Plover	M	Great Black-backed Gull	b, V
Black-bellied Plover	M	Herring Gull	V
Ruddy Turnstone	M	Ring-billed Gull	M, V
American Woodcock	b	Bonaparte's Gull	M
Common Snipe	B	Common Tern	M
Whimbrel	M	Caspian Tern	M*
Spotted Sandpiper	M	Black Tern	B
Solitary Sandpiper	M	Thick-billed Murre	V*
Greater Yellowlegs	M	Rock Dove	V
Lesser Yellowlegs	M	Mourning Dovbe	M, V
Willet	b	Black-billed Cuckoo	b
Red Knot	M	Great Horned Owl	b, R
Purple Sandpiper	M	Snowy Owl	V, W
Pectoral Sandpiper	M	Barred Owl	b, R
White-rumped Sandpiper	M	Short-eared Owl	b, V
Least Sandpiper	M	Saw-whet Owl	b, R
Dunlin	M	Common Nighthawk	M

Appendix I. (continued)

Species	Status	Species	Status
Chimney Swift	M	Marsh Wren	B
Ruby-throated Hummingbird	b	Sedge Wren	V
Belted Kingfisher	B	Mockingbird	M
Common Flicker	B	Gray Catbird	B
Pileated Woodpecker	V	Brown Thrasher	M
Yellow-bellied Sapsucker	M	American Robin	B
Hairy Woodpecker	B	Hermit Thrush	B
Downy Woodpecker	B	Swainson's Thrush	B
Black-backed 3-toed Woodpecker	V	Gray-cheeked Thrush	M
		Veery	M
Northern 3-toed Woodpecker	V	Golden-crowned Kinglet	B, R
Eastern Kingbird	B	Ruby-crowned Kinglet	B
Eastern Phoebe	M	Water Pipit	M
Yellow-bellied Flycatcher	B	Bohemian Waxwing	V, W
Alder Flycatcher	B	Cedar Waxwing	B
Least Flycatcher	B	Northern Shrike	V, W
Eastern Wood Pewee	b	Loggerhead Shrike	V*
Olive-sided Flycatcher	b	Starling	B
Horned Lark	b	Solitary Vireo	B
Tree Swallow	B	Red-eyed Vireo	B
Bank Swallow	b	Black and White Warbler	B
Barn Swallow	b	Tennessee Warbler	B
Cliff Swallow	M, V	Nashville Warbler	B
Purple Martin	V	Northern Parula	B
Gray Jay	b, R	Yellow Warbler	B
Blue Jay	B, R	Magnolia Warbler	B
Common Raven	B, R	Cape May Warbler	B
Common Crow	B, R	Black-throated Blue Warbler	M
Black-capped Chickadee	B, R	YUellow-rumped Warbler	B
Boreal Chickadee	B, R	Black-throated Green Warbler	B
White-breasted Nuthatch	V	Blackburnian Warbler	b
Red-breasted Nuthatch	b	Chestnut-sided Warbler	B
Brown Creeper	B, R	Bay-breasted Warbler	B
Winter Wren	B	Blackpoll Warbler	M

Appendix I. (continued)

Species			
Palm Warbler	b	Pine Siskin	b, V
Ovenbird	b	American Goldfinch	B
Northern Waterthrush	b	Red Crossbill	M, V
Mourning Warbler	M	White-winged Crossbill	M, V
Common Yellowthroat	B	Rufous-sided Towhee	V*
Wilson's Warbler	B	Savannah Sparrow	B
Canada Warbler	b	Sharp-tailed Sparrow	B
American Redstart	B	Vesper Sparrow	M
House Sparrow	V	Dark-eyed Junco	B
Bobolink	B	Tree Sparrow	V, W
Eastern Meadowlark	M	Chipping Sparrow	V
Red-winged Blackbird	B	Field Sparrow	V
Rusty Blackbird	b	White-crowned Sparrow	M
Common Grackle	B	White-throated Sparrow	B
Brown-headed Cowbird	B	Fox Sparrow	M
Scarlet Tanager	M	Lincoln's Sparrow	b
Rose-breasted Grosbeak	b	Swamp Sparrow	B
Evening Grosbeak	V	Song Sparrow	B
Purple Finch	B	Lapland Longspur	V, W
Pine Grosbeak	V, W	Snow Bunting	V, W
Common Redpoll	V, W		

Appendix II. List of Mammals That Occur at Chignecto NWA

Masked Shrew	Red Squirrel
Arctic Shrew	Northern Flying Squirrel
Short-tailed Shrew	Deer Mouse
Star-nosed Mole	Red-backed Vole
Little Brown Bat	Meadow Vole
Raccoon	Muskrat
Short-tailed Weasel	Meadow Jumping Mouse
Mink	Woodland Jumping Mouse
Striped Skunk	Porcupine
Red Fox	Snowshoe Hare
Eastern Chipmunk	White-tailed Deer
Woodchuck	

Appendix III. List of Fish, Amphibians and Reptile Species Known to Occur or Suspected of Occurring at Chignecto NWA.

Atlantic Sturgeon	American Toad
American Eel	Spring Peeper
Gaspereau	Bull Frog
Golden Shiner	Green Frog
White Sucker	Leopard Frog
Banded Killifish	Spotted Salamander
Mummichog	Red-backed Salamander
Fourspine Stickleback	
Threespine Stickleback	Green Snake
Ninespine Stickleback	Red-bellied Snake
White Perch	Garter Snake

Appendix 1V. Plans of wetland Developments at Chignecto NWA

AMHERST POINT

AMHERST 2Km.

AMHERST PT. 3-2

LAYTON'S LAKE

3·2·1

AMHERST PT. 3-1

2·1·2

N.S.P.C. RIGHT OF WAY

2·2·1

3·1·1

2·1·1

AVG. LEVEL MARSH 16.5

2·1·3

N.S.P.C. RIGHT OF WAY

AMHERST PT. 2-1

AMHERST PT. 2-2

NAPPAN

SMITH ROAD

C.N.R. LINE

PROJECT NO.	SEGMENT	FLOOD AREA (acres)	LEVEL MARSH (feet)	MAX. OPERAT. LEVEL (feet)
6128	AMHERST PT. 2-1	428	16.5 TO 18.0	20.4
6128	AMHERST PT. 2-2	89	16.8	19.8
6205	AMHERST PT. 3-1	18	16.1	18.7
6205	AMHERST PT. 3-2	31	15.5	18.0

SCALE : 1in. - 400ft.

FEET 400 0 400 800 1200 FEET

LEGEND

■ — CONTROL STRUCTURE LOCATION

2·1·2 — STRUCTURE NUMBER

— FLOODING LIMITS

— DYKES BUILT AFTER PHOTOGRAPHY

MOSAIC PREPARED FROM 1975 PHOTOGRAPHY

CANADIAN WILDLIFE SERVICES-CHIGNECTO NATIONAL WILDLIFE AREA

Ducks Unlimited Canada

AMHERST POINT
2-1; 2-2; 3-1; 3-2

SCALE 1"- 400'	PROJECT DU 6205
DRAWN BY R.T.	APPROVED
DATE JAN. '83	DRAW. No. 2 of 3

SCALE : 1in. - 400 ft.

FEET 400 0 400 800 1200 FEET

LEGEND

■ — CONTROL STRUCTURE LOCATION

— — FLOODING LIMITS

MOSAIC PREPARED FROM 1975 PHOTOGRAPHY

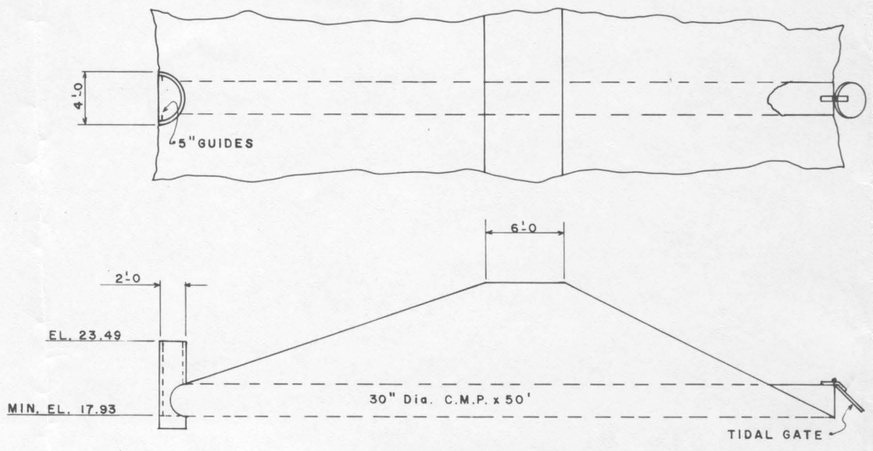
PROJECT & NO.	FLOOD AREA (acres)	LEVEL MARSH (feet)	MAX. OPERAT. LEVEL (feet)
JOHN LUSBY (6112)	33	22.0	23.49
AMHERST POINT (6113)	17	19.5	23.4

Ducks Unlimited Canada

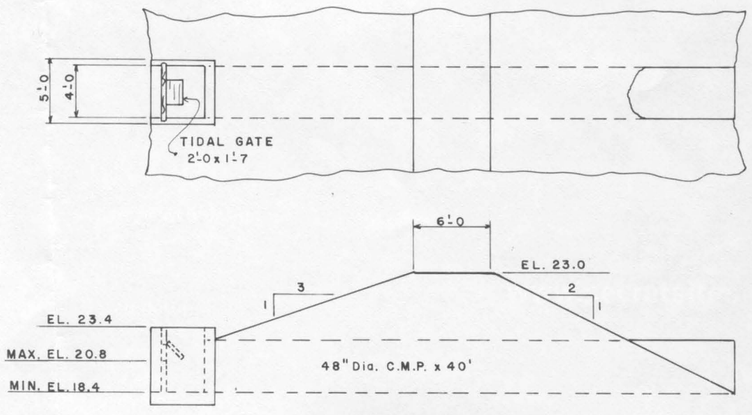
AMHERST POINT 1 & JOHN LUSBY

SCALE 1"- 400'	PROJECT
DRAWN BY R.T.	APPROVED
DATE JAN. '83	DRAW. No. 1 of 3

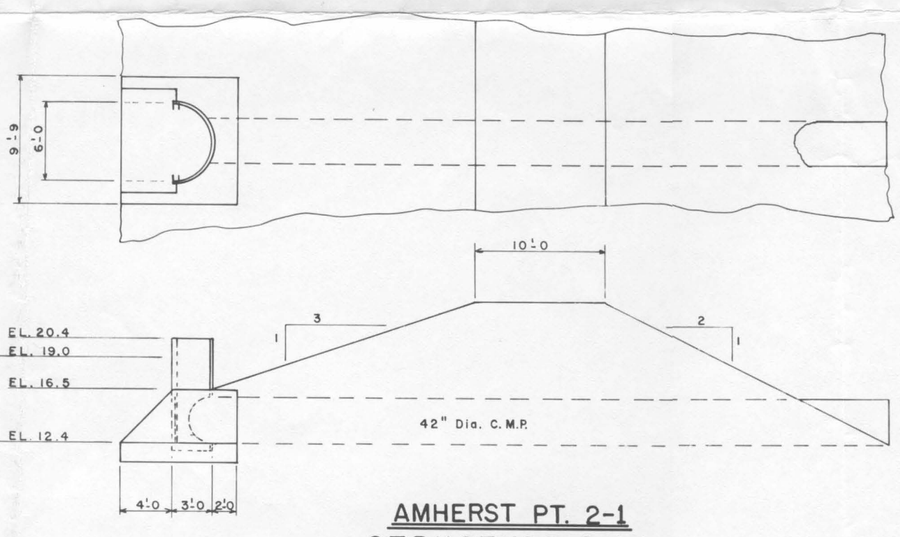
CANADIAN WILDLIFE SERVICES - CHIGNECTO NATIONAL WILDLIFE AREA



JOHN LUSBY 1
STRUCTURE JL 1-1



AMHERST PT. 1
STRUCTURE 1-1



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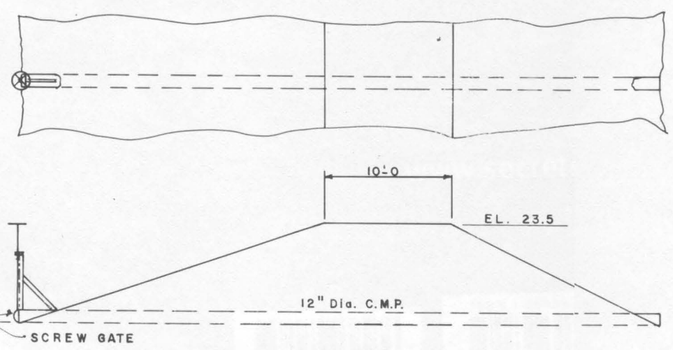
STRUCTURE 2-1-1



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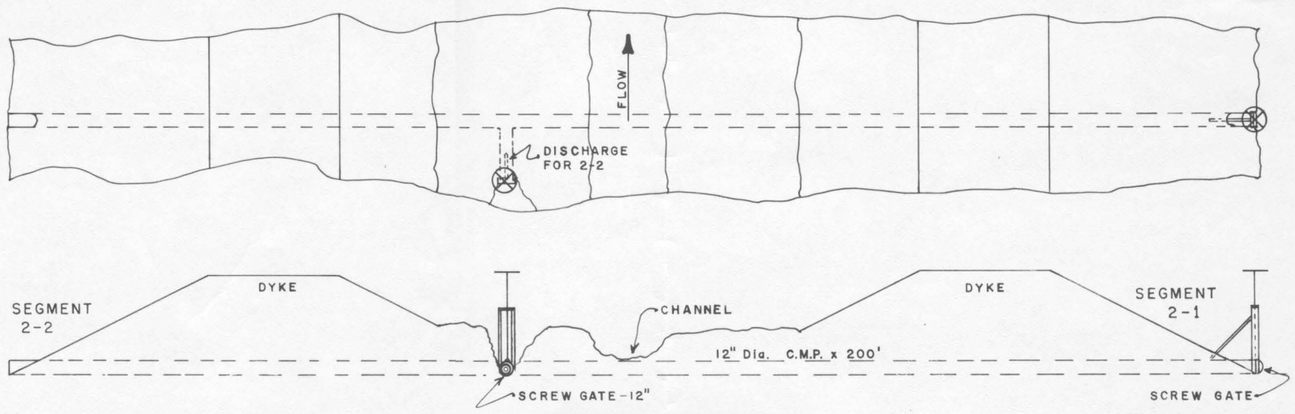
STRUCTURE 2-1-2



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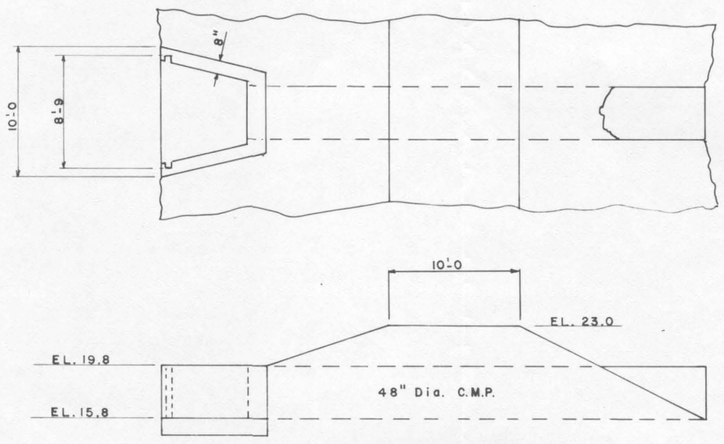
STRUCTURE 2-1-2



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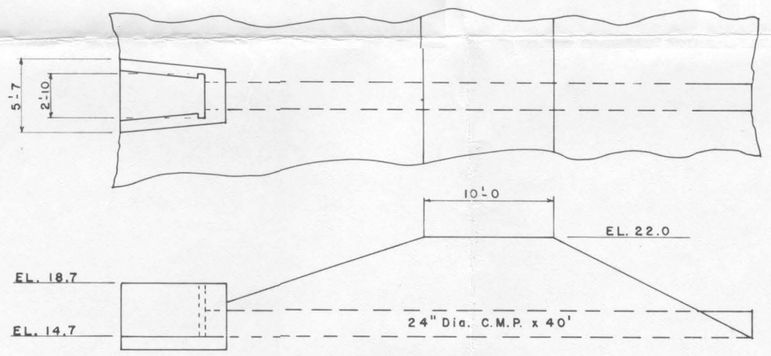
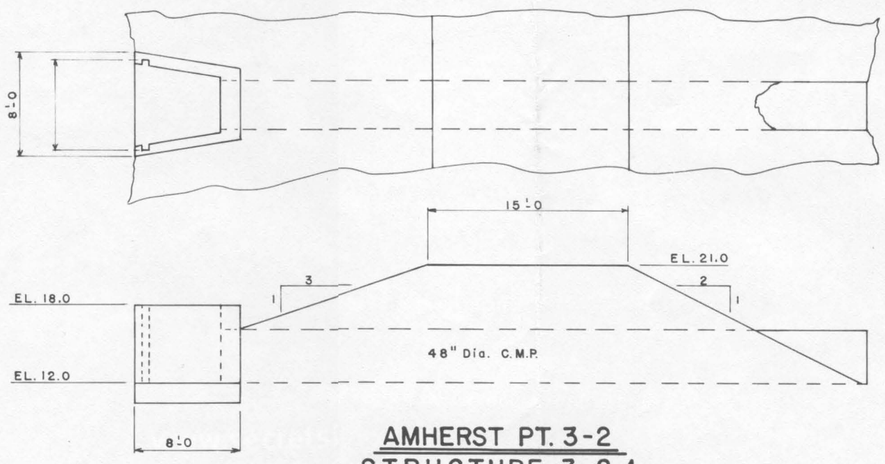
STRUCTURE 2-2-1



AMHERST PT. 3-1
STRUCTURE 3-1-1



AMHERST PT. 3-2
STRUCTURE 3-2-1

CANADIAN WILDLIFE SERVICES-CHIGNECTO NATIONAL WILDLIFE AREA

Ducks Unlimited Canada

JOHN LUSBY & AMHERST POINT STRUCTURES

SCALE 1"-10' Approx.	PROJECT
DRAWN BY R.T.	APPROVED
DATE JAN. '83	DRAW. No. 3 of 3