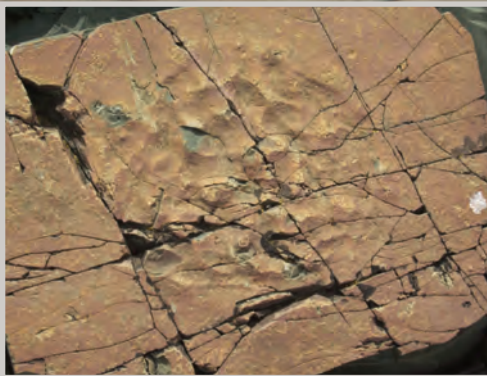


# MISTAKEN POINT

## Ecological Reserve

*Management Plan*



## **Mistaken Point Ecological Reserve Management Plan**

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(unless otherwise noted)



### Foreword

Newfoundland and Labrador's protected areas are special places. They preserve examples of woodland caribou herds, diverse seabird colonies, globally important fossil sites, endangered and threatened plants and animals, and globally rare habitats. Our protected areas provide natural venues for scientific research, education, and enjoyment for current and future generations.

Parks and Natural Areas Division of the Department of Environment and Conservation currently manages 31 provincial parks, 2 wilderness reserves, 18 ecological reserves, 2 Canadian heritage rivers, and 1 public reserve. Establishing and maintaining a system of protected areas is the foundation for sustainable and responsible development in Newfoundland and Labrador.

Our vision for a system of natural areas is:

*A comprehensive system of publicly supported parks and protected areas for citizens present and future that protects the province's rich biodiversity and natural heritage, helps support a vibrant culture and sustainable economy, and enhances public understanding, appreciation, and enjoyment of our natural environment.*

Mistaken Point Ecological Reserve is an example of our vision in action. The reserve protects globally significant fossil assemblages, which are the world's oldest and largest known, architecturally complex examples of organisms from the Ediacaran Period (620-543 million years ago). Parks and Natural Areas Division is committed to working with the community of Portugal Cove South, scientific researchers, and other agencies to maintain fossil and site integrity, to provide sustainable visitor experiences, and to successfully establish the reserve as a UNESCO World Heritage Site. This management plan for Mistaken Point Ecological Reserve demonstrates the Department's commitment to protect and present one of Newfoundland and Labrador's special places.

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## 1 MISTAKEN POINT ECOLOGICAL RESERVE

### 1.1 Significance of Mistaken Point Ecological Reserve

The Ediacaran biota, which flourished some 575-542 million years (Ma) ago, represents the “first appearance of large, architecturally complex organisms” in the fossil record of life on Earth (Narbonne, 2005). Mistaken Point Ecological Reserve (MPER) is globally significant because it protects a sequence of sedimentary rocks containing:

- The world’s oldest known, architecturally complex fossils.
- The largest (up to almost 2 m in length) known Ediacara-type fossils.
- The most reliably dated (i.e., best constrained in terms of their absolute, radiometrically-determined ages) Ediacaran fossils from anywhere.
- Spectacular fossil-bearing surfaces that possess abundance (100s-1000s of specimens), density and diversity levels (of large complex organisms) unrivaled by any other Ediacaran assemblage in the world. Such bedding planes, especially the famous ‘D’ and ‘E’ Surfaces (Landing et al., 1988) at Mistaken Point, furnish a unique natural laboratory for the study of the composition and ecology of early animal communities that were buried, in situ, on the sea floor where they lived.

The ‘E’ Surface has been described by Clapham et al. (2003) as “perhaps the finest exposure of an Ediacaran ecosystem available anywhere.” According to Narbonne et al. (2007), “there probably are more Ediacara-type fossils at Mistaken Point than in the combined collections of every museum on Earth.”

### 1.2 History of Discovery and Establishment

Remains of complex, soft-bodied organisms were discovered at Mistaken Point in 1967 during the course of geological mapping by Memorial University of Newfoundland M.Sc. student S.B. Misra (assisted by P. Thompson). They were first described by Anderson and Misra (1968) in the prestigious scientific journal, *Nature*. This represented the first report of large, Ediacara-type fossils from the Western Hemisphere and the first ever record of a deep water Ediacaran fauna.

## Mistaken Point Ecological Reserve Management Plan

The discovery generated a considerable amount of scientific and public interest, which led to a number of fossils being collected (by museums or university field parties and private individuals) and/or damaged. In July 1987, the Provincial Government established Mistaken Point Ecological Reserve (MPER; 2.95 km<sup>2</sup>) to protect the area's main fossil locations.

Since 1998, Professor Guy Narbonne of Queen's University, together with various students and colleagues, has been involved in a continuous, long-term study of the paleontology and geology of MPER. As of 2008, Narbonne and his co-workers have

published 17 refereed scientific papers based on this fieldwork. A paper by Narbonne and Gehling (2003), which reported Ediacaran fossil finds from outside the original Reserve (and extended the known stratigraphic range of the Ediacaran biota some 1.5 km below the 'D' and 'E' Surfaces of Mistaken Point), prompted the establishment of Mistaken Point Extension Emergency Ecological Reserve (2.7 km<sup>2</sup>) in 2003 and again in 2007. In 2009, MPER was expanded to permanently include the emergency extension (see Figure 1 for new boundary).

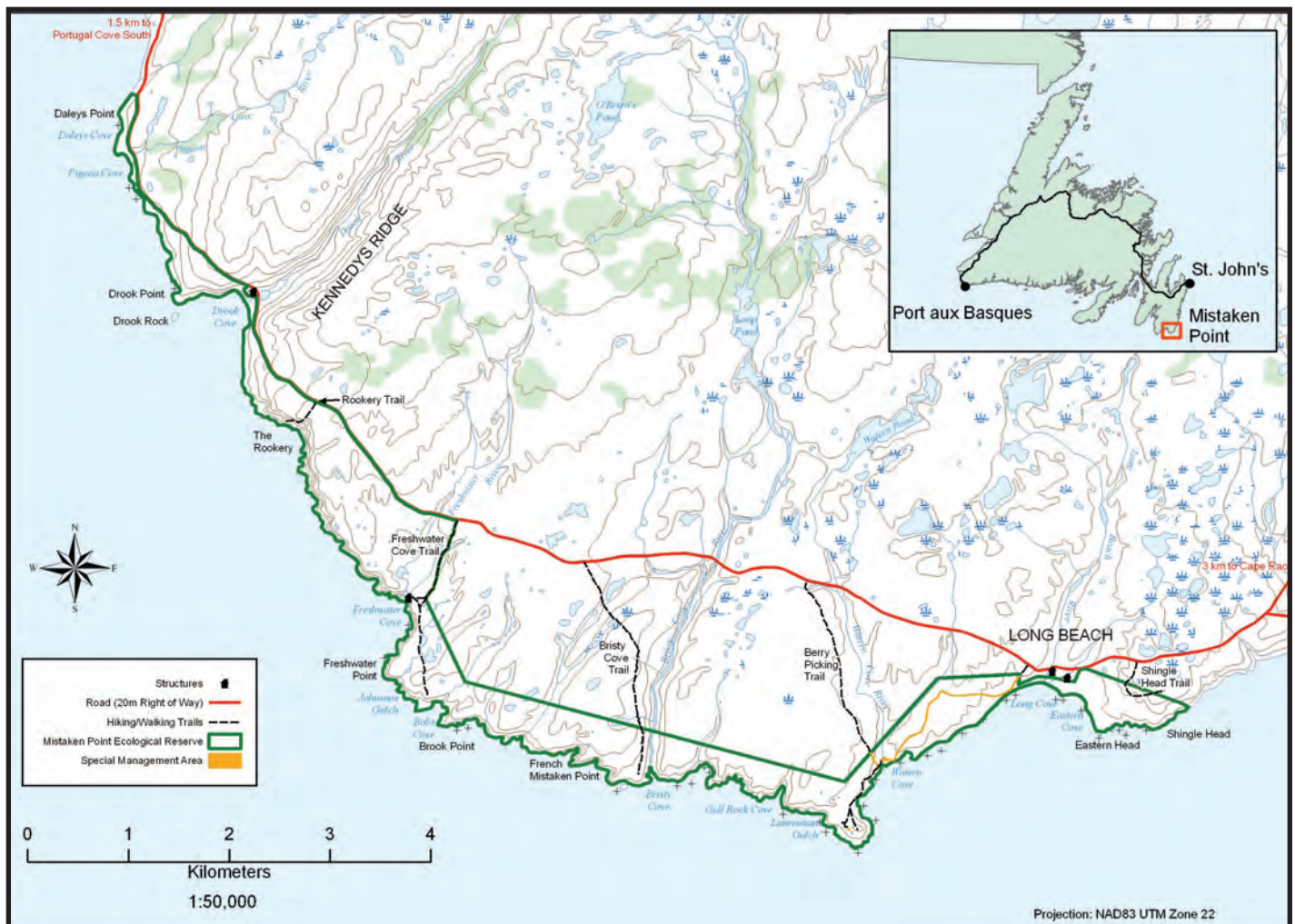


Figure 1. Map of Mistaken Point Ecological Reserve

Such discoveries have added momentum to the efforts of a coalition of scientists and conservationists to secure MPER's nomination for UNESCO World Heritage Site status. In March 2004 the reserve was formally added to Canada's Tentative List of World Heritage Sites.

### 1.3 Location and Nature of the Reserve

Mistaken Point Ecological Reserve lies within the Eastern Hyper-oceanic Barrens Ecoregion (Ecoregion 7; Meades, 1990) and is characterized by frequent and persistent fog. It's gently to moderately rolling topography is cut by several significant, and innumerable minor, southward-flowing streams. The glaciated landscape is covered by blanket bog and moss-heath communities with scattered patches of stunted Balsam Fir (known as tuckamore). The reserve features spectacular coastal scenery and impressive views of the barrens.

Several seabird colonies (e.g., the Rookery and Freshwater Cove) – dominated by Black-legged Kittiwakes – are contained within the reserve. Other breeding seabird species include Herring Gull, Great Black-backed Gull, Razorbill, Common Murre, Atlantic Puffin, Black Guillemot, and Double-crested Cormorant. A small colony of Leach's Storm-Petrels is believed to be present at Mistaken Point itself.



The Rookery

Part of the coastline of MPER is encompassed by the official Mistaken Point Canadian Important Bird Area (IBA), which extends from the Drook to Cape Race. Designated under the congregatory species criterion, this IBA is considered globally significant because of its wintering populations of Purple Sandpipers and Common Eiders.

### 1.4 Geology

#### 1.4.1 Earth History

The Earth is now considered to be ca. 4.6 billion years (Ba) old. As shown in Figure 2, the Precambrian accounts for ~ 88% of Earth's lifespan and consists of

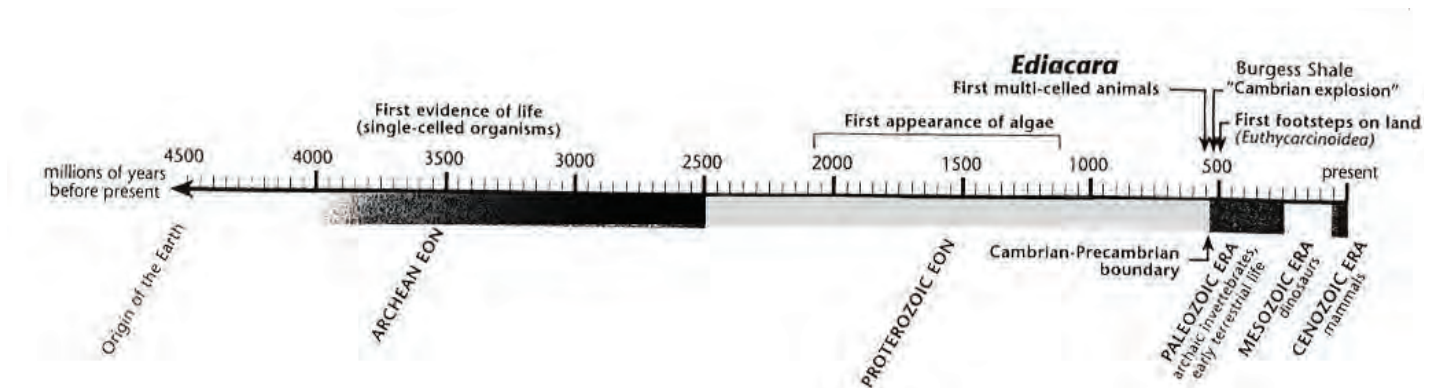


Figure 2. Highly generalized geologic time scale showing the 'location' of the Ediacaran biota (from Grady, 2004)

the Archean and Proterozoic Eons. The Phanerozoic – the era of abundant life – commences at the base of the Cambrian Period. This 542 Ma-old boundary marks the beginning of the celebrated ‘Cambrian explosion’, when a diverse and abundant fauna of marine animals – including the ancestors of the majority of modern animal groups – ‘suddenly’ appears in the fossil record. Abundant trace fossils were later accompanied by small shelly fossils. Sedimentary rocks of the eastern Avalon Peninsula are mostly Late Neoproterozoic (750-542 Ma) in age.

1.4.2 Geology of Newfoundland and the Avalon Peninsula

Newfoundland’s rocks record the opening and closing of an ancient ocean known as Iapetus. The Island of Newfoundland lies at the northeastern extremity of the Appalachian Orogen, which comprises the eroded remnants of a high mountain chain formed by the closure of Iapetus. The Newfoundland Appalachians are divided into four main tectono-stratigraphic zones or terranes (Figure 3; e.g. Sharpe, 2008), the easternmost of which is the Avalon Zone. This zone, named for the Avalon Peninsula, “is the ‘type area’ for the Late Proterozoic-Ordovician exotic composite terrane termed Avalonia” (Ichaso et al., 2007). Approximately 580 Ma ago, the microcontinent of Avalonia (present day eastern Newfoundland, England and Wales) was located at a latitude of approximately 40-65° S, off what is now the Guyana massif of South America (which was part of a supercontinent called Pannotia-Gondwana).

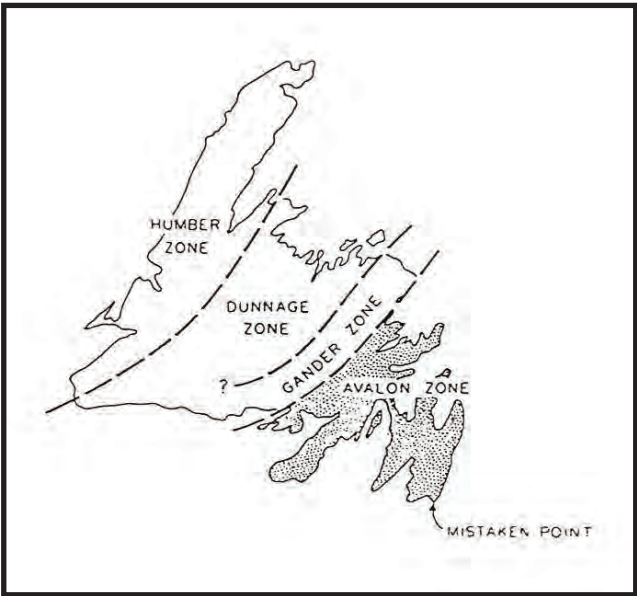


Figure 3. The four main tectono-stratigraphic zones (or terranes) of Newfoundland

Group (thickness in metres)	Formation (thickness in metres)	Lithology
SIGNAL HILL (> 1500)	CAPE BALLARD (>260m)	Upper part: thick bedded, buff weathering grey sandstone and quartz granule conglomerate. Lower part: grey to purple shale and grey siltstone (50 m).
	FERRYLAND HEAD (250m)	Thin- to medium-bedded grey and red sandstone. Red, wavy bedded sandstone and shale (High Rocks Member) locally at base.
	GIBBETT HILL (760m)	Thick bedded, light grey sandstone, thin bedded, dark grey sandstone and siltstone, local calcareous sandstone ellipsoids.
	CAPPAHAYDEN (175m)	Laminated, fissile, light grey siltstone.
Local erosional disconformity		
ST. JOHN'S (~2000m)	RENEWS HEAD (300m)	Thin, lenticular bedded, dark grey sandstone and minor shale.
	FERMEUSE (1400m)	Grey to dark grey and black shale, thin lenses of buff weathering sandstone and siltstone.
	TREPASSEY (250m)	Medium- to thin-bedded, graded, grey sandstone and shale.
CONCEPTION (> 4,000m)	MISTAKEN POINT (400m)	Medium bedded, grey to pink sandstone, green, purple and red shale, minor tuff.
	BRISCAL (100-1200m)	Thick bedded, grey sandstone, green to grey argillite, red sandstone and arkose, locally grey, thin bedded siltstone and shale.
	DROOK (1500m)	White weathering, green, grey and buff, and locally red to purple argillaceous chert, siliceous siltstone, sandstone, silicified tuff, locally thick sandstone with shale, siltstone and minor purple argillite.
	GASKIERS (250-300m)	Grey diamictite, intercalated rhythmites of mudstone, siltstone and sandstone with dropstones, and conglomerate.
	MALL BAY (> 800m)	Green siliceous siltstone and argillite, grey sandstone, black, green and purple argillite and chert, tuffaceous sandstone, green siliceous tuff and agglomerate, white quartzose sandstone and minor limestone.
Angular Unconformity		
HARBOUR MAIN (> 1500m)		Red, pink and grey silicic tuff, agglomerate, pink to red rhyolite and welded tuff; massive dark green to purplish basalt.

Figure 4. Late Proterozoic stratigraphy of the Avalon Peninsula (from Narbonne et al., 2005)

The stratigraphic units (with their component rock-types) form the >10 km-thick, Late Proterozoic sedimentary succession of the Avalon Peninsula (Figure 4). This succession unconformably overlies the >1,500 m-thick Harbour Main Group (interpreted as the product of island arc volcanism). Towards its base, the Gaskiers Formation (580 Ma) is considered to be of glacial origin and represents the last of a series of severe, Neoproterozoic global glaciation intervals known as ‘Snowball Earth.’ In environmental terms, the sequence above the Gaskiers Formation documents a gradual upward shallowing, from submarine fan deposits of the Conception Group to braided stream/alluvial fan redbeds within the Signal Hill Group (cf. King, 1989).



Prominent, 35cm-thick, volcanic ash unit (pale, centre) overlying the “pizza disc”-bearing surface near Daley’s Cove. Radiometrically dated at 575 Ma.

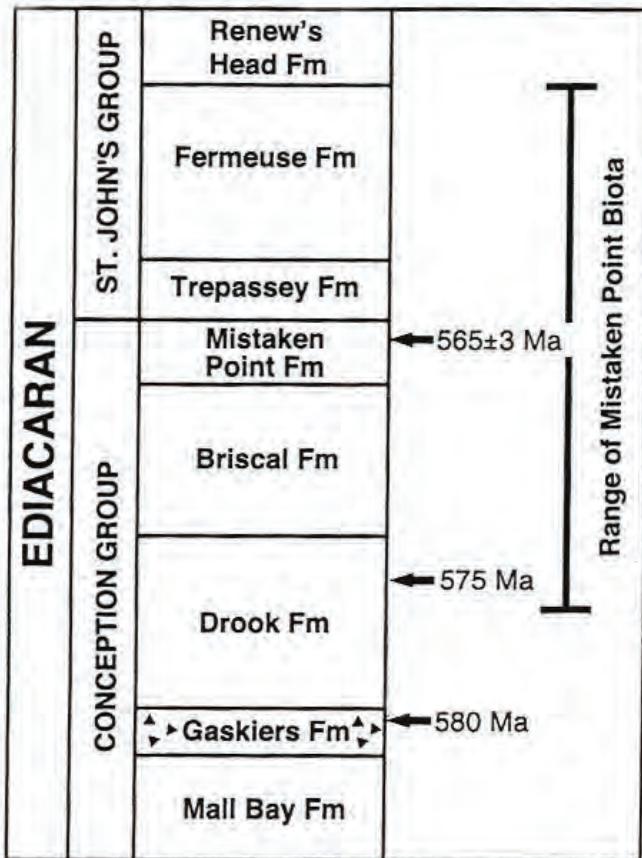


Figure 5. Diagram showing the stratigraphic position of the section contained within Mistaken Point Ecological Reserve (black bar) and radiometrically-dated units referred to in the text (Fm = Formation) (Modified from Narbonne, 2004)

#### 1.4.3 Stratigraphy, Structural Geology, and Sedimentology of the Reserve

Currently, an exact total thickness for the stratigraphic sequence contained within MPER is yet to be determined, but it is believed to be about 2,100 - 2,500 m. As shown in Figure 5, it includes the upper ~400 m of the Drook Formation and the succeeding Briscal and Mistaken Point formations (of the Conception Group), plus the Trepassey Formation and the lowermost portion of the Fermeuse Formation (St. John's Group). Based upon U-Pb (uranium-lead) radiometric dates obtained from zircons in ashes overlying the 'E' surface (565±3 Ma; Benus in Landing et al., 1988) and the *Charnia wardi* level (Narbonne and Gehling, 2003) in the upper Drook Formation (575±1 Ma; Bowring et al., 2003), this interval spans at least 10 million years. The distribution of the above-mentioned five formations within the reserve is shown in Figure 6.

Structurally, MPER is dominated by the open, upright, NNE-SSW- trending Freshwater Anticline whose axis (which plunges 'south' at ~10°) intersects the

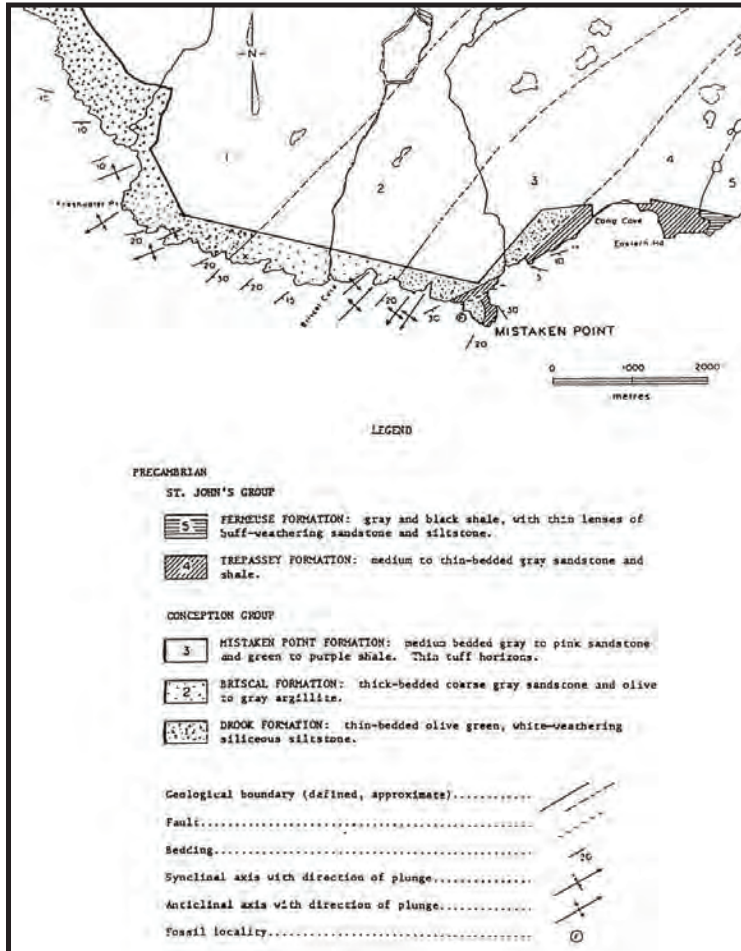


Figure 6. Geological map of Mistaken Point Ecological Reserve (after King, 1988)



Differential weathering of bedding planes, previously interpreted as wave ripples

coast near the Drook. The western limb of this fold dips at  $\sim 25^\circ$  into the Biscay Bay Syncline while strata on its eastern limb generally dip at  $30-40^\circ$  (Figure 6; King, 1988; Sharpe, 2008). Rocks of the Fermeuse Formation occur in the core of the Cape Race Syncline. A number of small folds parasitize the limbs of these large structures. Axial planar to the major folds is a penetrative, pressure solution cleavage of variable intensity. In the Mistaken Point area, this cleavage has a strike of  $058-238^\circ$  (Wood et al., 2003). Simple shortening perpendicular to the cleavage planes ranges in value from 0-50% (typically  $\sim 42\%$ ; Narbonne et al., 2005). As a result of this pervasive tectonic deformation, researchers use computer techniques to restore the fossils' shapes

and angular relations to their original values – a process known as ‘retrodeformation’ (e.g., Seilacher, 1997; Wood et al., 2003). On the bedding planes of certain cleaved units such as the ‘D’ and ‘E’ Surfaces, differential weathering has produced distinctive topographic patterns that, in the past, have been erroneously interpreted as wave ripples.

The (Figure 7), the vast majority of the MPER stratigraphic sequence accumulated in an elongate, NE-SW oriented, deep marine basin associated with a tectonically active, volcanic island arc (Figure 7; Wood et al., 2003; Ichaso et al., 2007). A partial modern analogue for this forearc basin is the deep ocean environment off the east coast of Japan. Volcanic

eruptions were frequent; at least 100 ash layers are present in the Mistaken Point and Trepassey formations' portion of the section alone (Wood et al., 2003). These ashes played a vital role in the preservation of the Mistaken Point biota (see below). The Drook and Briscal formations have been interpreted by Wood et al. (2003) as the products of a basin floor, axial turbidite system. (Turbidites are the deposits of turbidity currents: dense sediment-water 'slurries' that flow down the continental slope onto the deep ocean floor.) The Mistaken Point Formation accumulated at the toe of the SE-facing basin margin

slope, whereas the Trepassey and Fermeuse formation deposits represent mid-slope environments (Wood et al., 2003). Sedimentation of the three latter formations was also influenced by NE-flowing contour currents (so-named because they flow parallel to the contours of the basin margin slope; their deposits are termed contourites). It is important to note that Wood et al. (2003), plus all earlier authors, concur that the reserve's fossil-bearing units were laid down at depths hundreds of metres beneath the ocean surface (i.e., well below storm wave-base and the lower limit of the photic zone).

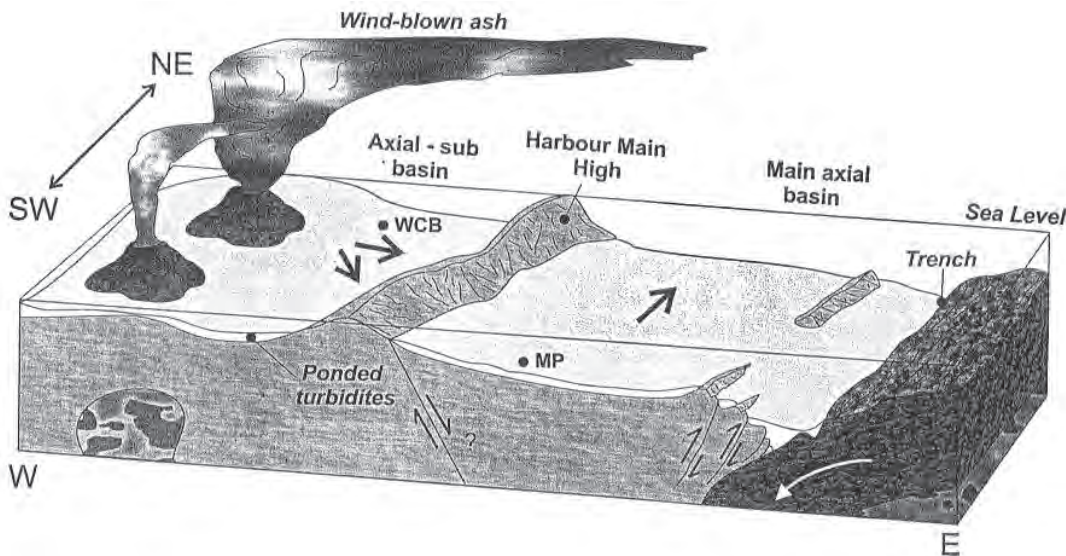


Figure 7. Block diagram showing a paleogeographic/plate tectonic reconstruction for the Avalon Peninsula during deposition of the Drook Formation. MP: Mistaken Point; WCB: West Conception Bay. (From Ichaso et al., 2007)



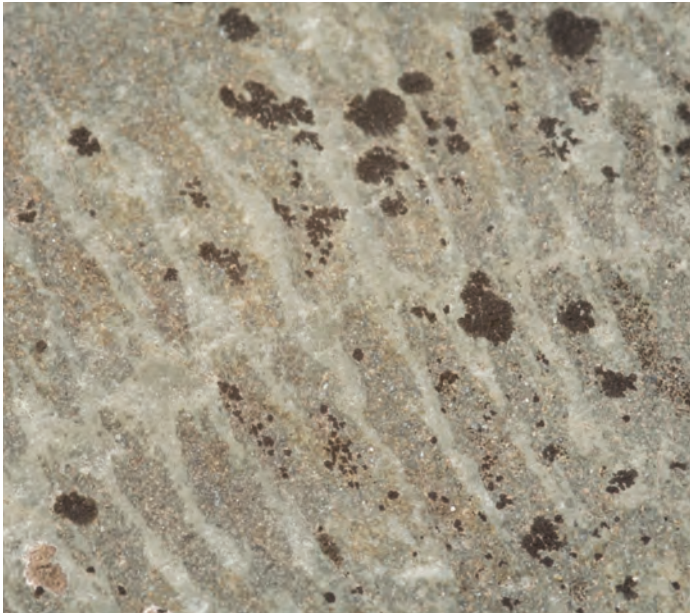


Figure 8. 'Spindle', *Fractofusus*

## 1.5 Paleontology

### 1.5.1 The Ediacaran Period and its Biota

Life on Earth arose at least 3.5 Ba and, for the first 3 Ba of its history was primarily microbial in nature (Fedonkin et al., 2007). The newly erected Ediacaran Period (620-543 Ma ago as originally defined by Knoll et al., 2006) was a crucial interval in Earth's evolution that witnessed the advent of major changes in the planet's atmospheric and ocean chemistry (Narbonne, 2005). The "abrupt appearance" of the first large, structurally complex, multicellular Ediacara-type fossils above the Gaskiers glacial deposits, "closely corresponds with geochemical evidence for a massive increase in oxygenation" of the world's oceans at this time (Canfield et al., 2007; Narbonne, 2007).

Unequivocal examples of the Ediacaran biota (named for the Ediacara Hills of South Australia, where fossils

were first discovered in 1946) are now known from ~30 localities on five continents. There are three basic "clusters" of Ediacaran fossil occurrences (Narbonne, 2005). The "Avalon assemblage" (sometimes termed the "Mistaken Point assemblage" e.g., Gehling and Narbonne, 2007) is the oldest (575-560 Ma) and is restricted to the deep water, marine, volcanoclastic setting of the Avalon Zone in Newfoundland. The richly fossiliferous Avalonian succession, which contains hundreds of volcanic ash layers, constitutes the thickest-known record of the Ediacaran biota (Narbonne, 2005). Worldwide, Narbonne (2005) identifies "four distinct styles of preservation" of Ediacara-type fossils. Two of these, Conception-style and Fermeuse-style preservation, characterize Avalon Zone sites. Excluding its Fermeuse Formation section, Conception-style preservation — whereby census populations of sea-floor communities are superbly preserved under beds of volcanic ash, creating what has been termed an "Ediacaran Pompeii" (Seilacher, 1997) — is the rule within MPER (Clapham et al., 2003; Narbonne, 2005; Narbonne et al., 2005).



Figure 9. 'Bush', *Bradgatia*

### 1.5.2 The Ediacaran Fossils of the Reserve

The Avalon assemblage contains approximately 30 taxa (distinctive fossil morphotypes), most of which are endemic to the Avalon Zone. Of these taxa, only a dozen or so are common (Clapham et al., 2003). Over 75% of the Avalon assemblage's distinctive taxa are classified as rangeomorphs — an extinct, high-order taxon whose members are characterized by their fractally branching, modular construction, and whose biological affinities are unknown (Narbonne, 2004; Gehling and Narbonne, 2007).

Eighteen taxa have been recorded at Mistaken Point, 12 of which are present on the 'E' Surface (Clapham et al., 2003). Until recently, few of the Ediacaran fossils found within MPER had been scientifically named, but were instead identified using informal terms such as 'spindles,' 'feather dusters,' 'bushes,' 'pectinates,' and 'pizza-discs'. Examples of some of the most common and/or distinctive MPER fossils are shown in Figures 8-11, and examples of their relative abundance are presented in Figure 12.



Figure 10. *Charniodiscus* (centre right) (Photo: PNAD, Julie Cappleman)

Within the reserve, Clapham et al. (2003) recorded more than 100 fossiliferous bedding planes within a stratigraphic interval of almost 2.5 km. They noted 30 different fossil-bearing surfaces in MPER's Mistaken Point Formation section alone. "Fossiliferous horizons increase in frequency and diversity up-section through the Briscal and Mistaken Point formations" (Gehling and Narbonne, 2007). Some of the reserve's fossil-bearing surfaces appear to be very continuous and can be correlated up to several kilometres laterally (Wood et al., 2003). The volcanic ashes overlying most of these fossil horizons killed and instantaneously buried the organisms living on the sea-floor sediment surface, thus "recording a snapshot of the living benthic community" at that moment (Clapham et al., 2003).

Fossil densities within the reserve are extremely impressive. Scientists mapped 1,488 fossils in an area of  $<100 \text{ m}^2$  on the 'D' Surface, and  $>4000$  fossils on the 'E' Surface (Clapham et al., 2003). The latter averages 40 fossils/ $\text{m}^2$  with  $>100$  fossils/ $\text{m}^2$  in the best-preserved areas.



Figure 11. 'Pizza Disc' (cf. *Ivesheadia*)

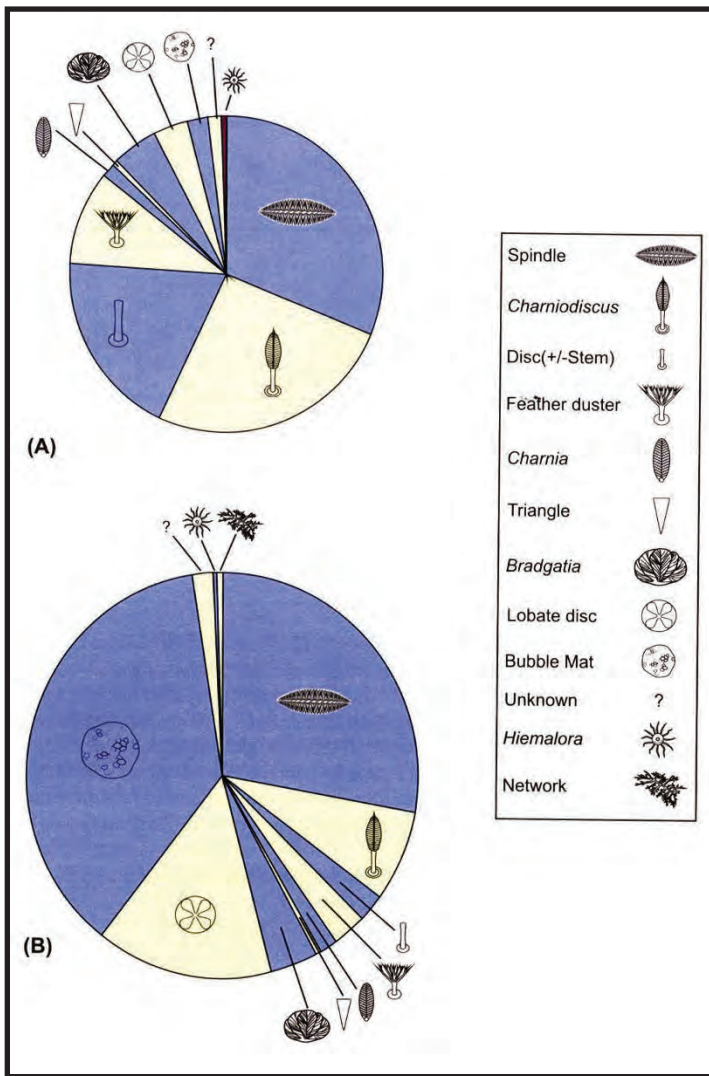


Figure 12. Relative abundance of the 12 most common fossil-types on the 'E' Surface at Mistaken Point. A: census measure; B: areal coverage (From Narbonne et al., 2005)

Most of the MPER organisms are believed to have been filter (suspension) feeders that were attached to the sea floor. No body or trace fossils attributable to bilaterally symmetrical animals have yet been found in the Mistaken Point biota.

Paleoecological analysis has demonstrated that MPER Ediacaran communities exhibited epifaunal tiering (i.e., the subdivision of vertical space within a community) equivalent to that shown by modern marine ecosystems composed of filter-feeding organisms (Figure 13; Clapham and Narbonne, 2002; Clapham et al., 2003). Based upon their work in the reserve, these authors concluded that "the earliest complex communities in the fossil record have structural attributes strikingly similar to those of modern counterparts." To date, however, the taxonomic relationships (if any) of the MPER fossils to modern organisms remain a mystery.

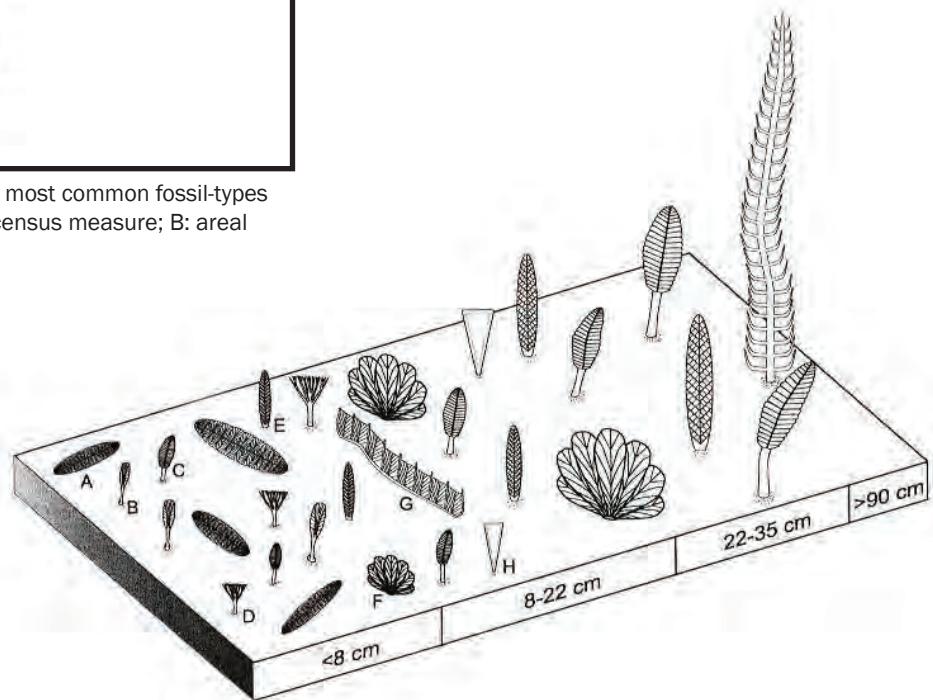


Figure 13. Diorama of the composite Mistaken Point community showing its tiered epifaunal structure. A: *Fractofusus* ('Spindle'). B: 'Ostrich Feather'. C: *Charniodiscus*. D: 'Duster'. E: *Charnia*. F: *Bradgatia*. G: *Pectinate*. H: *Thectardis* ('Triangle'). I: 'Xmas Tree' (From Clapham and Narbonne, 2002.)



## 2 MANAGEMENT POLICIES

### 2.1 Introduction

Ecological reserves are established under the *Wilderness and Ecological Reserves Act* (1980) for the preservation of areas of the province which contain unique or representative species, ecosystems or natural phenomena.

Mistaken Point Ecological Reserve encompasses 5.7 km<sup>2</sup> of coastline between Cape Race and Portugal Cove South, at the southeastern tip of Newfoundland.

This site contains the oldest, largest and most reliably-dated, complex Metazoan fossils on Earth. In terms of its overall diversity, density and abundance, the Mistaken Point biota is unrivalled among the world's other Ediacaran fossil assemblages.

Mistaken Point is a significant site for paleontologists studying the nature and evolution of very early, multicellular forms of life.

Mistaken Point is established as an ecological reserve primarily to protect an internationally significant Precambrian fossil locality, but also serves a variety of other objectives.

As per Section 5 of the *Wilderness and Ecological Reserves Act*, Mistaken Point Ecological Reserve is established:

1. To preserve rare botanical, zoological, geological or geographical characteristics;
2. To provide for scientific research and educational purposes in aspects of the natural environment;
3. To preserve the habitat of an animal or plant species that is rare or endangered;
4. To provide standards against which the effects of development in other areas may be measured;
5. To preserve representatives of distinct ecosystems in the province; and
6. To preserve organisms in their natural habitat to ensure the preservation of their gene pools.

This management plan specifies guidelines for protection and use of the site for scientific research, education, and sustainable tourism.

### 2.2 Vision

Our vision for Mistaken Point Ecological Reserve is:

*Mistaken Point Ecological Reserve is an internationally significant fossil site where fossil protection is the primary objective.*

*Research and monitoring provide vital information for reserve management and offer opportunities for local involvement and stewardship. Exciting possibilities for additional fossil discoveries attract international researchers who continually add to global understanding of the Ediacaran Period, the reserve and its outstanding universal value.*

*Reserve management reflects the standards of a UNESCO World Heritage Site. We are leaders in protection, education and sustainable tourism experiences. We are part of the community and are dedicated to establishing effective long-term partnerships - locally, nationally and internationally.*

### 2.3 Goals

Goal 1. Fossil Protection and Ecological Integrity

To protect the integrity of the fossils and maintain the reserves ecological integrity

Goal 2. Research and Monitoring

To promote and maintain an active research and monitoring program

Goal 3. Education and Sustainable Tourism

To provide high quality educational and sustainable tourism experiences

Goal 4. Partnerships

To create and maintain active partnerships with local communities, educational institutions, organizations and government agencies in research, education and stewardship activities

Parks and Natural Areas Division will work with local communities and interested groups and individuals to further develop the vision, goals and objectives prior to the submission of the UNESCO World Heritage Site Nomination.



## 2.4 Management Policies

The overall approach to reserve resource management is one that emphasizes protection of the fossils and ecological integrity of the reserve. The management approach for Mistaken Point Ecological Reserve is consistent with IUCN Protected Area Management Category II. In keeping with this approach, the following overall management policies are established:

- a. Public access to the fossils is controlled via a permit system and guided tours to ensure the security of the fossil resources.
- b. Scientific research is encouraged where it does not conflict with the general objectives of site protection.
- c. Use of the site for educational purposes may be permitted where it does not conflict with the general objectives of site protection and scientific research.
- d. Use of the site for purposes other than (b) and (c) may be permitted where it does not conflict with the general objective of site protection. Berry picking, hunting, and fishing are examples of such uses.

For a summary of the regulations see Appendix C. The full *Wilderness and Ecological Reserves Act* and *Fossil Ecological Reserve Regulations* are available online at [www.gov.nl.ca/parks/library/leg.html](http://www.gov.nl.ca/parks/library/leg.html).

## 2.5 Land Use

### 2.5.1 Licence to Occupy

There is one recreational cottage (License to Occupy #96326) located at Freshwater Cove within Mistaken Point Ecological Reserve. The title holder is bound by the reserve regulations.

### 2.5.2 Private Land

In Newfoundland and Labrador private land owners are not required by law to register their property. Given the long history of settlement in this area, and based on information received at public consultations, it is likely that there is additional private land within or adjacent to the reserve. Parks and Natural Areas Division will work with the community to identify and map all private land in the area and to accommodate access and use.

### 2.5.3 Grazing

As per the *Fossil Ecological Reserve Regulations*, grazing of animals is permitted in the reserve. The number of grazing animals shall not exceed those present at the time of reserve establishment.



Grazing cattle in the reserve (Photo: PNAD, Julie Cappelman)

### 2.5.4 Special Management Area

The *Wilderness and Ecological Reserves Act* prohibits the development of any structures in an ecological reserve. Therefore, a small area of land (0.6 ha) as shown in Figure 14 has been excised from MPER and established as a Special Management Area (SMA) under the *Lands Act* to facilitate visitor management to the reserve and prevent further erosion of wetlands. The Mistaken Point SMA includes the Watern Cove Trail up to Watern Cove River, a small parcel of land around the river, a section of the Berry Picking Trail and a small viewpoint on the headland at Mistaken Point.

The purpose of the special management area is:

1. To allow trail development to stabilize sections of the hiking trails and to provide visitors with a safe water crossing at Watern Cove River;
2. To allow the development of a small interpretive viewpoint at Mistaken Point; and
3. To allow duck hunters to use ATVs on these trails in the SMA during the duck hunting season with a permit from Parks and Natural Areas Division.

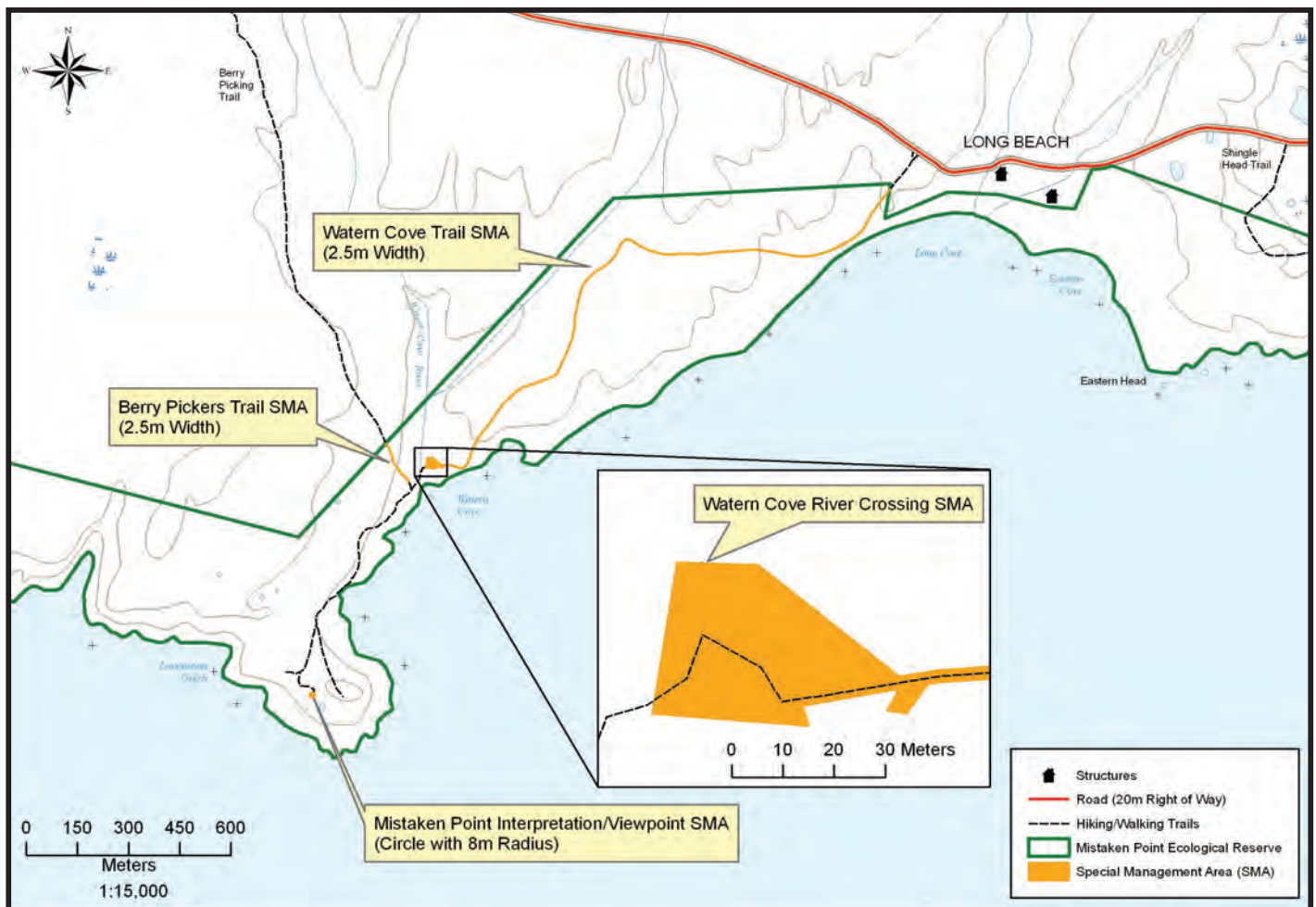


Figure 14. Mistaken Point Special Management Area



Portugal Cove South

### 3 IMPLEMENTATION GUIDELINES

In addition to the requirements of the *Wilderness and Ecological Reserves Act*, which apply to all ecological reserves, and to the *Fossil Ecological Reserve Regulations*, reserve establishment provides opportunities for residents and visitors to experience MPER via education, research, recreation and tourism activities. The following statements are to serve as a guide to users and managers of Mistaken Point Ecological Reserve.

#### 3.1 Reserve Management

- a. The managing agency of the reserve is the Parks and Natural Areas Division of the Department of Environment and Conservation.
- b. The existence of the reserve shall be noted by signs placed at appropriate places along its boundary. Other signs may be erected in the reserve, with the written approval of the Manager of Natural Areas, to identify existing trails, demarcate the fossil protection zone, and provide educational information for visitors.
- c. No new buildings or other permanent structures will be erected within the reserve.
- d. Berry picking, mushroom picking, hunting and fishing may be permitted within the reserve as they

do not directly affect the integrity of the features for which the reserve is established.

- e. Mapping of the site at a very detailed level will aid in site management and future monitoring.
- f. Regular patrols of the reserve are made by staff of Parks and Natural Areas Division, Department of Environment and Conservation and the Department of Natural Resources, to ensure that regulations are being adhered to. Local support and stewardship are also vital to site protection.
- g. Every effort will be made through the appropriate agencies to keep the viewshed along the road from Portugal Cove South and Cape Race in as natural a condition as possible.



(Photo: PNAD, Sean Greene)

### 3.2 Scientific Research

Providing areas for long-term scientific research is one of the main reasons for creating and managing the province's ecological reserves. Therefore, it is important that research be carried out in such a way that the scientific value of the reserve is not destroyed or diminished for future investigators. Accordingly, persons making requests to conduct research within Mistaken Point Ecological Reserve require a permit from the Parks and Natural Areas Division of the Department of Environment and Conservation. Applications for permits should provide a description of the research proposed, including the objectives, methodologies and time frame involved.

The following conditions shall be stipulated for each permit issued:

All published material related to research conducted at the site will acknowledge the existence of the reserve and the permission of Newfoundland and Labrador Department of Environment and Conservation.



Researchers casting fossils



Interpretive tour of the fossils (Photo: PNAD, Julie Cappleman)

A report of the results of each research project will be filed with Parks and Natural Areas Division of the Department of Environment and Conservation and a copy of all scientific papers will be forwarded to the Division upon publication.

When practical, staff from Parks and Natural Areas Division will accompany site visits made by researchers and educational groups in order to record and monitor potential impacts on the reserve.

### 3.3 Educational Use

The site may be used for educational purposes provided such use does not damage the integrity or scientific value of the reserve. Permits are required for institutions, individuals and groups wishing to utilize the area. Such permits can be obtained from Parks and Natural Areas Division of the Department of Environment and Conservation.



The Rookery northward (Photo: PNAD, Sean Greene)

### 3.4 Sustainable Tourism

In keeping with the general management policy to retain the site in as natural a state as possible, the only on-site development for educational use is the posting of signs, as stipulated in 3.1(b).

Information concerning the reserve is distributed to the public through the Parks and Natural Areas Division of the Department of Environment and Conservation.

Sustainable tourism presents an opportunity to support the conservation of biodiversity in protected areas as well as provide regional economic, social and cultural benefits. Permits are required for all commercial operators wishing to utilize the area. Such permits can be obtained from Parks and Natural Areas Division of the Department of Environment and Conservation.

The Division will champion excellence in sustainability in the design, construction, promotion and operation of public and private sector tourism facilities, services and educational programs in Mistaken Point Ecological Reserve.

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## APPENDIX A - Fossils of Mistaken Point Ecological Reserve

List is currently being compiled

## APPENDIX A - Fossils of Mistaken Point Ecological Reserve

List is currently being compiled

## APPENDIX B - Birds of Mistaken Point Ecological Reserve

Table 1. Checklist of bird species detected at Mistaken Point Ecological Reserve and adjacent waters (up to 500 m offshore). List based on incidental sightings made from 1998-2009 by experienced field ornithologists.

sp = spring (21 March – 20 June); s = summer (21 June – 20 September); f = fall (21 September – 20 December); w = winter (21 December – 20 March)

Family	Common name	Scientific name	Season <sup>a</sup>	Rare <sup>a</sup>
<b>Ducks, Geese, and Swans (Anatidae)</b>				
	Brant	<i>Branta bernicla</i>	f	yes
	Canada Goose	<i>Branta canadensis</i>	spfw	no
	American Wigeon	<i>Anas americana</i>	sfw	no
	American Black Duck	<i>Anas rubripes</i>	spsfw	no
	Northern Pintail	<i>Anas acuta</i>	sp	no
	Green-winged Teal	<i>Anas crecca</i>	spsfw	no
	Ring-necked Duck	<i>Aythya collaris</i>	spsfw	no
	Greater scaup	<i>Aythya marila</i>	w	no
	King Eider	<i>Somateria spectabilis</i>	spfw	no
	Common Eider	<i>Somateria mollissima</i>	spw	no
	Harlequin Duck <sup>1,2</sup>	<i>Histrionicus histrionicus</i>	fw	no
	Surf Scoter	<i>Melanitta perspicillata</i>	spfw	no
	White-winged Scoter	<i>Melanitta fusca</i>	spsfw	no
	Black Scoter	<i>Melanitta nigra</i>	sf	no
	Long-tailed Duck	<i>Clangula hyemalis</i>	spfw	no
	Red-breasted Merganser	<i>Mergus serrator</i>	w	no
<b>Partridges and Grouse (Phasianidae)</b>				
	Willow Ptarmigan	<i>Lagopus lagopus</i>	spfw	no
<b>Loons (Gaviidae)</b>				
	Red-throated Loon	<i>Gavia stellata</i>	spf	no
	Common Loon	<i>Gavia immer</i>	spsfw	no
<b>Grebes (Podicipedidae)</b>				
	Red-necked Grebe	<i>Podiceps grisegena</i>	spfw	no
<b>Shearwaters and Petrels (Procellariidae)</b>				
	Northern Fulmar	<i>Fulmarus glacialis</i>	s	no
	Cory's Shearwater	<i>Calonectris diomedea</i>	s	no
	Greater Shearwater	<i>Puffinus gravis</i>	sf	no
	Sooty Shearwater	<i>Puffinus griseus</i>	sf	no
	Manx Shearwater	<i>Puffinus puffinus</i>	spsf	no
<b>Storm-petrels (Hydrobatidae)</b>				
	Leach's Storm-petrel	<i>Oceanodroma leucorhoa</i>	sf	no
<b>Boobies and Gannets (Sulidae)</b>				
	Northern Gannet	<i>Morus bassanus</i>	spsf	no
<b>Pelicans (Pelecanidae)</b>				
	American White Pelican	<i>Pelecanus erythrorhynchos</i>	s	yes
<b>Cormorants (Phalacrocoracidae)</b>				
	Double-crested Cormorant	<i>Phalacrocorax auritus</i>	spf	no
	Great Cormorant	<i>Phalacrocorax carbo</i>	w	no

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Family	Common name	Scientific name	Season <sup>a</sup>	Rare <sup>a</sup>
<b>Hérons, Bitterns, and Egrets (Ardeidae)</b>				
	American Bittern	<i>Botaurus lentiginosus</i>	s	no
	Great Egret	<i>Ardea alba</i>	f	yes
<b>Eagles, Hawks, and Allies (Accipitridae)</b>				
	Osprey	<i>Pandion haliaetus</i>	spsf	no
	Bald Eagle	<i>Haliaeetus leucocephalus</i>	spsfw	no
	Northern Harrier	<i>Circus cyaneus</i>	spsf	no
	Sharp-shinned Hawk	<i>Accipiter striatus</i>	spsf	no
	Northern Goshawk	<i>Accipiter gentilis</i>	spsfw	no
	Swainson's Hawk	<i>Buteo swainsoni</i>	f	yes
	Red-tailed Hawk	<i>Buteo jamaicensis</i>	f	yes
	Rough-legged Hawk	<i>Buteo lagopus</i>	spsfw	no
	Golden Eagle	<i>Aquila chrysaetos</i>	f	yes
<b>Falcons (Falconidae)</b>				
	American Kestrel	<i>Falco sparverius</i>	sfw	no
	Merlin	<i>Falco columbarius</i>	spsf	no
	Gyr Falcon	<i>Falco rusticolus</i>	spw	no
	Peregrine Falcon <sup>2,3</sup>	<i>Falco peregrinus anatum</i>	spsfw	no
<b>Rails, Gallinules, and Coots (Rallidae)</b>				
	American Coot	<i>Fulica americana</i>	f	no
<b>Lapwings and Plovers (Charadriidae)</b>				
	Black-bellied Plover	<i>Pluvialis squatarola</i>	spsf	no
	American Golden-plover	<i>Pluvialis dominica</i>	sf	no
	Common Ringed Plover	<i>Charadrius hiaticula</i>	s	yes
	Semipalmated Plover	<i>Charadrius semipalmatus</i>	sf	no
	Killdeer	<i>Charadrius vociferus</i>	spf	no
<b>Sandpipers, Phalaropes, and Allies (Scolopacidae)</b>				
	Spotted Sandpiper	<i>Actitis macularius</i>	spsf	no
	Solitary Sandpiper	<i>Tringa solitaria</i>	s	yes
	Greater Yellowlegs	<i>Tringa melanoleuca</i>	spsf	no
	Willet	<i>Tringa semipalmata</i>	s	no
	Lesser Yellowlegs	<i>Tringa flavipes</i>	spsf	no
	Whimbrel	<i>Numenius phaeopus hudsonicus</i>	sf	no
	Eurasian Whimbrel	<i>Numenius phaeopus phaeopus</i>	s	yes
	Hudsonian Godwit	<i>Limosa haemastica</i>	sf	no
	Ruddy Turnstone	<i>Arenaria interpres</i>	spsfw	no
	Red Knot <sup>4</sup>	<i>Calidris canutus</i>	sf	no
	Sanderling	<i>Calidris alba</i>	sfw	no
	Semipalmated Sandpiper	<i>Calidris pusilla</i>	sf	no
	Least Sandpiper	<i>Calidris minutilla</i>	spsf	no
	White-rumped Sandpiper	<i>Calidris fuscicollis</i>	sfw	no
	Baird's Sandpiper	<i>Calidris bairdii</i>	sf	yes
	Pectoral Sandpiper	<i>Calidris melanotos</i>	sfw	no
	Purple Sandpiper	<i>Calidris maritima</i>	spsfw	no
	Dunlin	<i>Calidris alpina</i>	sfw	no
	Curlew Sandpiper	<i>Calidris ferruginea</i>	f	yes
	Stilt Sandpiper	<i>Calidris himantopus</i>	sf	yes
	Buff-breasted Sandpiper	<i>Tryngites subruficollis</i>	sf	yes
	Short-billed Dowitcher	<i>Limnodromus griseus</i>	sps	no
	Wilson's Snipe	<i>Gallinago delicata</i>	spsfw	no

Family	Common name	Scientific name	Season <sup>a</sup>	Rare <sup>a</sup>
	Wilson's Phalarope	<i>Phalaropus tricolor</i>	f	yes
	Red-necked Phalarope	<i>Phalaropus lobatus</i>	s	no
	Red Phalarope	<i>Phalaropus fulicarius</i>	sf	no
<b>Gulls and Terns (Laridae)</b>				
	Black-legged Kittiwake	<i>Rissa tridactyla</i>	spsf	no
	Sabine's Gull	<i>Xema sabini</i>	s	yes
	Bonaparte's Gull	<i>Chroicocephalus philadelphia</i>	sw	yes
	Black-headed Gull	<i>Chroicocephalus ridibundus</i>	spfw	no
	Little Gull	<i>Hydrocoloeus minutus</i>	s	yes
	Laughing Gull	<i>Leucophaeus atricilla</i>	sf	yes
	Franklin's Gull	<i>Leucophaeus pipixcan</i>	sf	yes
	Ring-billed Gull	<i>Larus delawarensis</i>	spsf	no
	Herring Gull	<i>Larus argentatus</i>	spsfw	no
	Iceland Gull	<i>Larus glaucoideus</i>	fw	no
	Lesser Black-backed Gull	<i>Larus fuscus</i>	spsf	yes
	Glaucous Gull	<i>Larus hyperboreus</i>	spfw	no
	Great Black-backed Gull	<i>Larus marinus</i>	spsfw	no
	Sooty Tern†	<i>Onychoprion fuscatus</i>	f	yes
	Common Tern	<i>Sterna hirundo</i>	spsf	no
	Arctic Tern	<i>Sterna paradisaea</i>	spsf	no
	Forster's Tern	<i>Sterna forsteri</i>	f	yes
<b>Skuas (Stercorariidae)</b>				
	South Polar Skua	<i>Stercorarius maccormicki</i>	s	no
	Pomarine Jaeger	<i>Stercorarius pomarinus</i>	s	no
	Parasitic Jaeger	<i>Stercorarius parasiticus</i>	s	no
	Long-tailed Jaeger	<i>Stercorarius longicaudus</i>	s	no
<b>Auks, Murres, and Puffins (Alcidae)</b>				
	Dovekie	<i>Alle alle</i>	fw	no
	Common Murre	<i>Uria aalge</i>	spsf	no
	Thick-billed Murre	<i>Uria lomvia</i>	spfw	no
	Razorbill	<i>Alca torda</i>	spsf	no
	Black Guillemot	<i>Cepphus grylle</i>	spsf	no
	Atlantic Puffin	<i>Fratercula arctica</i>	sps	no
<b>Pigeons and Doves (Columbidae)</b>				
	Mourning Dove	<i>Zenaidura macroura</i>	spsf	no
<b>Cuckoos, Roadrunners, and Anis (Cuculidae)</b>				
	Yellow-billed Cuckoo	<i>Coccyzus americanus</i>	sf	yes
<b>Typical Owls (Strigidae)</b>				
	Great-horned Owl	<i>Bubo virginianus</i>	f	no
	Snowy Owl	<i>Bubo scandiacus</i>	spfw	no
	Short-eared Owl <sup>1,2</sup>	<i>Asio flammeus</i>	spsfw	no
<b>Swifts (Apodidae)</b>				
	Chimney Swift <sup>3,5</sup>	<i>Chaetura pelagica</i>	f	no
<b>Woodpeckers and Allies (Picidae)</b>				
	Northern Flicker	<i>Colaptes auratus</i>	spsf	no
<b>Tyrant Flycatchers (Tyrannidae)</b>				
	Yellow-bellied Flycatcher	<i>Empidonax flaviventris</i>	spsf	no
	Least Flycatcher	<i>Empidonax minimus</i>	s	no
	Fork-tailed Flycatcher	<i>Tyrannus savana</i>	s	yes

## Mistaken Point Ecological Reserve Management Plan

Family	Common name	Scientific name	Season <sup>a</sup>	Rare <sup>a</sup>
<b>Shrikes (Laniidae)</b>				
	Northern Shrike	<i>Lanius excubitor</i>	spsfw	no
<b>Vireos (Vireonidae)</b>				
	Warbling Vireo	<i>Vireo gilvus</i>	f	yes
	Philadelphia Vireo	<i>Vireo philadelphicus</i>	f	no
	Red-eyed Vireo	<i>Vireo olivaceus</i>	sf	no
<b>Jays and Crows (Corvidae)</b>				
	Gray Jay	<i>Perisoreus canadensis</i>	spsfw	no
	Blue Jay	<i>Cyanocitta cristata</i>	f	no
	American Crow	<i>Corvus brachyrhynchos</i>	spsfw	no
	Common Raven	<i>Corvus corax</i>	spsfw	no
<b>Larks (Alaudidae)</b>				
	Horned Lark	<i>Eremophila alpestris</i>	spsfw	no
<b>Swallows (Hirundinidae)</b>				
	Tree Swallow	<i>Tachycineta bicolor</i>	spf	no
	Northern Rough-winged Swallow	<i>Stelgidopteryx serripennis</i>	f	yes
	Bank Swallow	<i>Riparia riparia</i>	spf	no
	Cliff Swallow	<i>Petrochelidon pyrrhonota</i>	spf	yes
	Cave Swallow	<i>Petrochelidon fulva</i>	f	yes
	Barn Swallow	<i>Hirundo rustica</i>	spf	no
<b>Chickadees and Titmice (Paridae)</b>				
	Black-capped Chickadee	<i>Poecile atricapillus</i>	spsfw	no
	Boreal Chickadee	<i>Poecile hudsonica</i>	spsfw	no
<b>Nuthatches (Sittidae)</b>				
	Red-breasted Nuthatch	<i>Sitta canadensis</i>	spsfw	no
<b>Kinglets (Regulidae)</b>				
	Golden-crowned Kinglet	<i>Regulus satrapa</i>	fw	no
	Ruby-crowned Kinglet	<i>Regulus calendula</i>	spsf	no
<b>Thrushes (Turdidae)</b>				
	Northern Wheatear	<i>Oenanthe oenanthe</i>	spsf	yes
	Hermit Thrush	<i>Catharus guttatus</i>	spsf	no
	American Robin	<i>Turdus migratorius</i>	spsfw	no
<b>Starlings (Sturnidae)</b>				
	European Starling	<i>Sturnus vulgaris</i>	sps	no
<b>Wagtails and Pipits (Motacillidae)</b>				
	American Pipit	<i>Anthus rubescens</i>	spsfw	no
<b>Waxwings (Bombycillidae)</b>				
	Bohemian Waxwing	<i>Bombycilla garrulus</i>	fw	no
<b>Wood-warblers (Parulidae)</b>				
	Yellow Warbler	<i>Dendroica petechia</i>	sps	no
	Yellow-rumped Warbler	<i>Dendroica coronata</i>	spsfw	no
	Yellow-throated Warbler	<i>Dendroica dominica</i>	f	yes
	Prairie Warbler	<i>Dendroica discolor</i>	sf	yes
	Palm Warbler	<i>Dendroica palmarum</i>	f	no
	Blackpoll Warbler	<i>Dendroica striata</i>	spsf	no
	Black-and-White Warbler	<i>Mniotilta varia</i>	spsf	no
	American Redstart	<i>Setophaga ruticilla</i>	f	no
	Northern Waterthrush	<i>Seiurus noveboracensis</i>	spsf	no
	Common Yellowthroat	<i>Geothlypis trichas</i>	s	no
	Yellow-breasted Chat	<i>Icteria virens</i>	f	yes

Family	Common name	Scientific name	Season <sup>a</sup>	Rare <sup>a</sup>
<b>Sparrows and Allies (Emberizidae)</b>				
	American Tree Sparrow	<i>Spizella arborea</i>	spfw	no
	Chipping Sparrow	<i>Spizella passerina</i>	f	no
	Savannah Sparrow	<i>Passerculus sandwichensis</i>	fw	no
	“Ipswich” Savannah Sparrow <sup>1</sup>	<i>Passerculus sandwichensis princeps</i>	sp	yes
	Grasshopper Sparrow	<i>Ammodramus savannarum</i>	f	yes
	Nelson’s Sharp-tailed Sparrow	<i>Ammodramus nelsoni</i>	f	yes
	Fox Sparrow	<i>Passerella iliaca</i>	spsf	no
	Song Sparrow	<i>Melospiza melodia</i>	fw	no
	Lincoln’s Sparrow	<i>Melospiza lincolnii</i>	spsf	no
	Swamp Sparrow	<i>Melospiza georgiana</i>	spsfw	no
	White-throated Sparrow	<i>Zonotrichia albicollis</i>	spsf	no
	White-crowned Sparrow	<i>Zonotrichia leucophrys</i>	spf	no
	Dark-eyed Junco	<i>Junco hyemalis</i>	spsfw	no
	Lapland Longspur	<i>Calcarius lapponicus</i>	sfw	no
	Snow Bunting	<i>Plectrophenax nivalis</i>	spfw	no
<b>Cardinals, Saltators, and Allies (Cardinalidae)</b>				
	Blue Grosbeak	<i>Passerina caerulea</i>	spf	yes
	Indigo Bunting	<i>Passerina cyanea</i>	f	yes
	Dickcissel	<i>Spiza americana</i>	f	yes
<b>Blackbirds (Icteridae)</b>				
	Bobolink	<i>Dolichonyx oryzivorus</i>	sf	no
	Red-winged Blackbird	<i>Agelaius phoeniceus</i>	f	no
	Eastern Meadowlark	<i>Sturnella magna</i>	f	yes
	Brewer’s Blackbird	<i>Euphagus cyanocephalus</i>	sp	yes
	Common Grackle	<i>Quiscalus quiscula</i>	sf	no
	Baltimore Oriole	<i>Icterus galbula</i>	sf	no
<b>Finches (Fringillidae)</b>				
	Pine Grosbeak	<i>Pinicola enucleator</i>	fw	no
	Purple Finch	<i>Carpodacus purpureus</i>	f	no
	White-winged Crossbill	<i>Loxia leucoptera</i>	fw	no
	Common Redpoll	<i>Carduelis flammea</i>	spfw	no
	Hoary Redpoll	<i>Carduelis hornemanni</i>	spfw	yes
	Pine Siskin	<i>Carduelis pinus</i>	spsfw	no
	American Goldfinch	<i>Carduelis tristis</i>	sf	no

<sup>a</sup> Seasonality and rarity in insular Newfoundland based on Mactavish, B, Maunder, J.E., Montevecchi, W.A., Wells, J.L., and Fifield, D.A. 2003. Checklist (2003) of the birds of insular Newfoundland and its continental shelf waters. The Natural History Society of Newfoundland and Labrador, Inc., St. John’s, NL.

<sup>1</sup> Species is listed as Special Concern under the Canada Species at Risk Act

<sup>2</sup> Species is listed as Vulnerable under the Newfoundland and Labrador Endangered Species Act

<sup>3</sup> Species is listed as Threatened under the Canada Species at Risk Act

<sup>4</sup> Species is listed as Endangered under the Newfoundland and Labrador Endangered Species Act

<sup>5</sup> Species is listed as Threatened under the Newfoundland and Labrador Endangered Species Act

‡ Carcass of an individual salvaged at Mistaken Point represents Newfoundland and Labrador’s first (and to date, only) record of this species



### APPENDIX C - Summary of Regulations

As per the *Wilderness and Ecological Reserves Act* and the *Fossil Ecological Reserve Regulations*, within Mistaken Point Ecological Reserve, a person shall not:

1. Remove, damage or destroy a fossil, plant, animal (with the exception of hunting with a valid license), or object of historical or scientific interest.
2. Introduce plants or animals, but may continue to graze animals at levels of use existing at the time of reserve establishment.
3. Cut or log trees, or carry out agriculture, mining, prospecting or claims staking.
4. Construct a road, path, building, fence or other structure.
5. Land a boat, or use a mountain bike or horse.
6. Cause alterations to the course or amount of water flowing inside the reserve.
7. Use motorized vehicles of any kind, except within the Special Management Area with a valid migratory bird hunting licence and a permit from Parks and Natural Areas Division.
8. Land an aircraft without a permit from Parks and Natural Areas Division.
9. Remove sand, stone or gravel.
10. Damage or remove a sign or other government property.
11. Operate a commercial or non-commercial enterprise, except guiding, touring, outfitting, photography, videography, sound recording or fossil replication, and then only with a permit from Parks and Natural Areas Division.
12. Display, post, or broadcast advertisements.
13. Pollute a stream or other body of water or dispose of garbage.
14. Camp.

In Mistaken Point Ecological Reserve a person can:

- Pick berries and mushrooms
- Hunt sea ducks (restrictions apply)
- Hike (restrictions may apply to protect fossils)
- Take an interpretive tour
- Take photographs, video or sound recordings
- Bird watch
- Graze animals (restrictions apply)
- Enjoy a beach fire in the Drook and Long Beach

The complete *Wilderness and Ecological Reserves Act* and *Fossil Ecological Reserve Regulations* are available online at [www.gov.nl.ca/parks/library/leg.html](http://www.gov.nl.ca/parks/library/leg.html).

