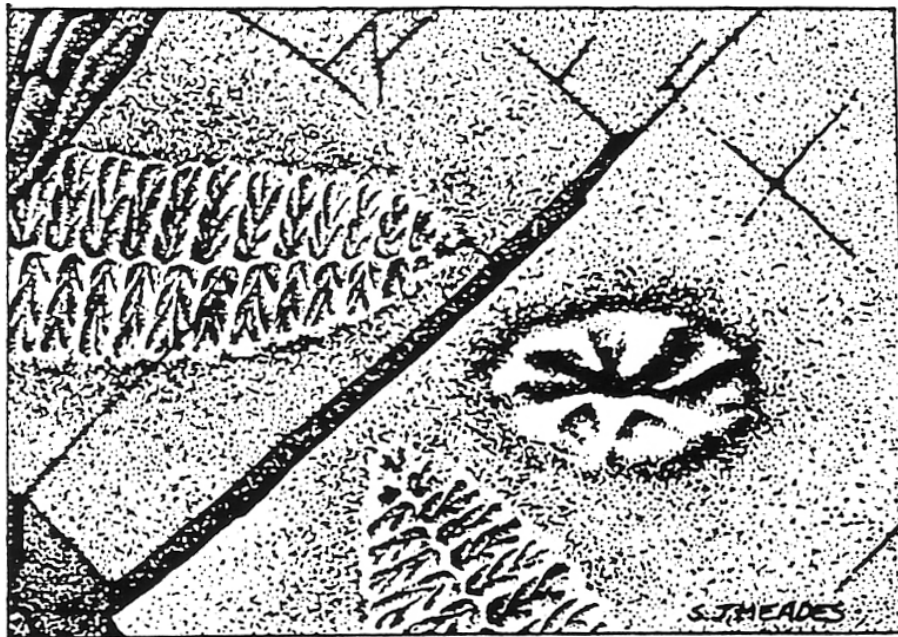


Management Plan

MISTAKEN POINT ECOLOGICAL RESERVE



Parks and Natural Areas Division
Department of Environment and Conservation
Government of Newfoundland and Labrador

1987

MANAGEMENT PLAN FOR MISTAKEN POINT ECOLOGICAL RESERVE



Parks and Natural Areas Division
Department of Environment & Conservation
Government of Newfoundland & Labrador
August, 1991

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1.0 MISTAKEN POINT ECOLOGICAL RESERVE NATURAL FEATURES

1.1 Location and Importance

Mistaken Point is a conspicuous southeasterly directed headland 7.5 km southwest of Cape Race at the southeastern corner of the Avalon Peninsula of Newfoundland (Figure 1). It is underlain by turbidites, with intercalated tuffaceous beds, part of the Precambrian Conception Group which underlies much of the eastern Avalon. The turbidites at Mistaken Point are profusely fossiliferous, containing impressions of frond-like and disc-like soft-bodied multicelled organisms. The Mistaken Point fossils are the oldest Metazoan fossils known in Canada, and constitute one of the most varied and well preserved assemblages of Precambrian fossils in the world. In addition to being an internationally important fossil site, Mistaken Point is representative of the Eastern Hyper-Oceanic Barrens Eco-region.

1.2 Regional Geology

The Avalon Peninsula forms part of the Avalon Zone, one of four major tectonostratigraphic subdivisions of the Appalachian orogen in Newfoundland (Figure 2). The peninsula is underlain by late Precambrian volcanic and sedimentary rocks, locally overlain by lower Paleozoic marine shelf sediments.

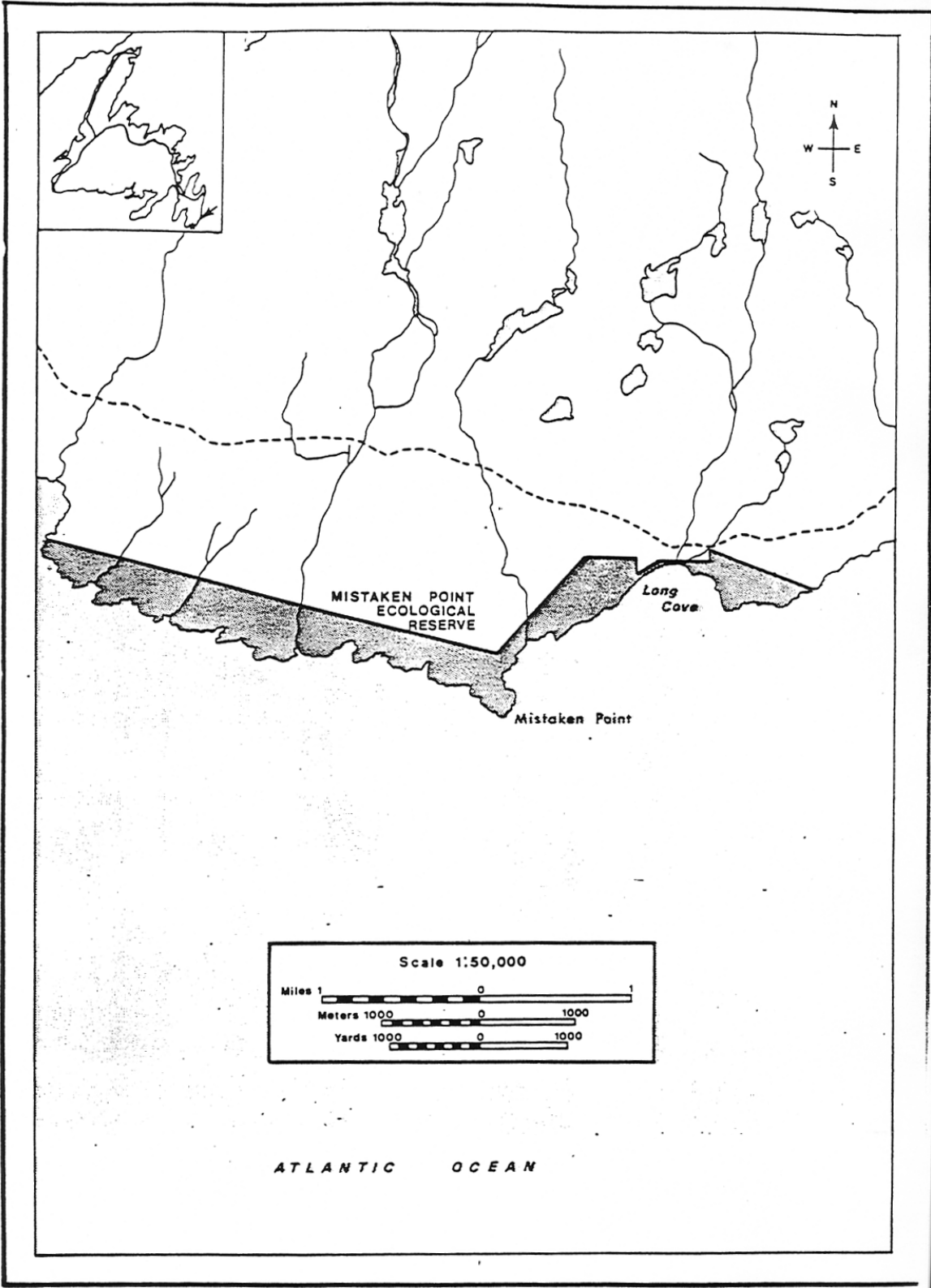


Fig. 1 Location of the Mistaken Point Reserve

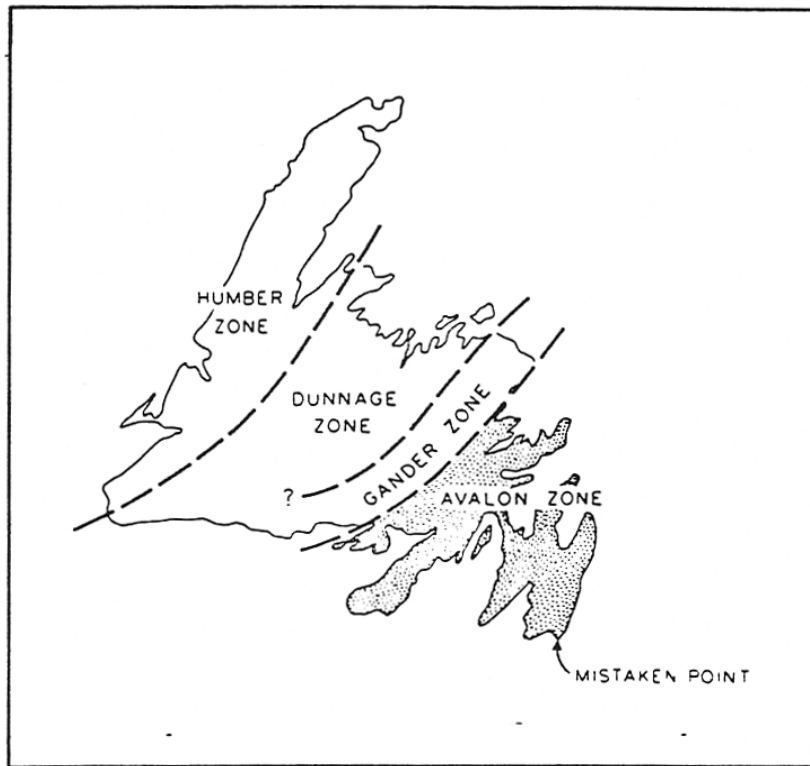


Fig. 2 Major Tectonostratigraphic Zones of the Newfoundland Appalachians.

The oldest rocks on the eastern Avalon Peninsula are marine and terrestrial mafic to silicic volcanic rocks of the Harbour Main Group, which are believed to be late Riphean in age (1000—670 Ma.). The Harbour Main Group is intruded by granitoid rocks of the Holyrood Plutonic series, which has been dated isotopically at 620 Ma. The Harbour Main Group and the Holyrood Plutonic series underlie much of the central Avalon (Figure 3).

The Harbour Main volcanic rocks are overlain by Vendian (670-590 Ma) turbidites and marine volcanoclastics of the Conception Group, which are in turn overlain by dark grey shales and sandstones of the St. John's Group. The St. John's Group forms a shallowing upward sequence which merges to the east with a coeval alluvial plain sequence of red sandstones and conglomerates, the Signal Hill Group (King, 1984).

The Precambrian volcanic and sedimentary sequences are unconformably overlain in southern Conception Bay by Cambrian and Lower Ordovician shales and sandstones.

Two periods of deformation are recognized on the eastern Avalon Peninsula, a late Precambrian event, the Avalonian orogeny, and a major Siluro-Devonian (ca. 396 M.Y.) disturbance, the Acadian orogeny (King, 1984). The effects of the Avalonian orogeny are seen in local Precambrian unconformities, the intrusion of the Holyrood plutonic suite, and is evidenced by blockfaulting, associated with the Precambrian sedimentary rocks. The Acadian orogeny produced most of the folding and faulting now evident and resulted in low-grade metamorphism of eastern Avalon assemblages.

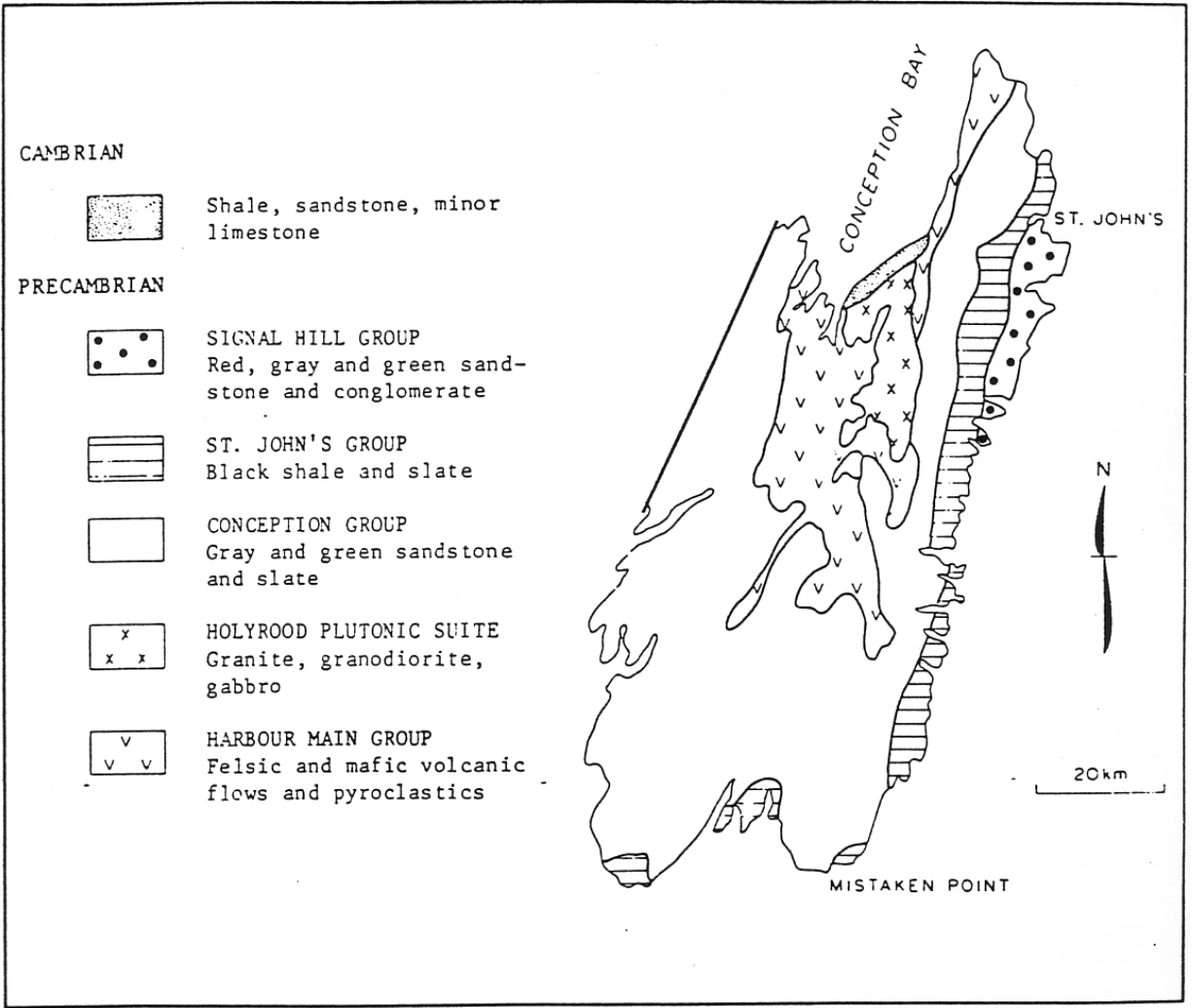


Fig. 3 Generalized geological map, eastern Avalon Peninsula.

1.3 Geology of the Reserve Area

The Mistaken Point Ecological Reserve is underlain by upper units of the Conception Group and lower parts of the St. John's Group, which form part of the eastern flank of a broad anticline, and axis of which plunges gently southwestward in the vicinity of the Drook (Figure 4)(Williams & King, 1979). The strata within the reserve, in general, strike northeast and dip gently to the southeast.

Outcrop is confined to the coast and the major brooks in the area.

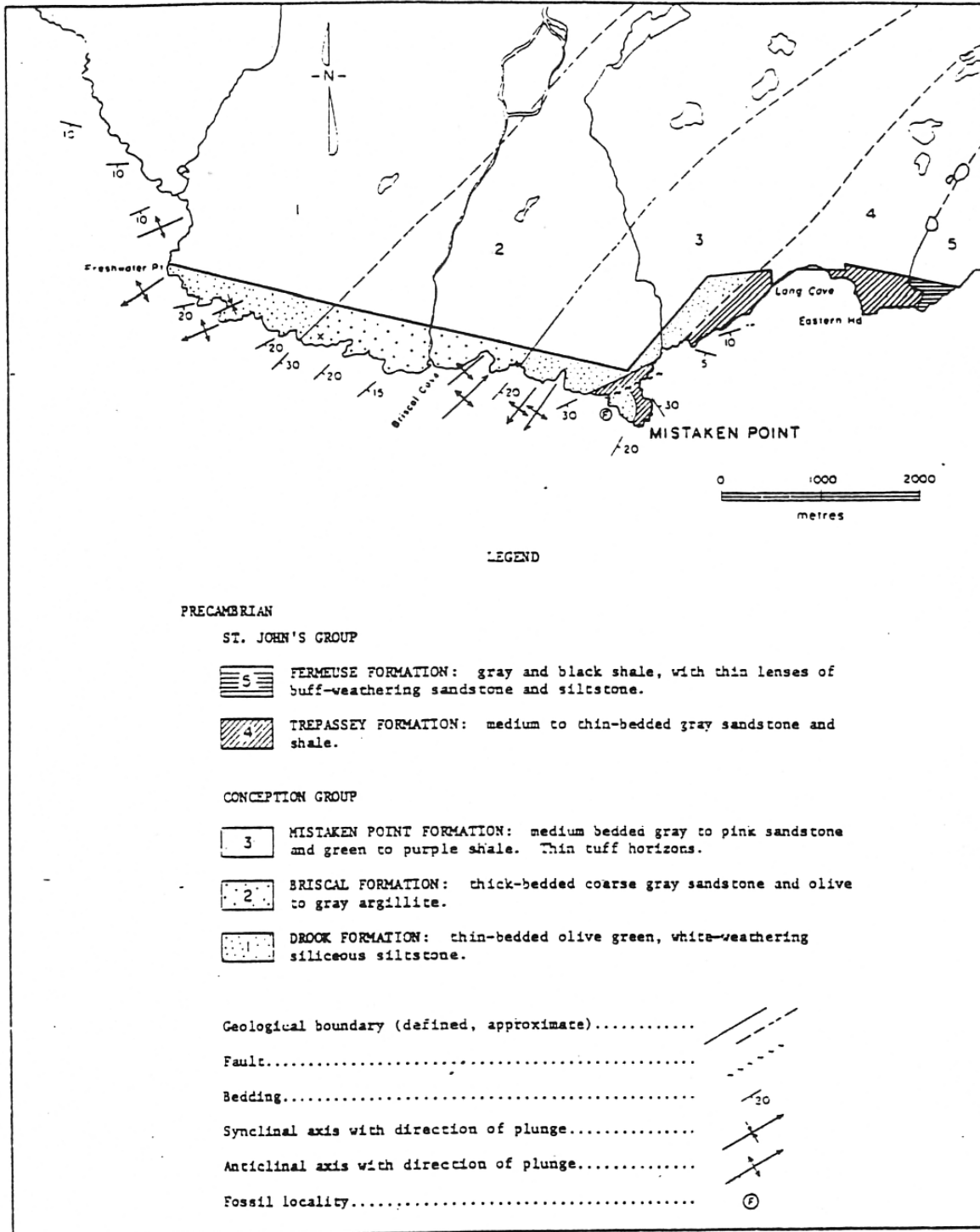


Fig. 4 Geology, Mistaken Point Ecological Reserve.

1.4 Stratigraphy

The stratigraphy of the Mistaken Point Ecological reserve is summarized in Table 1.

TABLE 1
MISTAKEN POINT ECOLOGICAL RESERVE
STRATIGRAPHIC SUCCESSION

<u>ERA</u>	<u>GROUP</u>	<u>FORMATION (THICKNESS)</u>	<u>LITHOLOGY</u>
Precambrian	St. John's	Fermeuse (1400 m)	Gray and black slate, with thin sandstone and siltstone lenses.
		Trepassey (250 m)	Medium to thin-bedded, graded, gray sandstone and shale.
	Conception	Mistaken Point (400 m)	Medium-bedded, gray to pink sandstone, green, purple and red shale, minor tuff.
		Briscal (1200 m)	Thick-bedded gray sandstone, green to gray argillite.
	Drook (1500 m)	White weathering, green gray and buff thinly bedded argillaceous chert, siliceous siltstone and sandstone.	

The oldest unit exposed within the reserve is the Drook Formation which occupies the area immediately east of Freshwater Point (Figure 3). The Drook Formation consists of thinly bedded, gray and green, white weathering, siliceous siltstone and cherts (Misra, 1971; Williams & King

1979). Beds vary in thickness from a few millimetres to 10 cm. The formation grades upward by a gradual increase in grain size and bed thickness, and a decrease in silica content, into the Briscal Formation.

The Briscal Formation occupies the coast immediately west of Mistaken Point. It consists of thick-bedded (1-2 m), graded, gray sandstone beds and thin, well-cleaved, olive-green argillite units (Williams and King, 1979). It grades upward into the Mistaken Point Formation.

The Mistaken Point Formation occupies the coast from Watern Cove to just west of Mistaken Point. It consists of a monotonous sequence of graded beds, the lower part of each consisting of fine to medium-grained greywacke, and the upper part of argillite, which is generally silicified (King, Brueckner, Anderson and Fletcher, 1974). The graded beds are gray to pale red or purple, and vary in thickness from a few centimetres to a metre. The graded beds are interpreted as turbidites deposited in a deep water environment (Anderson, 1978). Interbedded with the turbidites, especially in the upper part of the formation, are light yellow to greenish gray tuffaceous layers, 2 to 60 cm thick, which are finely laminated and strongly cleaved (King et al., 1974). Fossiliferous horizons are present throughout the formation.

The Mistaken Point Formation is the uppermost unit of the Conception Group. It is overlain on the west side of Long Cove by the Trepassey Formation, the lowest unit of the St. John's Group. The contact is conformable and gradational, marked by a color change from the purplish sandstones and argillites at the top of the Mistaken Point formation to the gray, thin to medium-bedded (10-30 cm) sandstones and shales of the Trepassey Formation (Williams & King, 1979). The sandstones are well graded, with sandy bottoms and shaley tops. The Trepassey Formation is overlain by upper units of the St. John's Group east of the reserve.

1.5 Paleontology

Introduction

Fossils were first discovered at Mistaken Point by S.B. Misra and P. Thompson in 1967 (Anderson and Misra, 1965, Misra, 1969) in the cliffs on the western side of the point. There are three fossiliferous horizons at this locality, within 10 m of strata. Several other horizons have since been discovered in the area.

The fossils represent the impressions of soft-bodied multicellular organisms. Of the twenty species found to date, over half are coelenterates (jellyfish and sea pens); the remainder are extinct organisms of uncertain affinities.

Description of Fossils

Anderson (1987) gives the following description of the fossils at Mistaken Point:

Coelenterates:

The medusoids show the circular shape typical of living jellyfish, but mouth parts and tentacles are not known. Their diameters range from less than 2 cm (juveniles) to over 35 cm. Seven genera can be distinguished: the bells of five have surfaces consisting of projecting lobes, eight in number in one form, and more numerous in the others, either regularly arranged or without an obvious pattern. Two of the lobed genera possess a marginal flange, broad and flat in the one and narrow and faintly lobed in the other. Members of the sixth genus have a markedly convex bell bounded by a narrow, slightly concave flange. A small papilla occupies the center of the bell of the seventh genus. The surface sculpture of which consists of concentric grooves; this form superficially resembles **Cyclonedusa** sp. from South Australia.

Pennatulcaans are represented by six genera. These ancient sea pens, unlike modern forms were individually attached to the sea floor by a circular holdfast at the base of the stalk that, at its upper end, becomes the axis of the apical leaf like portion or frond of the colony; holdfasts separated from their stalks can easily be mistaken for medusoids. The genera can be distinguished by the shape, size and structure of their fronds. Three of the genera are of particular interest. The first is represented by a small form only 5 cm high (holdfast to apex of frond); the second includes forms (possibly two species) with remarkably long and narrow fronds; and the third is **Charnia** sp. first described from the Charnian Supergroup (in England). The specimens of **Charnia** sp. from the Conception Group and from the Charnian are identical and belong to

the same species, **C. masoni**. This species is the only element of the Avalon fauna that is definitely known to occur outside the Avalon Peninsula.

Extinct organisms with unknown affinities:

- a. Spindle shaped forms (single genus, two species), juveniles to adults (1.3 to over 30 cm in length) are particularly abundant at two stratigraphic levels in the Conception Group.
- b. Rare small star-shaped organisms consist of a number of slender branches radiating from a central disk.
- c. Pectinate or comb-shaped animals (two genera) have straight or curved wormlike bodies up to 40 cm long, bearing down one side only, a series of apparently tubular projections.
- d. Fan-shaped or bush-like forms, apparently attached to the sea floor basally, are numerically an important element of the fauna. They consist of a number of more or less curved branches extending upward and outward (divergence slight to marked) from a common origin that are linked to one another laterally by fine, obliquely arranged bars.

Preservation

The Mistaken Point fossils are preserved in most cases beneath layers of fine volcanic ash. The fauna is envisaged as living on a fairly deep sea floor (the associated sediments are deep water turbidites), which received airborne ash from intermittent eruptions on volcanic islands nearby. The ash killed and buried the animals. Those with soft bodies imprinted mud on which they settled and these impressions filled with ash from the overlying layer, forming casts of the organism on the base of the tuff layer. Organisms with more resistant bodies remained long enough for imprints of their surfaces (molds) to be formed on the base of the tuff layer; as they decayed, mud from below squeezed into the molds giving casts on the

upper surface of the mud. In both cases, impressions of the external surfaces of the organisms are preserved (Anderson, 1978).

Age

The Conception Group is undoubtedly Precambrian in age. It is overlain by a considerable thickness (5000 m) of sediment, followed by a disconformity, before fossiliferous Cambrian units are encountered.

The Charnian Supergroup in England, which lithologically resembles the Conception Group, and also contains the fossil Charnia sp. is believed to have a minimum age of 680 m.y. (Anderson, 1979).

2.0 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.

The Mistaken Point Ecological Reserve encompasses 2.95 square kilometers of coastline immediately west of Cape Race, at the southeastern tip of Newfoundland. The site contains Metazoan fossils that are probably the oldest known in the western hemisphere, and one of the most varied and well preserved assemblages of Precambrian fossils in the world. Some of the Mistaken Point forms are, in fact, unknown anywhere else in the world.

Mistaken Point is a very significant site for palaeontologists who are studying the nature of very early forms of life, and for those who are concerned with the evolution of shelled organisms, which appear in the rock record shortly after Mistaken Point time.

2.2 Objectives

Mistaken Point is established as an ecological reserve in order to prevent damage to an internationally significant Precambrian fossil locality. This management plan will provide guidelines for that protection and for use of the site for scientific research and education.

2.3 Management Policies

The overall approach of resource management at the Mistaken Point site will be one which emphasizes the maintenance of the integrity and quality of the fossil-bearing outcrops, and the retention of the reserve area in as natural a state as possible. In keeping with this approach, the following overall management policies are established:

- a. There will be no removal of material from the site and there will be no development within the area which destroys the fossils or prevents access to them.
- b. Scientific research at the site will be encouraged to the limit permitted by 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) will be permitted where it does not conflict with the general objective of site protection. Hunting, fishing, and herding of cattle are examples of such uses. The decision to allow such activities will be made by the Wilderness and Ecological Reserves Advisory Council on the advice of the Mistaken Point Management Advisory Committee.

3.0 IMPLEMENTATION GUIDELINES

In addition to the requirements of the Wilderness and Ecological Reserves Act, 1980, which apply to all ecological reserves and to the attached regulations, the following statements are to serve as a guide to users and managers of the Mistaken Point Ecological Reserve.

3.1 Reserve Management

- a. The managing agency of Mistaken Point will be Parks and Natural Areas Division, Department of Environment and Conservation.
- b. Parks and Natural Areas Division will be directed in the management of the Mistaken Point site by advice and assistance from a committee consisting of appropriate representatives of Memorial University, the Newfoundland Department of Mines, the National and Provincial Parks Associations, and communities near the site. This committee will be appointed by the Wilderness and Ecological Reserves Advisory Council. In cases of conflict between the Mistaken Point Management Advisory Committee and the Wilderness and Ecological Reserves Unit, the matter will be referred to the Wilderness and Ecological Reserves Advisory Council for a final decision.
- c. The existence of the reserve shall be noted by signs placed at appropriate places along its boundary parallel to the Cape Race road and other locations near the shoreline at the major access points. These signs will present the name of the reserve, the fact that the natural features are legally protected, and a phone number and address where more information can be obtained.
- d. No buildings or other permanent structures will be erected within the reserve.

- e. Hunting, fishing and trapping may be permitted within the reserve since they do not directly affect the integrity of the geological features for which the reserve is established.
- f. Mapping of the site at a very detailed level will prove beneficial to site management and future monitoring. Such a “control map” will be produced as early as possible after establishment of the reserve.
- g. Regular periodic visits to the site will be made by staff of Parks and Natural Areas Division, Department of Environment and Conservation, to ensure that regulations are being adhered to. Every effort should also be made to ensure local support for the site and local involvement in site protection.
- h. Every effort will be made, through the appropriate agencies, to keep the road from Portugal Cove South and Cape Race maintained and free of garbage along its entire length.

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. It is important, therefore, 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 the Mistaken Point Ecological Reserve will require a permit from the Parks and Natural Areas Division of the Department of Environment and Conservation. Applications for permits should be addressed to Parks and Natural Areas Division, Environment and Conservation, 33 Reid’s Lane, Deer Lake, NL, A8A 2A3 and should provide a description of the research proposed, including the objectives, methodologies and time frame involved. Applications for permits will be reviewed by the Mistaken Point

Management Advisory Committee. The following conditions shall be stipulated for each permit issued:

- a. All published material related to research done at the site will acknowledge the existence of the reserve, the Newfoundland and Labrador Department of Environment and Conservation permission, and the requirements made of the researcher.
- b. 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 Department upon publication.

When practical, staff from the Department of Environment and Conservation or from the Mistaken Point Management Advisory Committee, will accompany on site visitations made by researchers and educational groups in order to record and monitor the impact on the site.

3.3 Educational Use

The site may be used for educational purposes as long as such use does not damage the scientific value of the reserve. Permits will be 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.

In keeping with the general management policy to retain the site in as natural a state as possible, there will be no development of facilities within the Reserve, the only on-site development will be the posting of signs, as stipulated above, at points along the boundary.

Self-guided trails, with the appropriate accompanying literature, may be developed if further detailed studies at the site indicate that such trails will not adversely affect site protection and scientific study.

Information concerning the reserve will be distributed to the public through the Department of Environment and Conservation.

Selected References

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APPENDIX 1

RESERVE ORDER AND REGULATIONS

THE NEWFOUNDLAND GAZETTE
July 31, 1987

NEWFOUNDLAND REGULATION 142/87

Mistaken Point Ecological Reserve Order, 1987
under
The Wilderness and Ecological Reserve Act
O.C. 919/87

(Filed July 29, 1987)

Under and by virtue of section 18 of *The Wilderness and Ecological Reserve Act*, and acting on the recommendation of the Wilderness and Ecological Reserves Advisory Council, the Lieutenant Governor in Council has been pleased to establish the Mistaken Point Ecological Reserve for the purpose of protecting this internationally significant Precambrian fossil locality for the educational and scientific benefit of present and future generations in the province.

Dated at St. John's this 23rd day of July, 1987.

J. THISTLE
Deputy Clerk of the Executive Council

ORDER

1. This Order may be cited as the Mistaken Point Ecological Reserve Order, 1987.
2. The area included in the Mistaken Point Ecological Reserve is set out in Schedule A.
3. An outline of the Mistaken Point Ecological Reserve Management Plan is set out in Schedule B.

SCHEDULE A

All that piece or parcel of land situate and being at Mistaken Point in the Electoral District of St. Mary's - The Capes, abutted and bounded as follows, that is to say: Beginning at a point in the northerly shoreline of the Atlantic Ocean, at the low tide line, at Freshwater point, the said point having coordinates of North 5,167,425 metres and East 329,700 metres; thence running in a southeasterly direction for a distance of four thousand eight hundred metres, more or less, to a point having coordinates of North 5,166.175 metres and East 334,350 metres; thence running in a northeasterly direction for a distance of one thousand three hundred and seventy-five metres, more or less, to a point in the centre of the brook which flows into Watern Cove River, the said point having coordinates of North 5,167,200 metres and East 335,275 metres; thence running in an easterly direction for a distance of six hundred metres, more or less; thence running along the westerly boundary of land granted by the crown to William Martin and registered in Volume 18, Folio 68 in the Registry of Crown Grants in a general southerly direction for a distance of one hundred and twenty-five metres, more or less; thence running along the southerly boundary of the said land and along the southerly boundary of land granted by the Crown to John Neal and registered in Volume 17, Folio 52 in the Registry of Crown Grants in a general easterly direction for a distance of five hundred and eighty metres, more or less; thence running along the easterly boundary of the said land granted by the Crown to John Neal in a generally northerly direction for a distance of one hundred and thirty metres, more or less; thence running in a southeasterly direction for a distance of one thousand one hundred metres, more or less, to a point in the aforesaid northerly shoreline of the Atlantic Ocean, at the low tide line, the said point having coordinates of North 5,166,950 metres and East 337,700 metres; thence running along the sinuosities of the aforesaid northerly shoreline of the Atlantic Ocean. at low tide line, in a general westerly direction to the point of beginning. The above described piece or parcel of land containing an area of 2.95 square kilometres, more or less. All bearings being referred to Zone 22 in the Universal Transverse Mercator Projection.

THE NEWFOUNDLAND GAZETTE
July 31, 1987

SCHEDULE B

**Outline of The Mistaken Point Ecological Reserve
Management Plan**

The area known as Mistaken Point is established as an Ecological Reserve to preserve the unique fossils found there. To accomplish this there will be no removal of material from the site, and there will be no development which destroys the fossils, or prevents access to them. Scientific research at the site will be encouraged, and educational use will be permitted where it does not conflict with the general objectives of preservation and scientific research. Hunting, fishing, berry picking and herding of cattle will be permitted. A permit will be required to travel in the area for any other purpose. Signs will be posted at appropriate sites to identify the Reserve.

The managing agency for the Reserve shall be Parks Division of the Department of Culture, Recreation and Youth. A management committee will be formed to advise on site management.

NEWFOUNDLAND REGULATION 143/87

Mistaken Point Ecological Reserve Regulations, 1987
under
The Wilderness and Ecological Reserves Act
O.C. 919/87
(Filed July 29, 1987)

Under and by virtue of the powers conferred upon him pursuant to section 28 of *The Wilderness and Ecological Reserves Act*, His Honor the Lieutenant Governor in Council has been pleased to make the following regulations.

Dated at St. John's this 23rd day of July, 1987.

J. THISTLE
Deputy-Clerk of the Executive Council

REGULATIONS

1. These regulations may be cited as the Mistaken Point Ecological Reserve Regulations, 1987.
2. Any person or group wishing to enter the Reserve for the purpose of studying, interpreting or otherwise viewing the fossils present must first obtain a permit from Parks Division, Department of Culture, Recreation and Youth. Berry picking, the herding of animals, hunting, fishing and trapping do not require entry permits.
3. There is to be no removal or dislocation of any material within the Reserve except for removal of fossils which are threatened by marine erosion.
4. There will be no construction of permanent structures - houses, roads, stages, etc. within the Reserve.
5. There will be no use of mechanized transportation within the area.
6. All garbage shall be removed from the Reserve.
7. Prospecting, claim staking, mining and quarrying are prohibited within the Reserve.
8. All hunting and fishing within the Reserve is allowed in accordance with permits or licences issued under *The Wildlife Act*, *The Migratory Birds Convention Act* or *The Federal Fisheries Act*.

Newfoundland Regulation /43/8 7 & republished to correct typographical error.