



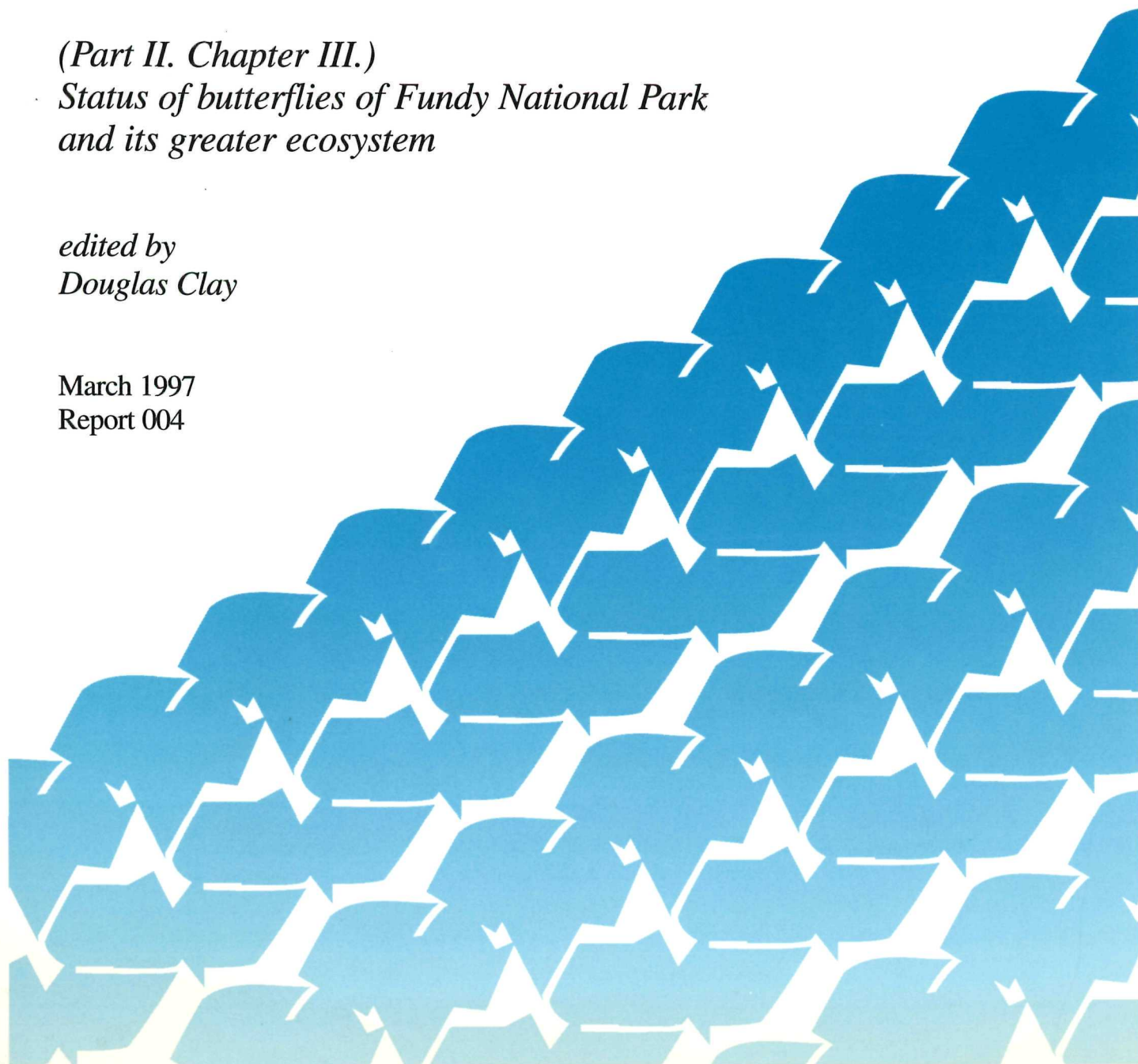
Resources of Fundy National Park: A primer of ecosystem studies

(Part II. Chapter III.)

*Status of butterflies of Fundy National Park
and its greater ecosystem*

*edited by
Douglas Clay*

March 1997
Report 004



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Status of butterflies of Fundy National Park and its greater ecosystem

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PREFACE

The first Resource Description and Analysis (RDA) for Fundy National Park was completed in 1985. Now, eleven years after its publication there is a need for an updated revised summary of the 'Resources of Fundy National Park and its Greater Ecosystem'. Unlike the first RDA that was completed as a single edited compendium, this edition will be built by installments as stand-alone chapters. This format is proposed to allow future editions to be updated on a subject by subject basis as required.

ACKNOWLEDGEMENTS

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Resources of Fundy National Park: A primer of ecosystem studies

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Part II: Biotic Resources

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Status of butterflies of Fundy National Park and its greater ecosystem

INTRODUCTION

From early May until late September, 1994, the author was engaged in a diversity study of moths in Fundy National Park (NP). During this period, opportunistic records were maintained of the date and location of every butterfly seen. This report is based mainly on these sightings. The moth diversity study continued in 1995 and 1996, but less time was spent in the field and only a few butterfly sightings from these two years are included. Notes were also available from a recreational trip I took to the park in 1977. Field notes of park staff were available from 1965, 1966, and 1967. I extracted all the butterfly records from these notes and added three species not seen by me during the 1994 to 1996 survey in order to get a more complete inventory of Fundy NP species. A 4-page unpublished report (MacFarlane 1972) listed 30 species of butterflies known or expected to occur in the park, all of which are included in this present report.

Except for the changes in the **Spring Azure** complex (see below), nomenclature follows that of Opler (1992), a readily available book that contains North American distribution maps (although incomplete for New Brunswick), and biological information on all of the species.

SPECIES

Since the publication of Opler's (1992) field guide, the species known as the **Spring Azure** has been separated into several species of which three occur in Fundy

NP. For these three species (**Spring Azure**, **Cherry Gall Azure**, **Summer Azure**) the nomenclature, both the common and the scientific names, follows the most recent publications (Pratt *et al.* 1994, Wright *et al.* 1995). Other nomenclatural changes since Opler (1992) include elevation of the **Mustard White** to a full species, *Pieris oleracea* (Harris), and the changing of the scientific name of the **Northern Pearl Crescent** to *Phyciodes cocyta* (Cramer) (see Bird *et al.* 1995). However, the scientific names used by Opler (1992) are retained in this manuscript for consistency.

A total of 79 butterfly species are known to breed in New Brunswick and a further six species are known as non-breeding vagrants (Thomas 1996). Of these 85 species, 42 were recorded from Fundy NP in 1994 through 1996 (Table 1). The park staff's lists add a further three species and my 1977 sighting of the **Eyed Brown** a further one, for a total of 46 (Table 1). All of these species, except the **Least Skipper**, are widely distributed in New Brunswick. Also listed in Table 1 are a further six hypothetical species whose occurrence in the greater ecosystem makes occurrence in Fundy NP possible. Colour photographs of 51 of the 52 species are in Plates I and II (no specimens of the **Laurentian Skipper** were available at the time the plates were photographed).

Several of the species exhibit sexual dichromatism. The most extreme case is seen in the **Silvery Blue** where the upperside colour of the female (Plate II, #21) is mostly brown as opposed to the shiny blue of the male (Plate II, #20).

The **Gray Comma** and **Green Comma** occur sympatrically and have similar appearances and behaviours. They are difficult to separate in the field. Dorsally, the **Gray Comma** is less

heavily marked than the **Green Comma** (Plate I, #22 and #27). The **Green Comma** and **Hoary Comma** have an almost identical dorsal pattern (Plate I, #26 and #27). They are best told apart by the underside patterns; light and dark grays in the **Hoary Comma** (Plate I, #24) and a more uniform gray with green lunules on the outside wing borders in the **Green Comma** (Plate I, #25). Males and females of the **Silvery Blue** are readily separated from the other species of blues by the distinctive, and unique, pattern of spots on the underside of the wings (Plate II, #22).

The three species of **Azures** are almost identical in appearance (Plate II, #26 - #30). In the field they can tentatively be separated by the time of the adult flight period (Table 2). Individuals flying in May until early June are probably **Spring Azures**. Individuals flying in late June/early July are probably **Cherry Gall Azures**. This leaves the individuals flying in mid-June difficult to name. Worn specimens are probably **Spring Azures**, freshly-emerged specimens are probably **Cherry Gall Azures**. Individuals flying in late July, August, and September, are definitely **Summer Azures**.

STATUS

As in the rest of New Brunswick, the butterflies in Fundy NP can be placed in three categories based on their residency status.

Year-round residents: Of the 46 species confirmed from Fundy NP, 40 are permanent residents. Two of these species disperse widely and it is expected that the local breeding populations are augmented each summer by dispersers from areas bordering the park. This is suggested by the low numbers of the **Clouded Sulphur** seen in early summer (1994) and the high numbers seen in August. In the

case of the **Cabbage Butterfly**, no individuals were seen in Fundy NP in early summer (1994) and yet the species was very common in late summer (Table 2); probably dispersing into the park from the village of Alma. The six hypothetical species listed in Table 1 are also permanent residents in New Brunswick.

Breeding migrants: This group of five species includes the **Alfalfa Butterfly**, **Question Mark**, **Red Admiral**, **American Painted Lady**, and **Painted Lady**. Members of these species cannot survive the winter in New Brunswick and adults migrate from the United States into Fundy NP, where they breed and produce one or more summer generations. Their numbers vary greatly from year to year and the summer generations may be further augmented by new immigrants. In the case of the **Red Admiral**, several worn specimens (obvious migrants) were seen in June (1994) and these produced the local August generation. No early migrants of the other four species were seen.

Vagrants, migrants that do not breed in Fundy NP. The only species in this category is the **Monarch**. Several specimens were seen during the three summers. The larval foodplants for this species are milkweeds, which are not known to occur in Fundy NP (Clay and Richard 1996).

LIFE HISTORIES

Two different life history strategies are exhibited by the butterflies of New Brunswick. These entail the number of broods per year and the means of overwintering.

Voltinism: The 46 confirmed species can be grouped with regard to the number of broods per year (voltinism). Most species are

univoltine, with just one flight period per year (Table 2). The **Spring Azure** was believed to have two or more generations (Opler 1992). The current interpretation is that two of the three New Brunswick species (**Spring Azure**, **Cherry Gall Azure**) are univoltine. The six hypothetical species are also univoltine in New Brunswick.

A few species are facultatively bivoltine. That is, in most years they have one flight period but in warm summers (1994 was a warm summer) a partial second generation is produced. In 1994, this group contained the **White Admiral**. A characteristic of these facultatively bivoltine species is that the numbers in the second generation are noticeably fewer than those in the first.

Several species regularly have more than one generation per year. These species are characterized by having greater numbers in the later generation than in the first. This group includes the **Mustard White**, **Clouded Sulphur**, **Silver-bordered Fritillary**, and **Viceroy** (Table 2). The **Cabbage Butterfly**, **American Copper**, and **Summer Azure**, are also 'multi-brooded' but their early generations were not seen in 1994. The **Harvester** has several generations per year but its late summer generations were not seen in 1994. The **Alfalfa Butterfly**, **Question Mark**, **Red Admiral**, **American Painted Lady**, and **Painted Lady**, are also multi-brooded but their generations are difficult to delineate due to the unpredictability in the occurrence of migrants.

Overwintering strategies: These are varied. The **European Skipper**, **Laurentian Skipper**, **Bog Copper**, and the hypothetical **Northern Blue**, overwinter as eggs. The **Dreamy Dusky Wing**, **Arctic Skipper**, **Least Skipper**, **Peck's Skipper**, **Long Dash**, and the hypothetical **Pepper and Salt Skipper**, **Roadside Skipper**, and **Jutta**

Arctic, overwinter as mature larvae that may do some feeding before pupating in the following year.

A further 14 species overwinter as immature larvae that resume feeding in the spring of the following year. These species include: **Pink-edged Sulphur**, **Great Spangled Fritillary**, **Atlantis Fritillary**, **Silver-bordered Fritillary**, **Harris Checkerspot**, **Northern Pearl Crescent**, **Baltimore**, **White Admiral**, **Viceroy**, **Northern Pearly Eye**, **Eyed Brown**, **Inornate Ringlet**, **Common Wood Nymph**, and the hypothetical **Dun Skipper**.

The **Tawny-edged Skipper**, **Hobomok Skipper**, **Canadian Tiger Swallowtail**, **Mustard White**, **Cabbage White**, **Clouded Sulphur**, **Harvester**, **American Copper**, **Brown Elfin**, **Spring Azure**, **Silvery Blue**, and the hypothetical **Bog Elfin**, all overwinter as pupae.

The **Green Comma**, **Gray Comma**, **Hoary Comma**, **Compton Tortoise Shell**, **Mourning Cloak**, and **Milbert's Tortoise Shell**, overwinter as adults. These six species may fly on warm days in spring when there is often much snow on the ground. This suggests overwintering sites significantly higher than ground level. Hollow trees appear to be the most suitable overwintering site.

BUTTERFLY HABITATS

The major natural habitat of Fundy NP and its greater ecosystem is the Maritime Acadian Forest. Human alteration has produced extensive forest edges and much young successional forest outside the park. Historic human land use has left some grassland and old-field habitats. Small wetlands occur throughout the landscape.

Forests: Very few of the butterfly species utilize the forest habitat *per se*, although several are associated with forest edges and trees.

Compton Tortoise Shell is a widely distributed but rare New Brunswick species whose habitat is upland deciduous boreal forests (Opler 1992). The larvae feed on aspens, birches, and willows. Two adults were seen in the old mixed forests in the vicinity of Wolfe Lake. This low density population in Fundy NP appears not to be threatened by loss of habitat. One other species, the **Green Comma** is associated with northern mixed forests. Its larval food plant includes forest trees. Apart from one specimen seen at the Foster Brook warden station, the species was seen only at the upper end of the Lavery road and the adjacent Shepody road near many clear cut openings of various ages. The species was common in these locations in late August. The adults require sunny glades in woods where nectar sources (flowers) are available. The verges of the unpaved roads in these locations are ideal habitat, as is the large clearing at the bridge crossing Cain Brook. The only perceivable threat to the species would be the closing of the forest canopy over the roads and/or the "tidying-up" of the roadside verges to remove flowering plants. An increase of vehicular traffic on these roads would also be detrimental to the species. The **Gray Comma** was found sympatrically with the **Green Comma**, but this species is less dependent on a forest habitat.

Forest edges: Forest edges and the adjacent roadside verges are a major habitat for butterfly species in Fundy NP. The two most common and most conspicuous park species heavily utilize this habitat. The **White Admiral** was extremely abundant along Hwy 114, in 1994, between Wolfe Lake and Bennett Lake, and many hundreds were killed as they crossed the highway at low level. The **Tiger Swallowtail** was also common along the entire length of

Hwy 114 and the Point Wolfe road in 1994. Whereas the larvae of the **White Admiral** feed only on willows, those of the **Tiger Swallowtail** eat the leaves of several species of trees. Both these species prefer very wide openings in the forest, such as Hwy 114, in contrast to the relatively narrow openings created by the Maple Grove and Hastings roads where these species were relatively scarce. The large numbers of these species seen suggest that they are not threatened. However, the adults of both species need an energy source in the form of nectar from flowers and the mowing of the verges along Hwy 114 and the Point Wolfe roads is detrimental to the species in that such mowing removes flowers. Such mowing was especially severe along the north-western section of Hwy 114 where the mower was actually within the forest. A better situation would be to leave a narrow belt of flowers and woody shrubs between the (mowed) grass verge and the forest. An ideal situation would be to divide the highway into sections where verges could be mowed in alternate years or to mow the entire highway edge only in late fall. Larvae of the **American Painted Lady** and **Mourning Cloak** were found on their respective food plants (pearly everlasting, and willows) along Hwy 114 before the loss of their food plants by mowing.

Old fields, open areas: From a butterfly habitat point of view, these are the most critical areas for the vast majority of Fundy NP species. Even small open areas can support a diverse fauna. My work schedule involved visiting three of these open areas on a daily basis and thus the inventory of the species seen is probably complete.

FOSTER BROOK WARDEN STATION: The meadow and south-facing hillside between the Point Wolfe road and the entrance to the Foster Brook trail is rich in butterfly species (Habitat/Locality 2, Table 3). The hillside habitat just below the forest entrance of the trail was especially rich in

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skippers, with all but one of the nine Fundy NP species seen. This habitat is under threat from encroachment by alders. If these are not removed in the very near future this site will be devoid of all butterfly species.

MEADOW AT JUNCTION OF HASTINGS ROAD AND HWY 114: A rich site especially because of the numerous flowering plants (Habitat/Locality 3, Table 3). The absence of most of the skippers can be attributed to the dense cover of perennials. Skippers, and several other species, prefer areas where bare soil and short turf are interspersed with woody perennials. The population of the **Long Dash** appeared to be concentrated in the short and sparse turf bordering the trailer parking area. This meadow would be improved if portions of it were mowed on about a 5-year rotation. The small open area at the Hastings road radio tower was also a rich butterfly site. However, it was destroyed as a useful habitat when the entire area was mowed down to the level of the plant roots. If the plant life is allowed to recover, it will surely return to being a rich butterfly habitat.

FOREST EDGES AND UN-MOWED CLEARINGS IN WOLFE LAKE VICINITY: The very small area (about 10 m wide) beginning at the end of the campground and extending about 100 m south towards the lake was rich in species (Habitat/Locality 4, Table 3). In 1994 this area was reverting to forest as spruces invaded the small openings. Complete removal of these small spruces and selective removal of some of the larger sapling hardwoods should help maintain the butterfly diversity. The only observation for the **Baltimore** was made there on July 12, 1995. A similarly rich area was the region of small clearings adjacent to the gravel pits on the opposite side (to Wolfe Lake) of Hwy 114. In contrast to these areas, the mowed fields at the Wolfe Lake campground and entrance, and the visitor centre supported only **Clouded Sulphur** butterflies.

The three hypothetical species of skippers (**Dun, Pepper and Salt, Roadside**) are expected to be found in this old field/open area habitat.

Sphagnum bogs: Several butterfly species use this specialized habitat to obtain nectar from flowers such as Labrador Tea. However, a few Fundy NP butterflies are restricted to such bogs (Habitat/Locality 6, Table 3). The **Bog Copper** was seen at the western edge of Caribou Plain on July 31, 1996. David Christie (staff field notes) recorded the **Brown Elfin** from this bog in the mid-60's. Another bog-restricted species is the **Bog Elfin** whose presence in Fundy NP has yet to be confirmed. I saw two elfins flying amongst the tops of black spruce (the larval food plant) at the western edge of Caribou Plain on June 1, 1995, which were probably this species. The **Pink-edged Sulphur** is another species characteristic of sphagnum bogs, it does, however, breed in other habitats. Two other species that I expect will be found in Caribou Plain are the **Northern Blue** and **Jutta Arctic**. The larval foodplants, black crowberry and cotton grass, respectively, grow in this bog.

Grass-edged permanent streams: A poorly-defined habitat that is nevertheless characterized by the presence of the **Least Skipper**. This very local New Brunswick species was seen on July 31, 1996 along the small stream that begins beneath the boardwalk crossing the beaver dam on the Caribou Plain trail. Three other potential sites for this species are below the dam at Bennett Lake, below the dam at Wolfe Lake, and along the stream flowing out of the pond at the Butland lookoff on Hwy 114.

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Butterflies of Fundy National Park

Table 1. Check list of butterflies of Fundy National Park and its greater ecosystem.

FAMILY	SCIENTIFIC NAME	COMMON NAME
Hesperiidae		
	<i>Erynnis icelus</i> (Scudder & Burgess)	Dreamy Dusky Wing
	<i>Carterocephalus palaemon mandan</i> (Edwards)	Arctic Skipper
	<i>Ancyloxypha numitor</i> (Fabricius)	Least Skipper
	<i>Thymelicus lineola</i> (Ochsenheimer)	European Skipper
	<i>Hesperia comma laurentina</i> (Lyman)	Laurentian Skipper
	<i>Polites peckius</i> (Kirby)	Peck's Skipper
	<i>Polites themistocles</i> (Latreille)	Tawny-edged Skipper
	<i>Polites mystic</i> (Edwards)	Long Dash
	<i>Polites hobomok</i> (Harris)	Hobomok Skipper
	*** <i>Euphyes vestris metacomet</i> (Boisduval)	Dun Skipper
	*** <i>Amblyscirtes hegon</i> (Scudder)	Pepper and Salt Skipper
	*** <i>Amblyscirtes vialis</i> (W.H. Edwards)	Roadside Skipper
Papilionidae		
	<i>Papilio canadensis</i> (Rothschild & Jordan)	Canadian Tiger Swallowtail
Pieridae		
	<i>Pieris napi oleracea</i> (Harris)	Mustard White
	<i>Pieris rapae</i> (Linnaeus)	Cabbage Butterfly
	<i>Colias philodice</i> Godart	Clouded Sulphur
	<i>Colias eurytheme</i> Boisduval	Alfalfa Butterfly
	<i>Colias interior laurentina</i> (Scudder)	Pink-edged Sulphur
Lycaenidae		
	<i>Feniseca tarquinius</i> (Fabricius)	Harvester
	<i>Lycaena phlaeas americana</i> Harris	American Copper
	<i>Lycaena epixanthe phaedrus</i> (Hall)	Bog Copper
	* <i>Incisalia augustinus</i> (Kirby)	Brown Elfin
	<i>Celastrina ladon</i> (Cramer)	Spring Azure
	<i>Celastrina neglecta</i> (Edwards)	Summer Azure
	undescribed <i>Celastrina</i> species	Cherry Gall Azure
	<i>Glaucopsyche lygdamus couperi</i> Grote	Silvery Blue
	*** <i>Incisalia lanoraieensis</i> Sheppard	Bog Elfin
	*** <i>Lycaeides idas empetri</i> (T.N. Freeman)	Northern Blue

* Species reported by David Christie in 1965-1967; not seen by AWT in 1994, 1995 or 1996.

** Species seen by AWT only in 1977.

*** Hypothetical species (expected, but not confirmed, in Fundy NP).

Butterflies of Fundy National Park

Table 1 continued:

Nymphalidae

<i>Speyeria cybele novascotiae</i> (McDunnough)	Great Spangled Fritillary
<i>Speyeria atlantis</i> (Edwards)	Altantis Fritillary
<i>Boloria selene atrocostalis</i> (Huard)	Silver-bordered Fritillary
<i>Chlosyne harrisii</i> (Scudder)	Harris Checkerspot
<i>Phyciodes selenis</i> (Kirby)	Northern Pearl Crescent
<i>Euphydryas phaeton</i> (Drury)	Baltimore
<i>Polygonia interrogationis</i> (Fabricius)	Question Mark
<i>Polygonia faunus</i> (Edwards)	Green Comma
* <i>Polygonia gracilis</i> (Grote & Robinson)	Hoary Comma
<i>Polygonia progne</i> (Cramer)	Gray Comma
<i>Nymphalis vau-album j-album</i> (Boisduval & Leconte)	Compton Tortoise Shell
<i>Nymphalis antiopa</i> (Linnaeus)	Mourning Cloak
<i>Nymphalis milberti</i> (Godart)	Milbert's Tortoise Shell
<i>Vanessa atalanta rubria</i> (Fruhstorfer)	Red Admiral
<i>Vanessa virginiensis</i> (Drury)	American Painted Lady
* <i>Vanessa cardui</i> (Linnaeus)	Painted Lady
<i>Limenitis arthemis</i> (Drury)	White Admiral
<i>Limenitis archippus</i> (Cramer)	Viceroy
<i>Enodia anthedon</i> Clark	Northern Pearly Eye
** <i>Satyrodes eurydice</i> (Johansson)	Eyed Brown
<i>Coenonympha tullia inornata</i> Edwards	Inornate Ringlet
<i>Cercyonis pegala nephele</i> (Kirby)	Common Wood Nymph
<i>Danaus plexippus</i> (Linnaeus)	Monarch
*** <i>Oeneis jutta ascerta</i> Masters and Sorenson	Jutta Arctic

* Species reported by David Christie in 1965-1967; not seen by AWT in 1994, 1995 or 1996.

** Species seen by AWT only in 1977.

*** Hypothetical species (expected, but not confirmed, in Fundy NP).

Butterflies of Fundy National Park

Table 2. Weekly flight dates for Fundy NP butterflies - 1994.

	MAY		JUNE				JULY				AUGUST				SEPTEMBER			
SPECIES	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Dreamy Dusky Wing																		
Arctic Skipper																		
European Skipper																		
Laurentian Skipper																		
Peck's Skipper																		
Tawny-edged Skipper																		
Long Dash																		
Hobomok Skipper																		
Canadian Tiger Swallowtail																		
Mustard White																		
Cabbage Butterfly																		
Clouded Sulphur																		
Alfalfa Butterfly																		
Pink-edged Sulphur																		
Harvester																		
American Copper																		
Spring Azure/Cherry Gall Azure																		
Summer Azure																		
Silvery Blue																		
Great Spangled Fritillary																		
Atlantis Fritillary																		
Silver-bordered Fritillary																		
Harris Checkerspot																		
Northern Pearl Crescent																		
Question Mark																		
Green Comma																		
Gray Comma																		
Compton Tortoise Shell																		
Mourning Cloak																		
Milbert's Tortoise Shell																		
Red Admiral																		
American Painted Lady																		
White Admiral																		
Viceroy																		
Northern Pearly Eye																		
Inornate Ringlet																		
Common Wood Nymph																		
Monarch																		

Butterflies of Fundy National Park

Table 3. Distribution of Fundy NP butterflies by habitats and localities.

SPECIES	HABITATS / LOCALITIES					
	1	2	3	4	5	6
Dreamy Dusky Wing	X	X		X		
Arctic Skipper		X		X		
Least Skipper					X	
European Skipper		X		X		
Laurentian Skipper	X	X	X	X		
Peck's Skipper		X		X		
Tawny-edged Skipper		X				
Long Dash		X		X		
Hobomok Skipper		X	X	X		
Canadian Tiger Swallowtail	X	X	X	X		
Mustard White				X		
Cabbage Butterfly	X	X	X	X		
Clouded Sulphur	X	X	X	X		
Alfalfa Butterfly		X	X			
Pink-edged Sulphur		X				X
Harvester		X				
American Copper	X			X		
Bog Copper						X
Spring Azure/Cherry Gall Azure	X	X		X		
Summer Azure				X		
Silvery Blue		X	X			
Great Spangled Fritillary	X	X	X	X		
Atlantis Fritillary	X	X	X	X		
Silver-bordered Fritillary	X	X				X
Harris Checkerspot		X	X	X		
Baltimore				X		
Northern Pearl Crescent		X		X		
Question Mark		X				
Green Comma	X	X				
Gray Comma	X	X	X	X		
Compton Tortoise Shell				X		
Mourning Cloak	X	X	X	X		
Milbert's Tortoise Shell	X			X		
Red Admiral		X	X	X		
American Painted Lady	X	X				
White Admiral	X	X	X	X		
Viceroy	X	X	X	X		
Northern Pearly Eye				X		
Inornate Ringlet		X		X		
Common Wood Nymph		X	X	X		
Monarch		X		X		

Butterflies of Fundy National Park

Legend for Table 3. Distribution of Fundy NP butterflies by habitats and localities.

Habitats / Localities:

- 1] Forest edge, roadsides, especially Shepody road and Lavery road.
- 2] Old fields and hillside, especially Foster Brook warden station but also including the small clearing at the radio tower on Maple Grove road.
- 3] Meadow (site of old stable), junction Hwy 114 and Hastings road, and gravelled trailer-parking area.
- 4] Forest edges and un-mowed clearings in Wolfe Lake vicinity.
- 5] Swampy stream at the base of the beaver dam on the Caribou Plain trail.
- 6] Edges of sphagnum bogs, especially Caribou Plain but also the smaller roadside bog at the park boundary on Shepody road.

Butterflies of Fundy National Park

EXPLANATION OF PLATE I

1] Clouded Sulphur, male	<i>Colias philodice</i> Godart
2] Clouded Sulphur, female	<i>Colias philodice</i> Godart
3] Cabbage Butterfly, male	<i>Pieris rapae</i> (Linnaeus)
4] Alfalfa Butterfly, male	<i>Colias eurytheme</i> Boisduval
5] Alfalfa Butterfly, female	<i>Colias eurytheme</i> Boisduval
6] Pink-edged Sulphur, male	<i>Colias interior laurentina</i> (Scudder)
7] Pink-edged Sulphur, female	<i>Colias interior laurentina</i> (Scudder)
8] Mustard White	<i>Pieris napi oleracea</i> (Haris)
9] Baltimore	<i>Euphydryas phaeton</i> (Dury)
10] Milbert's Tortoise Shell	<i>Nymphalis milberti</i> (Godart)
11] Great Spangled Fritillary, male	<i>Speyeria cybele novascotiae</i> (McDunnough)
12] Great Spangled Fritillary, female	<i>Speyeria cybele novascotiae</i> (McDunnough)
13] Atlantis Fritillary, male	<i>Speyeria atlantis</i> (Edwards)
14] Atlantis Fritillary, female	<i>Speyeria atlantis</i> (Edwards)
15] Compton Tortoise Shell	<i>Nymphalis vau-album j-album</i> (Boisduval & Leconte)
16] Painted Lady	<i>Vanessa cardui</i> (Linnaeus)
17] American Painted Lady	<i>Vanessa virginiensis</i> (Dury)
18] Mourning Cloak	<i>Nymphalis antiopa</i> (Linnaeus)
19] White Admiral	<i>Limenitis arthemis</i> (Dury)
20] Red Admiral	<i>Vanessa atalanta rubria</i> (Fruhstorfer)
21] Viceroy	<i>Limenitis archippus</i> (Cramer)
22] Gray Comma	<i>Polygonia progne</i> (Cramer)
23] Northern Pearly Eye	<i>Enodia anthedon</i> Clark
24] Hoary Comma	<i>Polygonia gracilis</i> (Grote & Robinson)
25] Green Comma, underside	<i>Polygonia faunus</i> (Edwards)
26] Hoary Comma, upperside	<i>Polygonia gracilis</i> (Grote & Robinson)
27] Green Comma, upperside	<i>Polygonia faunus</i> (Edwards)
28] Common Wood Nymph, male	<i>Cercyonis pegala nephele</i> (Kirby)
29] Common Wood Nymph, female	<i>Cercyonis pegala nephele</i> (Kirby)
30] Eyed Brown, male	<i>Satyrodes eurydice</i> (Johansson)
31] Eyed Brown, female	<i>Satyrodes eurydice</i> (Johansson)
32] Jutta Arctic	<i>Oeneis jutta ascerta</i> Masters and Sorenson
33] Canadian Tiger Swallowtail	<i>Papilio canadensis</i> (Rothschild & Jordan)
34] Question Mark	<i>Polygonia interrogationis</i> (Fabricius)
35] Monarch	<i>Danaus plexippus</i> (Linnaeus)

All specimens are from New Brunswick (except [34] from South Carolina) but not from Fundy NP.

Scale Bar = 5 cm

PLATE I

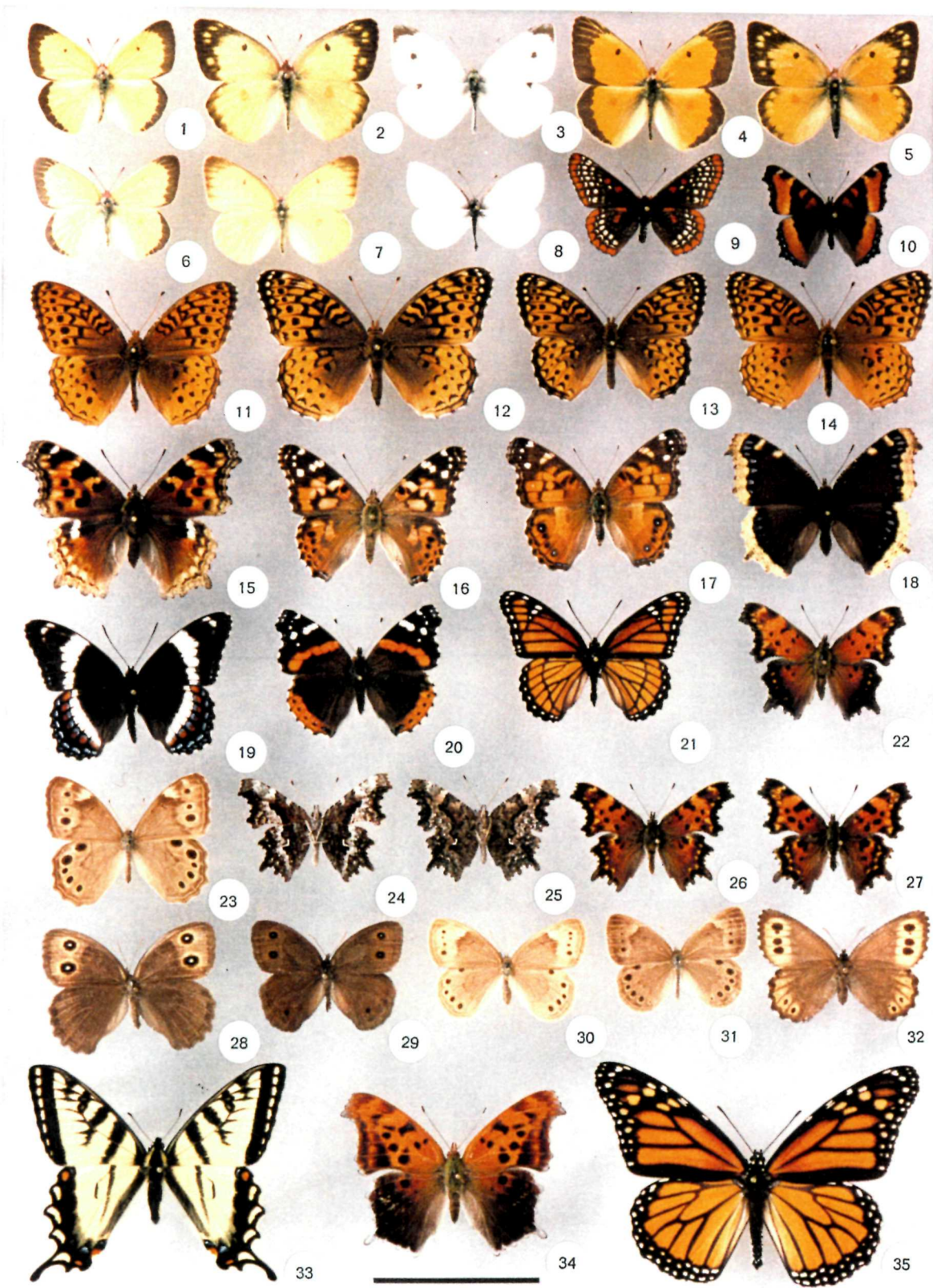
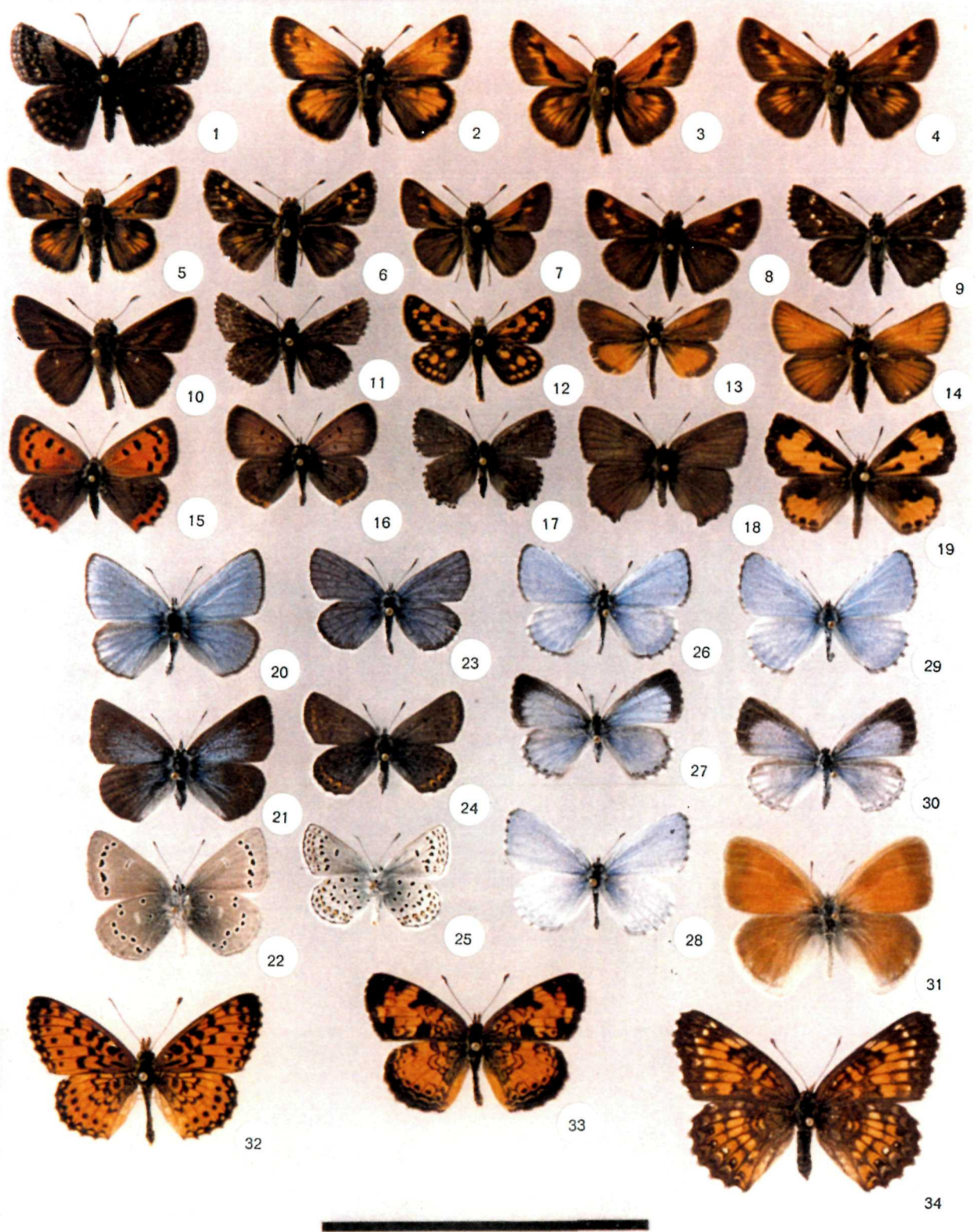


PLATE II



Butterflies of Fundy National Park

EXPLANATION OF PLATE II

1] Dreamy Dusky Wing	<i>Erynnis icelus</i> (Scudder & Burgess)
2] Hobomok Skipper	<i>Poanes hobomok</i> (Harris)
3] Long Dash, male	<i>Polites mystic</i> (Edwards)
4] Long Dash, female	<i>Polites mystic</i> (Edwards)
5] Peck's Skipper, male	<i>Polites peckius</i> (Kirby)
6] Peck's Skipper, female	<i>Polites peckius</i> (Kirby)
7] Tawny-edged Skipper, male	<i>Polites themistocles</i> (Latreille)
8] Tawny-edged Skipper, female	<i>Polites themistocles</i> (Latreille)
9] Pepper and Salt Skipper	<i>Amblyscirtes hegon</i> (Scudder)
10] Dun Skipper	<i>Euphyes vestris metacomet</i> (Boisduval)
11] Roadside Skipper	<i>Amblyscirtes vialis</i> (W.H. Edwards)
12] Arctic Skipper	<i>Carterocephalus palaemon mandan</i> (Edwards)
13] Least Skipper	<i>Ancyloxypha numitor</i> (Fabricius)
14] European Skipper	<i>Thymelicus lineola</i> (Ochsenheimer)
15] American Copper	<i>Lycaena phlaeas americana</i> Harris
16] Bog Copper	<i>Lycaena epixanthe phaedrus</i> (Hall)
17] Bog Elfin	<i>Incisalia lanoraieensis</i> Sheppard
18] Brown Elfin	<i>Incisalia augustinus</i> (Kirby)
19] Harvester	<i>Feniseca tarquinius</i> (Fabricius)
20] Silvery Blue, male upperside	<i>Glaucopsyche lygdamus couperi</i> Grote
21] Silvery Blue, female	<i>Glaucopsyche lygdamus couperi</i> Grote
22] Silvery Blue, underside	<i>Glaucopsyche lygdamus couperi</i> Grote
23] Northern Blue, male upperside	<i>Lycaeides idas empetri</i> (T.N. Freeman)
24] Northern Blue, female upperside	<i>Lycaeides idas empetri</i> (T.N. Freeman)
25] Northern Blue, underside	<i>Lycaeides idas empetri</i> (T.N. Freeman)
26] Spring Azure, male	<i>Celastrina ladon</i> (Cramer)
27] Spring Azure, female	<i>Celastrina ladon</i> (Cramer)
28] Summer Azure	<i>Celastrina neglecta</i> (Edwards)
29] Cherry Gall Azure, male	undescribed <i>Celastrina</i> species
30] Cherry Gall Azure, female	undescribed <i>Celastrina</i> species
31] Inornate Ringlet	<i>Coenonympha tullia inornata</i> Edwards
32] Silver-bordered Fritillary	<i>Boloria selene atrocotalis</i> (Huard)
33] Northern Pearl Crescent	<i>Phyciodes selenis</i> (Kirby)
34] Harris Checkerspot	<i>Chlosyne harrisii</i> (Scudder)

All specimens are from New Brunswick but not from Fundy NP.

Scale Bar = 5 cm

Parcs Canada, région de l'Atlantique, produira trois séries de rapports en sciences des écosystèmes afin de communiquer de nouvelles données scientifiques, de consigner des données scientifiques, et de résumer les connaissances existantes ou de formuler des recommandations d'ordre technique. La fonction principale et le public visé détermineront la série dans laquelle un rapport sera publié. Chaque série contiendra des informations scientifiques et techniques qui viendront enrichir les connaissances existantes, mais ne pourraient être publiées dans les revues professionnelles en raison de leur présentation.

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Ces séries de rapports serviront à :

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- offrir des publications professionnelles, crédibles et précises qui seront soumises à l'évaluation par les pairs.
- favoriser la diffusion de l'information, la créativité, l'efficacité et le travail d'équipe dans les projets de recherche.

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Le rédacteur nommera deux lecteurs choisis, dans la mesure du possible, parmi le personnel scientifique de Parcs Canada, qui seront chargés de faire une critique de chaque manuscrit. On fera appel à des lecteurs de l'extérieur en raison de l'expertise exigée, du temps disponible et de l'objectivité nécessaire. Les lecteurs renverront le manuscrit au rédacteur en y joignant leurs commentaires par écrit. Le rédacteur renverra le manuscrit à son ou à ses auteurs avec les commentaires des lecteurs. L'auteur prendra connaissance des commentaires et tiendra compte de ceux avec lesquels il est d'accord, puis il retournera le manuscrit révisé au rédacteur en lui expliquant par écrit pourquoi il n'a pas tenu compte de certains commentaires. Le rédacteur enverra ensuite le manuscrit au garde de parc en chef, ou, s'il s'agit d'employés du bureau régional, au superviseur immédiat de l'auteur, pour faire approuver la publication et l'impression du manuscrit. Dans le cas de publications de moindre importance, le rédacteur peut, à sa discrétion, décider de ne pas avoir recours à des lecteurs; lui-même et le superviseur immédiat de l'auteur serviront alors de lecteurs. En cas de désaccord entre l'auteur et le rédacteur au sujet du manuscrit, c'est le gestionnaire ministériel principal qui tranchera.


Directives à l'intention des auteurs

Ces séries de rapports seront consacrées à la publication de travaux effectués dans la région de l'Atlantique en science des écosystèmes et seront mises à la disposition de tous les employés de Parcs Canada, du ministère du Patrimoine canadien, de leurs collaborateurs ou de toute personne qui travaille pour le compte de Patrimoine canadien.

Les auteurs soumettront au rédacteur régional une copie de leur manuscrit sur support en papier, une version sur disquette en WordPerfect Windows ou DOS et le nom de trois lecteurs éventuels qui ne connaissent pas le manuscrit.

Pour de plus amples renseignements, communiquez avec:

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