



**The Species Status Advisory Committee**

**Status Review of  
Mountain Fern**

*Oreopteris quelpaertensis*  
(formerly *Thelypteris quelpaertensis*)

in Newfoundland and Labrador



**Department of Fisheries and Land Resources  
Forestry and Wildlife Research Division**

Available in alternate formats.

Please contact the Department of Fisheries and Land Resources  
at 709-637-2025 or [endangeredspecies@gov.nl.ca](mailto:endangeredspecies@gov.nl.ca).

## **Cover Photographs**

Mountain Fern: Michael Burzynski

Colony of *O. quepaertensis* in open woodland at Heather Pond site: Michael Burzynski

## **Recommended Citation**

Species Status Advisory Committee. 2019. Status Review for Mountain Fern *Oreopteris quepaertensis* (formerly *Thelypteris quepaertensis*) in Newfoundland and Labrador. Forestry and Wildlife Research Division, Department of Fisheries and Land Resources, Government of Newfoundland and Labrador, Corner Brook, Newfoundland and Labrador, Canada.

## **Author**

The initial draft of this status review was prepared by Elisabeth Belanzaran. Significant contributions to the report were made by John E. Maunder.

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## SSAC Status Review Summary

**Date of Status Review:** March 8, 2019

**Common Name**

Mountain Fern

**Scientific name**

*Oreopteris quepaertensis* (formerly *Thelypteris quepaertensis*)

**Status**

Vulnerable

**Reasons for Recommendation**

Meets 'Threatened' under COSEWIC criteria D2 (Index of area of occurrence < 20 km<sup>2</sup>; number of locations ≤ 5), but butted down to Vulnerable due to low level of threat to the population and legal protection afforded to this species, which occurs entirely within a protected area.

**Range in Newfoundland and Labrador**

Newfoundland only, 1 known location

**Status History**

In April 2006, the species was assessed as Vulnerable by the Species Status Advisory Committee. See the document entitled: "The Status of Mountain Fern *Thelypteris quepaertensis* (H. Christ) Ching in Newfoundland and Labrador" (2006) [https://www.flr.gov.nl.ca/wildlife/endangeredspecies/ssac/Mountain\\_Fern\\_SSAC.pdf](https://www.flr.gov.nl.ca/wildlife/endangeredspecies/ssac/Mountain_Fern_SSAC.pdf) [This Web version may be abridged].

In November 2007, the Mountain Fern was listed as Vulnerable under the provincial Endangered Species Act.

The species has not been assessed by COSEWIC and is not protected under the federal Species at Risk Act.

## Overview

### Species Description and Significance

#### General Description of the Species

A crown-forming fern that can occur both singly or in large colonies of up to thousands of crowns (VASCAN 2018). Similar in appearance to the closely related European species *Thelypteris limbosperma*, it has elliptical or lanceolate light green, monomorphic (fertile and sterile fronds look alike), pinnate fronds (Smith 1993) that reach heights of up to 75 cm, and die back in the winter. Each pinna is deeply divided into pinnules that taper to a pinnatifid apex (Smith 1993). Near the margins of the pinnules, on their underside, are round sori (which contain the spore-producing sporangia), covered by tan indusia (Burzynski 2006, Smith 1993). Both the sori and the sporangia are smooth (Smith 1993). The petioles, which range in size from 3-20 cm long by 2-5 mm wide, and the rachis, are straw-coloured (Smith 1993).

#### Taxonomy and Designatable Units:

*Oreopteris quelpaertensis* (Christ) Holub

Mountain Fern.  
thélyptère de quelpart

Family: Thelypteridaeeae (Marsh Ferns)

#### Synonyms:

*Athyrium quelpaertense* (Christ) Ching  
*Ctenitis quelpaertensis* (Christ) H. Itô  
*Dryopteris quelpaertensis* Christ  
*Lastrea quelpaertensis* (Christ) Copeland  
*Oreopteris limbosperma* auct. non (Allioni) Holub  
*Polypodium limbospermum* auct. non Allioni  
*Thelypteris quelpaertensis* (Christ) Ching  
*Dryopteris limbosperma* auct. non (Bell. ex All.) Becherer  
*Dryopteris oreopteris* auct. non (Ehrh.) Maxon  
*Thelypteris limbosperma* auct. non (Bell. ex All.) H.P. Fuchs

(Synonymy adapted from Brouillet et al. 2017)

In NL, there is one designatable unit.

### Taxonomic Note:

Recent phylogenetic work by He and Zhang (2012) changed the name of *Thelypteris quelpaertensis* to *Oreopteris quelpaertensis*. The change is supported in Wen et al. (2016).

The name *Oreopteris quelpaertensis* is also accepted in the VASCAN database (Brouillet et al. 2017).

### Social and Cultural Significance

Mountain Fern has no known cultural or economic significance. This may be related to its rarity and remote location. It is not known to be either poisonous or invasive (SSAC 2006; Wildlife Division 2011). It is not mentioned in Arnason et al.'s (1981) study of the ethnobotany of the plants of eastern North America.

Representatives of the Newfoundland Qalipu and Miawpukek First Nations know of no traditional ecological knowledge associated with the species (J. Strickland, pers. comm., 2018; and I. Sullivan, pers. comm., 2018).

### Distribution

#### Global:

This species has an Amphi-Beringian distribution (western Asia and western North America) with a Cordilleran disjunct population in western Newfoundland (<https://newfoundland-labradorflora.ca/checklist/>, Bouchard et al. 1991, Wen et al. 2016).

#### National:

Disjunct populations in Canada (Coastal BC and western Newfoundland (<https://newfoundland-labradorflora.ca/checklist/>)).

#### Provincial:

Found only in a valley surrounding Heather Pond, Long Range Mountains, Gros Morne National Park. The Newfoundland population is believed to be the only eastern population in North America.

The Extent of Occurrence is 2.47 km<sup>2</sup> and the Index of Area of Occupancy is 8 km<sup>2</sup> (see Figures 2 and 3).

## Habitat

In Canada, Mountain Fern is only found in two areas: along the coast of British Columbia and on the Island of Newfoundland. In Newfoundland, it has only been identified within the bounds of Gros Morne National Park, typically along the base of talus slopes in moist open subalpine meadows (Wildlife Division 2011). Moist soils and lightly shaded or open conditions seem to be habitat requirements for this species, which is consistent with the findings in Gros Morne National Park (Burzynski 2006; Talbot et al. 2010; Wildlife Division 2011).

The main colony is located in the valley surrounding Heather Pond (Wildlife Division 2011). In September 1998, a solitary second plant was found by Marilyn Anions and Janet Feltham near Arm Pond, roughly 3 km from the Heather Pond population; this plant was relocated by Carson Wentzell and Beth Pollock in August of 1999 (Robineau-Charette and Whitaker 2017). Sometime later, Wentzell and Pollock located a second plant lying 13 m away from the initial Arm Pond plant, though neither of these has been relocated since (Burzynski 2006; Robineau-Charette and Whitaker 2017).

The bedrock in the area is Precambrian gneiss with younger diabase dykes cutting through it (Berger et al. 1992). Glaciation within the last 1.6 million years stripped and polished the underlying bedrock, and in the roughly 8,000 years since the highlands have been ice-free a thin layer of soil and vegetation has formed, with patches of till remaining in low-lying areas (Grant 1989). This talus and till act as underground drainage channels for the water flowing off the highlands, and form important habitat for Mountain Fern in Newfoundland (Burzynski 2006; Robineau-Charette and Whitaker 2017). It is likely that the highland tundra environment surrounding the valley around Heather Pond, paired with the shorter growing season compared to that found in other Mountain Fern habitats, limits the spread of the Newfoundland population. The high rate of sterility in fronds (estimated to be up to 75%) is considered an indication that the population is at the edge of its altitudinal and climatic limit (SSAC 2006, Wildlife Division 2011).

## Biology

Little research has been done on the Newfoundland populations of Mountain Fern, so most natural history information is either drawn from observational reports and monitoring efforts, studies of distant populations, or inferred from studies of closely related species (see, for instance, Odland et al. 1995, 1998; Sato 1982).

Mountain Fern reproduces both through the dissemination of the homosporous spores and through vegetative growth (Burzynski 2006). Examination of herbarium specimens from 1973 and 1985 as well as field observations from



2002 and 2004 indicate that as many as 75% of sporangia on the Heather Pond plants are sterile, so the colony apparently relies heavily on vegetative growth (Burzynski 2003 and 2005; Wildlife Division 2011).

The Newfoundland population has no known significant predators or parasites, though some light browsing damage from introduced moose has been observed (SSAC Status Report, 2006).

### Population Size and Trends

Habitat condition appears to be stable. However, population size seems to show some minor decrease.

When located, in 1973, by André Bouchard and Stuart Hay, and initial population were believed to consist of a few hundred plants (Bouchard and Hay 1976; Bouchard et al. 1977). Fieldwork conducted in 2002 found that there were an estimated 18,500 crowns in the valley to the northwest of Heather Pond, and subsequent fieldwork in 2004 found an additional 750 plants in the valley running to the northeast on the north side of the river connecting Long Pond to Heather Pond, adjacent to the initial population (Burzynski 2003, 2005). The most recent population estimate, determined through fieldwork conducted in August 2017 by Gabrielle Robineau-Charette and Darroch Whitaker, was of 11,349 crowns. However, these differences in population may be due to the highly subjective nature of identifying individual crowns as well as the difficulty of access of certain patches due to the density of the crowns makes it nearly impossible to produce an absolute estimate of the population.

Survival estimates have not been determined.

Year	Search effort days	Number of people	Site	Note
1997	0.5	2		
1999	2	2		
2002	1	4		Population census
2003	0.5	2		
2004	1	3		Population census
2017	2	6	Heather Pond	Permanent monitoring sites set up

**Table 1:** Summary of Previous Search Efforts and Population Counts for Mountain Fern in NL.

## Threats and Limiting Factors

Mountain Fern is known to exist only in one small site, which makes it particularly vulnerable to stochastic changes including, potentially, the effects of climate change. The remoteness of the Newfoundland population of Mountain Fern, with the closest road access being 15 km away, offers the population a natural protection from direct human disturbance.

A threats assessment for *Oreopteris quelpaertensis*, employing the protocol of Salafsky et al. (2008), is presented below:

### 6. Human Intrusions & Disturbance

There has been some limited historic use of the area by snowmobilers, researchers, hikers, and small numbers of hunting and fishing parties, but it is unlikely that this sporadic use has had a significant effect on the population. Additionally, the Heather Pond area has been designated by Parks Canada as “Zone I wilderness” (special preservation) since the 2007 listing of the Mountain Fern. This designation prohibits the use of all motorized vehicles, including snowmobiles (Robineau-Charette and Whitaker 2017).

### 11. Climate Change and Severe Weather

The impact of climate change on Mountain Fern is currently unknown, although there are concerns that changes in hydrology patterns brought about by climate change could disturb the Newfoundland population. Conversely, as the population currently exists at the upper climactic limit of its range, an overall increase in average temperature and lengthening of the growing season may lead to an increase in the population.

## Protection, Status and Ranks

All ranks listed below for *Oreopteris quelpaertensis* are based on “Wild Species 2015: The General Status of Species in Canada” (Canadian Endangered Species Conservation Council 2016).

Category	Rank
Global	
G-rank:	G4, apparently secure
IUCN:	Not listed

National

N-rank:	N3N4
COSEWIC:	Not assessed

Provincial

Newfoundland:	S1, critically imperiled
Labrador:	Not present

Adjacent Jurisdictions:

None; only present in BC	S3S4
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Mountain Fern was designated as Vulnerable under the Newfoundland and Labrador Endangered Species Act in November 2007.

As the entirety of the known Newfoundland and Labrador Mountain Fern population occurs within the confines of Gros Morne National Park, it already benefits from the protection of the Canada National Parks Act, preventing its destruction, disturbance, or removal.

Recognizing the vulnerability and importance of the species, the Gros Morne management plan has designated the Heather Pond area a “Zone I wilderness” special preservation area (Parks Canada 2009). A management plan has been produced (Wildlife Division. 2011). Mountain Fern is now included in the ‘Multi-species Action Plan for Gros Morne National Park of Canada’, although no specific protections or actions seem to have been specified for the species (Parks Canada 2016).

## Status Review Report

*Thelypteris quelpaertensis*

Mountain Fern

Thélyptère de Quelpart

Range of occurrence in NL (NL/ LB): NL – 1 known location: Heather Pond,  
Gros Morne National Park

### Existing SSAC Assessment:

Status category:

XT     E     T     SC

Date of last assessment: April 12, 2006

Reason for designation at last assessment:

- Amphi-Beringian/Newfoundland disjunct
- Only one population east of the Rocky Mountains
- Restricted to a single small valley in the Long Range Mountains
- Population is thought to be stable
- No rescue effect possible due to disjunction

Criteria applied at last assessment:

- Technically qualified for Threatened under SSAC/COSEWIC criteria D2: Prone to stochastic events; area of occupancy <20 km<sup>2</sup> and number of locations <5. However, since the plant occurs only in an isolated valley in a national park affording legal protection to the individuals and habitat, and the population was considered to face minimal threats, the status was butted down and assessed as Vulnerable by the SSAC in 2006.

### SSAC Recommendation:

- No change in status and criteria  
 No change in status, new criteria

**Evidence supporting this Status Review:**

<b>Wildlife species:</b>	
Change in eligibility, taxonomy or designatable units: Explanation: VASCAN lists the accepted species name as <i>Oreopteris quepaertensis</i> (Christ) Holub.	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
<b>Range:</b>	
Change in Extent of Occurrence (EO):	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Unk <input type="checkbox"/>
Change in Index of Area of Occupancy (IAO): Explanation: More properly “n/a”. “AO”, not “IAO”, was used in the 2006 report.	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Unk <input type="checkbox"/>
Change in no. of known or inferred current locations* Explanation: [*] Use the IUCN definition of location	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Unk <input type="checkbox"/>
<b>Population Information:</b>	
Change in number of mature individuals:	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Unk <input type="checkbox"/>
Change in population trend: [pre-2011 data is deficient]	Yes <input type="checkbox"/> No <input type="checkbox"/> Unk <input checked="" type="checkbox"/>
Change in severity of population fragmentation:	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Unk <input type="checkbox"/>
Change in trend in area and/or quality of habitat:	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Unk <input type="checkbox"/>
Significant new survey information: Explanation: While the 2017 survey showed a decrease from an estimated 18,500-20,000 (in 2002 and 2004) to 9,680-11,350 crowns, surveyors noted the difficulty of accurately estimating the number of ferns in crowns, as well as probable inconsistency in surveying techniques.	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
<b>Threats:</b>	
Change in nature and/or severity of threats: Explanation:	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Unk <input type="checkbox"/>

<p>The largest threat facing Mountain Fern in Newfoundland remains the small size of the population and the fact that it seems to exist at the northern edge of its range. There are also concerns that the effects of climate change may result in changes in hydrology that would potentially lead to loss of habitat.</p>	
<p><b>Protection:</b></p>	
<p>Change in effective protection:</p> <p>Explanation: As the species is located exclusively within the bounds of Gros Morne National Park in a Zone 1 area, the listing of the species under the provincial Endangered Species Act has not directly changed the effective protection on the species, since the Province does not have legal authority on federal land.</p> <p>Nonetheless, a provincial management plan was developed in 2011 that primarily addressed objectives of knowledge gathering and continuing partnership and collaboration with parks authorities.</p> <p>Mountain Fern is included in the Gros Morne management plan and Multi-Species Action Plan, but without any measurable or actionable changes put in place for the species (Parks Canada 2009, Parks Canada 2016).</p>	<p>Yes <input checked="" type="checkbox"/> No <input type="checkbox"/></p>
<p><b>Rescue Effect:</b></p>	
<p>Change in evidence of rescue effect:</p> <p>Explanation: The closest population is 4500 km away and is therefore very unlikely to provide a rescue effect.</p>	<p>Yes <input type="checkbox"/> No <input checked="" type="checkbox"/></p>
<p><b>Quantitative Analysis:</b></p>	
<p>Change in estimated probability of extirpation:</p>	<p>Yes <input type="checkbox"/> No <input type="checkbox"/> Unk <input checked="" type="checkbox"/></p>

**Summary and Additional Considerations:**

A Management Plan was established in 2011 following the 2008 listing as Vulnerable.

Permanent sampling plots were established in 2017.

**Acknowledgements and authorities contacted:**

Adam Durocher - Data Manager, Atlantic Canada Conservation Data Centre

Claudia Hanel – Ecosystem Management Ecologist – Botanist, Forestry and Wildlife Research Division, Government of Newfoundland and Labrador

**Author of Status Review:**

Elisabeth Belanzaran

## Technical Summary

*Thelypteris quelpaertensis*

Mountain Fern

Thélyptère de Quelparte

Range of occurrence in the province: A single small valley by Heather Lake, Long Range Mountains

### Demographic Information

1. Generation time (usually average age of parents in the population)	Unknown
2. Is there an [observed, inferred, or projected] continuing decline in number of mature individuals?	Potentially but unknown; survey techniques have varied over the years
3. Estimated percent of continuing decline in total number of mature individuals within [5 years or 2 generations]	Unknown
4. [Observed, estimated, inferred, or suspected] percent [reduction or increase] in total number of mature individuals over the last [10 years, or 3 generations].	Unknown
5. [Projected or suspected] percent [reduction or increase] in total number of mature individuals over the next [10 years, or 3 generations].	Unknown
6. [Observed, estimated, inferred, or suspected] percent [reduction or increase] in total number of mature individuals over any [10 years, or 3 generations] period, over a time period including both the past and the future.	Unknown
7. Are the causes of the decline a. clearly reversible and b. understood and c. ceased?	a. n/a b. n/a c. n/a
8. Are there extreme fluctuations in number of mature individuals?	Unknown

### Extent and Occupancy Information

9. Estimated extent of occurrence	2.47 km <sup>2</sup>
10. Index of area of occupancy (IAO) (Always report 2x2 grid value).	8 km <sup>2</sup>



11.	Is the population “severely fragmented” i.e., >50% of its total area of occupancy is in habitat patches that are (a) smaller than would be required to support a viable population, and (b) separated from other habitat patches by a large distance?	n/a
12.	Number of locations* (use plausible range to reflect uncertainty)	1
13.	Is there an [observed, inferred, or projected] continuing decline in extent of occurrence?	No
14.	Is there an [observed, inferred, or projected] continuing decline in index of area of occupancy?	No
15.	Is there an [observed, inferred, or projected] continuing decline in number of subpopulations?	No
16.	Is there an [observed, inferred, or projected] continuing decline in number of locations*?	No
17.	Is there an [observed, inferred, or projected] continuing decline in [area, extent and/or quality] of habitat?	No
18.	Are there extreme fluctuations in number of subpopulations?	No
19.	Are there extreme fluctuations in number of locations*?	No
20.	Are there extreme fluctuations in extent of occurrence?	No
21.	Are there extreme fluctuations in index of area of occupancy?	No

**Number of Mature Individuals (in each subpopulation)**

22.	Subpopulation (give plausible ranges)	N Mature Individuals (crowns)
	Heather Pond site	11,349 to 19,250
	Arm Pond site	0 (2 historical, now believed to be

\* See Definitions and Abbreviations on [COSEWIC website](#) and [IUCN 2010](#) for more information on this term.

	extirpated)
Total	11,349 to 19,250

### Quantitative Analysis

23. Probability of extinction in the wild is at least [20% within 20 years or 5 generations, or 10% within 100 years].	Unknown
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### Threats (actual or imminent, to populations or habitats)

<p>24. The largest threat to mountain fern in Newfoundland is its small population size and unique, remote location with low potential for dispersal.</p> <p>Climate change poses a threat to the species as there is potential that it will cause changes in the hydrology or soil moisture by Heather Pond, so that it will no longer be viable habitat for the species.</p> <p>Though the area is remote enough as to be largely inaccessible, snowmobiles do use it during the winter months, despite its designation as a “Zone 1” wilderness area.</p>
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### Rescue Effect (immigration from outside Newfoundland)

25. Status of outside population(s) most likely to provide immigrants to Canada?	Not present in the Maritime Provinces or Quebec, present in BC
26. Is immigration known or possible?	Unknown but highly unlikely; disjunct population
27. Would immigrants be adapted to survive in Newfoundland?	Unknown
28. Is there sufficient habitat for immigrants in Newfoundland?	Unknown
29. Is rescue from outside populations likely?	No

### Data Sensitive Species

30. Is this a data sensitive species?	No
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## Current Status

### 31. Status History (COSEWIC or SSAC)

In April 2006, the species was assessed as Vulnerable\* by the Species Status Advisory Committee, in the document entitled: "The Status of Mountain Fern *Thelypteris quepaertensis* (H. Christ) Ching in Newfoundland and Labrador"

In November 2007, the species was listed as Vulnerable\* in Newfoundland and Labrador under the Newfoundland and Labrador Endangered Species Act.

Because the species is not rare nationally, it has not been assessed by COSEWIC and is not protected under the federal Species at Risk Act.

### 32. Criteria (old):

D2. Prone to stochastic events; area of occupancy <20 km<sup>2</sup>, and number of locations <5

### 33. Year Assessed: 2006

### 34. Reasons for Designation:

Qualifies as Vulnerable\* under the SSAC/COSEWIC criteria D2:

- Amphi-Beringian/Newfoundland disjunct
- Only one population east of the Rocky Mountains
- Restricted to a single small valley in the Long Range Mountains
- Population is thought to be stable
- No rescue effect possible due to disjunction

.....

[\*]Technically qualified for Threatened\* status under SSAC/COSEWIC criteria D2. However, since the plant occurs only in an isolated valley in a national park affording legal protection to the individuals and habitat, and the population was considered to face minimal threats, the status was butted down and assessed as Vulnerable\* by the SSAC in 2006.

35. Author of Technical Summary: Elisabeth Belanzaran

36. Additional Sources of Information: n/a

### Recommended Status and Reasons for Designation

37. Recommended Status: <b>Vulnerable</b>	38. Alpha-numeric Code: D2
39. Reasons for Designation:  Qualifies as Threatened under COSEWIC criteria D2 but butted down to Vulnerable due to low level of threat to the remote population and legal protection afforded to this species, which occurs entirely within a protected area.  <ul style="list-style-type: none"><li>• Canadian population with a very restricted index of area of occupancy (&lt;20 km<sup>2</sup>) and number of locations (&lt;5) such that it is prone to the effects of human activities or stochastic events within a very short time period (1-2 generations) in an uncertain future, and is thus capable of being extinct, extirpated or critically endangered in a very short period of time. Population thought to exist at the edge of its altitudinal and climatic limit.</li><li>• Disjunct population</li><li>• Lack of rescue effect</li><li>• Some indication of potential population decline in recent years, although this may reflect differing survey methods.</li></ul>	

### Applicability of Criteria

40. Criterion D2 (Very Small or Restricted Population):  Number of locations typically $\leq 5$ and index of area of occupancy $< 20 \text{ km}^2$ .
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## Information Sources

### Cited References

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Wildlife Division. 2011. Management Plan for the Mountain Fern (*Thelypteris queipaertensis*) in Newfoundland and Labrador. Wildlife Division, Department of Environment and Conservation, Government of Newfoundland and Labrador, Corner Brook, Canada. iii + 14 pp. [https://www.flr.gov.nl.ca/wildlife/endangeredspecies/Mountain\\_Fern\\_Management\\_Plan.pdf](https://www.flr.gov.nl.ca/wildlife/endangeredspecies/Mountain_Fern_Management_Plan.pdf)

### **Additional Sources of information**

Herbarium specimen examined for the 2006 SSAC assessment report: Gros Morne National Park Herbarium (GMNP), five specimens: 100 pressed fertile fronds from different plants at Heather Pond.

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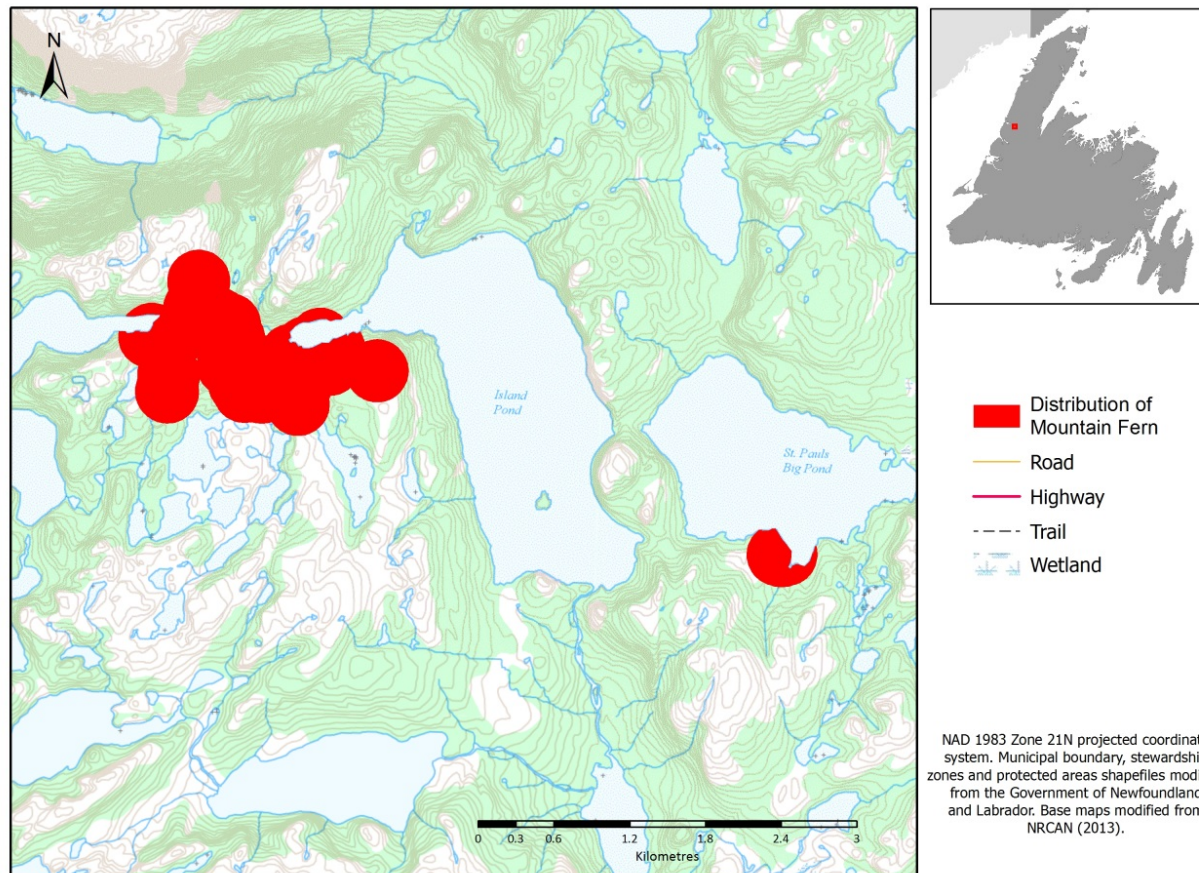
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### **Personal Communications**

Jonathan Strickland – Director of Natural Resources, Qalipu First Nation

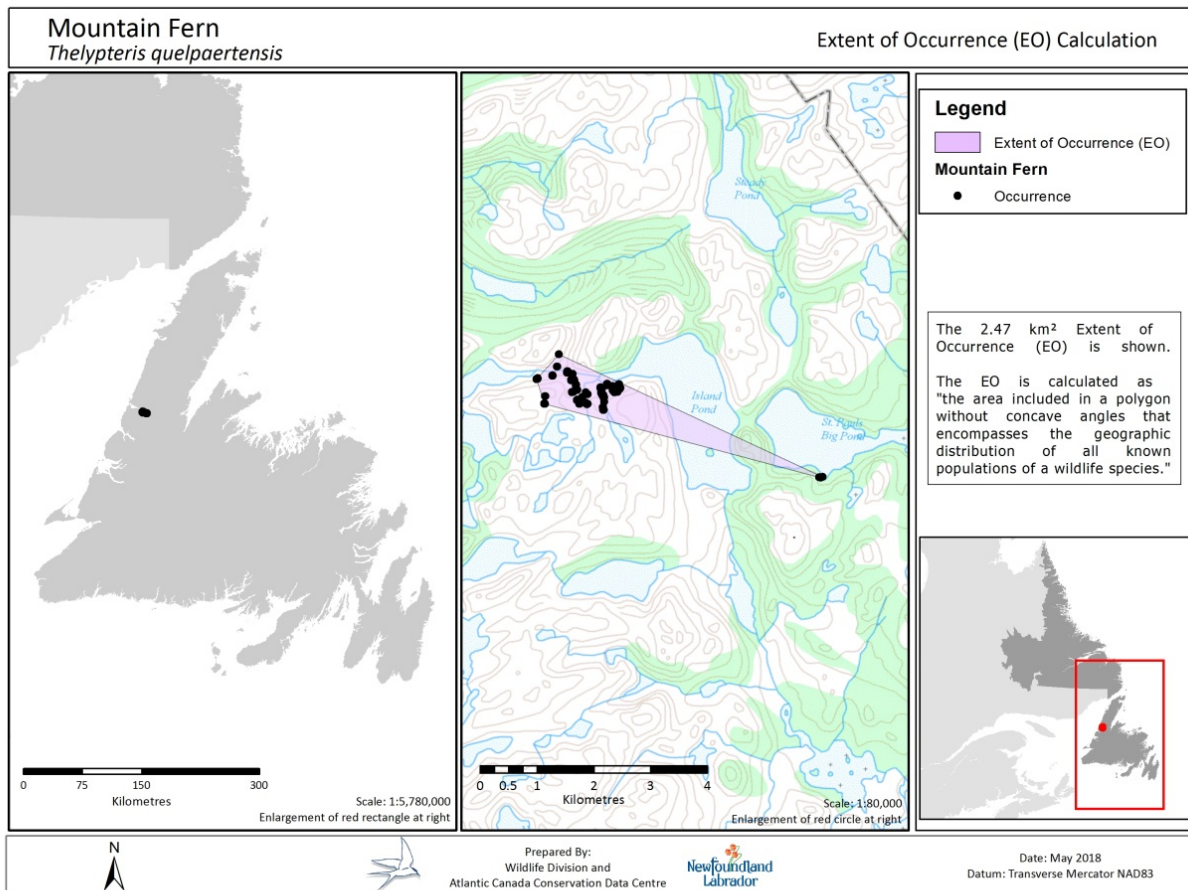
Ian Sullivan – GIS Technician, Department of Natural Resources, Qalipu First Nation

## Figures

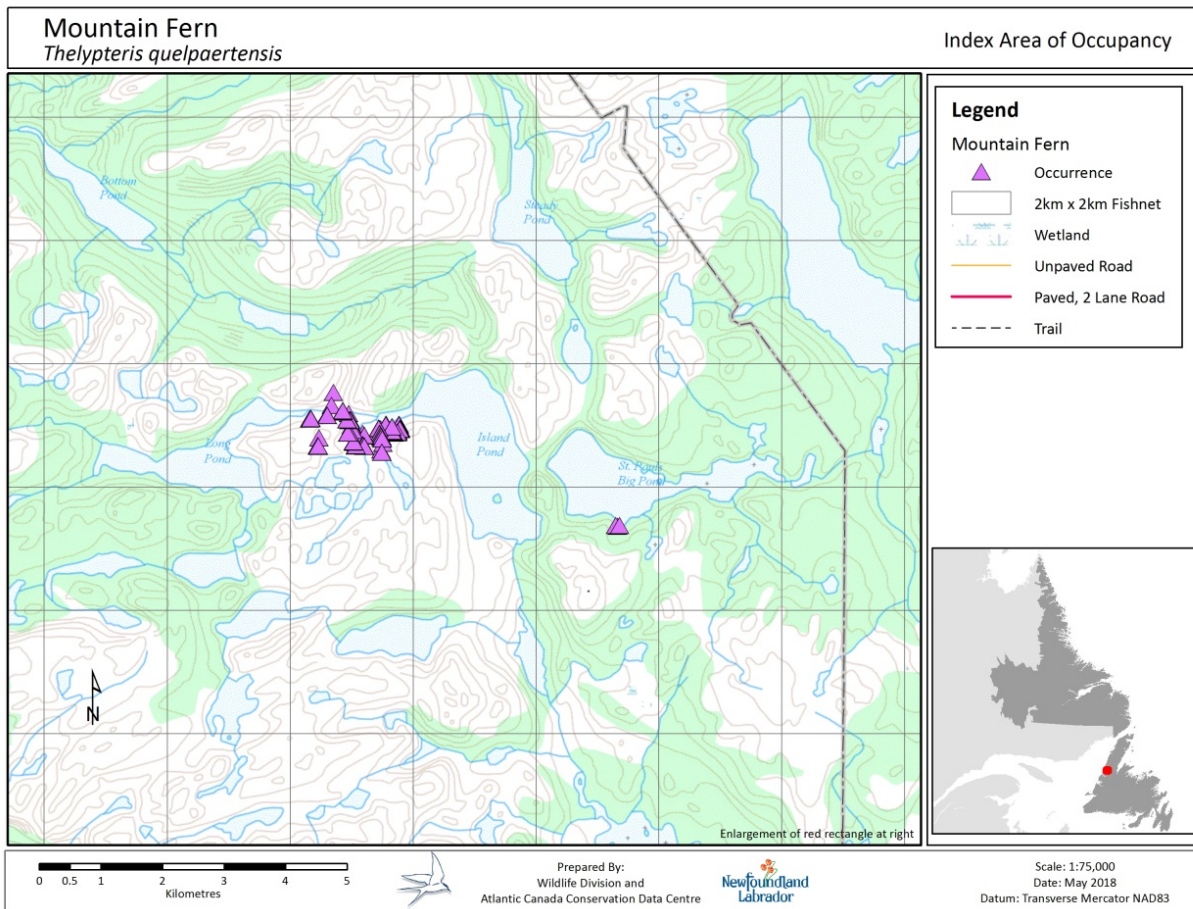


**Figure 1:** Distribution of Mountain Fern in Newfoundland. The red shaded areas on the map represent the locations of the Mountain Fern population, which in Newfoundland is located entirely within the bounds of Gros Morne National Park in the Long Range Mountains. Map prepared by Adam Durocher.





**Figure 2:** Extent of occurrence of Mountain Fern (*T. quelpaertensis*) in Newfoundland (2.47 km<sup>2</sup>). Figure prepared by Adam Durocher.



**Figure 3:** Map of Area of Index of Occupancy of Mountain Fern in Newfoundland (8 km<sup>2</sup>). Map created by Adam Durocher.