

# **The Status of Mountain Fern**

*Thelypteris quelpaertensis* (H. Christ) Ching  
**in Newfoundland and Labrador**



**THE SPECIES STATUS ADVISORY COMMITTEE  
REPORT NO. 4**

**April 12, 2006**

## ASSESSMENT

<b>Assessment:</b>  Vulnerable	<b>Current designation:</b>  None
<b>Criteria met:</b>  D. (2) Prone to stochastic events; area of occupancy <20 km <sup>2</sup> , and number of locations <5	
<b>Reasons for designation:</b>  Qualifies as " <i>vulnerable</i> " under the SSAC/COSEWIC criteria D (2): <ul style="list-style-type: none"><li>• Amphi-Beringian/Newfoundland disjunct</li><li>• Only one population east of the Rocky Mountains</li><li>• Restricted to a single small valley in the Long Range Mountains</li><li>• Population is thought to be stable</li><li>• No rescue effect possible due to disjunction</li></ul>	

This report was completed by Michael Burzynski, under contract to the SSAC.

## Status Report

### *Thelypteris quelpaertensis* (H. Christ) Ching

[=*Dryopteris quelpaertensis* H. Christ *in* Lévillé]

[=*Dryopteris limbosperma auct. non* (Bell. ex All.) Becherer]

[=*Dryopteris oreopteris auct. non* (Ehrh.) Maxon]

[=*Oreopteris limbosperma auct. non* (Bell. ex All.) Holub]

[=*Oreopteris quelpaertensis* (H. Christ) Holub]

[=*Polypodium limbosperma auct. non* Bell. ex All.]

[=*Thelypteris limbosperma auct. non* (Bell. ex All.) H.P. Fuchs]

Synonymy from Meades *et al.* (2000)

Family: Thelypteridaceae

Population: Newfoundland (= eastern North American)

Life form: Fern

English common name: Mountain fern.

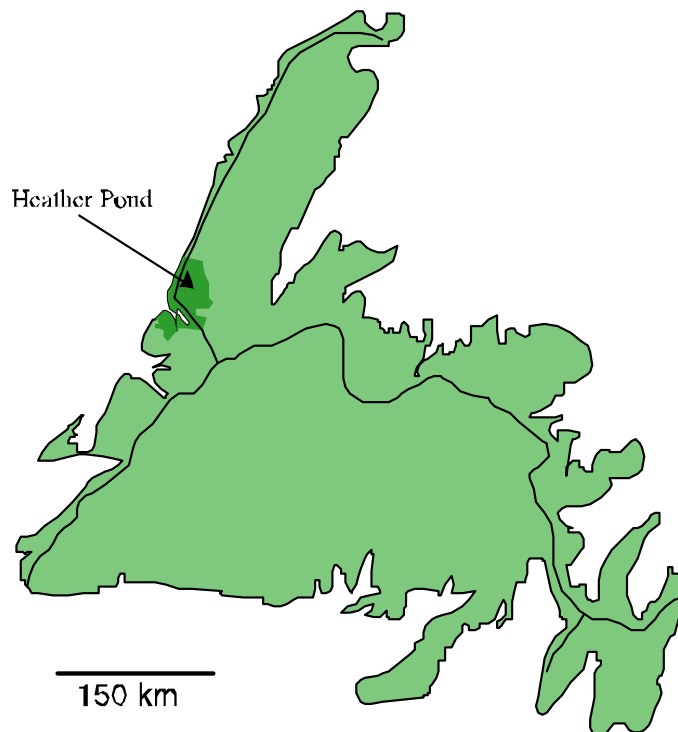
French common name: Thélyptère de Quelpart.

### Distribution

**Global:** This species has an Amphi-Beringian distribution (western Asia and western North America) with a Cordilleran disjunct population on western Newfoundland Island (Meades 2000, Bouchard *et al.* 1991).

**National:** In North America this species is found along the coast from the Aleutian Islands and southeast Alaska into coastal British Columbia and Washington (Scoggan 1978).

**Provincial:** The sole population east of the Rocky Mountains is found on wet alpine slopes in Gros Morne National Park in western Newfoundland (Bouchard *et al.*, 1991). Discovered in 1973 by A. Bouchard and S. Hay (Bouchard & Hay 1976, 1977)



### Annotated range map

*Figure 1. Location of Heather Pond, on the Island of Newfoundland. This is the only known location for T. quelpaertensis in the province. See Appendix B for a map of the population in Gros Morne National Park.*



## Description and Habitat



Figures 2 and 3. Typical habitat and habit of *T. quelpaertensis* at Heather Pond, at left in talus, at right in open woodland.



Figure 4. View from the base of a talus slope with fern patch, looking east towards Heather Pond.



Figure 5. Heather Pond from the valley rim, near the upper limit of the population of *T. quelpaertensis*. These ferns grow at an altitude of 490 m to 600 m.

*T. quelpaertensis* is a crown-forming fern that sends out stolons along which new plants are initiated. It can form large colonies of thousands of crowns, but also grows singly. In Newfoundland, this species is found in moist open alpine meadows; beside lake shore, brooks, and springs; on talus slopes; in light shade beneath conifers; and in one case, in a late-melting snowbed. Moist soil seems to be a consistent habitat requirement, and the plants are capable of growing in full open conditions or light shade. Fronds are monomorphic (fertile and sterile fronds look alike), and reach a height of 75 cm in Newfoundland (pers. obs.). Fronds die back in winter. Pinnæ are deeply divided into pinnules. Sori are round, near the margin of the pinnules, with smooth tan indusia. The sporangia are smooth. Terrestrial in open, rocky woods and subalpine meadows in acid soils; 30 to 1,300 m; B.C., Nfld.; Alaska, Wash.; e Asia (Flora of North America 2005).

## **Overview of Biology**

Vegetative homosporous spores are the most important disseminules of this fern, and since they are light they can be carried great distances by wind. Fern spores are relatively long-lived, but must be deposited on an appropriate substrate for germination. Upon germination, the spore grows a small haploid gametophytic prothallus, and sexual reproduction is accomplished by means of motile sperm fertilizing eggs. The resulting zygote is the beginning of the diploid sporophyte generation, and grows into one of the ferns shown in the photographs in this document. After several years of growth, the sporophyte produces sporangia around the lower edges of pinnae on fertile fronds, and within these grow spores. Once mature, the sporangia split open and shed their spores into the wind. Can also spread vegetatively, Some related fern species are unable to produce fertile spores if they do not receive enough degree-days of warmth during the growing season, and reproduce mainly vegetatively (Odland 1995, 1998). Hultén (1968) describes *T. quelpaertensis* as “often sterile in Alaska”. From examination of herbarium specimens from 1973 and 1985, from field observations in 2002 and 2004, and from microscopic examination of collected fronds, it seems that many of the sporangia (up to 75%) of *T. quelpaertensis* at Heather Pond fail to develop completely (Burzynski 2003, 2005). This may be what has restricted them from escaping from the valley of Heather Pond. At Heather Pond, these ferns are always associated with either running water or very moist soil. Interestingly, Hay (pers. com. 2002) checked the Herbar Marie-Victorin specimens and reported “...as you observed, most of them seem to have poorly developed sporangia or few sori. One collection, however, made by Marilyn Anions on Aug. 18 1998 at Arm Pond is fully developed and laden with sporangia.”

## **Population Size**

Inventories of *T. quelpaertensis* at Heather Pond in 2002 and 2004 produced a population estimate of just under 20,000 crowns (Burzynski 2003, 2005). Because of the density of the largest glades of ferns, it was impossible to count them individually without damaging them, so estimates were necessary.

## **Traditional and Local Ecological Knowledge**

None known.

## **Trends**

Population size and habitat condition appear to be stable. No indications of changes in either have been noticed at the site.

## **Threats and Limiting Factors**

The greatest threat to this species in Newfoundland is the fact that it is confined to a single valley at the head of one lake (except for two individual plants found about five kilometres away, which have not been re-located since). Any changes, especially climatic, that affect soil moisture could adversely affect this species. Likewise, climatic warming, if not associated with drought, might increase the fern's ability to produce viable spores. Preliminary research has shown that about 75% of the sporangia on fronds collected at this site are undeveloped, and produce no viable spores. This may be climatically controlled (Burzynski 2002, 2005). Snowmobilers use this valley,

although it is a Parks Canada Zone 1 Area. Snow depth should provide some protection for these plants, but compaction by over-snow vehicles could result in later snow melt and reduce the growing season further. Late frost and grazing by moose damage the tips of some fronds, but for the most part this population seems unaffected by disease or herbivory. However, the high prevalence of undeveloped sporangia indicates that this population is probably at its altitudinal and climatic distributional limit.

### Existing Protection

The entire eastern North American population of *T. quelpaertensis* grows within the boundaries of Gros Morne National Park and is protected from destruction, disturbance, or removal under the Canada National Parks Act, and if declared a species at risk by the province, it will also be protected under the Federal Species at Risk Act.

### Special Significance

No known scientific or cultural significance. Not known to be invasive or poisonous.

### Rank and Status

#### Jurisdiction

Global  
National (Canada)  
Status/COSEWIC  
Newfoundland  
Labrador  
British Columbia  
Alaska  
Washington  
(NatureServe 2005)

#### Rank

G4  
N3  
Not rated  
S1  
Not known from Labrador  
S3S4  
S3S4  
SNR



Figure 6. Dense colony of *T. quelpaertensis* at Heather Pond.



## Sources of Information and List of References

- Bouchard, André and Stuart G. Hay. 1976. *Thelypteris limbosperma in eastern North America*. *Rhodora* 78(815): 552-553.
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*All photographs were taken by Michael Burzynski.*

## Collections examined

Gros Morne National Park Herbarium (GMNP), five specimens; 100 pressed fertile fronds from different plants at Heather Pond; live plants at Heather Pond in Gros Morne National Park.

## Technical Summary

<b>Distribution and Population Information</b>	<b>Criteria Assessment</b>
<i>Extent of occurrence (EO)(km<sup>2</sup>)</i>	5
<i>Area of occupancy (AO) (km<sup>2</sup>)</i>	0.5
<i>Number of extant locations (in NL)</i>	1
<i>Trend in # of locations, EO, AO</i>	Stable
<i>Habitat trend</i>	Stable
<i>Trend in area, extent, or quality of habitat</i>	Stable
<i>Generation time</i>	Unknown, several years at least
<i>Number of mature individuals</i>	At least 70% of the plants bore sporangia, so about 14,000 were mature
<i>Total population trend</i>	Probably stable, no extreme fluctuations have been observed, but this is a very difficult site to visit, and has not been surveyed frequently
<i>Is the total population severely fragmented?</i>	The entire Newfoundland population is in one small valley, except two plants growing 5 km away. This population is extremely disjunct from other plants of the species (by about 4500 km).
<b>Rescue Effect (immigration from an outside source)</b>	
<i>Does the species exist elsewhere?</i>	Yes, about 4500 km away
<i>Status of the outside population(s)?</i>	Unknown
<i>Is immigration known or possible?</i>	Extremely unlikely because of the distance
<i>Would immigrants be adapted to survive here?</i>	Not applicable
<i>Is there sufficient habitat for immigrants here?</i>	Not applicable



