



The Species Status Advisory Committee
Status Review of
Crowded Wormseed Mustard

Erysimum coarctatum
(formerly *E. inconspicuum* var. *coarctatum*)

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.

Cover Photographs

Left: Flowering/fruiting stem: Photo by Michael Burzynski.

Right: Buds and flowers: Photo by Claudia Hanel.

Recommended Citation

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Authors

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SSAC Status Review Summary

Date of Status Review: March 8, 2019

Common Name

Crowded Wormseed Mustard

Scientific name

Erysimum coarctatum (formerly *E. inconspicuum* var. *coarctatum*)

Status

Endangered

Reasons for Recommendation

COSEWIC criteria D1

D1. Number of mature individuals <250

Range in Newfoundland and Labrador

Newfoundland only; restricted to a small coastal site north of the Bay of Islands

Status History

In April 2006, the species was assessed as Endangered by the Species Status Advisory Committee in the document entitled: "The Status of Crowded Wormseed Mustard (*Erysimum inconspicuum* (S. Watson) MacMill. var. *coarctatum* (Fernald) Rossbach) in Newfoundland and Labrador" (2006)

http://www.flr.gov.nl.ca/wildlife/endangeredspecies/ssac/crowded_wormseed_mustard.pdf.

[This Web version may be abridged].

In November 2007, the species was listed as Endangered 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.

Overview

Species Description and Significance

General Description of the Species:

Erysimum coarctatum is a biennial or a short-lived [at least 3 yr (Claudia Hanel, pers. comm. 2018)] perennial. Stems erect and rarely branching; height 15-75 cm, varying with exposure and growth conditions. Basal leaves linear to oblanceolate; 2-7 cm long and 2-7 mm wide, narrowing towards the base (See Figure 1, left image). Leaves of the stem sessile, ending in an acute tip. Leaf margins entire or denticulate. Flowers in racemes with corymb-like summits (See Figure 1, right image). Racemes elongated when in fruit. Pedicels ascending, stout, and slightly narrower than the fruit. Flowers yellow with 4 narrowly egg-shaped to oblong petals which are (8)10-15 mm long and 2-4 mm wide. Sepals oblong to linear-oblong and 4-6 mm long. Fruits ascending, narrowly linear, straight; 3-6(-7) cm long, 1-1.8 mm wide, and slightly square in cross-section. Generally flowers in June-August, however, in Newfoundland, flowering generally occurs in July, while fruiting generally occurs in August.

(Adapted from Species Status Advisory Committee (2006), and from Al-Shehbaz 2009).

Taxonomy and Designatable Units:

Erysimum coarctatum Fernald

Crowded Wormseed Mustard
Tall Wormseed Mustard
Shy Wormseed Mustard
vélar du golfe du Saint-Laurent
vélar à petites fleurs variété du Saint-Laurent

Family: Brassicaceae (Mustards)

Synonyms:

Erysimum inconspicuum (S. Watson) MacMillan var. *coarctatum*
(Fernald) Rossbach

In NL, there is one designatable unit.

Social and Cultural Significance:

The 2006 SSAC status report gave the following account of the cultural and social importance of Crowded Wormseed Mustard:

“... The genus [*Erysimum*] was once thought to have medicinal value, the name is derived from the Greek eryomai meaning “help” or “save” (Fernald [1950]), and its officinal effect was believed to be associated with sight. [*Erysimum*] was used by the Hopi in the American southwest as a tuberculosis cure. Alcohol extracts of *E. inconspicuum* fruits were found by Piatak et al. (1985) to have cytotoxic properties against the KB cell line and activity against P-388 lymphocytic leukemia.”

Since *E. coarctatum* appears to have some effect as a treatment for certain types of cancer, each population of the species is potentially economically and medicinally valuable.

Distribution

Global:

Erysimum coarctatum is endemic to North America and is found only within Canada and Alaska (Al-Shehbaz 2010).

National:

E. coarctatum is found in the Yukon, the Northwest Territories, Alberta, Quebec, and on the Island of Newfoundland (NatureServe)

Provincial:

Within Newfoundland and Labrador *E. coarctatum* is known to occur at only one locality – Chimney Cove, north of the Bay of Islands, Newfoundland - where it grows within a narrow belt along the edge of a 150m tall basalt cliff (see Figures section).

The Extent of Occurrence is 0.013 km², and the Indexed Area of Occurrence is 4 km².

Habitat

Erysimum coarctatum generally grows in a broad variety of habitats including meadows, road sides, bluffs, crevices and calcareous cliffs. Its ability to grow as a ruderal species in man-made and disturbed habitats is typical of *Erysimum* species.

In Québec, most plants are found on upper beaches composed of limestone gravel. These beaches are essentially [calcareous] gravel flats above the high tide line (Hanel and Burzynski 2009).

At Chimney Cove, it grows on presumably alkaline soils on the edge of sheer cliffs above the sea (see Figure 3); the underlying rock is calcium-rich basalt (SSAC 2006, Hanel and Burzynski 2009). It is not known whether the plants could spread into the adjoining meadow if grazing pressure were relieved, or whether the competition from other plant species would preclude this (Hanel and Burzynski 2009).

Biology

In the 2006 status report, it was noted that there was no evidence to suggest that *E. coarctatum* had a perennial life history at the Chimney Cove locality. Instead, it was stated that there was evidence of a biennial life history, given the lack of flower stems from previous years, a short root system and early wilting of basal rosette. The generation time of the plants at Chimney Cove was thus presumed to be two years. However, little is actually known about the reproductive biology of the species.

Since the 2006 report, a small number of plants were tagged in an attempt to monitor survival from year to year. What was revealed was that 5 out of 9 plants tagged survived from 2009 to 2011, suggesting that a good part of the population may, in fact, be short-lived perennials (Claudia Hanel, pers. comm. 2018).

Population Size and Trends

In 1995, the number of individual plants present at Chimney Cove was estimated to be 100 (SSAC 2006). In 2000, no plants were found at all. Attempting to explain the 2000 count, Hanel and Burzynski (2009) stated that: "... no plants were seen, but this was thought to be due to the early withering of the plant after seed set (Burzynski 2006)".

The site was further surveyed in 2011, 2013 and 2017. Between 2011 and 2017, the population size of mature individuals increased by more than an order of magnitude from 10 to 142 (Claudia Hanel, pers. comm. 2018). See Figure 4.

Owing to the dangerous nature of the cliff-top habitat, the full extent of the *E. coarctatum* population has been very difficult to survey, and may, or may not, be somewhat larger than existing surveys have suggested. Indeed, the cliff may provide additional habitat for *E. coarctatum* that has been impossible to detect by conventional means. Future drone surveys might prove useful.

Threats and Limiting Factors

In the 2009 Recovery Plan, *Erysimum coarctatum* was considered to be threatened by livestock grazing, the introduction of exotic plant species and the precarious nature of its habitat at Chimney Cove. Table 1 summarizes the nature and severity of these threats, as perceived in 2009.

Category of Threat	Threat General threat Specific threat	S-E Information Sector Activity Stakeholder	Causal Certainty		Timing	Frequency	Extent	Severity		Current Level of Concern
			Local	Range-wide				Local	Range-wide	
Exotic Species	Ge-livestock grazing Sp-removal of whole plants or flowers/seed capsules	Se-Animal production Ac-livestock grazing St-livestock owners	Medium	Medium	Current	Seasonal	Localized	Medium	Medium	Medium
Climate and natural disasters	Ge-Rockslides Sp-loss of individuals and habitat	Se-N/A Ac-Species management St-General public	High	High	Anticipated	Unknown, but believed to be Infrequent	Localized	High	High	Medium
Exotic Species	Ge-exotic plants Sp-competition limiting survival and reproduction	Se-Animal production Ac-introduction of forage plant species (possibly inadvertently)	Low	Low	Current	Constant	Localized	Medium	Medium	Low

Table 1: Classification of threats to *E. coarctatum* in Newfoundland (from Hanel and Burzynski 2009).

An up-to-date threats assessment for *Erysimum coarctatum* in Newfoundland, employing the protocol of Salafsky et al. (2008), is presented below:

2. Agriculture & Aquaculture

2.3. Livestock, Farming & Ranching:

Grazing cattle are occasionally present at Chimney Cove. However, the extent to which cattle threaten *E. coarctatum* at that locality is unclear. Grazers may remove immature seed pods, thereby limiting the persistence of the biennial part of the population (SSAC 2006). An estimated 30 cattle and 15 horses may graze at the site, but this number

likely varies from year to year (Hanel and Burzynski 2009). Apparently, these animals are not deliberately pastured there, but a few animals seem to escape from the nearby Trout River community pasture on a fairly regular basis.

Cattle were still grazing in the Chimney Cove meadow in 2018 (Claudia Hanel, pers. comm. 2018)

6. Human Intrusions & Activities

6.1 Recreational Activities

The Crowded Wormseed Mustard Recovery Plan (Hanel and Burzynski 2009) recorded that: "... six seasonal cabins are located on the south side of Gregory River approximately 500 m from the Crowded wormseed mustard plants. An ATV trail has been constructed, which will permit more frequent visitation to the area."

A small number of new cabins and out-buildings have been constructed at the same place since 2009. However, according to Claudia Hanel (pers. comm. 2019): "The cabins are all across the river [to the south of the mustard locality] and not a direct threat. I don't think the people ever go up to the Crowded wormseed mustard site, just the cattle. You have to wade through the river and I didn't see any evidence of ATV crossings at that spot. They cross on ATV further upstream, but there is no trail along the northern bank (too steep)."

8. Invasive & Other Problematic Species & Genes

8.1 Invasive Non-native/Alien Species

A number of non-native/alien plant species have been found in the habitat of *E. coarctatum* at Chimney Cove (Hanel and Burzynski 2009). The extent of competition between these invasive plant species and *E. coarctatum* is unknown, but *E. coarctatum* does not occur in dense herbaceous vegetation (Hanel and Byrzynski 2009).

10. Geological Events

10.3 Avalanches & Landslides

The headland of Chimney Cove is likely unstable, and a landslide or a large failure of the cliffs might very well extirpate the whole *E. coarctatum* population (Hanel and Byrzynski 2009). More likely would be a minor event causing partial population loss.

Protection, Status and Ranks

All ranks listed below for *Erysimum coarctatum* are based on “Wild Species 2015: The General Status of Species in Canada” (Canadian Endangered Species Conservation Council 2016) and NatureServe (2018).

Category	Rank
Global	
G-rank:	G5
IUCN:	Not listed
National	
N-rank:	N4N5
COSEWIC:	Not assessed
Provincial	
Newfoundland: Labrador:	S1, critically imperiled Not present
Adjacent Jurisdictions:	
Quebec S-Rank	S2, imperiled

Erysimum coarctatum was designated as Endangered under the Newfoundland and Labrador Endangered Species Act in 2006. A recovery plan has been produced for the species (Hanel and Burzynski 2009).

The critical habitat for *E. coarctatum* is now included in a Sensitive Wildlife Area (SWA) under the provincial Crown Lands Atlas. An inclusion of known critical, recovery, and potential habitat in an SWA on the provincial Crown Lands Atlas does not afford a species any legal protection, nor does it have any associated legislation (J. Humber, pers. comm., 2018). Rather, it functions as a habitat protection mechanism that affords a degree of protection. During the environmental assessment process, or during a land use referral from the Interdepartmental Land Use Committee (ILUC), an SWA designation will trigger a review by the Wildlife Division and/or the Forestry and Wildlife Research Division for any new land use or development proposals (J. Humber, pers. comm., 2018).

This review can lead to the denial of the proposal, conditions being placed on land use activities, and/or development of appropriate mitigation measures (Jessica Humber, pers. comm. 2018).

Status Review Report

Crowded Wormseed Mustard
Vélar à petites fleurs variété du Saint-Laurent
Erysimum coarctatum
Range of occurrence in NL (NL/LB): Chimney Cove, Newfoundland

Existing SSAC Assessment:

Status category:

XT E T SC

Date of last assessment: April 2006

Reason for designation at last assessment:

- Only 1 known population in the province
- Narrowly restricted to a very unstable habitat (30 m band at the upper edge of a friable cliff along ocean coast)
- Small population estimated at 100 mature individuals a decade ago (not surveyed since)
- Biennial or short lived perennial reliant on soil seed bank
- Cattle grazing and increased human use at the site could pose a threat
- Variety endemic to the Gulf of St. Lawrence region and rare throughout its range
- Rescue effect unlikely

Criteria applied at last assessment:

- Qualified as Endangered under the SSAC/ COSEWIC criteria D1: Number of mature individuals <250

SSAC Recommendation:

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

Evidence supporting this Status Review:

Wildlife species:	
Change in eligibility, taxonomy or designatable units: Explanation: The taxonomic name of Crowded Wormseed Mustard has changed from <i>Erysimum inconspicuum</i> var. <i>coarctatum</i> to <i>Erysimum coarctatum</i> .	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Range:	
Change in Extent of Occurrence (EO): Explanation: different measuring protocol	Yes <input checked="" type="checkbox"/> No <input 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*	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Unk <input type="checkbox"/>
Significant new survey information: Explanation: Multiple new surveys were conducted in 2009, 2011, 2013 and 2017.	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Unk <input type="checkbox"/>
Population Information:	
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] Explanation: The population trend between 2011 and 2017 suggests that there is an increase in the number of mature individuals. However, previous to 2011, data is deficient. The original count made in 1995 was ~100 mature plants – a number that is roughly comparable to the 2017 count of 142. (Figure 4; also SSAC 2006).	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:	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Threats:	
Change in nature and/or severity of threats:	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Unk <input type="checkbox"/>
<p>Comment:</p> <p>Looking to the future, the nature of the habitat makes it unlikely that threats from human activities to the current population will change appreciably. The threat of grazing and introduced plant species may or may not increase in the future.</p>	
Protection:	
Change in effective protection:	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
<p>Explanation:</p> <p>Since the 2006 status report the species has gained the status of Endangered under the NL Endangered Species Act and the habitat it grows in has been included in a Sensitive Wildlife Area.</p>	
Rescue Effect:	
Change in evidence of rescue effect:	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
Quantitative Analysis:	
Change in estimated probability of extirpation:	Yes <input type="checkbox"/> No <input type="checkbox"/> Unk <input checked="" type="checkbox"/>
Details: No quantitative analysis was performed.	

Summary and Additional Considerations:

A recovery plan has been produced for this species in Newfoundland (Hanel and Burzynski. 2009). However, recovery feasibility is expected to be low as habitat specificity is likely the limiting factor for range expansion. Since the 2009 recovery plan, an *ex situ* population has been established at the Memorial University botanical garden. This second population could be used to repopulate the Chimney Cove site, if required. In the botanical garden *E. coarctatum* reproduces above expectations and has the potential to become a weed (Todd Boland, pers. comm. 2018).

The largest threat to the species at Chimney Cove is currently a natural event like a land slide or partial collapse of the habitat. Since such events would be difficult if not impossible to prevent at the locality in question, *ex situ* conservation efforts may be paramount for the survival of *Erysimum coarctatum* in Newfoundland.

Acknowledgements and authorities contacted:

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

Jessica Humber – Ecosystem Management Ecologist – Biodiversity, Forestry and Wildlife Research Division, Government of Newfoundland and Labrador

Adam Durocher - Data Manager, Atlantic Canada Conservation Data Centre

Author of Status Review:

Sander Bennett Boisen

Technical Summary

Erysimum coarctatum

Crowded Wormseed Mustard

Vélar à petites fleurs variété du Saint-Laurent

Range of occurrence in the province: Chimney Cove, Newfoundland

Demographic Information

1. Generation time (usually average age of parents in the population)	2-3 yrs. (see Biology section above)
2. Is there an [observed, inferred, or projected] continuing decline in number of mature individuals?	No
3. Estimated percent of continuing decline in total number of mature individuals within [5 years or 2 generations]	n/a
4. [Observed, estimated, inferred, or suspected] percent [reduction or increase] in total number of mature individuals over the last [10 years, or 3 generations].	~1420% increase (from 10 to 142) over 6 years (between 2011 and 2017) Note, however, that the number recorded in 1995, when the Chimney Cove population was rediscovered, was ~100. Not enough data to predict trends.
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 period including both the past and the future.	Unknown

7. Are the causes of the decline [a] clearly reversible, [b] understood, and/or [c] ceased?	n/a
8. Are there extreme fluctuations in number of mature individuals?	Unknown. Over the past 22 years (1995 to 2017) the observable population size has varied from ~100 to 0 to 10 to 34 to 142. However, the 0 count is thought to be due to the early withering of the plant after seed set.

Extent and Occupancy Information

9. Estimated extent of occurrence	0.013km ²
10. Index of area of occupancy (IAO) (Always report 2x2 grid value).	4 km ²
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, entire known population on NFL occurs in a single area.
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?	n/a
16. Is there an [observed, inferred, or projected] continuing decline in number of locations*?	No

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

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
Chimney Cove	100-200
Total	100-200

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)

24. Threats and IUCN categories summary: 2.3. Livestock, Farming & Ranching: 6.1 Recreational Activities 8.1 Invasive Non-native/Alien Species 10.3 Avalanches & Landslides

Rescue Effect (immigration from outside Newfoundland)

25. Status of outside population(s) most likely to provide immigrants to Newfoundland?	Status in Quebec is S2, closest population is near Baie-Sainte-Claire on Anticosti Island.
26. Is immigration known or possible?	Unknown, but long-distance dispersal seems unlikely in the immediate future.
27. Would immigrants be adapted to survive in Newfoundland?	Yes
28. Is there sufficient habitat for immigrants in Newfoundland?	Yes
29. Is rescue from outside populations likely?	No

Data Sensitive Species

30. Is this a data sensitive species? No

Current Status

31. Status History (COSEWIC or SSAC)

In April 2006, the species was assessed as Endangered by the Species Status Advisory Committee in the document entitled: "The Status of Crowded Wormseed Mustard (*Erysimum inconspicuum* (S. Watson) MacMill. var. *coarctatum* (Fernald) Rossbach) in Newfoundland and Labrador" (2006)

In November 2007, the species was listed as Endangered 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):

D1. Number of mature individuals <250

33. Year Assessed: 2006

34. Reasons for Designation:

Qualified as "endangered" under the SSAC/COSEWIC criteria D1:

- Only 1 known population in the province
- Narrowly restricted to a very unstable habitat (30 m band at the upper edge of a friable cliff along ocean coast)
- Small population estimated at 100 mature individuals a decade ago (not surveyed since)
- Biennial or short lived perennial reliant on soil seed bank
- Cattle grazing and increased human use at the site could pose a threat
- Variety endemic to the Gulf of St. Lawrence region and rare throughout its range
- Rescue effect unlikely

35. Author of Technical Summary: Sander Bennett Boisen

36. Additional Sources of Information:

Claudia Hanel of the Forestry and Wildlife Research Division, Department of Fisheries and Land Resources.

Recommended Status and Reasons for Designation

37. Recommended Status: Endangered	38. Alpha-numeric Code: D1
39. Reasons for Designation: Qualifies as endangered under COSEWIC criteria D1	

Applicability of Criteria

40. Criterion D (Small and Declining Number of Mature Individuals): Qualifies as endangered under COSEWIC criteria D1 Total number of mature individuals <250

Information Sources

Cited References

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Personal Communications

Claudia Hanel, 2018, Crowded Wormseed Mustard Data Update 2018.

Claudia Hanel, April 17, 2018, unpublished report: “Crowded Wormseed Mustard (CWM) Data Update”, Forestry and Wildlife Research Division, Department of Fisheries and Land Resources, Government of Newfoundland and Labrador.

Todd Boland, May 7, 2018, email correspondence on the *ex-situ* conservation of *E. coarctatum*.

Figures



Figure 1: Left: the basal leaves of *Erysimum coarctatum*. Right: the inflorescence of *E. coarctatum* with early fruits on the lower part, and mature flowers towards the outside of the dense raceme and buds in the center. Photos courtesy of Claudia Hanel.



Figure 2: The distribution of *Erysimum coarctatum* in Canada. Map from VASCAN database <http://data.canadensys.net/vascan/taxon/13742>



Figure 3: The habitat of *Erysimum coarctatum* at Chimney Cove. See the characteristic yellow flowers growing on the edge of the cliff. Photo courtesy of Claudia Hanel.

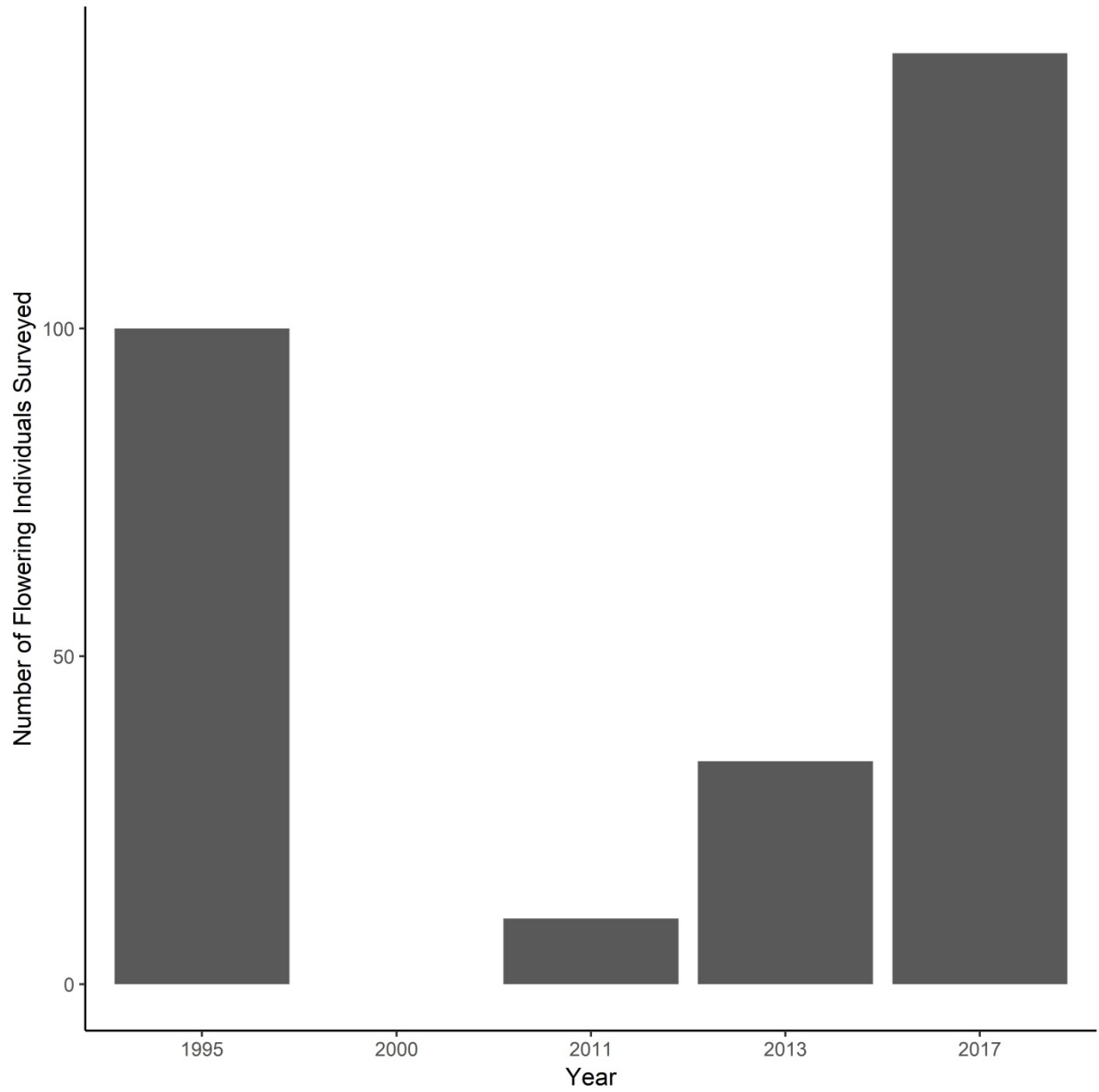


Figure 4: The number of flowering individuals found in surveys of Chimney Cove in 1995, 2000, 2011, 2013 and 2017. Note that the “0” count for 2000 is thought to be due to the early withering of the plant after seed set (Hanel and Burzynski 2009).

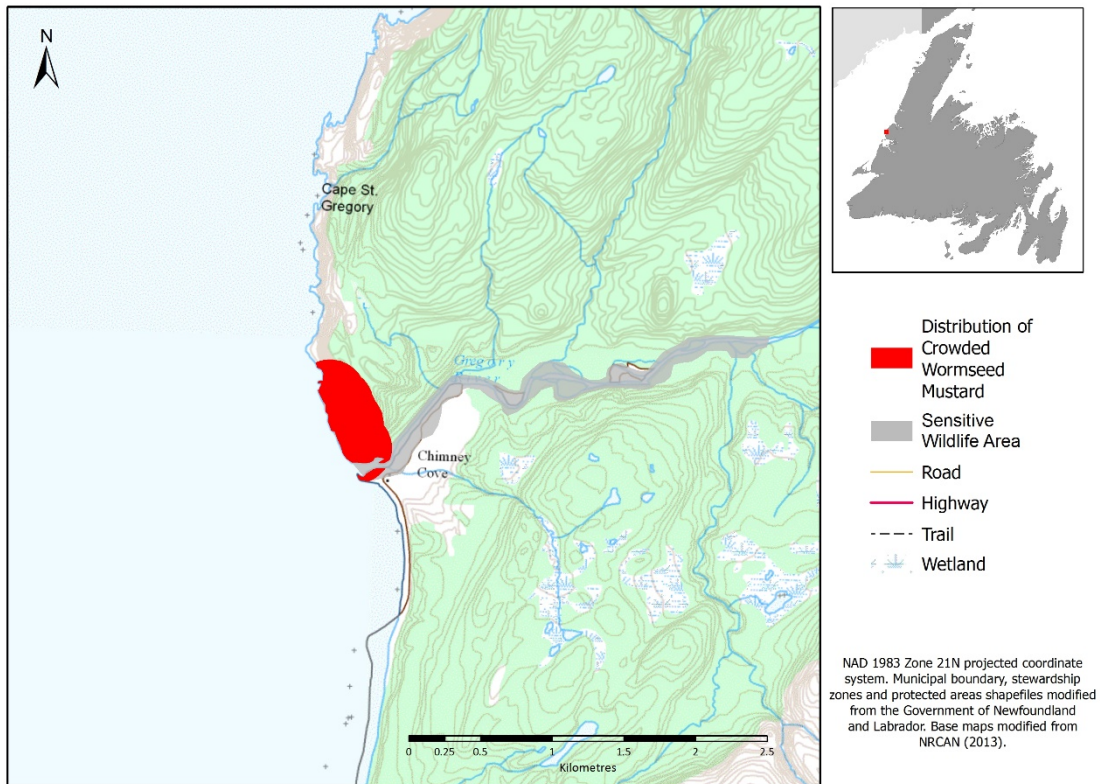


Figure 5: Critical habitat of *Erysimum coarctatum* in Newfoundland. The species is known to occur at only one Newfoundland locality – Chimney Cove. Map prepared by Adam Durocher, Atlantic Canada Conservation Data Centre.

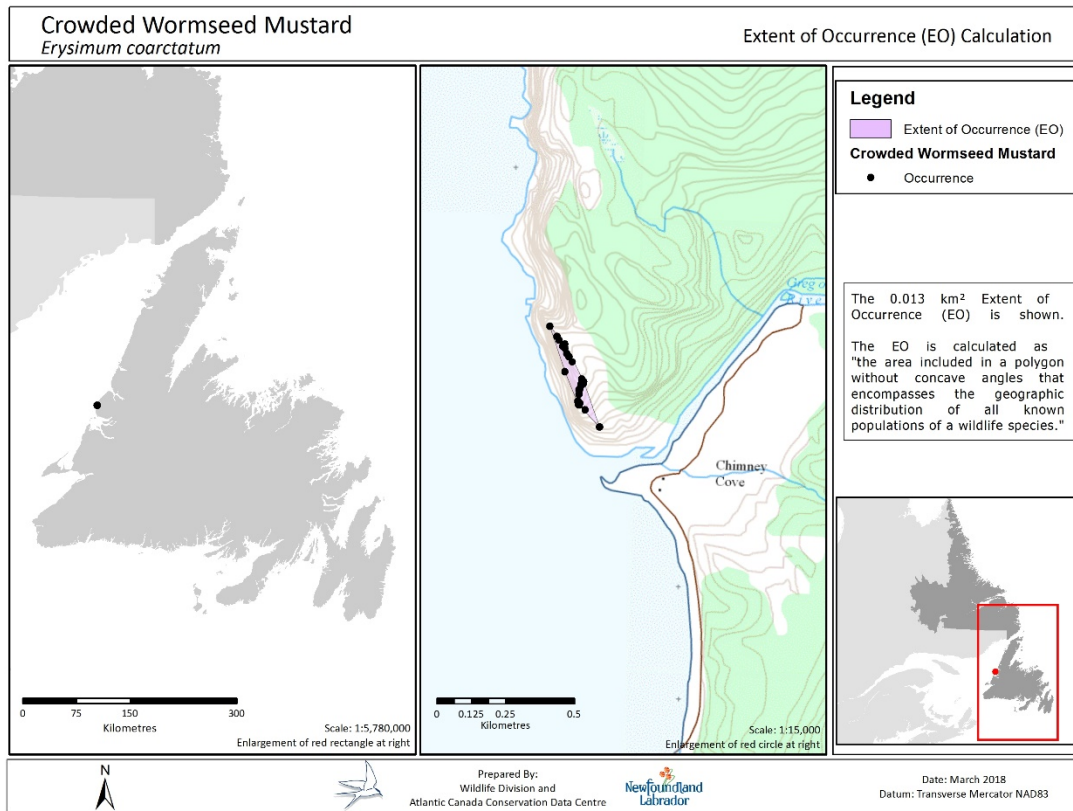


Figure 6: The distribution of *Erysimum coarctatum* and its extent of occurrence in Newfoundland. Prepared by Adam Durocher, Atlantic Canada Conservation Data Centre.

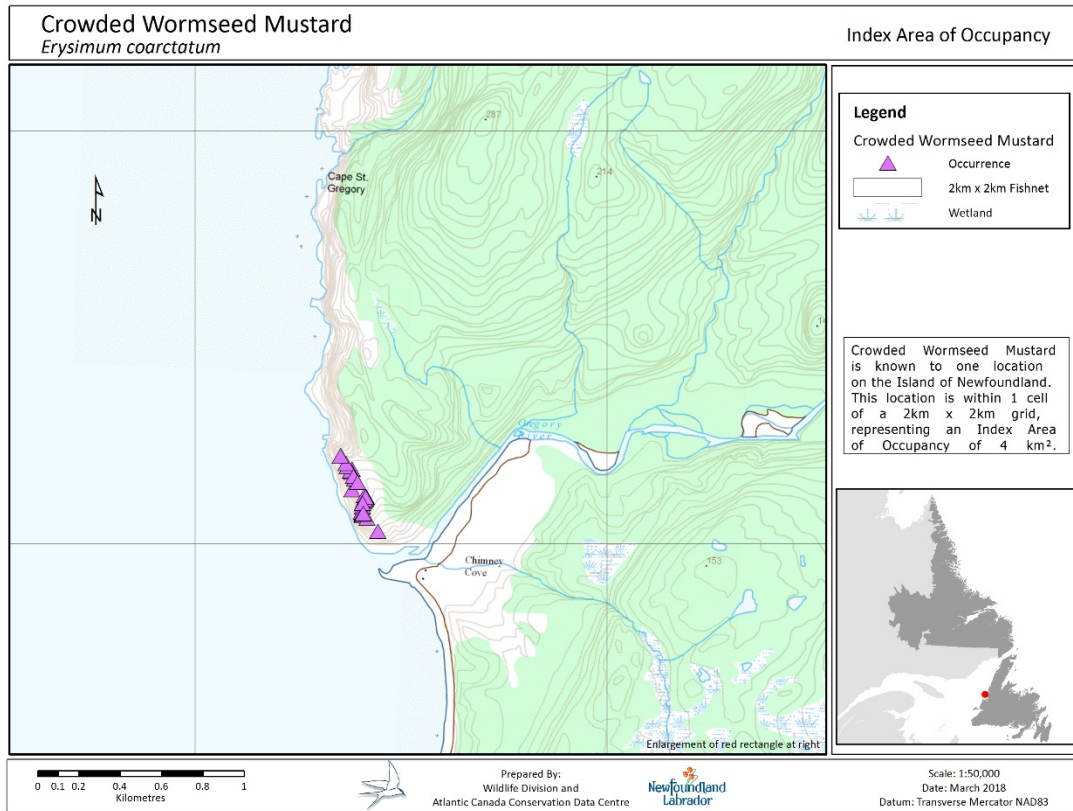


Figure 7: The occurrences of *Erysimum coarctatum* in Newfoundland and the 2x2km grid used to calculate the Indexed Area of Occurrence. Prepared by Adam Durocher, Atlantic Canada Conservation Data Centre.