Recovery Strategy for the nugget moss (*Microbryum vlassovii*) in British Columbia

Prepared by the British Columbia Bryophyte Recovery Team

February 2009

About the British Columbia Recovery Strategy Series

This series presents the recovery strategies that are prepared as advice to the province of British Columbia on the general strategic approach required to recover species at risk. The Province prepares recovery strategies to meet its commitments to recover species at risk under the *Accord for the Protection of Species at Risk in Canada*, and the *Canada – British Columbia Agreement on Species at Risk*.

What is recovery?

Species at risk recovery is the process by which the decline of an endangered, threatened, or extirpated species is arrested or reversed, and threats are removed or reduced to improve the likelihood of a species' persistence in the wild.

What is a recovery strategy?

A recovery strategy represents the best available scientific knowledge on what is required to achieve recovery of a species or ecosystem. A recovery strategy outlines what is and what is not known about a species or ecosystem; it also identifies threats to the species or ecosystem, and what should be done to mitigate those threats. Recovery strategies set recovery goals and objectives, and recommend approaches to recover the species or ecosystem.

Recovery strategies are usually prepared by a recovery team with members from agencies responsible for the management of the species or ecosystem, experts from other agencies, universities, conservation groups, Aboriginal groups, and stakeholder groups as appropriate.

What's next?

In most cases, one or more action plan(s) will be developed to define and guide implementation of the recovery strategy. Action plans include more detailed information about what needs to be done to meet the objectives of the recovery strategy. However, the recovery strategy provides valuable information on threats to the species and their recovery needs that may be used by individuals, communities, land users, and conservationists interested in species at risk recovery.

For more Information

To learn more about species at risk recovery in British Columbia, please visit the Ministry of Environment Recovery Planning webpage at:

<http://www.env.gov.bc.ca/wld/recoveryplans/rcvry1.htm>

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Additional copies

Additional copies can be downloaded from the B.C. Ministry of Environment Recovery Planning webpage at: <http://www.env.gov.bc.ca/wld/recoveryplans/rcvry1.htm>

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Disclaimer

This recovery strategy has been prepared by the British Columbia Bryophyte Recovery Team, as advice to the responsible jurisdictions and organizations that may be involved in recovering the species. The British Columbia Ministry of Environment has received this advice as part of fulfilling its commitments under the *Accord for the Protection of Species at Risk in Canada*, and the *Canada - British Columbia Agreement on Species at Risk*.

This document identifies the recovery strategies that are deemed necessary, based on the best available scientific and traditional information, to recover nugget moss populations in British Columbia. Recovery actions to achieve the goals and objectives identified herein are subject to the priorities and budgetary constraints of participatory agencies and organizations. These goals, objectives, and recovery approaches may be modified in the future to accommodate new objectives and findings.

The responsible jurisdictions and all members of the recovery team have had an opportunity to review this document. However, this document does not necessarily represent the official positions of the agencies or the personal views of all individuals on the recovery team.

Success in the recovery of this species depends on the commitment and cooperation of many different constituencies that may be involved in implementing the directions set out in this strategy. The Ministry of Environment encourages all British Columbians to participate in the recovery of the nugget moss.

RECOVERY TEAM MEMBERS

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RESPONSIBLE JURISDICTIONS

The British Columbia Ministry of Environment is responsible for producing a recovery strategy for the nugget moss under the *Accord for the Protection of Species at Risk in Canada*. Environment Canada's Canadian Wildlife Service participated in the preparation of this recovery strategy.

ACKNOWLEDGEMENTS

Initial drafting of this recovery strategy was by Terry McIntosh, with further review and updating by the B.C. Bryophyte Team. Funding for this recovery strategy was provided by the B.C. Ministry of Environment.

EXECUTIVE SUMMARY

The nugget moss (*Microbryum vlassovii*) was designated by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) as Endangered in November 2006 and will be considered for listing under the federal *Species at Risk Act* (SARA) Schedule 1 in 2009. Its current known Canadian range consists of two widely separated populations in the semi-arid regions of south-central British Columbia. The nugget moss is a tiny moss that grows as individual plants or in small patches on mineral soil. It is restricted to habitats on or near silt-rich lacustrine banks. As with many arid-land moss species, its growth cycle begins in late autumn after the first fall rains and, when temperature allows, grows through winter and into spring and early summer.

Potential threats to the survival of the populations include road or utilities construction and maintenance, recreational activities, invasive alien vascular plants, and erosion from unusual storm events.

Recovery Goal

The goal of this recovery strategy is to protect and maintain the extant populations of the nugget moss in Canada.

Recovery Objectives

The recovery strategy has the following objectives:

I. To ensure protection for the extant populations and respective habitats by 2013.
II. To assess the extent of and mitigate the main threats by 2013.
III. To determine habitat requirements at known sites by 2013.
IV. To confirm the distribution of the nugget moss (including new locations) to reliably determine population trends by 2013.

No critical habitat can be identified for the nugget moss in Canada at this time. It is expected that critical habitat will be proposed following the completion of outstanding work required to quantity specific habitat and area requirements for the species. Further research on the biology of the species and monitoring of populations is required to determine population trends. Consultation with affected land managers will also be necessary.

Approaches to achieve the recovery objectives are: habitat management, habitat protection, stewardship, inventory and monitoring, and scientific research.

An action plan will be completed by 2013.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

BACKGROUND

Species Assessment Information from COSEWIC

Date of Assessment: November 2006
Common Name (population): nugget moss
Scientific Name: *Microbryum vlassovii*
COSEWIC Status: Endangered
Reason for designation: In North America, this globally rare moss is known from only three localized sites. Two of these sites are in semi-arid areas of south-central British Columbia. Recent surveys have re-located the species at only one of these. This moss grows on fine soils on the steep portions of silt banks in early stages of plant community development. The extremely small populations render this moss vulnerable to disturbance. Threats include potential road development and maintenance of existing roads, and collection of specimens.
Canadian Occurrence: British Columbia
COSEWIC Status History: Designated Endangered in November 2006. Assessment based on a new status report.

Description of the Species

The nugget moss is a tiny, less than 2 mm tall, inconspicuous plant that grows as individuals or in small, scattered patches on mineral soil (Figure 1). It is sometimes hidden under litter or among other mosses. Its leaves are usually light yellow to golden when dry and yellow-green when wet, and they wrap around each other as they grow, protecting the maturing sporophyte (structure that produces spores). Its leaf margins are strongly recurved. The midribs of the leaves extend from the leaf apices as smooth and often orange hair-points. The upper surface of each midrib and parts of the adjacent leaf surface are ornamented with distinctive bottle-shaped cells (Figure 2). Its underground stems bear tiny, hemispherical structures that probably act as vegetative propagules. The nugget moss has both male and female structures on each plant, which may help to ensure successful fertilization and consequent production of spores (although this species has not been observed with mature sporophytes in North America; Zander 2007). Unlike most mosses, the nearly spherical capsules do not open with a lid in order to release their spores. Instead, spores are released when the capsule wall disintegrates after maturity.

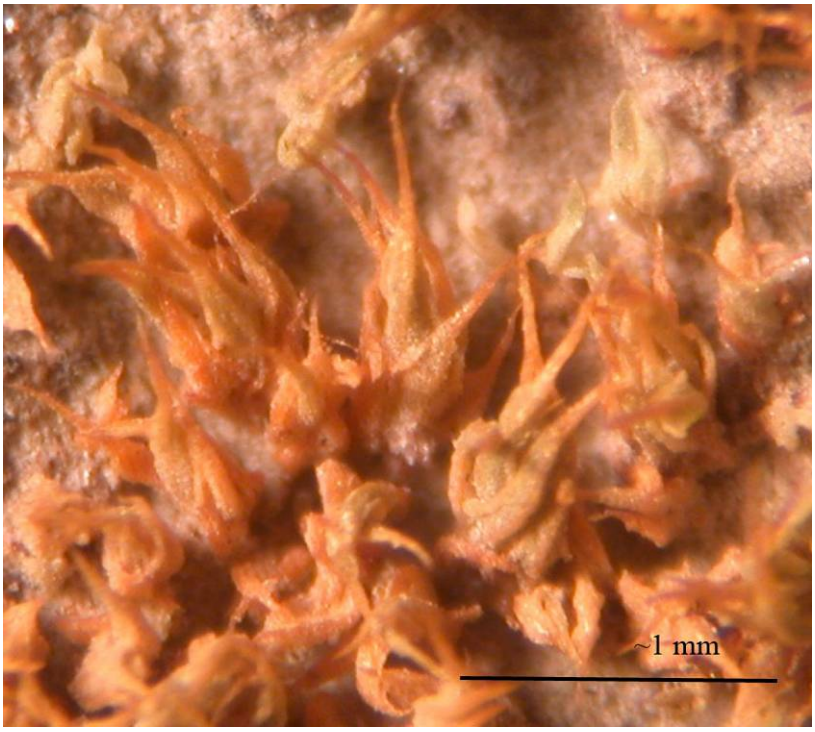

Figure 1. A dried patch of the nugget moss. Photo by T. McIntosh.

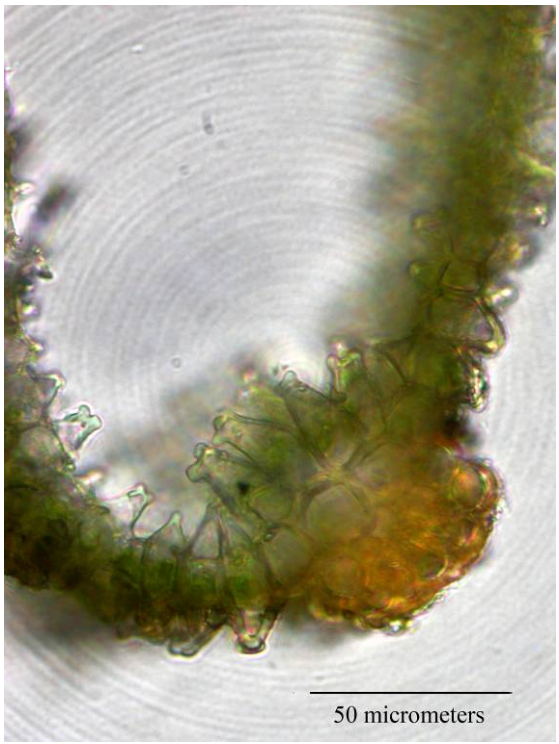

Figure 2. Transverse section of a leaf of nugget moss showing the characteristic bottle-like cells covering the upper side of the midrib and adjacent leaf cells. Photo by T. McIntosh.

Populations and Distribution

The nugget moss has a disjunct distribution between western North America and western Eurasia. It is rare across its global range. Eurasian locations include Spain (Jiménez et al. 1990), Ukraine, Armenia, and central Asia (COSEWIC 2006; Zander 2007). In North America it has been reported from southern British Columbia (McIntosh 1986, 1997) and California (Zander 2007; Figure 3). The nugget moss was first collected in Canada in 1980 from two locations in south-central British Columbia (Table 1, Figure 4). During extensive surveys of lacustrine banks east of Kamloops and in the Okanagan Valley between 2004 and 2006 (T. McIntosh, pers. comm. 2007), the more southerly Penticton population was rediscovered. However, the Kamloops population was not rediscovered and no new populations of the nugget moss were found. Because of the broad extent of the lacustrine banks in the Kamloops area and because an exact location for this moss was not recorded in 1980, it may have been missed in recent surveys (especially as this moss is very small in size and therefore difficult to see). The general location where it was found in 1980 has not been disturbed, so it is likely that the population is still extant.

The nugget moss is globally listed as G2? (Possibly Imperiled) and it is Red listed (S1; Critically Imperiled) by the B.C. Conservation Data Centre (CDC; B. C. Species and Ecosystem Explorer 2008). NatureServe Explorer (2008) lists only the CDC rankings for the moss (as *Phascum vlassovii*) and does not rank its Californian location. Nugget moss is a priority 1 species under goal 1of the B.C. Conservation Framework (see www.env.gov.bc.ca/conservationframework/ for details).

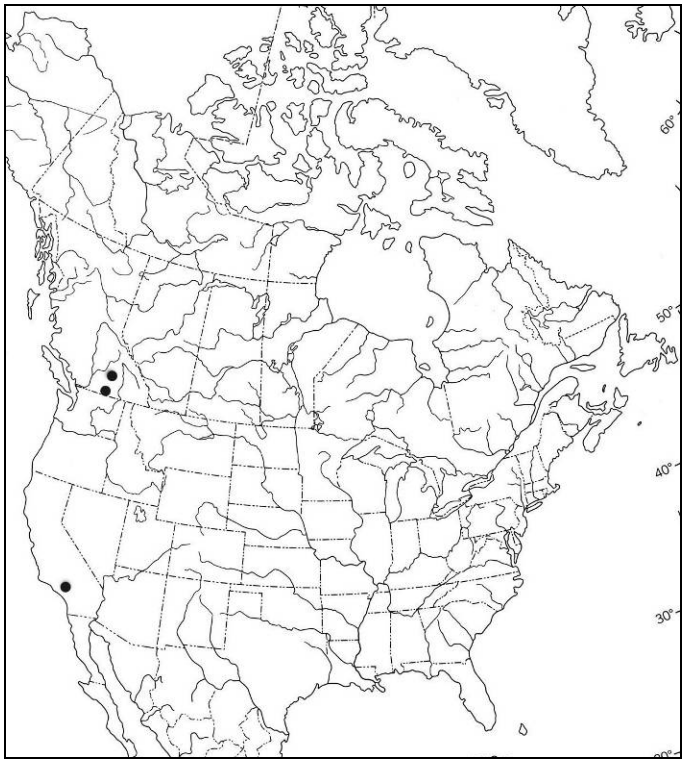

Figure 3. North American distribution of the nugget moss.

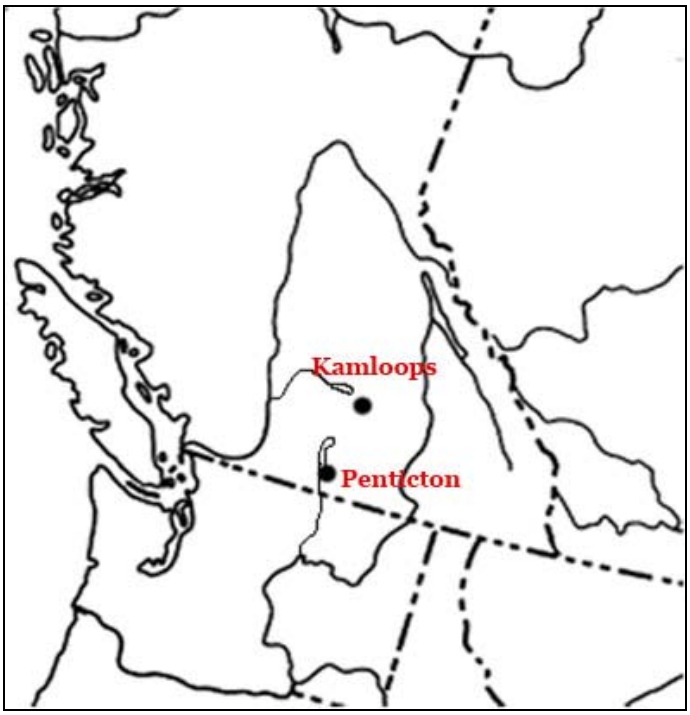

Figure 4. Distribution of the nugget moss in British Columbia and Canada.

Table 1 lists population data for the two known occurrences of the nugget moss in British Columbia and Canada. Both occurrences are represented by a few small (<1 cm^2) patches[1] or as scattered individual plants that are apparently restricted to relatively small areas at each location. An assessment of population trends is not possible at this time, but field observations suggest that regular recruitment is occurring at some sites. The Canadian populations of the nugget moss represent less than 1% of its global distribution and abundance.

Table 1. Population data for the nugget moss in Canada.

Population	Dates observed	Estimated number of patches/individuals and extent	Habitat characteristics	Population trend	Land tenure
1. Kamloops	1980	One patch observed and collected.	Unknown; extent and habitat not described in 1980.	Unknown	City of Kamloops
2. Penticton	1980, 2005, 2006	Approx. 8 patches (all <1 cm^2) and a few individuals observed in 3 microhabitats[2] of area >1500 m^2.	Unknown from 1980 collection; 2005: on steep, south-facing lacustrine bank (previous road cut); 2006: at the base of a lacustrine bank along south side of road.	Apparently stable	City of Penticton

[1] 'Patches' refers to a group of plants that cannot be determined to be individual reproducing units.
[2] 'Microhabitat' refers to the small areas of habitat in which the patches are placed on the landscape.

Needs of the Nugget Moss

Habitat and biological needs

In British Columbia, the nugget moss is restricted to habitats on or near silt-rich post-glacial lacustrine banks in semi-arid steppe environments in south-central British Columbia. Lacustrine banks are often kilometers long, such as those found near Kamloops and Penticton.

In Penticton, the nugget moss has been observed in two microhabitats on lacustrine banks. It has been found on compact mineral soil on steep, nearly perpendicular, exposed bank faces, a mostly bare habitat where few other moss species grow. Associated moss species, all poorly developed in this harsh habitat, include *Aloina bifrons*, *A. rigida*, and *Pseudocrossidium obtusulum* (there are no common names for these mosses). A few early successional lichen species were present as well (including *Collema* spp.). A second microhabitat for nugget moss is at the base of lacustrine cliffs on soil in more shaded habitats. Other mosses, including *Barbula unguiculata*, a species characteristic of more shaded conditions, grow adjacent to nugget moss in this habitat. The nugget moss appears to be more common in this second microhabitat; the largest patches and most developed plants were observed there. It has not been found growing in late successional lichen-dominated crust that dominates on large portions of undisturbed lacustrine banks. These observations imply that the nugget moss may be characteristic of early successional habitats, supported by its association with early seral species of mosses in more shaded habitat and with early seral species of lichens in more exposed habitat. The Californian collection was found on clay soil in an open, hillside pasture, also indicating that it is an early successional species.

The nugget moss is found in Bunchgrass and Ponderosa Pine Biogeoclimatic Zones. Characteristic vascular plants in these zones are bluebunch wheatgrass (*Pseudoroegneria spicata*), needle-and-thread grass (*Hesperostipa comata*), big sage (*Artemisia tridentata*), and, in the southern portions of the Okanagan Valley, antelope brush (*Purshia tridentata*).

Published information about the biological needs of the nugget moss is lacking. However, T. McIntosh (pers. comm., 2008) has provided information on this species from British Columbia. As with many arid-land moss species, its growth cycle begins in late autumn after the first fall rains and, when temperature allows, grows through winter and into spring and early summer. However, although sporophytes and spores mature during this period, mature sporophytes of the nugget moss have not yet been observed in British Columbia. Incomplete development of the sporophytes may be a response to the harsh arid climate combined with the compact mineral soil on which this species grows. It is possible that this species needs a relatively prolonged, wet spring period to enable the spores to mature, but this is unknown. Although the primary means of dispersal and reproduction of most mosses is by spores, the nugget moss may depend on vegetative reproduction to maintain or expand populations. The small hemispherical structures on its underground stems probably grow into plants under favorable conditions. There are no data on spore dispersal distances, viability, or germination success for this species, although, if produced, moss spores produced by species in this type of habitat are most frequently water or insect-dispersed.

Ecological role

The nugget moss may have a role in increasing soil stability, but, because of its low abundance, this role would be minor. No other ecological roles are likely for this species.

Limiting factors

A possible limiting factor for the nugget moss is its small size. This may be a competitive disadvantage when growing among other mosses and vascular plants, including invasive species. However, it appears that this species readily takes advantage of open mineral soil. Climate may be another limiting factor: it may prevent this species from producing spores unless there is a wet spring. Lastly, the nugget moss may be limited due the lack of suitable habitat in British Columbia. Although silt banks are common in the Kamloops and Penticton areas, they are rare elsewhere in the province.

Threats

Threat classification

Table 2. Threat classification for the nugget moss in British Columbia.

1. Road or utilities construction and maintenance		**Threat attributes**	
Threat category	Habitat loss or degradation, accidental mortality	**Extent**	Unknown
General threat	Road expansion, cleaning ditches, debris deposition, or impact by machinery	**Occurrence**	Anticipated
		Frequency	Recurrent
Specific threat	Destruction, removal, or burial of species and alteration of habitat.	**Causal certainty**	High
		Severity	High
Stress	Reduction in population size and local extirpation	**Level of concern**	High
2. Recreational activities		**Threat attributes**	
Threat category	Habitat loss or degradation, accidental mortality	**Extent**	Unknown
General threat	Walking through habitat or near plants in the lower sections of the known habitats	**Occurrence**	Anticipated
		Frequency	Unknown/recurrent
Specific threat	Trampling or digging (by dogs)	**Causal certainty**	Low
		Severity	Medium
Stress	Reduction in population size and local extirpation	**Level of concern**	Low
3. Invasive vascular plants		**Threat attributes**	
Threat category	Invasive species	**Extent**	Unknown

General threat	Invasive weedy species (unknown)	**Occurrence**	Anticipated
		Frequency	Seasonal
Specific threat	Changing habitat characteristics, increased litter and competition for resources.	**Causal certainty**	Unknown
		Severity	Unknown
Stress	Reduction in population size and local extirpation	**Level of concern**	Unknown
4. Unusual storm events		**Threat attributes**	
Threat category	Climate and natural disasters	**Extent**	Unknown
General threat	Unusual storm events	**Occurrence**	Anticipated
		Frequency	Unknown
Specific threat	Washing away of populations and part of habitat; burial of plants	**Causal certainty**	High
		Severity	High
Stress	Reduction in population size and local extirpation	**Level of concern**	High

Description of the threats

Road or utilities construction and maintenance

Both of the known populations of the nugget moss are adjacent to roadways (<1 m away) and sites for potential road expansion and utilities construction. Construction or associated activities such as roadside maintenance (e.g., cleaning ditches, clearing weeds or debris), subsequent debris deposition, or impact by machinery could impact the nugget moss populations and habitat. Plants could be accidentally destroyed, buried, or removed, and its habitat disturbed or buried. It is likely that road expansion would be the most likely event that would destroy plants on steep banks, as no one can walk there and invasive plants are mostly absent. However, any of these activities would likely affect the lower portions of banks closest to the roadway where, at least in the case of the Penticton site, the nugget moss has been found in greater abundance than on steeper faces of banks. Most or all of the populations and their viability could be reduced or populations could be extirpated. Road construction and maintenance has happened historically, and it is anticipated that it will also occur in the future, especially if these habitats are affected by erosional events that threaten the road. The frequency of these activities is unknown, but probably recurs when needed.

Recreational activities

Although this activity was not observed during visits to B.C. sites, recreational hiking is a threat to the nugget moss since both of the reported locations in B.C. are near residential areas and some trails were observed at the lacustrine banks at the Kamloops site. Also, many hikers take their dogs with them, and the possibility of damage from dogs running along the lower, more shaded portions of the banks is high. Plants could be accidentally destroyed or buried, and their habitat disturbed. Because the plants and the patches are small, damage to habitat and loss of plants could be high.

Invasive alien vascular plants

Invasive alien vascular plants are unlikely to be a threat to this species on steep, exposed silt bankfaces, but may be a threat along bases of banks where the nugget moss is more common, mainly by changing habitat characteristics, such as increasing shade or by producing litter that might bury the nugget moss. Most or all of the lower slope populations and their viability could be reduced, or populations extirpated. The presence or extent of this threat is unknown although numerous alien invasive species were noted (but not listed by name) along this roadway in 2006. The threat of invasive species is anticipated, and probably seasonal. These plants would disturb the habitat as they grow and the litter they produce may cover the nugget moss during the winter to spring growing period. This is a presumed or plausible threat only, thus the causal certainty is low (Table 2). However, this threat may decrease the population size over the long term.

Unusual storm events

Given the location of the main portions of the population along the base of banks in the Penticton area, a severe storm may lead to an unusually high overland waterflow especially in the ditches alongside the road. The subsequent scouring could wash both plants and soil away, or sediments could bury plants. Most or all of the lower populations could be reduced or extirpated. Although the extent of this threat is unknown, the threat of a severe storm event is anticipated, especially in the warmer seasons, but the effects of such a storm are unknown (e.g., erosional pathways may not be where this moss is located). The causal certainty is probably high. However, this threat may have a high severity on population numbers.

Actions Already Completed or Underway

No actions are underway to protect this species in the Kamloops area. The B.C. Ministry of Environment in Penticton (O. Dyer, pers. comm., 2008) as well as the City of Penticton are investigating ways that the known Penticton location for this species could be protected.

Knowledge Gaps

- More information is needed on the threats to this species, including road maintenance and local recreational activities. Potentially threatening invasive vascular species need to be recorded. The impacts of unusual storm events should be monitored.
- Scientific research needs to be completed to determine the habitat requirements of the nugget moss (e.g., soil structure, and composition, and light requirements).
- Detailed inventories need to be completed for this moss at the two reported sites, and accurate location and population data gathered. Little is known about the number of subpopulations of the nugget moss. The Kamloops area population was not rediscovered during COSEWIC-funded searches in 2002, and only four patches were located over the past three years at the Penticton site.
- Distribution and population trends need to be determined for this species.

RECOVERY

Recovery Feasibility

Successful recovery will depend on a combination of scientific investigations, habitat protection and possibly, management activities (e.g., road construction or maintenance contractors are aware of locations of the nugget moss), and long-term population monitoring. The level of effort required for recovery is expected to be low. In most cases, further studies and trials will be needed to determine whether there are insurmountable barriers to the recovery of existing populations.

Overall, recovery is considered to be biologically and technically feasible for the nugget moss. An assessment of the criteria for technical and biological feasibility for recovery of the nugget moss is found in Table 3.

Table 3. Technical and biological feasibility for recovery of the nugget moss.

	Criteria	Feasibility
1.	Are individuals capable of reproduction currently available to improve the population growth rate or population abundance?	YES – there is at least one extant population in Canada.
2.	Is sufficient suitable habitat available to support the species or could it be made available through habitat management or restoration?	YES – the habitat at the currently occupied sites are suitable, and additional suitable habitat may also be available.
3.	Can significant threats to the species or its habitat be avoided or mitigated through recovery actions?	YES – recovery actions in cooperation with land managers can prevent major threats.
4.	Do the necessary recovery techniques exist and are they demonstrated to be effective?	YES – general recovery methods and techniques are known.

Source: Criteria from Environment Canada et al. (2005).

Recovery Goal

The goal of this recovery strategy is to protect and maintain the extant populations of the nugget moss in Canada.

Rationale for the Recovery Goal

As with many other rare plant species, we lack adequate information about the historical distribution of the nugget moss. There is no evidence to indicate that this species was previously more abundant or widespread in the arid central interior of British Columbia; therefore, recovery with respect to this species should focus on improving the probability that it will persist in the

wild. Although the biology and ecology of nugget moss are not completely understood, field observations suggest that regular recruitment is occurring at some sites.

Recovery Objectives

I. To ensure protection for extant populations and respective habitats by 2013.
II. To assess the extent of and mitigate the main threats by 2013.
III. To determine habitat requirements at known sites by 2013.
IV. To confirm the distribution of the nugget moss (including new locations) to reliably determine population trends by 2013.

Approaches Recommended to Meet Recovery Objectives

- Habitat management
- Habitat protection
- Stewardship
- Inventory and monitoring
- Scientific research

Table 4. Recovery planning for the nugget moss.

Priority	Obj. No.	Broad approach / Strategy	Threat addressed	Specific steps	Outcomes or deliverables
High	I	Habitat management	Road or utilities construction and maintenance, recreational activities	• Communicate with the cities of Kamloops and Penticton (ongoing) about the presence of the species and the importance of protecting habitat. • Work with the municipalities to ensure their activities are compatible with conservation of the species.	• Populations maintained. • Mortality reduced. • Increased awareness and assistance by the land managers in the protection and recovery of this species.
High	I	Habitat protection	Road or utilities construction and maintenance, recreational activities	• Establish appropriate protection mechanisms (e.g., stewardship agreements), depending on land tenure.	• Securement and protection of populations and habitats.
High	I, II	Stewardship	Recreational activities	• Communicate with land managers and encourage them to steward and manage lands for persistence of the species.	• Populations maintained. • Mortality reduced. • Increased understanding and stewardship of species at risk and their habitats among land mangers.

High	II	Scientific research: real and potential threats of invasive plants, road/utility construction/ maintenance; recreational activities; storm events	All	• Research and document potential impact of threats to habitat at both known sites. • Mitigate threats (e.g., prevent and treat invasive species; identify location of species to highway crews; trail signs or redirect trails; erect storm drain controls).	• Precise information on degree and extent of threat. • Maintenance of current suitable habitat for the species.
Medium	III	Scientific research: investigate habitat requirements	All	• Analyze soil structure and composition. • Analyze light requirements.	• Precise information on habitat requirements to manage the life history stages to ensure recovery.
High	IV	Inventory and population monitoring	All	• Inventory suitable habitat throughout the species' range. • Design and implement a monitoring program. • Research and document population sizes and health.	• Data on population sizes, reproduction status, and health, and determination of population trends. • Ability to assess status of populations and effectiveness of recovery actions.

Performance Measures

I. Protection of known populations and habitats of the nugget moss is secured by 2013 (Objective I).

II. Impact of the main threats to the populations has been investigated, and threats reduced by 2013 (Objectives II and III).

III. Agreements with appropriate resource managers are developed to mitigate the impacts of road construction, utility construction and maintenance activities by 2013 (Objective II).

IV. Assessments of habitat requirements are completed by 2013 (Objective III).

V. Surveys of suitable habitat at extant sites for new populations (and resurvey of the Kamloops site) has been conducted and documented and a monitoring program initiated by 2013 (Objective IV).

Critical Habitat

No critical habitat can be identified for the nugget moss in Canada at this time. It is expected that critical habitat will be proposed following the completion of outstanding work required to quantity specific habitat and area requirements for the species, further research on the biology of the species and monitoring of populations to determine population trends. Consultation with affected land managers will also be necessary.

The schedule of studies included in the section below outlines the additional research and analysis required to address the biological and technical limitations that prevent identification of critical habitat in this recovery strategy.

Recommended schedule of studies to identify critical habitat

The following studies will allow for identification of critical habitat for extant populations:

1. Identify habitat attributes, including microhabitats, at extant sites (e.g., soil composition, structure and texture; light and moisture requirements) by 2013.
2. Using established survey and mapping techniques, delineate the boundaries of all occupied habitat by 2013.
3. Identify, map, and describe all suitable sites that are currently occupied by the nugget moss by 2013.

Existing and Recommended Approaches to Habitat Protection

To date, the extant nugget moss population is not protected, although protective measures are presently being considered for the Penticton site. Recommended approaches to protection of the nugget moss include stewardship with the two municipalities. This species is a potential candidate for addition to the list of Species at Risk under the *Wildlife Amendment Act (2004).*

Effects on Other Species

Impacts to other species, natural communities, or ecological processes are not anticipated during the recovery of the nugget moss. In addition, no other known COSEWIC-assessed or SARA-listed species are present at the known sites for this moss.

Socio-economic Considerations

The socio-economic impact is considered low for the nugget moss. Modification of recreational activities and city works programs may incur some cost (meetings, pamphlets, etc.), but this is probably minor.

Recommended Approach for Recovery Implementation

A number of opportunities are available to implement this recovery strategy. The City of Penticton is aware that rare species are important to their natural heritage and that protection measures should be considered within their mandate. Protection measures are presently being discussed with O. Dyer, Regional Rare and Endangered Species Specialist Wildlife Biologist for the B.C. Ministry of Environment in Penticton.

The South Okanagan Similkameen Conservation Program (SOSCP) should be contacted and be made aware of this species and its potential habitat. Integrating the protection of the nugget moss

within their conservation program would be beneficial to this species recovery. The Grasslands Recovery Implementation Group is currently developing an action plan (first draft is due for completion by March 31, 2009) for grassland species at risk, which will include this species. The Grasslands Recovery Implementation Group draft action plan is an ecosystem-based, landscape-level recovery action plan which identifies priority recovery actions for implementation (2009-2013). Nugget moss is one of the species occurring in the regions covered by this action plan which will address the most significant threats to B.C.'s interior grassland ecosystems and species.

Statement on Action Plans

An action plan for the nugget moss will be completed by 2013. Nugget moss is also included in the grasslands draft action plan (see Recommended Approach for Recovery Implementation). This initiative will improve communication and coordination between stakeholder groups, and will facilitate the development and implementation of SAR recovery action plans at the local level. In addition, this initiative will work towards building a broad level of awareness and understanding about species at risk and land use pressures leading to fragmentation and development of grasslands and species at risk habitat (development includes, but is not limited to, urban growth, urbanization of rural landscapes, intensive agriculture, mining, etc.).

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