

DRAFT, Version 1.1

Draft Management Recommendations for
False apple moss
Bartramiopsis lescurii (James) Kindb.

Version 1.1
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TABLE OF CONTENTS

EXECUTIVE SUMMARY	2
I. Natural History	3
A. Taxonomic/Nomenclatural History	3
B. Species Description	3
1. Morphology	3
2. Reproductive Biology	3
3. Ecology	3
C. Range, Known Sites	4
D. Habitat Characteristics and Species Abundance	4
II. Current Species Situation	4
A. Why Species is Listed under Survey and Manage Standards and Guidelines	4
B. Major Habitat and Viability Considerations	5
C. Threats to the Species	5
D. Distribution Relative to Land Allocations	5
III. Management Goals and Objectives	5
A. Management Goals for the Taxon	5
B. Specific Objectives	5
IV. Habitat Management	6
A. Lessons from History	6
B. Identification of Habitat Areas for Management	6
C. Management within Habitat Areas	6
D. Other Management Issues and Considerations	7
V. Research, Inventory and Monitoring Needs	7
A. Data Gaps and Information Needs	7
B. Research Questions	7
C. Monitoring Needs and Recommendations	7
VI. References	7

EXECUTIVE SUMMARY

Species: *Bartramiopsis lescurii* (James) Kindb.

Taxonomic Group: Bryophyte: Moss

ROD Components: 1,3

Other Management Status: None at present. Included on preliminary list of rare mosses submitted to the Washington Natural Heritage Program (Harpel and Gamon, pers. comm.) with suggested category S1 (critically imperiled in the state because of extreme rarity or because it is particularly vulnerable to extinction or extirpation).

Range: *Bartramiopsis lescurii* has a north Pacific distribution, extending from Washington, north through British Columbia to Alaska, and across Kamchatka to Japan. It is very rare south of the Canadian border with only one documented siting in the contiguous United States, in the Big Four area, Mt. Baker Snoqualmie National Forest, Snohomish Co., Washington.

Specific Habitat: This species occurs in cool, humid, often shady, canyons and stream terraces at low elevations, where it occurs on overturned tree roots, rock, soil over rock, and cliff ledges and faces, becoming more common farther north on mineral soil of overturned tree roots in moist coniferous forest. It is generally on vertical rather than horizontal surfaces. *Bartramiopsis lescurii* may appear only after stands reach mid-seral status, when moisture and temperature conditions become favorable.

Threats: Activities that alter the microclimate could have a detrimental effect on this species. Collection of material for scientific purposes could extirpate a population from the site.

Management Recommendations:

- C The Big 4 population in Snohomish Co., Washington represents the southern edge of the range for this species. Protect this population by maintaining microsite characteristics and avoiding disturbance to the plants themselves and to the surfaces upon which they live, including scientific collection unless specifically approved.
- C Manage to protect the environmental conditions at known sites.
- C Route roads and trails away from cliff bases, and leave trees to shade these areas to retain optimal temperature and moisture regimes near known sites.

Information Needs:

- C Cliff bases on toe slopes, midslopes and on floodplains and other suitable habitat should be examined to find new populations.
- C Determine specific ecological requirements of *Bartramiopsis lescurii*.

- C Establish rates of growth and colonization.
- C Evaluate degree of genetic uniqueness relative to other populations

I. Natural History

A. Taxonomic/Nomenclatural History

Bartramiopsis lescurii (James) Kindberg was originally described in 1875 as *Atrichum lescurii* James. In 1894, Kindberg described the new genus *Bartramiopsis* based on this species. The genus remains monotypic, differing from *Bartramia* in the lack of peristome teeth and presence of a distinctive membrane (epiphragm), which is broken free from the capsule wall and projects on the columella like a parasol, slightly above the mouth of the capsule (Christy and Wagner 1996). It is placed in the family Polytrichaceae.

B. Species Description

1. Morphology (Botherus 1909:678, Frye 1910:291, Frye 1937:112, Lawton 1971:33, Schofield 1985:58, Christy and Wagner 1996)

Plants of *Bartramiopsis lescurii* are erect, dark green, brownish red to blackish-brown, 2-8 cm tall, 2-4 mm broad when leaves dry. Lower stems are without leaves, long and wiry, blackish-brown, with tiny sheathing scales. Leaves are crisped and contorted when dry, 4-6 mm long, serrate at tips, with conspicuous basal sheaths running down the stems. Clusters of cilia occur on the leaf margin where the leaf blade joins the leaf sheath. Capsules are 1.5-2 mm long, widest at the mouth and tapered to the base, round in cross-section, slightly shrunken under mouth when dry. The seta is 7-12 mm long. The unique capsule is distinctive, with a membrane projecting on the columella, slightly above the mouth of the capsule. The small size, crisped and contorted leaves that are serrate at the tips and conspicuous, ciliate sheaths distinguish this species vegetatively. See Christy and Wagner (1996) for a discussion of similar species.

Figure 1. *Bartramiopsis lescurii* [line drawings from Brotherus (1909), Frye (1937), Lawton (1971), and Schofield (1985) (to be added)].

2. Reproductive Biology

Bartramiopsis lescurii is dioicous, with male plants similar to the females, except with smaller heads. Sporophytes are reported to be occasional (Schofield 1976); they are unknown from the southern populations.

3. Ecology

Bartramiopsis occurs in crevices and on perpendicular surfaces, rarely directly on rock, but in humus or soil over rock (Schofield, pers. comm.). This species forms mats.

C. Range, Known Sites

Bartramiopsis lescurii has a north Pacific distribution, extending from Washington, north through British Columbia to Alaska, and across Kamchatka to Japan. It is very rare south of the Canadian border with only one documented siting in the contiguous United States, in the Big 4 area, Snohomish Co., Washington. In British Columbia, it was reported to be widespread in humic portions of the Province from sea-level to subalpine elevations, extending inland to the flanks of Hudson Bay Mountain, near the town of Smithers (Schofield 1976).

References to populations on the west slopes of the Olympic Mountains (Scientific Analysis Team Report, page 289) have not been substantiated and are believed to be erroneous.

Figure 2. Distribution of *Bartramiopsis lescurii* in Washington (to be added).

D. Habitat Characteristics and Species Abundance

Bartramiopsis lescurii inhabits cool, often shady humid canyons and stream terraces at low elevations in moist, coniferous forest. It is generally found on vertical rather than horizontal surfaces, on mineral soil over cliffs or outcrops or on the soil of upturned roots systems (Schofield, pers. comm.). It becomes more common farther north on mineral soil of overturned tree roots in moist coniferous forests. *Bartramiopsis lescurii* may appear only after stands reach mid-seral status, when moisture and temperature conditions become favorable

The site of the original collection near Big 4 is characterized by steep cliffs and an ice cave with northern aspect affording unusual microclimate conditions at a relatively low elevation (640 m/2100 ft.). Five to six patches covering less than 1 square meter (three square ft) were located on a scree slope with embedded boulders below a rock cliff above perpetual ice, at approximately 70 percent slope. At the Big Four site, associated species include *Aruncus sylvester*, *Gaultheria ovatifolia*, *Spiraea densa*, *Carex spectabilis*, *Athyrium filix-femina*, *Saxifraga ferruginea*, *Heuchera micrantha*, *Cladothamnus pyroliflorus*, *Alnus sitchensis*, *Pseudotsuga menziesii*, and *Chamaecyparis nootkatensis*. Associated bryophytes include *Pogonatum urnigerum*, *Oligotrichum aligerum*, and *Dicranella heteromalla*.

Other bryophyte species associated with *Bartramiopsis lescurii* include *Oligotrichum parallelum*, *Bartramia pomiformis*, and species of *Heterocladium* and *Polytrichum*.

II. Current Species Situation

A. Why Species is Listed under Survey and Manage Standards and Guidelines

Bartramiopsis lescurii is at the southern edge of its range in Washington, known only from one collection in Snohomish county. The date of collection is unknown. *Bartramiopsis lescurii* was not rated by the bryophyte viability panels during the Forest Ecosystem Assessment Team process because of limited information (Thomas et. al 1993). Because of its apparent extreme rarity in the Pacific Northwest, this species was included as a strategy 1 and 3 species in the Record of Decision (1994). The basis for its inclusion was to maintain viability of this species

and to conduct inventories to learn more about the actual extent of its range, abundance, and ecology.

Populations on the periphery of their range are often disproportionately important for protecting genetic diversity (Lesica and Allendorf 1995). These geographically marginal populations may contain genetically unique alleles better suited to potential climate change and other environmental variation.

B. Major Habitat and Viability Considerations

The major viability considerations for *Bartramiopsis lescurii* are loss of populations due to management activities which directly impact the habitat or population. The known site is within a recreational area. The greatest threats to this population would be loss due to collection and recreational impacts. If no additional sites are discovered, the Big Four population would be vulnerable to stochastic events that could eliminate this species from the contiguous United States.

C. Threats to the Species

Activities that disrupt moisture and temperature regimes would have a detrimental effect on this species. Collection of material for scientific purposes could extirpate the population from the single known site. Since *Bartramiopsis lescurii* occurs on overturned tree roots, removal of wind-thrown trees could eliminate potential habitat, although where it occurs on upturned roots, there are often populations on adjacent cliffs.

D. Distribution Relative to Land Allocations

The only known site is located on the Mt. Baker Snoqualmie National Forest.

III. Management Goals and Objectives

A. Management Goals for the Taxon

The goal for the management of *Bartramiopsis lescurii* is to assist in maintaining viability of this species.

B. Specific Objectives

- C Maintain microsite characteristics including appropriate microclimate.
- C Determine if recreation use in area is impacting habitat or population.
- C Restrict bryophyte collecting in the area.

IV. Habitat Management

A. Lessons from History

The single known site within the contiguous United States was relocated in June 1996 based on information from a historical collection. The importance of field work to verify known sites and collect ecological data cannot be underestimated. Updating Management Guidelines with new information will be essential. Revisiting known sites will lead to more detailed and accurate habitat information and management guidelines that reflect the ecological requirements of the species.

B. Identification of Habitat Areas for Management

At present, the habitat area for management consists of the area surrounding the *Bartramiopsis lescurii* population at Big 4 that is large enough to maintain the microclimate of the site.

The Big 4 area contains other rare bryophytes and vascular plants. Other rare species of bryophytes in the vicinity include *Campylopus atrovirens* and *C. fragilis*, *Dicranodontium denudatum*, *Ditrichum zonatum* var. *scabrifolium*, *Fissidens osmundioides*, and *Tetradontium brownianum* (Harpel pers. comm).

If additional populations of *Bartramiopsis lescurii* are located, they should receive similar management, maintaining viable populations at all sites, until populations that represent the genetic diversity within the species at a minimum of sites are determined to be stable.

C. Management within Habitat Areas

The Big 4 population in Snohomish Co., Washington represents the southern edge of the range for this species. This known site is within a recreation area and it will be necessary to determine if recreational activities are impacting the population or habitat.

- C Take appropriate action if there are negative impacts to *Bartramiopsis lescurii* or its habitat.
- C Maintain microsite characteristics and avoid disturbance of substrate on which it lives and disturbance to the plants themselves.
- C Maintain canopy shade (if present), to avoid replacement by xerophytic bryophytes and vascular plants typical of exposed rock outcrops.
- C Route roads and trails away from cliff bases, and leave trees to shade these areas to retain optimal temperature and moisture regimes at known sites.
- C Collection of bryophytes should not be permitted in the Perry Creek-Big 4 area unless specifically approved. No collection of bryophytes as special forest products should be permitted within one mile of a known site.

D. Other Management Issues and Considerations

As with other species at the edge of their range, the southern populations of *Bartramiopsis lescurii* may be vulnerable climate change. Air quality is a concern for bryophytes in general.

The small size of bryophytes allows many individuals to exist within a small area (Wyatt 1992). As long as the microsite conditions are maintained, it may be preferable to maintain numerous smaller reserves rather than a few larger ones, to better capture their genetic diversity.

V. Research, Inventory and Monitoring Needs

A. Data Gaps and Information Needs

Initial efforts should focus on gathering additional information on associated species, habitat, and ecology. Contacting bryologists and botanists familiar with *Bartramiopsis lescurii* in other parts of its range may assist in defining high probability habitat to search for additional populations.

Shaded cliff bases on toe slopes, midslopes and on floodplains and other high probability habitat should be examined for new populations.

B. Research Questions

- C What ecological factors characterize the habitat of *Bartramiopsis lescurii*?
- C Assuming populations are located in the Big 4 area or within the contiguous United States, how similar genetically are these populations to those farther north? What contribution do these populations make to the genetic diversity of the species?
- C What factors limit *Bartramiopsis lescurii*? What is the growth rate of this species?

C. Monitoring Needs and Recommendations

Monitor recreational impacts to known site at Big 4.

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