# Aleutian shield fern
# *(Polystichum aleuticum)*

# 5-Year Review:
# Summary and Evaluation

**U.S. Fish and Wildlife Service**
**Southern Alaska Fish and Wildlife Field Office**
**Anchorage, Alaska**

# 5-YEAR REVIEW
# Aleutian shield fern (*Polystichum aleuticum*)

## 1. GENERAL INFORMATION

### 1.1 Reviewers:

**Lead Regional or Headquarters Office:** Alaska Region, Nichole Bjornlie

**Lead Field Office:** Southern Alaska Fish and Wildlife Field Office, Sabrina Farmer

**Cooperating Field Office(s):** None

**Cooperating Regional Office(s):** None

### 1.2 Methodology used to complete the review:

In 2024, the U.S. Fish and Wildlife Service (Service) initiated steps to complete its regulatory requirements for a 5-year review under section 4(c) of the Endangered Species Act (ESA) for Aleutian shield fern (*Polystichum aleuticum*). The Service solicited information on this species through a *Federal Register* (FR) notice (January 9, 2024, 89 FR 1125). We received one set of comments from the State of Alaska. To complete this review, we assessed the most current information on the status of, and threats to, this narrow endemic species. The Aleutian shield fern 5-year review summarizes the key information considered and the results of the Service's deliberative process.

### 1.3 Background:

#### 1.3.1 Federal Register Notice citation announcing initiation of this review:

89 FR 1125 1126, Endangered and Threatened Wildlife and Plants; Initiation of 5-Year Status Reviews of the Aleutian Shield Fern and the Alaska Breeding Population of Steller's Eider, January 8, 2024

#### 1.3.2 Listing history

Original Listing
**FR notice:** 53 FR 4626-4630
**Date listed:** February 17, 1988
**Entity listed:** Species
**Classification**: Endangered

**1.3.3 Associated rulemakings:** None

**1.3.4 Review History**: The Service initiated a 5-year review for the Aleutian shield fern in 2005 (70 FR 51840-51841) and in 2017 (82 FR 32573-32574). In the

subsequent reviews, the status of the endangered species remained the same.

**1.3.5 Species' Recovery Priority Number at start of 5-year review:** Eight

**1.3.6 Recovery Plan or Outline:**

**Name of plan:** The Aleutian Shield Fern Recovery Plan
**Date issued:** September 30, 1992

## 2.0 REVIEW ANALYSIS

## 2.1 Application of the 1996 Distinct Population Segment (DPS) policy

### 2.1.1 Is the species under review a vertebrate?

_____**Yes,** go to section 2.1.2.
__X__**No,** go to section 2.2.

## 2.2 Recovery Criteria

### 2.2.1 Does the species have a final, approved recovery plan containing objective, measurable criteria?

__X_ ***Approved recovery plan but lacking measurable criteria****, continue to section 2.2.2.*

While the Aleutian Shield Fern does have a final approved recovery plan (Recovery Plan; Service 1992), the plan is an action-oriented document lacking measurable delisting criteria by which to gauge progress toward recovery. No changes to the Recovery Plan have occurred since the prior Aleutian shield fern 5-year review (Service 2019). The stated objective of the Recovery Plan is to protect and maintain the existing population of the Aleutian shield fern and its habitat on Mount Reed, Adak Island, Alaska. The Recovery Plan further identifies four down-listing criteria:

1. The discovery of significant new populations.
2. The maintenance of a greenhouse population of at least 1,000 mature sporophytes.
3. The installation of genetic material in a germplasm repository.
4. The protection of the extant population from disturbance.

The Recovery Plan indicates that, due to the rarity and restricted occurrence of the Aleutian shield fern, delisting in the foreseeable future is unlikely; therefore, no delisting criteria are identified. Although the Recovery Plan includes management actions necessary to achieve the stated objective of downlisting, it does not provide an explicit assessment of threats to the species and how they will be eliminated or moderated by the downlisting criteria or their associated actions, nor does it provide quantifiable criteria by

which to objectively measure the species' progress towards recovery. See further discussion of recovery criteria in 2.2.3, below.

**2.2.2 Adequacy of recovery criteria.**

**2.2.2.1 Do the recovery criteria reflect the best available and most up-to date information on the biology of the species and its habitat?**

____ **Yes,** go to section 2.2.2.2.
__X_ **No**, go to section 2.2.3.

Although the stated recovery criteria are relevant to potential threats to the Aleutian shield fern, they are based on our understanding of these threats in 1992. Our understanding of potential threats to this species has evolved in the intervening decades. Potential threats to the population on Adak Island at the time the Recovery Plan was written included: human foot traffic, collecting for scientific purposes, and grazing and trampling by introduced caribou.

**2.2.3 List the recovery criteria as they appear in the recovery plan, and discuss how each criterion has or has not been met, citing information:**

Below, we discuss the criteria from the Recovery Plan in 1992 and our progress toward these criteria. However, our understanding of the species biology and the threats influencing the species have evolved in the three decades since the Service wrote the plan. Further, we recognize that these recovery criteria are no longer appropriate and applicable to the species.

While we provide a discussion of the criteria below, these criteria do not need to be met to consider the species recovered. While recovery plans provide important guidance to the Service and other partners on methods for minimizing threats to listed species and criteria against which to measure progress towards recovery, they are guidance and not regulatory documents. A decision to revise the status of a species or remove a species from the Federal Lists of Endangered and Threatened Wildlife and Plants is ultimately based on an analysis of the best scientific and commercial data available, regardless of whether that information differs from the recovery plan.

**Criterion 1:** "Pending additional information, down-listing could be considered only if significant new populations are discovered" (Service 1992, *Executive Summary*).

"Until additional information is obtained on the causes of rarity and the potential for recovery, no precise recovery goal can be set for re-classification to threatened status. However, consideration for re-classification to threatened status could result from the discovery of additional populations" (Service 1992, *page 11*). Associated management actions include the development of a survey plan with a prioritized list of potential survey areas and protocol and implementation of the survey plan. The estimated Aleutian shield

fern population at the time of listing was 7 plants located on Adak Island, and, upon completion of the Recovery Plan in 1992, the population was estimated to be 112 plants. Beginning in 1993, field surveys were initiated to search for additional Aleutian shield fern locations on Adak Island. These efforts resulted in the discovery of additional populations in 1995 (Talbot et al. 1995) and in 1999 (Talbot and Talbot 2002), for a total of 4 populations on Mount Reed. The known number of Aleutian shield ferns on Adak Island has increased from the 7 individuals originally confirmed at the time of listing in 1988, to 131 individuals at the turn of the millennium, to 155 individuals during the most recent survey (Service 2024). Most of this increase in numbers is believed to be the result of increased search effort and discovery of additional populations.

The original collection of the Aleutian shield fern was made by Walter J. Eyerdam in 1932 on Atka Island, Alaska and described by Christensen (1938). Atka Island has been searched numerous times to try to relocate the original discovery site, with no success. The most recent effort to relocate the original discovery site was initiated in 2016; high potential fern habitat around Egg Bay was searched for 9 days, and no shield ferns were observed (Gravley et al 2017). Additional botanical work on Atka Island was completed by university colleagues, and no ferns were located (personal communications with M.L. Carlson 2025). Similar habitats on 15 other islands have been opportunistically searched, and no ferns have been found (Talbot and Talbot 2002). All efforts to locate additional Aleutian shield fern populations on islands beyond Adak have been unsuccessful.

Criterion 1 neither quantifies the population size nor characterizes the spatial distribution of populations that would afford the greatest protection to the species from either unpredictable, destabilizing environmental events or other disturbance sources. Criterion 1 addresses, albeit incompletely, threats associated with the compounding effects of small population size, low genetic diversity, restricted distribution, and their interaction with the naturally occurring and human-caused threats identified at the time of listing. The Recovery Plan does not outline a specific, measurable criterion to describe the number and sizes of "significant new populations" needed to consider down or delisting. Since the plan was finalized, the number of known populations of Aleutian shield fern has doubled from two to four following additional search effort, and these discoveries have increased the total numbers of known Aleutian shield fern individuals.

**Criterion 2:** "A greenhouse population of a minimum of 1,000 mature sporophytes should be maintained…" (Service 1992, *Executive Summary*).

Associated management actions include research into artificial propagation and the establishment and maintenance of a greenhouse population. Research initiated in 1989 to verify spore viability and identify optimum methods of in vitro spore germination and propagation met mixed results. By February 1992, efforts had resulted in a greenhouse population of 1,476 Aleutian shield fern sporophytes, and our understanding of the reproductive biology of this species had been enhanced. However, by the conclusion of this project in 1994, fewer than 50 sporophytes remained in the greenhouse population, and no mature, spore-bearing fronds had developed (Holloway 1994). The greenhouse facilities at the University of Alaska Fairbanks were not amenable to creating conditions

that would allow for long term shield fern maintenance (personal communication with P. Holloway 2025). However, the recovery-funded greenhouse work resulted in an instructional on how to germinate the Aleutian shield fern from spores, if warranted in the future (personal communication with P. Holloway 2025). Additional attempts to cultivate a greenhouse population at Kew Gardens, England and New York Botanical Garden in the mid-1990s and at the Alaska Department of Natural Resources Plant Material Center in 2010 were unsuccessful (Margaret Ramsay, Royal Botanic Gardens, Kew, United Kingdom, pers. comm., October 19, 2005; PMC 2011).

Given the previous, unsuccessful attempts to maintain a viable greenhouse population, we no longer consider this criterion to be a feasible recovery goal. Concerted efforts to maintain a viable greenhouse population were undertaken over a 20-year period at four separate greenhouses, and all attempts to grow and maintain Aleutian shield fern populations failed. Therefore, we no longer consider it is feasible or necessary to continue efforts toward this recovery criterion. The ultimate intent of this criterion was to increase the number of Aleutian shield fern populations in the wild (via reintroductions from greenhouse cultivated populations) and therefore its redundancy in the face of catastrophic events. With the discovery of two additional populations, particularly the population on the northwest arm of Mount Reed, the known redundancy of the species relative to the time of listing has increased. We no longer view reintroduction as necessary and have discontinued this recovery activity.

**Criterion 3:** "…genetic material should be stored in a germplasm repository" (Service 1992, *Executive Summary*).

Associated management actions include the determination of the viability of spores during long-term storage and the accession of genetic material into an appropriate facility. Long-term storage of spores is of interest, not only for ex situ conservation of the Aleutian shield fern, but also for taxonomic studies. The length of time over which Pteridophyte spores remain viable varies from species to species and is influenced by other factors, such as spore age, ploidy level, and storage conditions (Aragon and Pangua 2004). Collections of properly stored spores could constitute an important part of the conservation strategy for the Aleutian shield fern. However, previous attempts to germinate spores and maintain sporophytes in a greenhouse were unsuccessful and indicate that long-term storage of Aleutian shield fern spores (as well as other plant materials) may not be possible at this time.

Similar to criterion 2, this criterion is no longer considered a feasible recovery goal and has been discontinued.

**Criterion 4:** "The extant population should be protected from disturbance by humans and introduced ungulates" (Service 1992, *Executive Summary*).

Associated management actions in the Recovery Plan include the mapping of the known populations, the development and implementation of a management plan, investigations

into the impacts on the habitat by introduced ungulates, and investigation into re-introduction of the Aleutian shield fern.

The Alaska Maritime National Wildlife Refuge (Refuge) finalized the Aleutian Shield Fern Management Plan (Management Plan) in 2007 (Byrd and Williams 2007). The Management Plan provides guidance and recommendations for the protection and monitoring of the extant Mount Reed populations. Since completion of the Management Plan, some of these management actions have been implemented and are summarized below.

- All four populations of the Aleutian shield fern have been mapped to support monitoring efforts. Population 1 and 2 were mapped in 1989, and Populations 3 and 4 were mapped in 2024 (Tande 1989, Service 2024).
- Barren-ground caribou (*Rangifer tarandus*) calves were introduced to Adak Island in 1958 and 1959 (Williams and Tutiakoff 2005, Ricca et al 2014). Caribou presence in Aleutian shield fern habitat was studied in 2012, and, although caribou were documented using habitat near Aleutian shield fern, there was no evidence that caribou were directly consuming, trampling, or damaging Aleutian shield fern populations or their habitat in that year (Spitler 2012). The current locations of all known shield fern plants are not in areas that caribou can easily access. We do not know what effects, if any, caribou might have had on ferns that might have been more easily accessible.
- Human disturbance was considered a potential threat to Aleutian shield fern when the Recovery Plan was finalized. However, the Aleutian shield fern population sites are remote and difficult to access due to the steep, unstable, and rough terrain. Additionally, no significant development has occurred on Adak since the time of listing, and the community of Adak has decreased dramatically, with the latest census indicating ~170 people inhabiting the island (U.S. Census Bureau, 2020). Human disturbance during surveys has been limited by decreasing the frequency of their occurrence and changing survey methodologies.
- All-terrain vehicle use is prohibited anywhere on wilderness and non-wilderness Refuge lands. Increasing use of all-terrain vehicles on Aleut Corporation lands and along lower elevations of Mount Reed prompted the Refuge to increase public awareness about all-terrain vehicle use on Refuge lands. Additionally, the habitat near the Aleutian shield fern is too steep to be suitable for all-terrain vehicle use.
- Introduction of the Aleutian shield fern in additional locations on Adak has not been considered because we do not have sufficient knowledge that the range of the species was broader than the currently described range on Adak. While the species was first documented on Atka Island in 1932 (Christensen 1938), it has not been rediscovered on the island since. Without additional knowledge about the historical range, reintroduction on Atka Island is not being pursued.

## 2.3 Updated Information and Current Species Status

### 2.3.1 Biology and Habitat

#### 2.3.1.1 New information on the species' biology, life history, and population trends:

At the time of listing in 1988, the Aleutian shield fern population was estimated to be 7 plants. Additional ferns were counted and mapped in 1989, bringing the estimated population to 112 plants in two populations (Tande 1989). Thus, the estimated population upon completion of the Recovery Plan in 1992 was 112 plants. Discoveries in 1993 and 1999 increased the known number of individuals to 131 at four different population sites (Talbot and Talbot 2002). While there are four known populations, the term population references distinct geographic locations on Mount Reed and does not indicate genetic differences. Results from genetic studies indicate an almost complete lack of genetic variation within and between the four populations of the Aleutian shield fern on Adak Island (as summarized in Service 2019). No additional surveys were completed prior to the 5-year reviews in 2005 and 2019. Despite additional searches on Adak, Atka, and other Aleutian Islands, the only ferns observed since the tie of listing are located on Adak Island.

In 2022, the Service piloted a modern survey effort and successfully relocated all four known populations of the Aleutian shield fern (Service 2022). In 2024, the Service surveyed all four known populations and counted a total of 155 plants (Table 1; Service 2024). No new populations were found in 2022 or 2024. Survey results from the last five years indicate that the Aleutian shield fern persists at all four locations. With additional search effort in 2024, additional clumps of ferns at the known population sites were discovered. In general, the increase in number of ferns counted is likely a reflection of additional search effort and changes in methodology, not population growth.

**Table 1.** Summary of results from the 2024 Aleutian shield fern survey compared to historical counts. Caution should be used in comparing individual counts between years, due to differences in methodologies used be each field team. See full report for more details (Service 2024).

| Population | Historical # of Individuals (clumps) | 2024 # of Individuals (clumps) | Minimum Elevation (meters) | Maximum Elevation (meters) |
|---|---|---|---|---|
| 1 | 98[a] | 99 | 469 | 514 |
| 2 | 14[b] | 18 | 497 | 507 |
| 3 (remote) | 5[b] | 6 | 349 | 349 |
| 4 | 14+[c] | 32 | 340 | 340 |
| **TOTAL** | **131** | **155** | | |

[a] Tande (1989).
[b] Talbot and Talbot (1995).
[C] Talbot and Talbot (2002).

Direct comparisons with historical survey efforts are challenging due to the variation in survey methodology and weathering of historical survey markers. Where direct comparisons with historical plots can be made at Population 1, we observed slight decreases in the number of individuals yet large increases in frond counts. This suggests that fern clumps may have grown and merged since historical surveys in 1989. At Population 2, four fern individuals documented in 1989 did not persist; however other fern clumps appear to have expanded, leading to an overall increase in individual ferns. At Population 3 (the remote population), one additional individual was in the graminoid meadow below the documented cliff dwelling population. Additionally, the individual with the most fronds was recorded as having 10 fronds in 1993 compared to 39 fronds in 2024, which again suggests growth in existing clumps. At Population 4, we counted more ferns than historical surveys due to additional search effort, but direct comparisons cannot be made.

One change in fern characteristics was noted in recent surveys. Botanical records indicate that the Aleutian shield fern grows up to 15 centimeters in height (Nawrocki et al. 2013). In 2022 and again in 2024, the Service measured multiple Aleutian shield ferns growing up to 22 centimeters in height (Service 2022 2024).

#### 2.3.1.2 Genetics, genetic variation, or trends in genetic variation (e.g., loss of genetic variation, genetic drift, inbreeding, etc.):

No new genetic information is available since the 2019 5-year review of the Aleutian shield fern (Service 2019).

#### 2.3.1.3 Taxonomic classification or changes in nomenclature:

No new taxonomic information is available since the 2019 5-year review of the Aleutian shield fern (Service 2019). The Service continues to recognize the Aleutian shield fern as a listable entity.

#### 2.3.1.4 Spatial distribution

At the time of the last 5-year review in 2019, the Aleutian shield fern was known to occur at three population sites on the northeast arm of Mount Reed and one population site on the northwest arm of Mount Reed. All four populations occur within the Alaska Maritime National Wildlife Refuge but outside designated Wilderness. The population site located on the northwest arm of Mount Reed had not been relocated since its discovery in 1993. Since the last review, the Service has twice confirmed the persistence of all four populations on Mount Reed, including the remote population on the northwest arm of Mount Reed (Service 2022, 2024). The remote population provides additional redundancy (the ability of a species to withstand catastrophic events; Service 2016) for the species.

No new Aleutian shield fern populations have been found since Population 4 was discovered in 1999 (Talbot and Talbot 2002).

#### 2.3.1.5 Habitat or ecosystem conditions (e.g., amount, distribution, and suitability of the habitat or ecosystem):

The Aleutian shield fern occurs on southeast or east facing slopes of Mount Reed at elevations between 340 and 514 meters. The substrate is "exposed, weathered basaltic and pyroclastic rock outcrops with rooting substrate confined to fissures, crevices, and thinly mantled horizontal ledges" (Service 1992). Slumping and erosion of the growing substrate within the cliff habitat is a threat to shield ferns (Byrd and Williams 2007).

Recent surveys documented evidence of soil erosion, vegetation mat shifts, and the sliding of fern clumps (Figure 1; Service 2022).


**Figure 1.** Evidence of erosion observed. A) One meter of soil erosion at Population 1, B) Vegetation mat creep at Population 1, C) Aleutian shield fern clump erosion at Population 4.

### 2.3.2 Five-Factor Analysis (threats, conservation measures, and regulatory mechanisms) -

#### 2.3.2.1 Present or threatened destruction, modification or curtailment of its habitat or range:

There have been no changes to this threat since the 2019 5-year review of the Aleutian shield fern (Service 2019). The species entirely occurs on lands managed by the Alaska Maritime National Wildlife Refuge. No present or anticipated development by humans is likely to alter the alpine habitat where the Aleutian shield fern occurs, and we do not currently consider this factor a threat to the species.

#### 2.3.2.2 Overutilization for commercial, recreational, scientific, or educational purposes:

At the time of listing, human trampling and unauthorized collection were considered potential threats to the Aleutian shield fern. Upon listing, the Service managed scientific collection through the Endangered Species Act. The significance of human trampling and unauthorized collection are minimized by the remote location of the habitat and the protective management of Alaska Maritime National Wildlife Refuge. Since listing, the human population of Adak has decreased dramatically from an estimated 5,000 people (Service 1992), to 50 to 300 in 2019 (Service 2019), to 171 people currently (United States Census Bureau 2020). In recent years, records on iNaturalist and inquiries about the fern indicate interest in the species and create the potential for overutilization; however, the species is protected by the Endangered Species Act and, if not listed, it occurs on Alaska Maritime National Wildlife Refuge lands where plants are afforded protections (see below). Additionally, Service staff discourage members of the public from visiting the fern sites on Adak Island. Consequently, although there has been some expressed interest in the Aleutian shield fern by the public, we do not consider overutilization to present a threat to the species.

#### 2.3.2.3 Disease or predation:

There have been no changes to this threat since the Aleutian shield fern 5-year review in 2019 (Service 2019). Caribou were introduced to Adak Island in 1958 and 1959 to provide sport hunting for residents (Williams and Tutiakoff 2005). Studies of potential predation of caribou on the Aleutian shield fern were conducted in 2011 and 2012. While caribou were documented using habitat near the fern, there was no evidence that caribou were directly foraging or trampling the Aleutian shield fern or directly impacting fern habitat (Spitler 2012). The current locations of all known shield fern plants are not in areas that caribou can easily access, although we do not know what effects, if any, caribou might have had on ferns that might have been more easily accessible. We do not currently consider disease or predation to be a threat to the existing known plants of the species.

#### 2.3.2.4 Inadequacy of existing regulatory mechanisms:

There have been no changes to this threat since the Aleutian shield fern 5-year review in 2019 (Service 2019). In the late 1990s and early 2000s during land exchange negotiations with the Aleut Corporation, the Refuge retained ownership of the entirety of Mount Reed on Adak Island (Byrd and Williams 2007), ensuring all known Aleutian shield fern populations occur on Refuge lands. All plants occurring on National Wildlife Refuges in the United States are protected from collecting (50 CFR 27.51). However, all plants occurring on National Wildlife Refuges in Alaska are open to noncommercial gathering by local residents for subsistence purposes (50 CFR 36.15 (b)). To our knowledge, the Aleutian shield

fern is not known to be a traditional subsistence resource. Therefore, we believe that the extant population of the Aleutian shield fern is largely protected by the 50 CFR 27.51 prohibitions, and we do not currently consider this to be a threat to the species.

#### 2.3.2.5 Other natural or manmade factors affecting its continued existence:

Habitat characteristics of the Aleutian shield fern consist of exposed, weathered rock outcrops in which rooting substrate is confined to fissures, crevices, and thinly mantled horizontal ledges (Lipkin 1985). The Aleutian shield fern population sites are fully exposed to natural conditions of climatic weathering and are vulnerable to wasting, down-slope creep, and the destabilizing effects of earthquakes and the freeze-thaw cycle. Human and animal foot traffic may create breaks in the vegetation mat or dislodge rocks. When combined with reduced resilience associated with population isolation, low genetic diversity, and lack of inter-populational mixing, the threat of climactic weathering may be magnified.

While there is evidence of erosion at some population sites (Service 2022), we now have multiple decades of data indicating that, in general, the ferns persist at the four populations sites. They persist despite occurring in a seismically active area – data from the past ten years (2015 through 2024) indicate 5,000 to 15,000 earthquakes per year occur in the Aleutian Islands (McFarlin 2025). The discovery and confirmation of the additional population on the northwest arm of Mount Reed adds redundancy in the case of a catastrophic event, such as a large earthquake. Where direct comparisons can be made, we see fern clumps with increased frond counts (Service 2024). While some individuals have been lost (likely due to erosion and habitat changes), the Aleutian shield fern continues to persist at all known locations at similar abundance, which demonstrates resiliency in the face of stochastic events. Therefore, although individual ferns may be affected by erosion, we do not currently consider this to rise to the level of a threat to the species as a whole.

## 2.4 Synthesis -

When the Aleutian shield fern was listed as an endangered species under the Endangered Species Act in 1988, records indicated there were six viable plants and one uprooted specimen (53 FR 4627). At the time, the Aleutian shield fern was described as among the most restricted and rarest ferns in North America (Smith 1985). Threats to the species included mortality due to natural habitat instability, depletion by collection, and the potential for grazing or trampling by introduced ungulates (53 FR page 4627).

Post listing, the Service undertook recovery planning and management efforts, as described in Section 2.2. These efforts expanded the number of known plants from seven at the time of listing to 131 by the end of the millennium (Table 1). Survey efforts in the past five years (2022 and 2024) show that the Aleutian shield fern continues to persist at the four known locations. While direct comparisons are challenging due to the

complexity of the terrain and variable survey methods, modern surveys counted a total of 155 Aleutian shield fern clumps (Service 2024).

One of the populations discovered after listing expanded the known range of the Aleutian shield fern to the northwest arm of Mount Reed (Talbot et al. 1995). The remote population (Population 3) is 2.8 kilometers from the population sites on the northeast arm of Mount Reed. In 2019, at the time of the last Aleutian shield fern 5-year review, the fern population on the remote northwest arm of Mount Reed had not been redocumented since its discovery in 1993. Subsequent survey efforts have confirmed the persistence of this population (Service 2022 and 2024). The persistence of this population increases the known redundancy (i.e., ability to withstand catastrophic events) of the species.

Our understanding of the threats facing the Aleutian shield fern have evolved since the listing of the species in 1988, as described in Section 2.3. The Aleutian shield fern population sites all occur within the Alaska Maritime National Wildlife Refuge, and no actions are anticipated to threaten the habitat of the species (Factor A). Current scientific collection is minimal and managed by the Service through the Endangered Species Act, and, in the event of delisting, would continue to be managed by the Alaska Maritime National Wildlife Refuge (Factor B). Grazing studies indicate introduced caribou are present but do not appear to graze on the known fern populations; there are no other identified potential disease or predation threats (Factor C). The inadequacy of regulatory mechanisms is not considered an issue for the Aleutian shield fern (Factor D). Finally, while the fern occurs in an unstable and seismically active environment, we now have decades of data indicating the fern persists at relatively stable population numbers despite these stochastic events (Factor E).

While the Aleutian shield fern continues to be among the most rare and restricted ferns in North America, studies and recovery activities completed in the nearly 40 years since its listing have demonstrated that there are currently no significant threats acting upon the species, which remains protected due to its remote and inaccessible habitat and location on the Alaska Maritime National Wildlife Refuge. Additionally, each of the activities identified in the Recovery Plan has been addressed and either completed or discontinued as our understanding of the species has increased. Due to the increase in known population size following additional search effort since the time of listing, stable population size despite forty years of stochastic events, and lack of imminent threats to the species, we recommend to delist the Aleutian shield fern from the Endangered Species Act.

## 3.0 RESULTS

**3.1 Recommended Classification**: *Given your responses to previous sections, particularly section 2.4. Synthesis, make a recommendation with regard to the listing classification of the species*

**___ Downlist to Threatened**
**____ Uplist to Endangered**

__X_ **Delist** (*Indicate reasons for delisting per 50 CFR 424.11):*

___ (1) The species is extinct;
_X_ (2) The species has recovered to the point at which it no longer meets the definition of an endangered or a threatened species;
___ (3) New information that has become available since the original listing shows the listed entity does not meet the definition of an endangered species or a threatened species; or
___ (4) New information the has become available since the original listing decision shows the listed entity does not meet the definition of a species.

____ **No change is needed**

**3.2 New Recovery Priority Number**: 14

**Brief Rationale for Recovery Priority Number:** The degree of threat was updated from Moderate to Low, resulting in a change in priority number from 8 to 14. Recent surveys coupled with previous surveys and studies suggest the species is not demonstrating a population decline or threats to its habitat. Therefore, we changed the threats description from Moderate to Low, leading to a change in the species recovery priority number.

**3.3 Listing and Reclassification Priority Number,** if reclassification is recommended *(see Appendix E)*

**Delisting (Removal from list regardless of current classification) Priority Number:** __6__

**Brief Rationale for Delisting Priority Number:** The management impact of the listing of the Aleutian shield fern is low. Each of the actions identified in the Recovery Plan for the species have been addressed and either completed or discontinued as our understanding of the species has increased. Therefore, current financial resource needs are limited to periodic surveys and do not divert substantial resources from other species in need of conservation effort. The recommendation to delist results from a 5-year review and is the result of an unpetitioned action.

## 4.0 RECOMMENDATIONS FOR FUTURE ACTIONS

We are making the recommendation to delist the Aleutian shield fern due to the lack of threats currently acting upon the species and the increase in known population size since the time of listing, including documenting both additional individuals and populations of ferns. Section 4(g) of the Endangered Species Act as amended in 1988 requires the Service to implement a system in cooperation with the states to monitor for not less than five years the status of all species that have recovered and been removed from the list of threatened and endangered plants and animals (50 CFR 17.11, 17.12, 224.101, and 227.4; Services 2018). Section 4(g)(2) directed the Service to make prompt use of their

emergency listing authorities under section 4(b)(7) to prevent a significant risk to the well-being of any recovered species. While not specifically mentioned in section 4(g), authorities to list species in accordance with the process prescribed in section 4(b)(5) and 4(b)(6) may also be utilized to reinstate species on the lists, if such an action is found to be appropriate (Services 2018).

We recommend the following future actions:

- Continue to monitor the Aleutian shield fern populations for changes and, if delisting occurs, design a post-delisting monitoring plan to further monitor the status of the species and the presence of any residual threats. Monitoring should occur infrequently to prevent damage to the steep, unstable sites.

## 5.0 REFERENCES


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U.S. FISH AND WILDLIFE SERVICE

**5-YEAR REVIEW of Aleutian Shield Fern (*Polystichum aleuticum*)**

**Current Classification**: Endangered

**Recommendation resulting from the 5-Year Review**:

____ Downlist to Threatened
___ Uplist to Endangered
_X_ Delist
____ No change needed

**Appropriate Listing/Reclassification Priority Number**: 6

**Review Conducted By**:
Sabrina Farmer, Biologist, Southern Alaska Fish and Wildlife Field Office

**FIELD OFFICE APPROVAL**:

**Southern Alaska Fish and Wildlife Field Office, Field Supervisor, Fish and Wildlife Service**

DOUGLASS COOPER Digitally signed by DOUGLASS COOPER
Date: 2025.12.18 12:57:38 -09'00'

Approve _____ Date _____

**REGIONAL OFFICE APPROVAL**:

**Assistant Regional Director – Fisheries and Ecological Services, Fish and Wildlife Service**

PETER FASBENDER Digitally signed by PETER FASBENDER
Date: 2025.12.18 13:58:23 -09'00'

Approve _____ Date _____