

Ecology and systematics of moonwort ferns (*Botrychium*) in Cook Inlet and South Coastal Alaska

Principal Investigator: Donald R. Farrar

Collaborators: Cindy Johnson-Groh, Gustavus Adolphus College
Mary Stensvold, USDA Forest Service, Alaska Region

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U. S. Fish and Wildlife Service, Ecological Service, Anchorage Field Office, Endangered Species Program.

Goals and Objectives:

1. Document the distribution, abundance, habitat, and range of morphological variation in the new species of moonwort ferns.
 2. Add moonwort survey and plant identity data to Forest Service and Alaska Natural Heritage Program databases
 3. Determine if the two new species of moonwort occur at sites away from known populations.
 4. Provide information to land managers allowing them to determine if conservation measures may be needed to prevent adverse effects to the viability of the moonwort ferns and to gain insight into the ecological requirements of the ferns so management practices appropriate to their conservation can be designed and implemented.
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Conclusions and Recommendations:

A final report was submitted to the U.S. Fish and Wildlife Service, Cook Inlet Alaska Coastal Program and Ecological Service, Anchorage Field Office. The results from that report follow:

Botrychium tunux was not found outside the Yakutat forelands. Tetraploids genetically similar to *B. yaaxudakeit* were found at several sites in the Denali area of the Alaska Range, near Fairbanks and in the Chugach mountains above Anchorage; however, these plants differed morphologically from *B. yaaxudakeit*.

A new population of *B. tunux* and *B. yaaxudakeit* was found on Blacksand Spit, which is on the outer coast of the Yakutat forelands and within the currently known range of both species.

The results of electrophoresis also reveal that much of the Alaskan *B. lunaria* is genetically different from and genetically more diverse than *B. lunaria* from other areas of North America. The typical North American *B. lunaria* genotype occurs in Alaska but it is not among the specimens we studied from Eurasia. The Alaskan and Eurasian *B. lunaria* appear to be genetically similar.

Other species of moonworts found during the Alaska surveys are: *Botrychium alaskense* Wagner & Grant, *B. ascendens*, *B. lanceolatum*, *B. minganense*, and *B. pinnatum*. General locations follow for each of these species:

- *B. alaskense*: Fairbanks area, two locations on Fort Richardson, near Illiamna Volcano and two locations near Telaquana Lake.
- *B. ascendens*: Denali area near the Chedotlothna Glacier and in the Yetna River drainage; and near the mouth of the Ankau River at Yakutat.
- *B. lanceolatum*: Fairbanks area, Fort Richardson, on the Kenai Peninsula at Funny River, summit Lake, Lyon Creek, Kaslof dunes, and Anchor point; near Illiamna Volcano, near Telaquana Lake, and the Yakutat area.
- *B. minganense*: Adak, Kasatochi and Amaknak Islands in the Aleutians, the Denali area, the Fairbanks Area, Fort Richardson, near Illiamna Volcano and the Yakutat area.
- *B. pinnatum*: Fairbanks area, the Denali area, near Talkeetna, near Hatcher Pass, near Illiamna Volcano, near Telaquana Lake, on the Kenai peninsula at Summit Lake and the Yakutat area.