

UNIT 2**BERING
GLACIER****Background**

Unit 2 encompasses the terminal lobe of Bering Glacier, a vast piedmont glacier undergoing a dramatic cycle of surge and retreat.

Physical features

Bering Glacier is part of the largest icefield in North America. It ranks among the largest temperate glacier systems in the world.

The rapid retreat of Bering Glacier, which has been interrupted by periodic galloping surges, has attracted intense national and international scientific interest. During the early 1990s, Bering Glacier retreated at an average rate of 0.6 miles per year. As Bering Glacier retreated, Vitus Lake expanded to over 50,000 acres in the early 1990s, with icebergs up to 1,500 feet long.

In 1994 and 1995, the glacier surged explosively at rates occasionally reaching 300 feet per day, and reclaimed much of the lake. Rivers have become lakes because their outlets have been cut off by the ice advance. Water levels have risen 75 feet in Tsiu and Tsiyat lakes, formerly river channels.

Scientists predict that the beach separating Vitus Lake from the Gulf of Alaska will breach, and the tidal incursion will cause the glacier to retreat nearly 35 miles in the next 50-100 years, creating a fiord as large as Yakutat Bay. High tides exceeding six feet in the Gulf of Alaska presently enter Vitus Lake through the Seal River.

Access

There are unimproved airstrips on both sides of Seal River.

Land status

All lands in this unit are state-selected from the Bureau of Land Management. Subunit 2a (in Range 9E) was selected as a potential overland transportation corridor to the Copper River region via one of the river drainages in Chugach National Forest. Subunit 2b (in Ranges 10E and 11E) was selected for high habitat values and for outstanding scenic, recreation, and scientific values (described in following sections).

Adjoining lands

This selection adjoins state land to the south and east. Chugach National Forest borders to the west. The U.S. Bureau of Land Management manages lands to the north.

Resources and uses

Since 1989, Bering Glacier has been the leading research site for glaciologists examining the latest scientific ideas on surging, drastic retreat, and iceberg calving dynamics. Field research has involved teams of 35 or more scientists and support crews from universities and agencies, including the U.S. Geological Survey and Alaska's Division of Geological and Geophysical Surveys (DGGs).

■ Scientific values

DGGS has identified the following scientific research opportunities associated with Bering Glacier:

1. **The first modern-day observation of catastrophic calving retreat of a piedmont-type glacier.** The calving front is significantly wider than any other calving glacier in Alaska. The Bering and Columbia glaciers are the only two glaciers undergoing catastrophic retreat in North America, and possibly in the world.
2. **Calving retreat in a pro-glacial saline lake.** The terminus presently fronts in 200-meter-deep "Vitus Lake", which captures most of the icebergs. Measurements of calving rates and study of calving processes at Bering Glacier will allow comparisons to glacial calving in fiords.
3. **Periodic bathymetric measurements of unusual accuracy.** The expansion and salinization of Vitus Lake have caused almost all of the glacier sediment to be deposited in the lake with little sediment escaping through Seal River. Periodic bathymetric measurements document rates of glacial sedimentation with accuracy not usually possible elsewhere.
4. **Erosion of the barrier beach.** Entrapment of Bering Glacier sediments in Vitus Lake also provides the opportunity to observe the effects of erosion of the barrier beach without the replenishment from the glacier.
5. **The introduction and establishment of marine species to Vitus Lake.** Vitus Lake is becoming increasingly saline from tidal influx through Seal River. There are unique opportunities to study the transition from a freshwater to a marine environment. This will include establishment of salmon runs, bird rookeries, and benthic species. Flocculation of sediments resulting from salinization allows further analysis of the glacial activity.
6. **Chronology of past glaciations and climatic change.** Interstadial forests and peat bogs, exposed as the Bering Glacier retreats, allow scientists to chronicle past glaciations and climate change. This record of the Holocene glacial and climatic history of coastal Alaska is important for understanding the influence of the Gulf of Alaska on continental climate. It may also prove important for the study of global warming.
7. **Dendrochronological studies.** Study of tree rings in the Bering Glacier area for both living trees and recently-uncovered ancient forests enable a two-to three-thousand-year study of forest conditions.
8. **Mapping the inland Cape Yakataga formation as the glacier retreats inland and exposes bedrock.** This mapping increases understanding of subsurface resources.
9. **The relation of isostatic and tectonic uplift.** Retreat of the glacier may expose traces of prehistoric faulting and ruptures.
10. **Documentation of a full surge cycle during a phase of catastrophic retreat.** A major portion of the Bering Lobe has surged in 1994.

■ Habitat values

The Nature Conservancy has identified the Bering Glacier system as having outstanding significance for biodiversity. Physical isolation and harsh conditions may have encouraged the evolution of unique plants and animals (speciation), especially on nunataks (*State Land Selection Project, Final Report*, Volume 1, March 19, 1993).

Vitus Lake and the periglacial areas are important habitat for harbor seals, trumpeter swans, dusky geese, and other waterfowl.

■ Scenic and recreation values

The Bering Glacier area has high scenic values, particularly at Vitus Lake where there is dynamic calving activity and sharp visual contrast between the lake, glacier, and mountains. Commercial recreation guides lead kayaking and wildlife viewing tours at Vitus Lake.

Unit 2 - Bering Glacier resource allocation summary

Forestry

Unit 2 appears to have no commercial timber.

Fish and wildlife harvest

Only a small part of Unit 2, the Grindle Hills, supports intensive hunting. There are no harvest designations in this unit.

Fish and wildlife habitat

Most of Unit 2 is designated habitat in order to protect concentrations of seals, swans, and geese in the Vitus Lake area, and to recognize the scientific interest in habitat evolution and transformation during a dynamic icefield advance and retreat.

Minerals development

There are no recorded mineral prospects.

Recreation and tourism

Most of Unit 2 is co-designated for dispersed recreation. This should promote opportunities for tourism based on natural history, scientific attractions, and scenery. The area plan recommends further evaluation of this unit for a potential state park to protect glacial-related phenomena of national and international scientific interest.

Settlement

The area plan did not designate settlement lands in this area. Most of this unit is glaciated and inhospitable for settlement. There is a public interest in retaining these lands in state ownership as directed by AS 38.04.015, based on their habitat, recreation, scientific, and cultural values. In addition these lands are remote from essential services. When DNR authorizes activities, it will ensure that the terms and duration of authorizations protect cultural and scientific values and do not affect the potential for creation of a state park.

Transportation

Subunit 2a was selected as a potential transportation corridor. Feasibility and or need for an overland transportation corridor have not been studied.

Waterfront development

This unit has no marine waterfront. Future retreat of Bering Glacier and the anticipated creation of Bering Fiord could create opportunities for marine access.

Subunit 2a - upper Okalee River

■ Designation

General uses (G)

■ Management Intent

Allow general multiple uses.

The state selected upper Okalee River for potential construction of an overland transportation link between the Yakataga and Copper River regions. The need for, and the feasibility of, an overland route are undetermined.

The value of this area for scientific study, wildlife habitat, and recreation and tourism may increase as the Bering Glacier retreats. As new information becomes available, DNR should re-evaluate the unit's resources and management including the potential for a state park.¹

■ Guidelines:

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| Land authorizations | Terms and duration for land authorizations should preserve the scientific and other values and research opportunities detailed at the beginning of this unit. Authorizations should be tailored to maintain the potential for creation of a state park at Bering Glacier. |
| Leases | Leases should not exceed ten years in order to maintain flexibility for creation of a state park. |
| Scenic & tourism potential along transportation route | If an overland transportation route is planned through this unit, DNR will consult with DPOR and the Division of Tourism to identify a corridor that optimizes the scenic and tourism values. |
| Mineral leasehold location | In the beds of Kiklukh River and its tributaries that support anadromous fish, new mineral entry will be allowed only under leasehold in order to protect high quality anadromous fish habitat and to avoid impacts to water quality that is essential for sustaining the productivity of the Yakataga areas's community and commercial harvest fisheries. See Appendix B for a map showing the leasehold location area. |

General information

This land selection was filed late in the planning process, after resource data had been collected for other areas. Consequently, DNR has no information on forestry or recreation in Subunit 2a. Information on habitat is incomplete. The proximity of the Bering Glacier may create tourist and scientific interest.

¹ Initial analysis by the Nature Conservancy for the Department of Natural Resources showed that nunataks and the western Bering Glacier have potential for rare species and outstanding biodiversity significance. (*State Land Selection Project Final Report, Volume 1, March 1993*, The Nature Conservancy of Alaska.)



Bering Glacier

Subunit 2b - Bering Glacier terminus and Grindle Hills

■ Designation

Habitat and dispersed recreation (H1, RD1)

■ Management intent

Protect or enhance fish and wildlife habitat, particularly for seals, waterfowl, moose, and mountain goats. Protect or enhance conditions for dispersed recreation, particularly scenic values. All activities will, to the extent feasible and prudent, avoid significant adverse impacts to the habitat and recreation resources listed above.

DNR will preserve and support opportunities for scientific research related to the Bering Glacier. All activities will, to the extent feasible and prudent, avoid disturbance to the ongoing natural change and the records of past activity of the Bering Glacier system.

The value of this area for scientific study, wildlife habitat, and recreation and tourism may increase as Bering Glacier retreats. As new information becomes available, DNR should re-evaluate the subunit's resources and management, including the area's potential for a state park. A biological inventory should be conducted before DNR considers major or wide-ranging development, to determine whether rare plants live in the area.²

² Initial analysis by the Nature Conservancy for the Department of Natural Resources showed that nunataks and the western Bering Glacier have potential for rare species and outstanding biodiversity significance. (*State Land Selection Project Final Report, Volume 1, March 1993. The Nature Conservancy of Alaska.*)

YAKATAGA AREA PLAN

The state's purpose in selecting Bering Glacier is to acquire islands and coastal uplands within the future bay. Because the future shoreline of the fiord is not known, the state should defer asking for conveyance of this selection and the legislature should wait before designating a state park.

■ Guidelines

- | | |
|----------------------------|---|
| Land authorizations | Terms and duration for land authorizations should preserve the scientific and other values and research opportunities detailed at the beginning of this unit. Authorizations should be tailored to maintain the potential for creation of a state park at Bering Glacier. |
| Leases | Leases should not exceed ten years in order to maintain flexibility for creation of a state park. |

■ General Information

The Alaska Division of Geological and Geophysical Surveys has identified unusual opportunities for scientific research at Bering Glacier.

Bering Glacier provides some of the most spectacular glacier and alpine scenery in the world. Vitus Lake entraps a spectacular jumble of giant icebergs up to 1,500 feet long.

The Grindle Hills, Donald Ridge, and Hanna Lake areas in the northern part of the unit have goat winter habitat. Lakes along the flank and terminal lobe of Bering Glacier are used by molting geese and perhaps migrating waterfowl. Vitus Lake is a known haul out concentration area for harbor seals.

Unit 2 - Bering Glacier

| Area # & name | Designation | Resource or Use (See the resource reports and maps for more complete information) | Background |
|---|-------------|---|---|
| 2a upper Okalee River | G | <p>habitat values:</p> <ul style="list-style-type: none"> ■ extensive moose rutting ■ extensive moose winter habitat ■ brown and black bear spring concentration area east of Suckling Hills ■ eagle concentration area at lower elevations east & west of Suckling Hills ■ swan nesting and brood rearing north and west of Suckling Hills ■ anadromous fish and trout overwintering in upper Kiklukh River. ■ Most creeks have not been field surveyed for anadromous fish. ■ community harvest: moose, fur trapping ■ guided harvest: moose, black & brown bear ■ scenic values: Vitus Lake, Bering Glacier and nunataks ■ No vegetation inventory available. ■ USGS maps indicate extensive marsh lands. | <ul style="list-style-type: none"> ■ USGS predicts that Bering Glacier will one day retreat, creating a fiord rivaling Glacier Bay. Glacial retreat will create expanding bird and marine habitat. BLM has drafted a management plan to designate these lands as an Area of Critical Environmental Concern. |
| 2b Bering Glacier terminus & Grindle Hills | H1 RD1 | <p>scenic and recreation values:</p> <ul style="list-style-type: none"> ■ flightseeing ■ icebergs trapped in Vitus Lake ■ glacial and alpine scenery at close range ■ interstadial forests and peat bogs ■ commercial kayak tours <p>scientific values:</p> <ul style="list-style-type: none"> ■ national & international scientific interest in glacial influences on landforms, hydrology, habitat succession, and ancient climate and geology <p>habitat values:</p> <ul style="list-style-type: none"> ■ seal haulout concentration area at Vitus Lake (approx. 300) & concentration in the mouth of the Seal River (approx. 50 to 75) ■ swan brood rearing in Vitus Lake ■ Dusky Canada geese migrate along the shore of Bering Glacier and Vitus Lake ■ goose molting ■ moose winter concentration and moose rutting in southern & southeastern part of unit ■ mountain goat winter habitat - Grindle Hills ■ beaver concentration - southern part of unit ■ extensive goose molting - Hanna Lake and periglacial lakes and ponds ■ harbor seal concentration area at Vitus Lake ■ guided goat hunting ■ non-forested | <ul style="list-style-type: none"> ■ USGS predicts that Bering Glacier will one day retreat, creating a tide-water fiord rivaling Glacier Bay. Glacial retreat will create expanding bird and marine habitat. ■ BLM has drafted a management plan designating these lands as an Area of Critical Environmental Concern. ■ Rated as having outstanding biodiversity significance by the Nature Conservancy (<i>State Land Selection Project Final Report, 1993</i>) |