

Appendix D

Research Natural Areas

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Introduction

The following narratives describe the potential Research Natural Area (RNA) proposals developed during the Tongass Forest Plan Revision. Each area has a map number (#) which is used to show their location on the map included at the end of the appendix. The RNA discussions are grouped by Geographic Province (see Glossary), as discussed in the Research Natural Area section of Chapter 3, which also explains the process used to identify and set priorities for these potential Research Natural Areas. The selection of RNA's for preparation of an establishment report, and potential recommendation for designation to the Chief of the Forest Service, is also shown by alternative in Chapter 3.

Within each geographic province the potential RNA proposals are placed into three general priority groupings, as developed by the RNA Steering Committee (Juday, et al, 1988): 1) "priority potential candidate proposals," which are the highest priority RNA proposals identified by the RNA Steering Committee; 2) "other recommended potential candidate proposals," which are RNA proposals redundant with the first group or with key features of lower priority than the first group; and, 3) "RNA proposals no longer considered," which are proposals which were found to lack the features being sought or with significant resource conflicts which would make them not suitable for RNA designation.

Yakutat Geographic Province

Priority Potential Candidate Proposals

1. Akwe Beach

Map # 6
Yakutat Ranger District
11,032 acres

Akwe Beach contains a representative outer coast and beach segment of the Yakutat Forelands, the only extended length of sandy beach in most of south coastal Alaska. The characteristic alternating dune ridges and low wetlands (swales) of the area are believed to be geologically very recent, perhaps only 2,000 years old. Strong storms and currents of the North Pacific are still building or modifying the beach environments, creating a specialized niche for dune plants, plant communities, shorebirds, marine mammals, and other wildlife.

Akwe Beach includes coastal dune formations, old stabilized dunes and their vegetation, and swale wetlands plant communities. The dune ridges and swales are thought to be progressively older from the coast inland. A large freshwater lake, Triangle Lake, adds important diversity to the RNA proposal. Potential uncommon plant species include *Atriplex drymarioides*, *Lysimachia thyrsoiflora*, and *Saussurea americana*. Significant wildlife habitats include freshwater wetland staging areas for migratory birds, and productive estuary. The area is within the range of moose and the glacier phase of the black bear.

The area includes recreation facilities and is important to tourism.

2. Akwe-Ustay Lakes

Map # 5
Yakutat Ranger District
9,786 acres

This area includes two low elevation lakes at the base of the mountain front overlooking the Yakutat Forelands. Akwe Lake receives relatively small amounts of glacial sediment and is fed predominantly by rainwater runoff and groundwater. Ustay Lake is in contact with the terminus of Rodman Glacier and is cloudy with

glacial sediment. The two lakes are especially suited for comparative hydrological studies.

The area offers the opportunity to study new alpine plant communities that have developed where glaciers have retreated in the Yakutat area's recent geologic past. The alpine zone on the mountain knob separating the two lakes may include a glacial refugium of higher plant diversity and should be searched for *Stellaria crassifolia*, *Stellaria ruscifolia*, *Gentiana aleutica*, *Veronica stelleri*, *Castilleja chrymactis*, and *Euphrasia mollis*. Low elevation wetlands should be searched for *Pedicularis macrodonta*. Other features of interest are black cottonwood forest and tall willow shrub plant communities.

Three primitive recreation places are located in the area; all are important to tourism and two contain some types of improvements. Activities include hiking, hunting, boating, fishing, and camping.

3. Mountain Lake

Map # 1
Yakutat Ranger District
5,425 acres

This area encompasses elevations above and below the flooding zone that forms when Hubbard Glacier blocks Russell Fiord and converts it to Russell Lake. When the lake fills to about 150 feet elevation it spills into drainages leading south across the Yakutat Forelands into the Pacific Ocean. The southern portion of the area includes the upper portion of one of these outlets leading to Situk Lake.

Areas below the floodline are covered with a maturing Sitka spruce forest that developed on a former lake bottom sometime after 1150 AD when Hubbard Glacier began its retreat from Yakutat Bay. In 1986, an ice dam temporarily formed and partially flooded the fiord, killing vegetation that was underwater for more than 2 weeks. The ice dam is forming again and may burst as in 1986 or it may stabilize and make the lake permanent.

Low elevation slopes above the floodline support old-growth western hemlock-Sitka spruce forest which is relatively restricted in this part of Southeast Alaska. The area encompasses Mountain Lake, a narrow elongate lake carved into bedrock in a direction parallel to the flow of ice when it filled Russell Fiord. Alpine zones in the area may have been a glacial refugium, and should be searched for *Stellaria ruscifolia*, *Veronica stelleri*, *Castilleja chrymactis*, and *Euphrasia mollis*.

Three primitive recreation places are located in the area; all are important to tourism, and two contain improvements. Visitor activities include viewing scenery and wildlife, hiking, fishing, camping, hunting, picnicking, and canoeing.

4. Pike Lakes

Map # 4
Yakutat Ranger District
1,822 acres

Pike Lakes are the only lakes in coastal Alaska south of the Alaska Range that are inhabited by northern pike. It is not known how this interior fish species reached the area. The area also includes one of the only coastal stands of the interior variety of lodgepole pine and several ice block depression lakes with different hydrological characteristics.

The area supports examples of old-growth western and mountain hemlocks, lodgepole pine, and Sitka spruce. The old-growth Sitka spruce-western hemlock

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forest type occurs on larger raised moraines, unlike the great majority of stands of this type in northern Southeast Alaska, which occur on steep unstable mountain slopes. Forest types that have developed on both coarse-textured well-drained soils and poorly drained organic soils are present.

The Pike Lakes RNA should be searched for special plants, especially *Eleocharis kamtschatica*, *Lysimachia thyrsoflora*, and *Pedicularis macrodonta*. The area is within the range of the glacier phase of black bear. Moose browse shrub habitat and graze on aquatic vegetation of the larger lakes. The upper reaches of streams are probably rearing habitat for sockeye salmon. The lakes are locally important waterfowl habitat.

The area is currently a recreation place used for fishing and hunting. It is likely that future levels of recreational fishing would increase.

5. Upper Situk

Map # 2
Yakutat Ranger District
2,723 acres

This area represents excellent moose habitat in the willows occupying the complex overflow channels of the former Russell Lake, and productive fisheries. When Hubbard Glacier dams Russell Fiord again and causes Russell Lake to spill over to the south this area will be modified again. The segment of the Situk River within the area currently contains high-quality king and coho salmon rearing habitat and supports sea-run cutthroat and fall run steelhead; it has not been stocked. The fishery could be largely destroyed during lake overflow or it may partially survive.

The area should be examined to see if it contains the uncommon plants *Lysimachia thyrsoflora*, *Pedicularis macrodonta*, and *Saussurea americana*.

The area is a recreation place important for tourism, and includes an existing recreational cabin and significant recreational fishing.

Other Recommended Potential Candidate Proposals

6. Lost River

Map # 3
Yakutat Ranger District
821 acres

This short river supports a late (February) run of coho salmon, offering a food resource to predators at a critical time of the year. The other features of interest are the shrub communities on the complex former Russell Lake overflow channels.

Lynn Canal Geographic Province

Priority Potential Candidate Proposals**1. Warm Pass**

Map # 7
 Juneau Ranger District
 8,980 acres

Subalpine fir has a highly restricted distribution in Southeast Alaska. It occurs mainly along a few low elevation corridors into British Columbia. Warm Pass includes the northernmost example of subalpine fir in Alaska. The forests of the middle and upper portions of the valley are pure subalpine fir stands. Warm Pass Valley is the only forested portion of the US-Canada border between the Taku River and Chilkat Pass. The valley has been an important migration corridor for interior vegetative species that mix with the coastal forest and tundra. Many of the interior species are rare in the Tongass National Forest. The interior alpine species *Dryas integrifolia* was collected in the area in 1988. Other possible uncommon species that should be searched for are *Carex interior*, *Carex atrostachya*, *Cypripedium montanum*, *Calypso bulbosa*, *Geocaulon lividum*, *Thlaspi arcticum*, *Viola selkirkii*, *Chimaphila umbellata*, *Phyllodoce empetriformis*, *Phacelia mollis*, *Plagiobothrys cognatus*, *Castilleja chrymactics*, *Symphoricarpus albus*, *Lactuca biennis*, and *Crepis elegans*.

Warm Pass Valley has a very different climate than most of Southeast Alaska. Because of a pronounced rainshadow effect, annual precipitation is much lower than typical coastal forest and mountains; the total precipitation at nearby Skagway is only 26 inches. The low elevation connection to interior British Columbia allows cold dry air to move through the valley in the winter. Laughton Glacier and an unnamed glacier occupy two tributary valleys on the north-facing side of the Warm Pass Valley. Both glaciers have retreated significantly in the last several decades and appear to be still contracting. A considerable amount of recently deglaciated land is in various stages of plant colonization. The south-facing slopes across the valley, a very short distance from the terminus of both glaciers, were burned over in a forest fire. This may be the closest that forest fire and glaciers have occurred in North America.

The valley supports a good population of moose that utilize both the alpine shrub belt and riparian shrubs at lower elevations; moose trails and signs of browsing are abundant. Portions of Warm Pass Valley are used intensively by brown bear. Mountain goat inhabit the area.

The area has one recreation place important to tourism. Viewing scenery and wildlife, fishing, camping, and hunting are primary activities. The Laughton Glacier recreational cabin and the associated trail have been deleted from this proposed RNA due to their potential conflict with management direction for RNA's. {Note.. during early considerations of Warm Pass as a recommended RNA, the cabin and trail were included in the proposed boundaries.}

Preliminary information about Warm Pass has been shared with the British Columbia Ecological Reserves Unit.

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2. Dayebas Creek

Map # 8
Juneau Ranger District
8,724 acres

Chilkoot and Chilkat Inlets at the head of Lynn Canal are funnels for cold winter winds moving down from the low passes at the northern end of Southeast Alaska; this region also has the highest summer temperatures and the least annual precipitation in Southeast Alaska. This climate is highly localized to the long steep fiord walls leading up from tidewater shores. Dayebas Creek is a short tributary valley opening onto Chilkoot Inlet or Tayia Inlet across from Haines. Dayebas Creek is proposed in order to include vegetation growing in this special climatic region including uncommon forest and tundra plants and unusual forest types. The region has served as an important migration corridor for coastal plants moving inland and interior plants moving into the coastal region. Dayebas Creek also contains significant mountain goat habitat, an old hanging glacial cirque basin, periglacial features, and a large waterfall.

The lower elevations of Dayebas Creek are covered with a successional paper birch-Sitka spruce forest, one of the only areas of this unusual forest type in the Tongass National Forest. Western hemlock is slowly replacing the birch on all but the rockiest sites. Exceptionally large tree-sized Sitka willows are scattered among the paper birch-spruce stands. These stands appear to have originated from fire, which is very rare on the Tongass National Forest. Some timber harvesting has taken place near tidewater. Steep convex slopes have very shallow soils over bedrock that support a dry lodgepole pine-lichen forest type. A mixed subalpine fir-mountain hemlock forest occupies the highest forested elevations. This area has the greatest tree species richness outside the southern fringe of the Tongass National Forest.

Tundra communities above treeline are an unusual mixture of interior and coastal alpine types. Two plants on the list of uncommon Tongass National Forest species were collected in the area in 1988, the interior alpine species *Dryas integrifolia* and *Diapensia lapponica*. The alpine species *Minuartia biflora* was also collected in the area, the first collection in Southeast or coastal Alaska for this species. Identification of other specimens collected late in the 1988 field season is underway. Other possible uncommon species that should be searched for are *Carex interior*, *Carex atrostachya*, *Cypripedium montanum*, *Calypso bulbosa*, *Geocaulon lividum*, *Thlaspi arcticum*, *Rorippa obtusa*, *Viola selkirkii*, *Chimaphila umbellata*, *Phacelia franklinii*, *Plagiobothrys cognatus*, *Castilleja chrymactis*, *Symphoricarpus albus*, and *Crepis elegans*. Within the tundra containing interior plant species are frost-sorted stone nets and other periglacial features. Steep talus slopes that experience active frost heaving are rich in alpine species although the total plant cover is low.

The lowermost portion of Dayebas Creek plunges over the vertical wall of the fiord forming a large waterfall. The waterfall splashes directly into saltwater. The tidewater shoreline of the area runs almost directly north and south except for a short east-west segment immediately south of the waterfall. The short east-west ridge is bathed in spray rising vertically from the splash zone of the waterfall and is covered in a lush growth of mosses and lichens which should be searched for unusual species.

Lush alpine meadows that have not been recently glaciated provide excellent mountain goat foraging habitat. Evidence of goat grazing is abundant and at least two bands of goats were seen during the 1988 site visit. The area has other

important features of goat habitat including cliffs that serve as escape terrain and easy access to both high elevation summer habitat and low elevation winter habitat.

Other Recommended Potential Candidate Proposals

3. Lower Endicott River

Map # 11
Juneau Ranger District
9,418 acres

Endicott River served as an outlet for glacial meltwater flowing eastward from Glacier Bay when the Grand Pacific Glacier filled the bay 200 years ago. As the glacier thinned and retreated, a low ridge at the head of Endicott River (Endicott Gap) emerged and rerouted the water and cold air southward down Glacier Bay. Vegetation of the Endicott River watershed has thus developed under both ice-affected and ice-free conditions during the last several centuries. The lower watershed is at the edge of the special northern Lynn Canal climate of drier and more continental conditions.

The interior alpine species *Dryas integrifolia* has been collected in the vicinity. *Cypripedium montanum*, *Chimaphila umbellata*, and *Euphrasia mollis* have been collected across the divide in Glacier Bay National Park. *Lactuca biennis* has been collected north of the proposed area near Davidson Glacier. Other possible uncommon species that should be searched for are *Carex interior*, *Carex atrostachya*, *Thlaspi arcticum*, *Viola selkirkii*, *Castilleja chrymactics*, and *Crepis elegans*. The distribution of these species in the lower Endicott River watershed is not well understood, and additional collections are needed. The William Henrey Mountain area appears to have the highest potential for the uncommon plants.

This area offers the opportunity to conduct watershed studies, especially the development of aquatic and riparian ecosystems in relation to glacial outwash events. The area also contains western hemlock-Sitka spruce forest communities typical of the northernmost portions of the Tongass National Forest. This area is entirely within designated wilderness. A future possible road connection route between Haines and Juneau may access the lower Endicott River drainage outside of the Wilderness; such access may improve research opportunities for this area.

Two recreation places are present within the proposed area. Viewing scenery, flightseeing, canoe/kayaking, fishing, hunting and camping occur in the area.

4. Berners- Lace River

Map # 10
Juneau Ranger District
23,964 acres

The Berners-Lace River proposal is designed to encompass two contrasting low elevation major river segments and associated ecosystems. The Lace River floodplain is a poorly vegetated, braided river channel that is typical of glacially-fed rivers. Sediment from glacial meltwater builds up on the bed of the river faster than the river can transport it away. The active river channel eventually becomes higher than the surrounding landscape and during a high water event (sometimes a prolonged period of warm, dry weather that causes high glacial melt) the river spills over into surrounding lower terrain and abandons the old channel. This process has formed a typical broad, meandering, and poorly vegetated glacial floodplain at Lace River.

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Berners River received great volumes of meltwater from the glacier flowing south off Sinclair Mountain, until the glacier retreated far enough to expose a low bedrock divide at the head of Berners River valley. The entire meltwater flow has since been routed down the Lace River drainage. Berners River is now a classic underfit river, one that is considerably smaller than that of the flow regime that formed its valley.

The continued buildup of sediments at the mouth of Lace River in upper Berners Bay is damming up the mouth of Berners River. As a result, the broad floodplain of Berners River is a very large and dynamic wetland complex. Vegetation of the Berners valley is predominantly submerged and emergent aquatic plants with fringing freshwater sedge marshes. The valley is prime moose, waterfowl, and furbearer habitat. The sloughs and lakes connected to the Berners River channel are excellent anadromous fish habitat. Several well-worn trails along the sides of the valley and other signs attest to a large population of brown bear.

The vegetation of Berners River valley suggests that a rise in water level from the damming action at the mouth of the river continues. Shrubs that once occupied raised levees are now being drowned, and extensive areas of floating mat vegetation occupy the valley. As a result, unlike much freshwater wetland vegetation in Southeast Alaska, the Berners River wetlands are being renewed and are not degenerating into acidic muskegs with low wildlife productivity.

A young cottonwood forest occupies point bars along the active channel of the Berners River floodplain. Slopes on either side of the valley are covered with a northern variant of western hemlock-Sitka spruce forest types.

The Tongass Timber Reform Act designated this area as a "Legislated LUD II."

The Berners River area has two recreation places, both important for tourism and marine-oriented recreation. Viewing scenery, fishing, and hunting are also attractors to this area.

5. Katzehin River Meadows

Map # 9
Juneau Ranger District
5,282 acres

As one travels north along Lynn Canal, Katzehin River is the last major river flowing west from the mainland before the special climatic zone at Skagway. The area includes productive and species-rich alpine and subalpine meadow communities, treeline mountain hemlock sites, and a northern example of western hemlock-Sitka spruce communities. It also contains extensive summer grazing habitat for mountain goats. Goat trails, terraces, and droppings are widespread and goats are consistently observed in the area during the summer.

Treeline plant communities include a mountain hemlock-copperbush (*Cladothamnus pyrolaeflorus*) open woodland. Extensive *Lutkea pectinata* patches cover talus and semi-stabilized boulders. Shallow depressions collect thick snowbanks and are species-poor, mainly a *Phyllodoce aleutica-Cassiope mertensiana* community. Meltwater coming off persistent snowbanks however produces a snowbank community that is rich in herbs, including species of *Saxifraga*, *Valeriana*, *Campanula*, *Anemone*, and *Viola*. Above treeline are an open grass and sedge subalpine meadow. Species that are common there include *Carex nigricans*, *Luzula parviflora*, *Deschampsia caespitosa*, *Phleum commutatum*, and *Trisetum spicatum*.

Western hemlock-Sitka spruce forest types occupy the lower elevation slopes. Forests on the south-facing slopes above Katzeihin River are especially large and well developed for a site so far north in the Tongass National Forest. The north and west-facing slopes are especially steep and broken by cliffs even though there is a nearly complete forest canopy. Where groundwater moves over the cliffs and steep slopes by sheet flow, a Sitka spruce/devil's club forest type occurs.

The lowermost portion of the area includes a section of the braided channel of the Katzeihin River. Sediment from meltwater at the terminus of Meade Glacier is causing the Katzeihin River to aggrade or build up its bed. The active river channel has shifted frequently, and most of the floodplain is in very early vegetative succession. Even though total plant cover is low on the floodplain, a distinctive set of species is found in the open and changing habitat. The terminus of Meade Glacier has retreated and thinned considerably in the last several decades, but a minor readvance of only a few kilometers would bring it to the edge of the potential RNA.

Boating and hunting occur on the one recreation place incorporated in this area.

Coast Range Geographic Province

Priority Potential Candidate Proposals

1. Blue Lake Lava

Map # 39
Misty Fjords National Monument
19,323 acres

Blue Lake Lava is located along the US-Canada border and contains a recent lava flow that originated in British Columbia. Because of its southerly location and connection to a valley leading into British Columbia, the area may contain some plant species uncommon on the Tongass National Forest and stands of subalpine fir. The area is also proposed in order to obtain examples of mountain hemlock forest types on soils not affected by the recent lava flows. The British Columbia Ecological Reserves Unit has been informed of the Blue Lake Lava Site and are interested in international cooperation.

A radiocarbon sample of a log at the surface of the lava was dated at 360 plus or minus 60 years. Two other flows overlap the main, dated flow. Their form as well as younger vegetation on them suggest that there were two periods of volcanic activity more recent than 360 years ago. The lava flows contain smooth, ropy "pahoehoe" surfaces and blocky "ah-ah" deposits. Isolated "islands" of forest surrounded by recent lava called steptoes are present. A cone near the lower end of the flow probably represents a secondary vent. Lava contraction (from cooling) features such as drainage gutters and circular pits occur in the area, too. The area should be searched for lava tube caves.

The volcanic vent is 5 kilometers north of the U.S. border in British Columbia. The vent erupted laterally near the terminus of a small valley glacier. The flows moved south 12 kilometers down Lava Fork River, continued across the border and spread into a fan at the confluence with Blue River, damming it to form Blue Lake. The lake gets its name from the blue or aquamarine color of the water that is caused by the Tyndall effect; light is refracted on the suspended clay particles in the water. The lava continued south about 9 kilometers down Blue River valley and then stopped. There are numerous small ponds on the lava surface where water has filled depressions.

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Plant succession has been relatively rapid on the lava because of the high rainfall environment of Southeast Alaska. Vascular plant communities have developed where fine soil particles collected on the lava. On some lava surfaces black cottonwood trees have developed an unusual growth form with multiple root crowns and adventitious roots extending from the stem out across the surface. Lush mats of moss and rich lichen beds are found on portions of the lava surface. However, most of the lava is still barren rock. The area offers the opportunity to compare rates of weathering of lava surfaces with other environments in the world, and is of special interest because of the unusual combination of cool and high rainfall conditions.

This area is a recreation place important for tourism, primarily used for viewing scenery from the air.

2. Marten River

Map # 48
Misty Fiords National Monument
6,213 acres

This area would target study of riparian spruce and brown bear along a major mainland stream. The Marten River site appears to have better spruce stands than other proposed locations, avoids anticipated recreation uses, and has the added benefit of being adjacent to the existing Red River RNA.

There are no identified recreation places in the potential RNA area.

3. Robinson Lake

Map # 40
Misty Fiords National Monument
4,297 acres

This area is focused on a natural slump lake, forest types typical of the southern portion of mainland Southeast Alaska, and some uncommon plants of restricted distribution in Alaska that may occur in the area. Robinson Lake formed in recent years when a natural earthslide dammed Robinson Creek. The geomorphology and stream morphology of the area have been intensively studied by the Juneau Forestry Sciences Laboratory. The area extends to the shore of Behm Canal in order to include habitat diversity associated with the shoreline and proximity to deep water. Warmth given off by deep water often delays the onset of winter snows, reduces total snow accumulation at low elevations, and initiates early snowmelt in the spring.

There has been little study and documentation of terrestrial vegetation and wildlife features in the area. The area probably contains examples of the western hemlock/swordfern type, the western redcedar/swordfern type, and relatively minor amounts of riparian Sitka spruce forest. Higher elevations probably contain mountain hemlock types, and high and low elevation muskegs are present. Uncommon species of the Tongass National Forest that should be searched for in the area are *Caltha biflora*, *Monotropa uniflora*, *Platanthera gracilis*, *Oxycoccus palustris*, and *Lycopus uniflorus*.

There are no identified recreation places in the potential RNA area.

4. Twin Lakes

Map # 28
Wrangell Ranger District
7,202 acres

The Stikine River is one of the few low elevation corridors from the interior of Canada that reaches the coastal forest region of Southeast Alaska. The river carries a heavy glacial sediment load and has a typical braided floodplain with much early successional shrub vegetation. The Twin Lakes area includes extensive willow stands on the Stikine floodplain that are continually renewed by the river and are excellent moose habitat. The Stikine floodplain is one of two locations in Alaska where garter snakes have been collected, probably as the result of their rafting down the Stikine River. The long-toed salamander has also been reported from the floodplain, and the spotted frog is expected to be present. Twin Lakes (also known as Figure Eight Lake) is located in the center of the area. The lake serves as an important coho salmon rearing habitat and supports sea-run cutthroats that overwinter there.

Two special vegetation types occur in the area. Higher terraces above the river support a tall black cottonwood forest, sometimes with a successional Sitka spruce understory. *Salix interior* is reported to be a dominant early successional plant on sandy river bars in this section of the Stikine River, but specimens to verify the report are not available. This would be the only known occurrence of *Salix interior* in Southeast Alaska. Slopes above the river support western hemlock forest types under the influence of down-canyon winds.

A plant new to the flora of Alaska, *Angelica arguta*, was reported in the Kakwan Point area; specimens in flower should be collected and checked carefully against *A. lucida* and *genuflexa*. *Cardamine pratensis* was reported in the proposed area near Twin Lakes, a significant southern range extension for this species. *Limosella aquatica* and *Listera convallarioides* were reported in Southeast Alaska for the first time in the Kakwan Point area. Specimens for all these reports should be collected and, if verified, should be preserved in Alaska herbaria. The uncommon plant *Lysimachia thysiflora* has been collected in wetlands south of the mouth of the Stikine River and should be searched for in the area. Other uncommon plant species that may occur are *Nymphaea tetragona*, *Caltha biflora*, *Spiraea douglasii*, and *Mimulus lewisii*.

A low-grade geothermal system occurs in the area. Two tepid springs issue from host rock just a few meters above the level of Twin Lakes on its northwest shore. One spring emerges from boulders at the base of an avalanche chute. The other spring emerges from alluvium at the base of a cliff. Bedrock in the immediate vicinity of the springs is a foliated, medium-grained quartz diorite. During high water stages on the Stikine River, the water level of the lake is raised, possibly flooding the springs.

One geothermal spring has a reported summer temperature of 21 degrees C, the other a temperature of 18 degrees C. Summer temperature of the springs may be lower than the winter temperature; a reading of 26 degrees C was obtained one winter. Cold surface water flows more readily down a cliff face above the springs during the warm season, diluting the heated water. Total dissolved solids and silica content are low as would be expected in a low-grade geothermal system, although magnesium content is relatively high. There are no hydrothermal deposits. The waters of the springs have a neutral pH.

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Relatively "high" amounts of recreation use, important for tourism, occur in conjunction with a cabin and the lakes. Uses include hunting, fishing, hiking, viewing scenery, and camping.

Other Recommended Potential Candidate Proposals

5. Anan Creek

Map # 36
Wrangell Ranger District
17,586 acres

Anan Creek is designed to include a watershed with an exceptional fishery and concentration of bears. Anan Creek supports a particularly productive pink salmon fishery; the long-term mean escapement is 200,000 pinks, one of the largest salmon runs in all of Southeast Alaska. Chum, chinook, coho, and sockeye salmon, and Dolly Varden char, steelhead, and cutthroat trout are also present. Anan Creek has gravels of the ideal size for spawning salmon, a constant flow of very clean water, and very low content of fine particles that clog the circulation of oxygen-rich water through spawning beds. Anan Creek plunges over two waterfalls in its lower section between Anan Lake and Bradfield Canal. The first (lower) waterfall is passable, but an obstacle to salmon migrating upstream to the extensive spawning habitat of Anan Creek and Anan Lake and Boulder Lake. A fish ladder in a tunnel has been installed on the first falls. The second falls delays fish passage and is about 2 meters high.

The largest known concentrations of black bear in the Tongass National Forest gather here to fish for salmon; as many as 50 different black bears have been counted at the falls during a period of several days at the peak of salmon migration. Two bear observation stations have been constructed near the two waterfalls. The abundance of fish schooled up at the base of the falls, or leaping through the obstacles attract the black bears. Despite the heavy black bear use of the area, brown bear are not uncommon on Anan Creek. Beaver are also abundant and a series of beaver ponds and channels are found above the falls.

Anan Creek is a very heavily used recreation place important to tourism, and is a new "Legislated LUD II" as a result of the Tongass Timber Reform Act.

6. Yehring Creek

Map # 12
Juneau Ranger District
19,065 acres

The Taku River is one of the few low-elevation corridors into interior British Columbia from coastal Alaska. Plant species have used this corridor as a migration route resulting in some interesting forest and tundra types. This area includes a short tributary stream to the Taku River that supports productive fisheries and a representative sample of plant communities along the river corridor. Yehring Creek is a rearing habitat for coho and sockeye salmon, and supports sea-run cutthroats and spring runs of steelhead. This stream has not been artificially stocked so the fish are native genotypes.

Taku Glacier blocked and dammed Taku River until the last few centuries. Recent measurements of ice volume and movement in the Juneau Icefield suggest that the Taku Glacier is in an active building phase and will dam the river again relatively soon. The lower portion of the RNA would probably be flooded when the ice dam forms. Fish populations and habitat of the entire Taku River watershed would be drastically affected by the formation of an ice dam and blockage of access to saltwater.

Subalpine fir has been collected on the outwash of Wright Glacier in the northern portion of the area along the Taku River lowlands. Extensive black cottonwood forest stands are found along the Taku River floodplain. Mountain hemlock forest types are typical of the upper slope forests in the area. Total forest cover is low because most of the area has a north-facing aspect and much of this steep watershed basin is above 500 meters in elevation. *Viola selkirkii*, a rare plant species in Alaska, may occur and has been collected nearby.

The area includes two recreation places used for hunting, fishing, canoe/kayaking, camping and recreation cabin use. One of the recreation places is important for tourism.

Northern Outer Islands Geographic Province

Priority Potential Candidate Proposals

1. Crater Ridge- Fred's Creek

Map # 22
Sitka Ranger District
8,630 acres

This area includes examples of several major volcanic landforms and a small watershed under the unique hydrologic influence of volcanic ash soils. The area has been the subject of intensive study from the standpoint of soils morphogenesis, ecosystem succession (Klinger, 1988), and geologic studies (Dave Brew, Jim Riehle, U.S. Geological Survey).

Crater Ridge is a caldera (collapsed volcanic summit) on a subsidiary volcanic cone 3 kilometers northeast of Mount Edgecumbe. Crater ridge is a composite dome (made up of lava flows alternating with ash) and stands about 500 meters in elevation. Two small lakes currently occupy a minor portion of the floor of the caldera although some volcanic deposits suggest that an eruption once took place in a large caldera or "crater" lake. The profiles of Mount Edgecumbe and Crater Ridge are smooth and symmetrical, evidence that they were not carved by glaciation and thus were erupted since the end of the last Ice Age 14,000 years ago. Radiocarbon dates indicate that the various volcanic layers were erupted over a time period lasting a few hundred to 2,000 years, just prior to 9,000 years ago. A relatively thin ash layer was laid down in one or two later and final eruptions about 5,000 years ago. Buried trees and soil indicate that forest vegetation was well developed on the volcano before the final eruption. The south Kruzof volcanic field contains tholeiitic basalt and younger calcalkalic flows and pyroclastic rocks. The volcanic activity on Kruzof is of particular interest as it is related to plate movements and the complex process of terrain accretion which occurred during the late Cretaceous and early Tertiary time, and subsequent crustal movements.

Fred's Creek drains the east slope of the crater summit. This watershed from summit to tidewater will allow studies of the influence of recent volcanic ash on stream flow regime and water chemistry. Porous ash soils can store large volumes of water and releases it steadily so that it stabilizes stream flow and temperatures.

Important forest types in the area include western hemlock and riparian Sitka spruce; both are growing on special soils which may produce variants of the "typical" forest type. Small areas of western hemlock/Alaska-yellow cedar and muskeg occur in the area also. *Agrostis thurberiana*, a wetland grass species on the list of uncommon Tongass National Forest plants, has been collected in the

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vicinity and should be searched for in the area. The area is also at the northern limit of salal (*Gaultheria shallon*). Klinger (1988) describes in great detail a transect from near sea level to high elevations on Mt. Edgecumbe including information on soils chemistry, forest composition, age, and structure. His data have been used to propose his controversial ideas relating to the role of *Sphagnum* mosses in bog formation and forest decline, with its implications for atmospheric chemistry. Long-term protection and monitoring of these sites could eventually test whether these hypotheses explain the natural successional processes occurring over this complex terrain.

Two recreation places are located in the area; both are important to tourism. There is a public recreation cabin, and the Mount Edgecumbe National Recreation Trail. Hiking, hunting, viewing scenery, fishing, picnicking, and nature study are all uses of the area.

2. Myriad Islands

Map # 18
Sitka Ranger District
302 acres

Myriad Islands are a set of numerous wave-battered, low elevation islands fronting the open North Pacific Ocean in the West Chichagof-Yakobi Wilderness. An RNA is proposed here to include islands of all sizes demonstrating biogeographic effects due to size and isolation from Chichagof Island, probable nesting habitat of the marbled murrelet, and the Sitka spruce/Pacific reedgrass forest type. The degree of isolation from Chichagof Island is unknown as some islands are only 1/4 mile from Chichagof and Herbert Graves Islands. Marten, an introduced species to islands in Southeast Alaska, is present on Chichagof and Herbert Graves Islands, but their absence or presence on the Myriad Islands is unknown. Cooperation with the State of Alaska would allow the establishment of a reserve on adjacent intertidal and subtidal habitats that are closely linked with island ecosystems. Rich kelp forests, shellfish beds, and populations of sea otters are important features of the state tidelands.

This area is free from local and regional sources of air pollution; winds arriving at the area have been cleansed by a long passage over the North Pacific Ocean. The area would make an excellent global background air quality monitoring site. It represents one of the most outstanding opportunities to study island biogeographic effects in north temperate marine and terrestrial ecosystems in the National Forest system. The islands are popular with ocean kayakers.

3. Plotnikof-Port Banks

Map # 30
Sitka Ranger District
16,723 acres

This area includes an oligotrophic rock basin lake system with high fisheries diversity, riparian Sitka spruce, western and mountain hemlock types, Alaska yellow-cedar, and muskegs. Two uncommon plants of the Tongass National Forest that may occur in the area are *Poa leptocoma* and *Stellaria crassifolia*.

Ice Age glaciers carved the southern portion of Baranof Island into a series of parallel northeast-southwest trending fiords and U-shaped valleys. Port Banks is a fiord-like inlet that runs perpendicular to the orientation of most of the fiords of the island. Upstream from Port Banks the glacial U-shaped valley connected to it curves back to the general orientation of the island's fiords. The valley is occupied by two large lakes, Plotnikof and Davidof. Davidof Lake is a low elevation hanging cirque basin lake in the upper watershed. The watershed supports a summer run of

steelhead, coho salmon rearing habitat in the lakes, an early run of coho, and overwintering populations of sea run cutthroat or Dolly Varden.

The lower segment of the area contains shoreline along Whale Bay and some exposed open coast of the North Pacific.

Port Banks is a popular salt water recreation area, while Plotnikof and Davidof Lakes each include a Forest Service recreation cabin on their lake margins. These two areas contain five recreation places, three of which are important to tourism, two of which contain facilities (cabins and trails), and three which are important to marine recreation. Activities include viewing, boating, hiking, canoeing, kayaking, hunting, fishing, and camping.

Other Recommended Potential Candidate Proposals

4. Lake Eva

Map # 19
Sitka Ranger District
5,172 acres

The Lake Eva area represents a highly productive sockeye fishery with an active history of research (Robert Armstrong's classic studies of arctic char, for example). Forest types present are typical spruce and hemlock, which have potential to serve as baseline monitoring sites for adjacent managed areas. Lake Eva is a low elevation (less than 70 meters above sea level) valley morainal lake. The lake is about 3 kilometers long by 0.5 kilometers wide. The features present in the Lake Eva RNA partially overlap the proposed Plotnikof-Port Banks RNA. Lake Eva is much better studied than Plotnikof-Port Banks and it is more accessible to researchers.

A public recreation cabin, two shelters and a trail constructed in the 1930's by the Civilian Conservation Corps exist in the area. Fishing in the lake and hunting also occur in the area.

5. Redoubt Lake

Map # 23
Sitka Ranger District
6,453 acres

Redoubt Lake is one of the only large meromictic lakes in the Tongass National Forest. The lake is 266 meter deep and has a saltwater layer at 100 meters. Meromictic lakes are characterized by a stable bottom layer and chemocline that prevents nutrients from mixing during the vernal and autumnal overturns, which normally occurs when cool water sinks. Nutrients contained in dead organisms filtering to the bottom are trapped in bottom sediments and subtracted from the ecosystem. However, freshwater springs seeping through fractures in bedrock may enter the bottom of the lake and gradually degrade the chemocline by dilution until it is renewed by saltwater intrusion. In some situations meromictic lake systems have been reported to act as effective concentrators of solar energy in the unmixed bottom layer, producing unusually warm temperatures at the bottom. Redoubt Lake offers the opportunity to conduct studies of these physical and ecological phenomena.

The lake and inlet stream support dolly Varden char, and sockeye, pink, chum, and coho salmon. Harvest records dating from the 1800's (during Russian occupation) indicated that Redoubt supported a harvest of over 50,000 sockeye salmon per year, with escapement of over 100,000 sockeye.

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By 1980, sockeye escapement occasionally measured in the low hundreds, and the Forest Service, Alaska Department of Fish and Game FRED Division and NSRAA (Northern Southeast Regional Aquaculture Association) joined in a cooperative effort to restore the run. Limnological analysis established that the system was low in phosphorous and nitrogen resulting in low primary productivity and zooplankton biomass. Zooplankton is the primary forage for juvenile sockeye. A pharmaceutical grade fertilizer mixture (no heavy metals) of nitrate and phosphate was prescribed from 1984 through 1987, and again from 1989 through the present to increase nutrients. Primary and secondary production were boosted by nutrient enrichment, however subsequent hydroacoustic testing and smolt enumeration established that fry abundance was also limiting a return to historic production levels. There were insufficient fry to take advantage of increased food. The Forest Service and NSRAA developed an in-lake fish culture system in 1990, which enabled up to 3 million eggs to be placed into six egg incubation boxes at Redoubt Lake outlet to increase egg-to-fry survival. This was discontinued in 1992 due to the adult returns which seem to indicate that the population is reaching escapement goals by simply continuing the fertilization portion of the project.

The first group of fish to benefit from enrichment returned to spawn in 1989. Escapement totalled approximately 30,000 fish in 1989, 72,000 in 1990, and 45,000 in 1991 for a three year average of 49,000 post-enrichment sockeye. In 1992, escapement dropped to 10,200 sockeye. The drop was expected however, since the lake was not fertilized in 1987 when those fish emerged to rear in the lake. That compares to an average of 8,080 fish for the pre-enrichment period of 1980 through 1988. The sport and subsistence fishery grew in proportion to escapement, and in 1990, Redoubt produced 16% of the total subsistence sockeye harvest.

In 1990, the Forest Service, NSRAA and ADF&G began a new multi-year effort towards creating a sockeye fishery for subsistence, personal use, sport and commercial use, after first establishing escapement at a level that would be self-sustaining.

The watershed of Redoubt Bay has a history of some logging dating back to Russian colonial times. Present management on adjacent State Lands may have an affect on this area.

The area contains a public recreation cabin and an administrative cabin. A hand-operated tramway has allowed small boat access to the lake; the tramway is to be reconstructed in 1993. Sport, personal use, and subsistence fishing use is relatively high. The area also contains a cultural site.

6. Lover's Creek

Map # 31
Sitka Ranger District
3,415 acres

This area represents several phenomena associated with exceptionally high precipitation. This area is located in possibly the highest rainfall zone in North America. The official Weather Service station at Little Port Walter, a few kilometers east of the RNA, records a long-term average annual precipitation of 569 cm (224 inches); the 1987 annual total was 742 cm (292 inches). Because of orographic uplift (winds forced to rise over mountains), total precipitation in the upper elevations of the RNA is likely significantly higher.

This area contains productive fisheries, and alpine, rock and snow avalanche communities that occupy unusually low elevations. The proximity of the area to the open North Pacific and the unimpeded movement of storms into the area from the

southwest probably result in a low freezing level and high snowfall total. As a result, treeline occupies a low elevation and much of the vegetation of the steep watershed basin is alpine tundra.

The Lover's Creek area is of interest because it displays Sitka spruce-western hemlock and yellow-cedar forest types that have developed under high rainfall conditions. The area should be searched for the uncommon plants *Agrostis thurberiana*, *Stellaria crassifolia*, *Rhododendron camtschaticum*, and *Mimulus lewisii* (collected 12 kilometers to the north at Cliff Lake).

Fisheries research has occurred in this proposed area since 1934, providing possibly the longest continuous record of pink salmon production on the Pacific coast. A record of air and water temperatures and stream discharge is available from the site, as well as biological information on salmon. It has been proposed for designation as an RNA as early as 1972 by the National Marine Fisheries Service and a variety of State-wide and region-wide scientific committees.

Vegetation of this area is similar to Plotnikof-Port Banks, although the high rainfall, record of environmental data, and research history make it unique.

Northern Interior Islands Geographic Province

Priority Potential Candidate Proposals

1. Tonalite Creek

Map # 17
Sitka Ranger District
9,515 acres

This area includes pristine examples of Sitka spruce, western and mountain hemlock, and yellowcedar forest types; productive bear and fisheries habitat; and muskegs. There is a long history of fisheries, hydrology, and brown bear research, here and in the nearby Kadashan River drainage. Proximity to logged and roaded areas makes Tonalite a suitable control area for various types of research on the effects of management activities on the environment.

The Tonalite drainage is a narrow glacial valley bisected by Tonalite Creek, which flows into Kadashan River about 1.5 miles outside the proposed RNA boundary. The RNA includes four main tributary streams to Tonalite Creek and part of a fifth. The valley bottom is a floodplain with backwater and side channels to the main stream. Portions of the floodplain have scattered Sitka spruce with dense thickets of understory vegetation; other portions are nonforested peatland fens and bogs with high plant diversity.

On the footslopes and mountainslopes, western hemlock forest types dominate to mid-elevations. Upper elevation (to over 3000 feet in the southeast end of the area) slopes have mountain hemlock plant communities to tree line, alpine heath and meadow above. One population of choris bog orchid, *Platenthera chorisiana*, a Region 10 sensitive plant species, is known to occur within the area.

Tonalite Creek supports runs of pink, chum, and coho salmon. The drainage is prime brown bear habitat; Sitka black-tailed deer frequent the area, and beavers use the valley. Bald eagle, Pacific slope flycatcher, American dipper, and raven are common in the floodplain.

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The area includes a variety of geologic features, but is dominated by lower Cretaceous biotite-hornblende tonalite and hornblende tonalite. There is a fault through the valley. The climate is cool maritime.

Access is available by boat to Kadashan Bay and part way up Kadashan Creek at high tide, or by vehicle on road #7540, in either case followed by a hike into the proposed RNA area. Helicopter access is available at a few points.

The area was used historically for mineral extraction (gold). An RNA designation would likely result in withdrawing the area from mineral entry. The proposed RNA is within a congressionally-designated LUD II area, and thus road development and commercial timber harvest are already precluded. RNA designation would also preclude salvage and personal use harvesting of timber, fish enhancement projects, recreational developments such as trails or cabins, and camping or campfires. Hunting would still be allowed.

2. Gambier Bay (West)

Map # 20
Admiralty Island National Monument
11,790 acres

Note: The location of this potential RNA has moved since it was first identified in the RNA process. The original area (of 4,777 acres) was described in the 1991 SDEIS; the new location is described here. West Gambier Bay has been proposed as a replacement for the Pack Creek RNA (as discussed in FEIS Chapter 3).

This potential RNA is located at the head of the west arm of Gambier Bay. The area includes productive wildlife habitat, an anadromous fish stream, and a variety of geological features including karst. West Gambier Bay contains forest and nonforest vegetation types typically found on the islands of northern Southeast Alaska (the same conditions for which the Pack Creek RNA was originally designated). The area includes long, narrow Pybus Lake and several smaller lakes. The climate is cool maritime.

The watershed at the head of the west arm of Gambier Bay is a broad glacial valley bisected by an unnamed stream with six mapped tributaries. One additional mapped stream occurs on the north side of the west arm. The valley bottom supports large riparian Sitka spruce and western hemlock stands, as well as extensive stands of mixed conifer, open forest and peatlands (muskeg). A few stands of red alder also occur in the floodplain.

High elevation plant communities (alpine meadows, heaths, Sitka alder and salmonberry) are most prominent at the west end of the watershed, which reaches to the east face of Middle Mountain (2,830 ft.). A large sedge and grass-dominated estuary occurs at the head of the bay. Rocky shoreline with fringing forest occurs east of the estuary on both the north and south shores of the bay. Several populations of choris bog orchid, *Platanthera chorisiana*, a Region 10 sensitive plant species, were found in 1995 in a mosaic of open mixed conifer forest and muskeg.

The main stream supports runs of pink, chum, and coho salmon, Dolly Varden, and cutthroat and steelhead trout (ADF&G 1982). Brown bear and Sitka black-tailed deer frequent the area. Other species known to occur include Canada geese and bald eagle in the estuary; beaver, red-tailed hawk and common loon in the Pybus Lake area; and blue grouse, rough-skinned newt, and boreal toad.

Geologically, the area is primarily Gambier Bay Devonian schist to the north of the main stream; Hyd Formation Trissic volcanic rock, limestone, slate, chert and

conglomerate along the main stream; and Cannery Formation Permian graywacke, slate, phyllite and conglomerate to the south (Lathram et al. 1965). A karst area of at least 1/2 square mile is located on a ridgetop plateau above the north shore of the west arm (elevation 1400-1700 feet); it contains a chain of over 50 sinkholes and possibly a cave.

Taku and Kake peoples have traditionally used the area for subsistence purposes. No known heritage sites are within the proposal area, although many are known for other parts of Gambier Bay (including petroglyphs and culturally modified trees, and a cannery, fur farm, flume, pipeline and cabins). The estuary was surveyed and cleared for heritage resources as part of a project-level analysis (a helicopter landing site not currently being considered).

Access is available by float plane or boat on either the south or north sides of the west arm. Helicopter access is possible at several points.

The area is Wilderness and thus already withdrawn from mineral entry. The Wilderness designation also precludes road development, timber harvest including salvage, and hydropower development. RNA designation would not change these restrictions. RNA designation would further preclude fish enhancement projects, recreational developments such as trails or cabins, camping or campfires, and beach log salvage. Hunting would still be allowed.

3. Tiedeman Island

Map # 16
Admiralty Island National Monument
4,750 acres

Tiedeman Island is in the center of Seymour Canal, a large inlet surrounded by Admiralty Island National Monument and Wilderness. The Tiedeman Island area includes exceptionally high-density bald eagle nesting habitat and has been used for long-term eagle studies. The area also includes the nearby Bug Islands, in addition to Tiedeman Island, at the recommendation of the U. S. Fish and Wildlife Service. Muskeg and beach forest types are included in the area. The area is linked through the eagles (feeding on fish) to the marine ecosystem of Seymour Canal.

Mature forest covers about 30 percent of the Island. Most of the remainder supports muskeg and low productivity open woodland types; only one lake and one watershed exist on the Island. Elevations on the island are below 200 meters.

A great variety of high-quality food is available to bald eagles. Fish comprise the greatest portion of the diet, although seabirds and waterfowl are seasonally important. Eagles of the area have been observed eating salmon, pollack, cod, herring, smelt, sculpins, rockfish, flounder, and halibut. Scoters, scaup, goldeneye, bufflehead, ducks, and geese are important winter food. Carrion is available in the form of seals, sea lion, deer, bear, whales, and other wildlife.

The fringe of tall mature Sitka spruce around the perimeter of Admiralty Island provides ideal nesting platforms and lookout perches. In addition to bald eagle habitat, the islands may serve as important deer winter ranges. Vancouver Canada geese nest in the area, both in the trees and on the ground.

The Island includes a recreation area important to tourism. Popular activities include viewing scenery and wildlife, hiking, canoeing, kayaking, camping and hunting.

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4. Pleasant Island

Map # 13
Hoonah Ranger District
5,256 acres

The western portion of Pleasant Island is an important field site for researchers studying ecosystem development on recently deglaciated land surfaces in Glacier Bay National Park. Pleasant Island was not covered by neoglacial advances which so drastically affected Glacier Bay as recently as two centuries ago. The island is one of the closest areas with old-growth forest, lake and muskeg ecosystems to compare with the successional surfaces in Glacier Bay National Park, and has been actively used in plant succession, ecosystem processes, aquatic ecology, and soils studies.

Geologically, Pleasant Island consists of relatively young (Tertiary: Oligocene to Miocene--about 25-16 million years old) andesitic lava flows and breccias that unconformably overlie an uneven surface that cuts across much older (late Silurian: about 420-410 million years) sandstone and siltstone turbidite beds. The latter were folded, otherwise deformed, and eroded before the flat-lying tertiary volcanic rocks were erupted. "The Knob" on the island is an undated plug of basalt; it is probably the same age or younger than the other volcanic rocks. The Silurian strata are part of a very widespread group of formations that occur throughout the Alexander Archipelago. The tertiary volcanic rocks are part of a narrow belt that extends from north of Glacier Bay proper across much of Southeastern Alaska to the Misty Fiords area on the south.

Pleasant Island includes a wide representation of upland and wetland ecosystems typifying much of the northern interior island province. Muskegs include 20 species of vascular plants and 12 species of mosses and liverworts not found at low elevations in Glacier Bay. Good examples of old-growth mixed western hemlock and Alaska cedar forests occur in the eastern portion of the island. On the western portion of the island the forest primarily occupies steeper slopes along streams. The youngest surfaces, a peripheral zone near shore are covered with Sitka spruce.

Recent and ongoing studies by Daniel Engstrom have focused on the hydrological processes that operate in the complex of old-growth forest and muskeg ecosystems on the island, and an age sequence of lakes on the island. The aquatic ecosystems on Pleasant Island are being used for comparisons with a wide range of aquatic ecosystem age classes in Glacier Bay National Park. Radiocarbon dating suggests some of the bog basins on Pleasant Island may be greater than 14,000 years old. Pollen and peat accumulation in lake sediment and in bogs there provide an important long-term record of large-scale ecosystem changes of significance to the Glacier Bay area as a whole.

Pleasant Island supports significant populations of bald eagle, Sitka black-tailed deer, and Vancouver Canada goose.

The entire island is in Wilderness, and is classified as a recreation place important to tourism and marine recreation. Popular activities include viewing scenery and wildlife, hiking, canoeing, kayaking, beachcombing, camping, picnicking, and hunting. Access to the area is particularly good; Gustavus airport is just a few kilometers north across Icy Passage.

**5. Upper Tenakee
Inlet Hot Springs**

Map # 14
Sitka Ranger District
15,651 acres

This is one of the few remaining pristine hot springs in Southeast Alaska. The hot water flow is concentrated in two main vents and several seeps that emerge through riparian gravel at the foot of a steep hill. The main pool is reported to have a water temperature of 76 degrees C, making it a medium-grade geothermal system. The flow rate of the combined springs is about 90 liters per minute, a moderate to low rate of flow. Sulfur content is distinctly higher (about 220 mg per liter) than at Bailey Bay Hot Springs. A large pool of hot water is generally clear and has several large old logs in it. A late winter visit during a heavy snow year showed that geothermally heated ground covers a large area around the hot springs vents.

No plant collections have been reported from the hot springs but the warm to hot soils and the special chemistry of the water could be expected to produce at least some major range extensions. Uncommon species of the Tongass National Forest that should be searched for include *Scheuchzeria palustris*, *Poa laxiflora*, *Juncus nodosus*, *Geocaulon lividum*, *Stellaria crasifolia*, *Rhododendron camtschaticum*, and *Lycopus uniflorus*. Lush moss communities line the edge of the pool. Tracks around the pool indicate that the hot springs is probably a seasonal wildlife concentration area, especially for deer and songbirds. Red squirrel were observed to be numerous and active unusually early in the year.

The entire mountain south of the hot springs is included in the area in order to encompass the groundwater infiltration and recharge zone affecting the hot springs vents. Lengths of the unnamed river above and below the hot springs discharge zone are included in order to allow studies of the stream before and after mixing with the hot water. The area proposal extends across lowlands, heavily used by wildlife, to the shore of Tenakee Inlet.

One recreation place exists in the area. Primary activities are viewing scenery, fishing, camping and hunting.

6. Swan Cove

Map # 15
Admiralty Island National Monument
24,408 acres

Swan Cove represents old-growth spruce/hemlock forest types of northern Southeast Alaska, and also includes excellent examples of estuary, beach fringe, riparian, subalpine and alpine habitats. Within the area are productive brown bear, bald eagle, river otter and Sitka black-tailed deer habitats.

Swan Cove has three inventoried recreation places. Two of them are important to tourism and marine recreation. Activities include viewing scenery and wildlife, hiking, boating, kayaking, fishing, hunting, camping, and picnicking.

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Other Recommended Potential Candidate Proposals

7. Chaik Bay

Map # 21
Admiralty Island National Monument
8,314 acres

The significance of high-productivity, low-elevation riparian Sitka spruce habitat for a variety of important game and other wildlife species, has become more widely understood in recent years. Chaik Bay is a superlative example of riparian spruce typical of the large islands of the Forest. The river entering Chaik Bay flows through a broad, low elevation floodplain that occupies most of the watershed. The riparian spruce stand at Chaik Bay is one of the most extensive areas of the type on the large islands of Southeast Alaska that has not been entered for commercial timber harvest.

The area contains exceptional brown bear habitat and productive fish habitats. Sitka black-tailed deer and bald eagle make intensive use of the low elevation forests. Beaver activity influences the riparian river bottom habitat. Marten and hairy woodpecker could be expected in the area. However, low elevation forests at Chaik Bay are not affected by the set of mammals that are common on the mainland but absent on Admiralty Island; these mammals include lynx, coyote, black bear, gray wolf, mountain goat, snowshoe hare, northern flying squirrel, and northern red-backed vole.

Other forest types include western and mountain hemlock, and low and high elevation muskegs. The Chaik Bay area includes broad and nearly level alpine benches at the north and south end of the watershed. The uncommon Tongass National Forest plants *Mimulus lewisii*, *Veronica stelleri*, and *Castilleja chrymactics* should be searched for in the alpine meadows.

Chaik Bay has one inventoried recreation place, which is important to tourism and marine recreation. Activities include viewing scenery and wildlife, hiking, beachcombing, fishing, hunting, and camping.

Central Interior Islands

Priority Potential Candidate Proposals

1. Bailey Bay Hot Springs

Map # 38
Ketchikan Ranger District
2,404 acres

In Southeast Alaska nearly all hot springs have been developed for resorts or public recreation. Modification of the springs for these purposes has resulted in the destruction of specially adapted high temperature organisms and delicate or unique rock formations. Bailey Bay Hot Springs are reported to have been tapped to some unknown degree for a resort before 1940, however, the main vents, pools, and seepage slope are reported to be in nearly pristine condition. Bailey Bay Hot Springs has the highest surface temperature of any hot spring in Southeast Alaska, and represents one of the only opportunities to include a medium to high grade (reservoir temperatures above 150 degrees C) geothermal area in an RNA anywhere in Alaska.

At least 10 major seeps and several minor seeps issue from granitic bedrock on a northwest-facing slope above Spring Creek valley; they drain into Lake Shelokum.

Temperatures of the seeps range from 92 degrees C to 71 degrees C. The water at the hottest vent has a pH of 8.9 (alkali).

The freshwater wetland plant *Lycopus uniflorus* has been collected in the area, one of only two known collections in Southeast Alaska. The only collection in Alaska of *Campanula scouleri* was made in the area or at a nearby hot spring. The wetland grass *Poa laxiflora* should be searched for in the area; only two collections are known in Alaska.

Current development in the area of the Bailey Bay Hot Springs includes a CCC constructed 3-sided shelter, and a 2.2 mile trail which extends from Bailey Bay past Lake Shelokum and on to the shelter near the springs. The spring itself has not been developed except for placing rocks and plastic sheeting on occasion to create pools. Current use of the hot springs is low due to the poor condition of the trail. The use of Lake Shelokum, which is stocked with eastern brook trout is also low due to the trail condition.

In 1982, private interests proposed developing the spring into a resort. The resulting Environmental Assessment recommended no action and to maintain the status quo.

The following reports have been compiled by the Forest Service for the Bailey Bay Hot springs area: 1) A Sensitive Plant Survey at the Bailey Bay Hot Springs Lake Shelokum, Southeastern Alaska, by Mary Clay Muller. 2) Geologic Report for Bailey Bay Shelokum Lake Hot Springs Resort Application, by Frederick W. Prange. 3) 1982 Environmental Assessment: Bailey Bay Hot Springs Management, signed 8/13/82 by Forest Supervisor Win Green.

2. Falls Creek Windthrow

Map # 27
Petersburg Ranger District
821 acres

This even-aged stand of spruce and hemlock in a strip going up a hillside apparently followed a catastrophic windthrow event about 200 years ago. The stand has been used for growth and yield research, and could be a valuable resource for future work on forest-soils interactions. This stand is much more productive than most forests of its age, or with its soils (Karta series), presumably due to the effect of windthrow on disturbing the soil, and, thereby, mixing organic and mineral layers. Comparisons with nearby less disturbed soils could be used for future research. The Falls Creek windthrow is currently used as a demonstration area for illustrating maximum levels of productivity in unmanaged second-growth forests. Because high volume second-growth stands have been utilized heavily in the past, they are relatively rare, and present unique research opportunities. Falls Creek is also easily accessible since it is on the Petersburg road system. This road access results in relatively high recreation use in the area and the gathering of forest products.

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3. Kadin Island

Map # 29
Wrangell Ranger District
1,623 acres

This area includes the occurrence of a unique form of high-productivity Sitka spruce/devil's club forest type. High winds moving down the Stikine River canyon pick up silt from the unvegetated glacial river floodplain and deposit it as loess on islands at the river's mouth. The continuing rain of loess onto the upper soil layers provides a supply of unleached, nutrient-rich soil material to the forests of the island. The loess deposition overcomes the process of acid bog formation (paludification) that overtakes most stable sites of moderate topographic relief in the Tongass National Forest. Few areas in the world have a combination of high rainfall and recent loess deposition, so the properties of the soils here are of special interest. Thick loess soils also have a high water-storage capacity, so the hydrology of the island is of interest, too.

The fringe of the island is subject to tidal influence and changes in water level due to shifts of the river. Wetland marsh communities should be included in the area. Plant species uncommon to the Tongass National Forest that should be searched for include the following wetland species: *Glyceria leptostachya* (collected near Wrangell), *Eleocharis kamtschatica*, *Nymphaea tetragona*, *Caltha biflora* (observed in Stikine bottomlands near Kakwan point) and *Lysimachia thyrsoiflora* (collected in Stikine River marshes).

Kadin Island bald eagle nest concentration is second only to parts of Admiralty Island, according to the U. S. Fish and Wildlife Service (personal communication).

Kadin Island is steep-sided and cone shaped in profile.

The Area is inventoried as a recreation place, important to the home range of Wrangell for hunting. However, there is very little use of the Island, and no large increases in use are anticipated. Access to the area is excellent; the city of Wrangell is only about 6 kilometers south of the area.

4. South Etolin Island

Map # 35
Wrangell Ranger District
5,346 acres

South Etolin Island includes an old-growth forest of fire origin, examples of the western hemlock/western red cedar forest type, and communities within the mixed conifer series including mountain hemlock, shore pine, and red- and yellow-cedar muskeg types. Forest fires are exceptionally rare in the Tongass National Forest because of high rainfall and the lack of natural ignition sources. The principal burned area within the proposed area regenerated from a fire that occurred an estimated 300 years ago. Fire scars occur on many trees in the area, indicating that the burning history of the forest here is probably a complex mosaic. The 300 year-old fire probably escaped from native burning of a western red cedar tree or snags. Snag or tree burning was a technique natives used to hollow out logs prior to carving them with stone tools to make sea canoes. Western red cedar was the basis for the northwest Indian culture and most stands near tidewater were heavily used for items such as woven bark, baskets, house planks, poles, paddles, weirs, and canoe logs. Western red cedar is generally restricted in Southeast Alaska to areas south of Sumner Strait.

Wolves occur on Etolin Island and they range into the area. Sitka black-tailed deer populations, as judged by their effects on preferred browse species, are relatively

low in the area. The area offers the opportunity to investigate possible relationships between wolves and deer. South Etolin was the site of a Roosevelt elk introduction in 1987.

The area contains the western hemlock/salal, the mixed conifer/salal, and the mixed conifer/salal/skunk cabbage communities which are restricted to the southern portion of the Tongass National Forest. Upper elevations in the area support the mountain hemlock/Alaska blueberry/cassiope community. Areas of beach and beach fringe communities add habitat diversity to the area.

No systematic plant collections have been made in the area but rare species that should be searched for include *Asplenium trichomanes*, *Glyceria leptostachya*, *Oxycoccus palustris*, *Penstemon serrulatus*, and *Mimulus lewisii*.

One recreation place partially in this area is important for marine recreation. Boating and hunting are the primary activities.

Other Recommended Potential Candidate Proposals

6. Duncan Salt Chuck

Map # 24
Petersburg Ranger District
3,478 acres

A salt chuck is a brackish lagoon usually constricted by a reversing waterfall. Fresh water from a stream or river spills over a rock shelf or obstruction during low tide stages, but during flood tide saltwater or brackish water cascades over the obstruction in the opposite direction. This unusual geological feature is found only along seacoasts with large tidal fluctuations and shorelines that are dynamic and relatively youthful so that they are not yet buried by sediments. Southeast Alaska experiences large tidal amplitudes and is dynamic because of tectonic uplift and subsidence and isostatic rebound.

Duncan Salt Chuck is one of the largest and best known salt chucks in the Tongass National Forest and is set in the Petersburg Creek-Duncan Salt Chuck Wilderness Area. The includes shoreline and associated upland ecosystems surrounding the restricted-circulation bay or salt lagoon in which the reversing falls occurs. Cooperation with the State of Alaska would allow the inclusion of key features below mean higher high tide in a state tidelands reserve.

Extensive muskeg and wetland communities line the level uplifted marine terrace that makes up much of the shoreline of the area. These communities are highly productive for waterfowl and shorebirds, in addition, the area is an important spring black bear feeding area, contains many bald eagle nests, and is important fish-rearing habitat. The area also contains two public recreation cabins and receives "heavy" recreation use. Little detailed inventory information is available on the plants of the area. Uncommon plant species of the Tongass National Forest that should be searched for in the area include *Scheuchzeria palustris*, *Eleocharis kamtschatica*, *Calypso bulbosa*, and *Nymphaea tetragona*.

Duncan Salt Chuck has one inventoried recreation place, which is important to tourism and marine recreation. There is a recreation cabin, and activities include hiking, hunting, fishing, and boat use.

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7. West Duncan Uplift

Map # 26
Petersburg Ranger District
6,495 acres

West Duncan Uplift contains special landforms that illustrate the development of a post-glacial landscape of the major islands of the Tongass National Forest. During the time of deglaciation at the end of the Wisconsinian glacial period (12,000 to 14,000 years ago), because of the depression of the land surface by the weight of glacial ice, what is now Kuprenof Island was a series of rocky islands. As the Wisconsinian glaciers melted, vast quantities of glacial sediment were deposited among the rocky islands now comprising the mountain peaks of Kuprenof Island. Once the weight of glacial ice was removed the compressed earth crust expanded and the land surface rose by a process known as isostatic rebound. The area is made up entirely of level uplifted marine deposits.

The glacio-marine deposits within the area are predominantly silt with sand lenses and clays. Fossils of modern marine shellfish such as cockles and pearly mussels are present. The terrace has been above sea level for about 7,000 or 8,000 years. During that time a stream system incised its meandering path down through the sediment. In the incised stream system there are several features of river morphology including paired terraces, meander scars, and abandoned channels. The streams have little further erosive power because the downcutting channels have reached bedrock obstructions.

The level, low-elevation plains of the area are one of the most extensive wetlands and muskeg surfaces in the Tongass National Forest. Tidal mudflats are important for migrating shorebirds. Little information about vegetation types and plant species is available for the area.

West Duncan Uplift includes five inventoried recreation places; most of them are important for tourism, hunting, and marine recreation. There is one recreation cabin, and Indian Point is an inventoried site of high potential for developed recreation. Other recreation activities in the area include hiking and fishing. The area also contains mining claims.

8. McDonald Lake

Map # 37
Ketchikan Ranger District
10,788 acres

This area would target study of riparian spruce and other upland forested and non-forested habitats. The McDonald Lake area contains sites from near sea level to 3,500 feet (alpine). A full range of volume class stands (hemlock, spruce, and hemlock/spruce) are present. Hydrologic features are diverse.

All five species of pacific salmon are present, plus steelhead, and Dolly Varden char. McDonald Lake has historically supported one of the largest sockeye runs in Southeast Alaska. Recent fisheries enhancement to restore that run has been accomplished by fertilization of the lake. Additional fish enhancements are being considered for the inlet. Because of the enhancement work, the area would not be suitable as an RNA for fish, and the proposed boundary excludes the lake and other areas which have been altered.

An abandoned fish hatchery is located at the Walker Creek inlet to the lake. Second-growth timber stands (about 40 years old) which occurred after logging are near the fish hatchery.

The area includes one inventoried recreation place important for tourism. Yes Bay, at the outlet of the lake, has a resort and heavy recreation use; however, the upper end of the lake and the riparian stands, in particular, are off the beaten path. Recreation activities in the area include boating, hiking, fishing, camping, and hunting.

The boundary proposed for the McDonald Lake RNA excludes the abandoned fish hatchery, second growth, and the most used recreation areas.

Mountain goat, brown bear and wolves also inhabit the area.

**9. Port Camden
Fossil**

Map # 25
Petersburg Ranger District
7,920 acres

Port Camden is a well-known fossil tree and plant locality. Exposures of individual plant remains and numerous logs of early Tertiary species occur in bluffs on either side of the bay. The fossils are estimated to be over 40 million years old. Fossil stumps and logs are present as both silicified and carbonaceous remains. Tuffaceous beds (volcanic ash) that contain carbonized imprints of plants are also present. The best fossil exposures are along the shore where marine erosion removes material in the bluff and concentrates remains in the intertidal zone. Recent road construction in the vicinity carved another exposure through the fossil-bearing layer. Further excavation or accelerated erosion on the uplands may damage paleontological resources.

Several warm temperate forest species have been identified among the fossils, including bald cypress (*Taxodium dubium*), redwood (*Sequoia langsdorfii*), chestnut (*Castanea castaneaefolia*), hazelnut (*Corylus maquarii*), planetree (*Planera ungerii*), and the fern *Osmunda doroschkiana*.

The Port Camden fossil area includes three inventoried recreation places. Of these, one is important for tourism, and the other two are important for marine recreation. Boating, fishing, nature study, and hunting are major recreation activities.

This area contains mining claims.

Southern Outer Islands Geographic Province

Priority Potential Candidate Proposals

1. Klakas Lake

Map # 45
Craig Ranger District
7,162 acres

Klakas Lake includes an area with a high quality riparian spruce study site. The area would encompass the entire lake (a low elevation warm water lake), its inlet (with a species rich wetland meadow) and outlet (with a small estuary located at its outlet). Sockeye salmon are present in the lake; pink and chum salmon are present in its outlet. Riparian spruce forests are present, developed on both colluvial and alluvial materials (spruce/salmonberry plant associations); the inlet contains a wide active flood channel with riparian spruce. Photo interpretation indicates this area would provide a better riparian spruce forest feature than that available at Johnson

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Lake (see Other Recommended Potential Candidate Proposals). Low to high volume hemlock stands are present; cedar may be present in some stands.

Klakas Lake is recognized in inventories as containing four primitive recreation places. Two of these are important to tourism, and one is important for marine recreation. Activities include boating, hiking, fishing, and kayaking.

2. Rio Roberts

Map # 41
Thorne Bay Ranger District
1,560 Acres

This area contains riparian flood plain spruce stands (spruce/devils club plant associations), upland old growth and natural second growth stands, and upland hemlock on drumlin fields (glacial feature). Note that the riparian spruce stands in this area include different plant associations than in the Klakas Lake potential RNA.

In the vicinity, associated with the hiking, camping, boating and fishing of the Thorne River, is a significant amount of recreation use.

3. Mount Calder-Virginia Mountain

Map # 32
Thorne Bay Ranger District
5,131 acres

Mount Calder-Virginia Mountain contains the only known coastal population of subalpine fir, several uncommon plant species that suggest its role as a glacial refugium, and typical southern Tongass National Forest forest communities on Prince of Wales Island. The area has a history of alpine research and would be of continuing value for additional comparative studies.

Several plants noted in the area are reported in Southeast Alaska for the first time. These species are *Androsace chamaejasme*, *Arctostaphylos alpina*, *Arnica diversifolia*, *Draba lactea*, *Draba lonchocarpa*, *Senecio lugens*, and *Woodsia glabella*. A plant identified as *Antennaria umbrinella* is reported from the area, which would be an addition to the flora of the state. However, it is known to intergrade with *A. rosea* (common in northern Alaska but only one collection in Southeast Alaska). Several plants reported on Mount Calder-Virginia Mountain are significant southward range extensions over previously known distributions in Alaska. These species include *Anemone parviflora*, *Cerastium beeringianum*, *Dryas drummondii*, *Erigeron humilis*, *Oxytropis campestris*, *Poa alpina*, *Poa arctica*, *Salix reticulata*, *Saxifraga oppositifolia*, *Silene acaulis*, *Thalictrum alpinum*, and *Tofieldia coccinea*. Most of these species are characteristic of arctic and subarctic alpine sites in interior Alaska and the high elevations of northernmost Southeast Alaska. Collectively they suggest the area may have been a glacial refugium with remnants of an ice age flora characteristic of a climate colder than that of contemporary Prince of Wales Island. Additional taxonomic work on the flora of the area is needed.

The subalpine fir community is made up of relatively small trees in a stand that extends to treeline and includes several wind-trained, prostrate or krumholz-form trees. The stand is located on the summit and northeast-facing slopes of the Virginia Mountain ridge system down to an elevation of about 300 meters (1000 ft). The summit of Virginia Mountain and the north-facing slope of Mount Calder contain well-formed cirque basins. The south-facing slope of Mount Calder rises directly up from tidewater and contains enough rough broken ground on the summit that it may have been a nunatak during much of the Wisconsinian glacial period.

Important forest types in the area are mountain hemlock, Alaska yellow-cedar, and western hemlock series. Limestone bedrock underlies some of the area, and karst features should be looked for in the area.

The Mount Calder-Virginia Mountain area is an important part of the Primary Sale Area for the Ketchikan Pulp Corporation long-term timber sale and has been partially roaded and logged. It contains several approved units for the 1989-1994 operating period.

4. Sarkar Lakes

Map # 34
Thorne Bay Ranger District
8,682 acres

Sockeye runs are known from only about 60 of the 3,000 streams in Southeast Alaska that support anadromous fisheries. Sarkar Lakes is one of the systems that supports a significant run of sockeye salmon. The availability of lake habitat for a juvenile rearing stage is an important factor in high-productivity sockeye fisheries. The sockeye run at Sarkar Lakes is important for commercial and sport harvest and is monitored at a weir by the Alaska Department of Fish and Game for the US-Canada salmon treaty. The Sarkar Lakes system has high population of coho salmon, cutthroat, and dolly varden. Pink salmon also occur here.

The watershed of Sarkar Lakes is on limestone bedrock that contributes to the high productivity of the aquatic ecosystem, especially high densities of juvenile salmon. Unlike the many valley moraine lakes in the mountains of Southeast Alaska, these lakes are representative of low-elevation gently rolling glaciated terrain. Warmer water temperatures in this low elevation watershed may also contribute to high aquatic productivity. Studies at Sarkar Lakes have shown that juvenile sockeye grow faster, get bigger, and go to sea earlier than in many other lakes and streams where they occur in Southeast Alaska.

This area is an overwintering area for the trumpeter swan, and has even-aged stands of trees.

The Sarkar Lakes area is the only legislated LUD II area within the roaded portion of Prince of Wales Island. It has historically been a high use recreation area and may be accessed by road and boat, float plane or walk-in. Presently, both developed and dispersed recreation use is occurring. Developed recreation includes a parking area, boat ramp and Forest Service recreational cabin. Many recreationists use the developed sites for fishing, hunting, trapping, hiking, canoeing, kayaking, skiffing, sight seeing, wildlife viewing, access to salt water and solitude. In addition, Sarkar contains significant cultural resource sites, some of which are nominated for inclusion to the National Register of Historic Places. Subsistence use of sockeye salmon is also very popular and prevalent within the area; over 60 dip net permits were issued in 1990.

According to the 1990 Database report for yearly cabin usage, Sarkar Lake Cabin received 526 visitor days and 263 person days. This use figure puts Sarkar Lake Cabin in priority position number seven, out of 14 Thorne Bay cabins. These figures reflect a relatively high use at Sarkar Lake cabin as compared with the entire Ketchikan Area. Visitor use during peak summer months is high as witnessed by the number of cars observed in the Sarkar Lake parking area which is rarely empty.

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5. Thunder Mountain

Map # 43
Craig Ranger District
5,189 acres

The Thunder Mountain area includes a possible glacial refugium, alpine plants uncommon in the Tongass National Forest, outer coastal forest types of the southern Tongass National Forest, potential habitat for the marbled murrelet, a karst landform, even-aged 150-200 year old productive stands on limestone, a sockeye stream and lake, very diverse wildlife, and possibly subalpine fir.

Three plant species (*Salix reticulata*, *Thalictrum alpinum*, and *Tofieldia pulsilla*) collected at about the 950 m (3110 ft) elevation on Thunder Mountain represent significant range extensions. The subalpine meadow plant community types found on Thunder Mountain are markedly different than the common types of southern Southeast Alaska. The soil parent material over much of the area is marble, which is often associated with noteworthy plant communities, rare or uncommon plant occurrences, and high-productivity forest types.

Thunder Mountain rises directly from the outer coast of the open North Pacific, and has no high elevation snow-gathering areas behind it toward the mainland. The topography of the mountain is very steep, rough, and broken, not rounded and polished as much of mountainous Southeast Alaska is. The location and physiography of the area suggest that it may have been an ice-free nunatak during at least portions of the Wisconsinian glacial period.

Thunder Mountain appears to contain suitable nesting habitat for the marbled murrelet. The marbled murrelet is a seabird which feeds on the open ocean and nests in old-growth forest trees. The Threatened, Endangered and Sensitive Species section of the AMS contains more information on the marbled murrelet.

Manhattan Lake is included within the area. This lake system contains a natural run of sockeye salmon and has been untouched by habitat manipulation or enhancement. Maintaining the lake and streams in a natural state, to provide baseline information for comparison with the numerous other lakes and streams which have been manipulated or enhanced, would be valuable.

This area is bordered by Native Corporation land on the south and east. The State proposes selection of community sites across Hook Arm from the area. Rough seas could present access problems; access across Native lands through a cooperative agreement may be a possibility. The area is subject to rapid changes in weather as storms from the open North Pacific Ocean quickly develop and move onshore.

One recreation place important for marine-oriented recreation is included in the area; viewing scenery, hiking and camping occur.

6. El Capitan

Map # 33
Thorne Bay Ranger District
2,560 acres (approximate: precise boundaries not delineated yet)

El Capitan includes sink holes, deep solution caverns, old growth associated with limestone, unique plant species and associations associated with limestone soils, and emergent cold springs. It contains the deepest sink hole measured in North America.

Other Recommended Potential Candidate Proposals

7. Hunter Bay- Biscuit Lagoon

Map # 46
Craig Ranger District
5,243 acres

This area contains a freshwater lake and brackish lagoon environments. Western hemlock, Sitka spruce, mixed hemlock/spruce, and western red cedar forest types are present; even-aged second-growth conifer stands occur in the area as the result of blowdown and landslides.

This area contains habitats for a variety of wildlife species, including: bald eagles, Sitka black-tailed deer, marten, gray wolf, black bear, numerous waterfowl species, river otter, spruce grouse, Prince of Wales flying squirrel, and Prince of Wales ermine. There is a good possibility that trumpeter swans may over-winter in this area, but this has not been documented. Sockeye, pink and chum salmon are present in the area. According to the Natives in the area there is good fishing.

Inventories show no concentrated recreation use in the area.

8. South Sumez- Angel Falls

Map # 42
Craig Ranger District
Acreage unknown since boundaries have not been delineated

This area may include a rare lily near Angel Falls; field searches by qualified botanists would be required to verify its presence. Recent volcanics provides a possible unique geologic feature. There may be opportunity to encompass a full range of forest types from riparian spruce to productive upland forest to muskeg.

9. Disappearance Creek

Map # 44
Craig Ranger District
741 acres

Disappearance Creek watershed is a steep north-south drainage. One entire side of the drainage is a landslide which buried the stream, and this side of the drainage currently has no trees. The lowermost segment of the valley is reported to contain an above-ground, spring-fed stream with high fisheries productivity. This area was originally proposed to represent plant associations and stream characteristics associated with typical limestone or karst regions of the Forest. The drainage does not contain the limestone/karst features which were originally sought after.

10. Johnson Lake

Map # 47
Craig Ranger District
2,641 acres

Johnson Lake contains a good, but small, riparian spruce stand, high fisheries values, at least two plants uncommon to the southerly portion of the Tongass National Forest, and good examples of typical southern Southeast Alaska forest types. Floodplain Sitka spruce are very large, reaching diameters of 280 cm (110 inches); most dominant trees are 64 to 67 meters (210 to 220 feet) tall, making the stand where the trees are located one of the most superlative remaining spruce stands in Southeast Alaska.

Physocarpus capitatus is reported along freshwater stream margins in the area. *Spiraea douglasii* is reported along the lake shore. As the southernmost of the

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various new potential RNA's for the Tongass National Forest, Johnson Lake could have the potential to contain several range-limited plants and animals. Some of the most significant potential plants are *Asplenium trichomanes*, *Poa laxiflora*, *Juncus nodosus*, *Platanthera gracilis*, *Viola sempervirens*, *Monotropa uniflora*, and *Stachys emersonii*.

The area includes two recreation places, both of which are important for tourism. Activities also occurring are marine recreation, hiking and fishing.

Potential Research Natural Areas

The areas are numbered from north to south. The previous descriptions and Table of Contents include the map number for each area.

