USDA Forest Service, Alaska Region
DESIGNATION ORDER
for the
Olsen Bay Creek Research Natural Area
on the
Chugach National Forest
Cordova Ranger District, Alaska

Background:
In September 2000, the Forest Supervisor recommended establishment of four new Research Natural Areas (RNAs) in his Preferred Alternative for the Revised Land and Resource Management Plan of the Chugach National Forest. The Record of Decision for the Revised Forest Plan, [which I] signed in May 2002, documented the decision to follow the Forest Supervisor's recommendation to designate four Research Natural Areas on the Forest.

Among these is the Olsen Bay Creek RNA northwest of Cordova, Alaska. That decision was the result of an analysis of the factors listed in 36 CFR 219.25 and Forest Service Manual 4063.41. Results of that analysis are documented in the Revised Land and Resource Management Plan for the Chugach National Forest, the Final Environmental Impact Statement for the Chugach National Forest Land Management Plan Revision, and the Establishment Record for the Olsen Bay Creek RNA. All of these documents are available to the public from the Chugach National Forest, 3301 "C" Street, Suite 300, Anchorage, AK 99503-3998. The Forest Plan documents are also available on the internet at: http://www.fs.fed.us/r10/chugach/forest_plan/plan_docs1.html

Designation:
Accordingly, by virtue of the authority delegated to me by the Chief of the Forest Service in Forest Service Manual 4063, and under regulations at 7 CFR 2.42, 36 CFR 251.23, and 36 CFR Part 219, I hereby establish the Olsen Bay Creek Research Natural Area. It shall be comprised of 6,847 acres (2,771 hectares) of land on the Cordova Ranger District of the Chugach National Forest, Alaska. The Olsen Bay Creek RNA shall include part or all of T12S R5W Sections 27, 28, 29, 30, 31, 32, 33, 34; T12S R6W Sections 25, 36; T13S R5W Sections 3, 4, 5, 6, 7, 8, 9; and T13S R6W Section 1, 12 on the U.S. Geological Survey 1:63,360 scale topographic map for the Cordova D-6 quadrangle, Alaska, as described in the section of the Establishment Record entitled "Legal Description."

This is an administrative step to implement the decision to designate this area as RNA as discussed in the Record of Decision for the Revised Land and Resource Management Plan.

The Olsen Bay Creek RNA will be managed in compliance with all relevant laws, regulations, and Forest Service Manual direction regarding RNA's, and in accordance with the management direction identified in the Revised Forest Plan.

Designated by /s/ Paul K. Brewster 9/14/07
for DENNIS E. BSCHOR Date
Regional Forester, Alaska Region

Concurrence of /s/ Bov B. Eav 9/7/07
DR. BOV B. EAV Date
Station Director, Pacific NW Research Station

SIGNATURE PAGE
for

RESEARCH NATURAL AREA ESTABLISHMENT RECORD

Olsen Bay Creek Research Natural Area

Chugach National Forest

Alaska

The undersigned certify that all applicable land management planning and environmental analysis requirements have been met and that boundaries are clearly identified in accordance with FSM 4063.21, Mapping and Recordation and FSM 4063.41, Establishment Record Content, in arriving at this recommendation.

Prepared by /s/ Robert L. DeVelice Date 8/15/07
Robert L. DeVelice, Forest Ecologist, Chugach National Forest

Prepared by /s/ Cara A. Staab Date 8/15/07
Cara A. Staab, Wildlife Biologist, Chugach National Forest

Recommended by /s/ Daniel W. Logan Date 8/21/07
Daniel W. Logan, District Ranger, Cordova District

Recommended by /s/ Joe L. Meade Date 8/28/07
Joe L. Meade, Forest Supervisor, Chugach National Forest

Concurrence of /s/ Bov B. Eav Date 9/7/07
Dr. Bov B. Eav, Station Director, Pacific Northwest Station

Establishment Record for the

Olsen Bay Creek
Research Natural Area within the

Chugach National Forest, Alaska

August 15, 2007

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IDENTIFICATION

Location Map

Olsen Bay Creek RNA is located adjacent to Prince William Sound in southcentral Alaska, on the Cordova Ranger District of the Chugach National Forest (Figures 1 and 2). The RNA is approximately 20 miles (32 kilometers) northwest of Cordova and 25 miles (40 kilometers) south-southeast of Valdez. No roads or established trails exist on the RNA or to its boundary. The closest roads are in the vicinity of the cities of Cordova and Valdez. The most common access to the RNA is by boat or aircraft (floatplane or helicopter). Further access details are described in the "Access" section of this Establishment Record.

Boundary Map[1]

The location of Olsen Bay Creek RNA within the public land survey system (PLSS) is shown in Figure 3.

Legal Description[1]

An area within the Chugach National Forest, at the head of Olsen Bay in Port Gravina, Prince William Sound, Alaska, comprising portions of T. 12-13 S., R. 5-6 W., Copper River Meridian as shown on the attached map (Figure 3) entitled "Olsen Bay Creek RNA", said map being made herewith a part of this description, and said area being more particularly bounded and described as follows:

Beginning at Corner 6 of United States Survey 10239 in Section 7, T. 13 S., R. 5 W., CRM (position approximately 60º 45' 28.11"N, 146º 10' 44.70" W), said corner being a 3 ¼" diam. Bureau of Land Management brass cap and said cap being the true point of beginning and designated 'A' on the referenced map; thence north approx. 1,270 ft. to the intersection of the East-West section line common to the N1/2, N1/2, NW1/4 and the S1/2, N1/2, NW1/4 in Section 7, T. 13 S., R. 5 W., CRM and designated 'B' on the referenced map; thence east approx. 860 ft. along the aforesaid East-West section line in Section 7, T. 13 S., R.5 W., CRM to the east bank of the West Fork of Olsen Bay Creek and designated 'C' on the referenced map; thence southerly along the east bank of the West Fork of Olsen Bay Creek approx. 260 ft. through Section 7, T. 13 S., R. 5 W., CRM to the mean high tide line in Olsen Bay; thence southeasterly along the mean high tide line in Olsen Bay approx. 2,640 ft. through Section 7, T. 13 S., R .5 W., CRM to the intersection of the North-South section line common to the SW ¼ and the SE ¼ in Section 7, T. 13 S., R. 5 W., CRM and designated 'D' on the referenced map; thence S 72º E, approx. 4,250 ft to the crest of a ridge, said ridge being the watershed divide between Port Gravina watershed and Olsen Bay Creek watershed in Section 8, T. 13 S., R. 5 W., CRM and designated 'E' on the referenced map; thence northeasterly and northerly along the aforesaid watershed divide between Port Gravina watershed and Olsen Bay Creek watershed through Sections 8, 9, 4 and 3, T. 13 S., R. 5 W., CRM and Sections 34 and 27, T. 12 S., R. 5 W., CRM. to the highest peak in Section 27 (Elevation = 3,715 ft.), said peak forming the divide between Port Gravina, Olsen Bay Creek and Whalen Bay watersheds and designated 'F' on the referenced map; thence

[1] Prepared by Randy D. Schrank, Professional Land Surveyor, Chugach NF, Anchorage, AK.

northwesterly, southwesterly and northwesterly along the watershed divide between Olsen Bay Creek watershed and Whalen Bay watershed through Sections 27, 28, 29 and 30, T.12 S., R. 5 W., CRM and northwesterly, southwesterly and southerly along the aforesaid watershed divide through Sections 25 and 36, T. 12 S., R. 6 W., CRM to the highest peak in Section 36 (Elevation = 3,720 ft.), said peak forming the divide between Whalen Bay, Olsen Bay Creek and Control Creek watersheds and designated 'G' on the referenced map; thence southeasterly and southerly along the watershed divide between Olsen Bay Creek watershed and Control Creek watershed through Section 36, T. 12 S., R. 6 W., CRM and Sections 1 and 12, T. 13 S., R.6 W., CRM to a peak in Section 12, said peak designated 'H' on the referenced map; thence S 57º E approx. 3,610 ft. to a point on the mean high tide line in Olsen Bay, said point intersecting the North-South section line common to Section 12 , T. 13 S., R. 6 W., CRM and Section 7, T. 13 S., R. 5 W., CRM and designated 'I' on the referenced map; thence northeasterly along the mean high tide line in Olsen Bay approx. 1,990 ft. through Section 7, T. 13 S., R. 5 W., CRM, to a 3 ¼" diam. Bureau of Land Management brass cap, said cap being Corner 6 of United States Survey 10239 and the Point of Beginning and said point of Beginning designated 'A' on the referenced map.

The area of this RNA comprises approximately 6,850 acres.

Informational distances, geographic position and references to PLSS locations herein above were obtained by measurements and observations of the above referenced map being a portion of the US Forest Service 1994 Single Edition Quadrangle Cordova (D-6), Alaska Map at a scale of 1:63,360 in original. Reference Datum is NAD-83.

End of Description

INTRODUCTION

The Olsen Bay Creek Research Natural Area (RNA) is located on the Cordova Ranger District of the Chugach National Forest. It occurs in the Port Gravina area in the eastern portion of Prince William Sound in southcentral Alaska (Figures 1, 2, and 3; Photo 1). The RNA supports a diversity of vegetation types representative of the Sound's mountainous coastal range. All of the lands in the RNA are under federal ownership and total 6,847 acres (2,771 hectares). None of the RNA is designated wilderness or wild/scenic river. Primary human uses of the area have been for fisheries research and bear hunting.

JUSTIFICATION

Justification Statement

Olsen Bay and adjacent land area has hosted extensive research on various natural resources. Research topics have included anadromous fisheries (Helle 1966), black bears (Frame 1974), sea otters, glaucous-winged gulls (Moyle 1966), and aquatic invertebrates. Much of this research has occurred within or immediately adjacent to the Olsen Bay Creek RNA. Datasets span more than 50 years and reflect efforts of multiple agencies, universities, and other research organizations. The area provides invaluable baseline and reference materials to which datasets in future time and similar places can be compared. This clearly meets one of the primary purposes for establishing RNA's: to form a long-term national network of ecological reserves designated for non-manipulative research efforts.

Principle Distinguishing Features

The Olsen Bay Creek RNA is located at the head of Olsen Bay in Port Gravina, Prince William Sound. The boundary encompasses most of the Olsen Bay Creek watershed, connecting shoreline to ridgetops on both sides of the bay. The interior basin is mostly forested, and is rimmed by a combination of mountain peaks and rocky ridgelines. The mountaintops are snow covered much of the year. The West and East Forks of Olsen Bay Creek drain most of the area (Photos 2, 3, and 4). The streams flow freely without convergence to the tidal area of Olsen Bay.

More detailed physical and biological information is found in the "Ecological Evaluation" section of this establishment record.

Objectives

The objectives of Olsen Bay Creek RNA are to:

1. Provide a reference area for the study of both short- and long-term ecological change, particularly as it relates to anadromous fish ecology and life history.
2. Provide a reference area for determining the effects of resource management activities and experimental research techniques applied to similar ecosystems outside the RNA.
3. Maintain and conserve, in a natural state, the wide diversity of vegetation types and landforms present.

LAND MANAGEMENT PLANNING

In 2002, the Olsen Bay Creek area was designated as RNA in the Record of Decision for the Revised Forest Plan (USDA Forest Service 2002a). That selection was the result of analyses documented in the Revised Forest Plan (USDA Forest Service 2002b) and the Final Environmental Impact Statement for the Plan (USDA Forest Service 2002c). No major issues or conflicts specific to Olsen Bay Creek were identified during the public review and comment period for the draft plan.

MANAGEMENT PRESCRIPTION

The Forest Plan (USDA Forest Service 2002b) prescription for Research Natural Areas is included in the Appendix of this establishment record. RNA management emphasizes non-manipulative research, monitoring, education, and the maintenance of natural diversity. Natural ecological processes dominate, largely undisturbed by human activity. Management for recreation uses, habitat improvement or restoration, and resource development are not emphasized. Recreation uses that interfere with the purpose of the RNA will be restricted. Any proposed action within the RNA must be coordinated with USDA Forest Service Pacific Northwest Research Station.

No measures for control of native insects or diseases will be undertaken unless forests on adjacent lands are threatened. If non-native (exotic) invasive plants or animals are found in the RNA control measures will be exercised to eradicate them, when practical.

USE OR CONTROL OF FIRE AND GRAZING

No prescribed fires are planned, but may be used as necessary to accomplish RNA objectives. Since the natural fire return interval of the area likely exceeds 1,000 years[2], it is unlikely that prescribed burning would be necessary to maintain the fire return cycle.

Most of the forested portion of the RNA is mapped within the full fire suppression protection level[3]. The suppression objective of this protection level is to control the fire at the smallest acreage reasonably possible. In the highly unlikely event that a fire was to occur within the RNA, the fire control methods used would be those causing the least disturbance.

No grazing by domestic livestock is planned, nor is there an existing or anticipated need for such grazing to maintain or restore ecological conditions.

[2] http://www.frcc.gov/docs/PNVG/Alaska/Coastal_Forests_CSLF.pdf
[3] http://www.dnr.state.ak.us/forestry/fire/fireplans.htm

ECOLOGICAL EVALUATION

Physical Site Description and Climatic Conditions

Location

Olsen Bay Creek RNA is within the Cordova Ranger District of the Chugach National Forest. The center of RNA is approximately at 60° 46 minutes north and 146° 9 minutes west (Figures 1, 2, and 3).

Size

Olsen Bay Creek RNA is 6,847 acres (2,771 hectares) in size.

Elevation

Elevation within Olsen Bay Creek RNA range from sea level to approximately 3,700 feet (1,128 meters).

Access

Access to the Olsen Bay Creek RNA is by boat, aircraft, or foot. The most common method involves boat travel into Olsen Bay and subsequent foot entry from there into the RNA. A Forest Service administered cabin exists approximately 0.25 mile (0.4 kilometers) southwest of the RNA boundary (shown as a small black square in Figure 3). The cabin site provides a safe landing area for skiffs or floatplanes from which foot access can then be obtained. The cabin is normally locked and is not open to public use. The key is retained by the Cordova District Ranger and may be available for legitimate research and administrative uses.

The RNA can also be accessed by floatplane or helicopter. No landing strip or pad exists. Aircraft operations on the Chugach National Forest are regularly restricted by storms, heavy precipitation, high winds, and limited visibility due to low clouds and fog. During colder months, supercooled water droplets in the atmosphere can cause dangerous wing icing conditions, and the short days of this high latitude location restrict daytime activities. Visitors arriving by boat or aircraft cannot plan on adhering to a schedule and must be prepared to arrive or depart as circumstances dictate.

Climatic Data

The climate station with conditions most similar to Olsen Bay Creek RNA is approximately 50 miles (80 kilometers) northwest at Cannery Creek at approximately 60° 01 minutes north and 147° 31 minutes west. Both locations are within the maritime influence of Prince William Sound, which is characterized by abundant precipitation, relatively warm winters and cool, cloudy summers. The Cannery Creek station is 86 feet (26 meters) above sea level. Records from this station (Table 1) are likely representative of the lower elevations of the RNA. Mean temperature and precipitation isohyte maps presented by Blanchet (1983) suggest that, depending on elevation, mean annual temperature varies from 32

Table 1 – Climate records for Cannery Creek, Alaska[4].

	Mean Temperature		Record High Temperature		Mean Precipitation	
	°F	°C	°F	°C	inches	cm
January	22.5	-5.3	47	8.3	9.74	24.74
February	25	-3.9	50	10.0	8.27	21.01
March	29.5	-1.4	58	14.4	7.08	17.98
April	36	2.2	65	18.3	6.72	17.07
May	42.9	6.1	80	26.7	6.95	17.65
June	50.8	10.4	87	30.6	5.89	14.96
July	54.8	12.7	89	31.7	6.93	17.60
August	53.8	12.1	85	29.4	12.7	32.26
September	47.3	8.5	73	22.8	16.37	41.58
October	37.8	3.2	60	15.6	13.33	33.86
November	28.3	-2.1	53	11.7	9.04	22.96
December	24.3	-4.3	50	10.0	11.97	30.40
Mean Annual	37.8	3.2			114.99	292.07
Mean May-September	49.9	10.0			48.8	124.05
Mean October-April	29.1	-1.6			66.2	168.02
Maximum			80	26.7		
date			07/10/93			
Minimum			-18	-27.8		
date			12/12/80			

[4] Data obtained from the Alaska Climate Research Center (http://climate.gi.alaska.edu/). Mean temperature and mean precipitation records are from the 1979 through 2000 period. Record high temperature, maximum, and minimum records are from the period 1979 through 2004.

to 40°F (0 to 4.4° C) and mean annual precipitation from 100 to 120 inches (255 to 305 centimeters) within the RNA.

Ecological Description

Eco-region

Within the ECOMAP (1993) hierarchy, the entire Olsen Bay Creek RNA occurs within the Humid Temperate Domain, Marine Division, Pacific Gulf Coastal Forest – Meadow Province, Northern Gulf Fjordlands Section, Prince William Sound Mainland Subsection (Bailey 1995; Davidson 1996)[5].

Landtype association and landtype (ECOMAP 1993; Davidson 1998) mapping of the area identifies the following three associations and associated landtypes in the RNA (see Table 2 and Figure 4):

10 Mountain Summits

This association covers about 46 percent of the RNA and includes mountaintops, ridges, and upper rocky portions of the watershed. Extreme climatic influences have resulted in the weathering and fracturing of bedrock by frost action. Rock outcrops and coarse textured soil dominate the surface.

30 Mountain Sideslopes

This association covers about 40 percent of the RNA and forms the generally steep forested slopes of the basin. The dominant physical process is transport of water downslope. Soil and rock material is also transported from erosion and mass wasting. Avalanches and landslides are common within this association.

90 Hills

Covering less than 14 percent of the RNA, this association is of low to moderate relief. The dominant physical process is erosion and sediment transport by water. Low areas collect runoff due to lack of out flow.

Plant Community Types

Landcover types of the Olsen Bay Creek RNA are shown in Figure 5 as mapped by Markon and Williams (1996) using the Alaska Vegetation Classification (Viereck et al. 1992). Table 3 summarizes the acreage for these types and a cross-walk to the National Vegetation Classification System (Federal Geographic Data Committee 1997). Vegetation types (DeVelice et al. 1999) observed or expected in the RNA are listed in Table 4[6].

[5] Based on data from the "Ecosections and Sub-Sections" data theme of the Chugach National Forest GIS.

[6] 40 vegetation plots were sampled to document vegetation compositional variation. The data for these plots are on file with the Forest Ecologist, Chugach National Forest, Anchorage, Alaska.

Table 2 – Landtype associations and landtypes of Olsen Bay Creek RNA[7].

Landtype Association	Landtype	Acres	Hectares	Percent
10	MTRUG	3176	1285	46.4
	LTA 10 Total	**3176**	**1285**	**46.4**
30	FSND	68	27	1.0
30	MSDI	959	388	14.0
30	MSND	1714	694	25.0
	LTA 30 Total	**2741**	**1109**	**40.0**
90	FLPL	24	10	0.4
90	FSND	108	44	1.6
90	HIHR	672	272	9.8
90	HILR	126	51	1.8
	LTA 90 Total	**930**	**377**	**13.6**
	GRAND TOTAL	**6847**	**2771**	**100**

[7] Data from the "Landsystem Types" data theme of the Chugach National Forest GIS. Landtype Association 10 = mountain summits; 30 = mountain sideslopes; and 90 = hills. Landtype FLPL = flood plains; FSND = foot slopes – non disturbed; HIHR = hills - high relief; HILR = hills - low relief; MSDI = mountain sideslopes - disturbed; MSND = mountain sideslopes - non disturbed; MTRUG = mountains – rugged (glacier landtypes in the GIS data were merged into MTRUG since glaciers are not present in the RNA).

Table 3 – Landcover classes of Olsen Bay Creek RNA[8].

Value	Landcover Class	NVCS[9]	Acres	Hectares	Percent	Subtotal Percents
1	Closed Needleleaf Forest	I.A.8.N.c	2796	1132	41	
2	Open Needleleaf Forest	II.A.4.N.b	3	1	0	forest
4	Closed Broadleaf Forest[10]	I.B.2.N.c	945	383	14	55
13	Closed Tall Shrub	III.B.2.N.b	1191	482	17	
14	Open Tall Shrub	III.B.2.N.b	302	122	4	
15	Closed Low Shrub	III.A, III.B.2	97	39	1	shrub
16	Open Low Shrub	III.A; III.B.2	442	179	6	30
17	Dry/Mesic Graminoid/Forb	V.A.5.N; V.B.2.N	498	202	7	herbaceous
19	Wet Graminoid/Forb	V.A.5.N; V.B.2.N	2	1	0	7
28	Clear Water	non-veg.	2	1	0	
29	Turbid Water	non-veg.	8	3	0	
33	Bedrock or Unconsolidated	non-veg.	184	74	3	
35	Sand/Mud	non-veg.	4	2	0	
36	Ice/Snow/Clouds	non-veg.	335	135	5	
38	Shadow	N/A	17	7	0	other
39	Sparsely Vegetated	VII	18	7	0	8
	GRAND TOTAL		**6847**	**2771**	**100**	**100**

[8] Data from the "Land Cover Classification" data theme of the Chugach National Forest GIS.
[9] National Vegetation Classification equivalent (Federal Geographic Data Committee 1997).
[10] Since broadleaf trees have not been observed within the RNA (Table 5), this class is likely misclassified and is actually "closed tall scrub".

Table 4 – Major vegetation types (DeVelice et al. 1999) observed in Olsen Bay Creek RNA during field surveys or expected in the area based on the habitat characteristics present.

Vegetation Type	Obs.	Exp.
Needleleaf Forest Types		
Sitka Spruce Cover Type		
Picea sitchensis/Alnus crispa ssp. *sinuata*		√
Picea sitchensis/Alnus crispa ssp. *sinuata-Echinopanax horridum*		√
Picea sitchensis/Echinopanax horridum		√
Picea sitchensis/Lysichiton americanus		√
Picea sitchensis/Rubus spectabilis-Echinopanax horridum	√	
Picea sitchensis/Vaccinium ovalifolium		√
Picea sitchensis/Vaccinium ovalifolium-Echinopanax horridum		√
Picea sitchensis/Vaccinium ovalifolium/Dryopteris dilatata		√
Western Hemlock Cover Type		
Tsuga heterophylla/Vaccinium ovalifolium	√	
Tsuga heterophylla/Vaccinium ovalifolium-Echinopanax horridum		√
Tsuga heterophylla/Vaccinium ovalifolium/Dryopteris dilatata	√	
Tsuga heterophylla/Vaccinium ovalifolium/Lysichiton americanus		√
Western Hemlock-Sitka Spruce Cover Type		
Tsuga heterophylla-Picea sitchensis/Echinopanax horridum		√
Tsuga heterophylla-Picea sitchensis/Rubus spectabilis-Echinopanax horridum	√	
Tsuga heterophylla-Picea sitchensis/Vaccinium ovalifolium	√	
Tsuga heterophylla-Picea sitchensis/Vaccinium ovalifolium-Echinopanax horridum		√
Tsuga heterophylla-Picea sitchensis/Vaccinium ovalifolium/Lysichiton americanus		√
Mountain Hemlock Cover Type		
Tsuga mertensiana/Alnus crispa ssp. *sinuata*		√
Tsuga mertensiana/Cassiope stelleriana		√
Tsuga mertensiana/Dryopteris dilatata		√
Tsuga mertensiana/Echinopanax horridum		√
Tsuga mertensiana/Phyllodoce aleutica		√
Tsuga mertensiana/Vaccinium ovalifolium	√	
Tsuga mertensiana/Vaccinium ovalifolium-Cassiope stelleriana	√	
Tsuga mertensiana/Vaccinium ovalifolium-Cladothamnus pyroliflorus		√
Tsuga mertensiana/Vaccinium ovalifolium-Echinopanax horridum		√
Tsuga mertensiana/Vaccinium ovalifolium/Calamagrostis nutkaensis		√

Table 4 – (continued)

Vegetation Type	Obs.	Exp.
Tsuga mertensiana/Vaccinium ovalifolium/Fauria crista-galli	√	
Tsuga mertensiana/Vaccinium uliginosum		√
Mountain Hemlock-Sitka Spruce Cover Type		
Tsuga mertensiana-Picea sitchensis/Echinopanax horridum		√
Tsuga mertensiana-Picea sitchensis/Vaccinium ovalifolium		√
Tsuga mertensiana-Picea sitchensis/Vaccinium ovalifolium-Echinopanax horridum		√
Tsuga mertensiana-Picea sitchensis/Vaccinium ovalifolium-Rubus spectabilis		√
Tsuga mertensiana-Picea sitchensis/Vaccinium ovalifolium/Dryopteris dilatata		√
Tsuga mertensiana-Picea sitchensis/Vaccinium ovalifolium/Lysichiton americanus		√
Mountain Hemlock-Western Hemlock Cover Type		
Tsuga mertensiana-T. heterophylla/Vaccinium ovalifolium		√
Tsuga mertensiana-T. heterophylla/Vaccinium ovalifolium-Cassiope stelleriana		√
Tsuga mertensiana-T. heterophylla/Vaccinium ovalifolium-Cladothamnus pyroliflorus		√
Tsuga mertensiana-T. heterophylla/Vaccinium ovalifolium-Echinopanax horridum		√
Tsuga mertensiana-T. heterophylla/Vaccinium ovalifolium/Calamagrostis nutkaensis		√
Tsuga mertensiana-T. heterophylla/Vaccinium ovalifolium/Fauria crista-galli		√
Tsuga mertensiana-T. heterophylla/Vaccinium ovalifolium/Lysichiton americanus	√	
Tall Shrub Types		
Alnus crispa ssp. *sinuata/Calamagrostis canadensis*		√
Alnus crispa ssp. *sinuata-Rubus spectabilis*	√	
Alnus crispa ssp. *sinuata-Rubus spectabilis/Athyrium filix-femina*	√	
Alnus crispa ssp. *sinuata-Salix sitchensis*		√
Alnus crispa ssp. *sinuata-Salix sitchensis/Calamagrostis canadensis*		√
Salix sitchensis	√	
Low Shrub Types		
Cladothamnus pyroliflorus		√
Rubus spectabilis		√
Rubus spectabilis/Athyrium filix-femina	√	
Rubus spectabilis/Calamagrostis canadensis		√
Dwarf Shrub Types		
Cassiope stelleriana-Luetkea pectinata		√
Cassiope stelleriana-Luetkea pectinata/Fauria crista-galli		√

Table 4 – (continued)

Vegetation Type	Obs.	Exp.
Empetrum nigrum-Vaccinium uliginosum	√	
Empetrum nigrum-Vaccinium uliginosum-Carex pluriflora		√
Empetrum nigrum-Vaccinium uliginosum/Fauria crista-galli		√
Empetrum nigrum-Vaccinium uliginosum/Trichophorum caespitosum	√	
Phyllodoce aleutica-Cassiope stelleriana		√
Phyllodoce aleutica/Fauria crista-galli	√	
Graminoid Herbaceous Types		
Calamagrostis canadensis	√	
Carex pauciflora		√
Carex pluriflora	√	
Elymus arenarius		√
Eriophorum angustifolium-Carex pauciflora	√	
Eriophorum angustifolium-Carex pluriflora		√
Eriophorum angustifolium-Trichophorum caespitosum		√
Trichophorum caespitosum		√
Forb Herbaceous Types		
Athyrium filix-femina		√
Fauria crista-galli		√
Fauria crista-galli/Trichophorum caespitosum		√
Lathyrus maritimus		√
Potentilla egedii	√	

Values

Flora

The flora of Olsen Bay Creek RNA has not been thoroughly collected, described, or studied. Table 5 lists the 163 plant taxa observed in the RNA during field surveys of the area.

Fauna

Animal species have not been systematically studied or inventoried in the Olsen Bay Creek RNA. The following species were observed during field surveys or are predicted to occur within the RNA based on the literature and comparison with similar areas:

Mammals

Ungulates – Mountain goats (*Oreamnos americanus*) are the most common ungulate in lands bordering Prince William Sound. The Alaska Department of Fish and Game (2004) has been monitoring goat populations in game management unit 6, which encompasses Prince William Sound and the North Gulf Coast. Populations in this unit have fluctuated widely over the last 60 years, and were estimated to total nearly 4,000 animals in the 1998-1999 regulatory year. A small herd of less than 20 animals uses the Olsen Bay Creek RNA (Jack Helle, National Marine Fisheries Service, *personal communication*). The animals primarily inhabit the high ridges of the RNA during summer, and drop to lower areas about September. During fall, goats are frequently seen around the small kettle lake located near the center of the RNA (Figure 3). This population can be legally hunted, but pressure has typically been low.

Sitka black-tailed deer (*Odocoileus hemionus sitkensis*) may occasionally be found in the RNA, but they are not common. Other ungulates such as moose (*Alces alces*), caribou (*Rangifer tarandus*), and Dall sheep (*Ovis dalli dalli*) are not present.

Carnivores – Bears are likely the most common meat-eating mammals in the RNA. Both brown (*Ursus arctos*) and black bears (*U. americanus*) are present. They are especially common when the large runs of pink and chum salmon are present, from late June to late September annually. Although not quantified, densities in Olsen Bay are high enough to attract bear hunters and bear watchers.

Frame (1974) studied black bear predation on salmon at Olsen Creek in 1967. During a three month period, he recorded 18 black bears fishing the tidal flat just outside the RNA boundary. He saw no brown bears within the study area. According to Jack Helle (*personal communication*), brown bears increased in abundance during the 1970's and are now

Table 5 – Plant taxa observed in Olsen Bay Creek RNA[11].

Scientific Name	Common Name	Source[12]
TREES		
Picea sitchensis	Sitka spruce	a
Tsuga heterophylla	western hemlock	a
Tsuga mertensiana	mountain hemlock	a
TALL SHRUBS		
Alnus crispa ssp. *sinuata*	Sitka alder	a
Alnus incana ssp. *tenuifolia*	thinleaf alder	d
Cladothamnus pyroliflorus	copperbush	a
Echinopanax horridum	devilsclub	a
Menziesia ferruginea	rusty menziesia	a
Ribes bracteosum	stink currant	b
Rubus spectabilis	salmonberry	a
Salix sitchensis	Sitka willow	a
Sambucus racemosa	scarlet elderberry	a
Sorbus sitchensis	Sitka mountainash	d
Vaccinium alaskaense	Alaska blueberry	a
Vaccinium ovalifolium	ovalleaf blueberry	a
Viburnum edule	highbush cranberry	b
DWARF OR SUBSHRUBS		
Andromeda polifolia	bog rosemary	a
Cassiope stelleriana	starry cassiope	a
Empetrum nigrum	black crowberry	a
Ledum palustre	marsh Labradortea	c
Loiseleuria procumbens	alpine azalea	a
Luetkea pectinata	partridgefoot	a
Oxycoccos microcarpus	bog cranberry	a
Phyllodoce aleutica	Aleutian mountainheath	a
Spiraea beauverdiana	Beauverd spiraea	c
Vaccinium cespitosum	dwarf blueberry	a
Vaccinium uliginosum	bog blueberry	a

[11] Vascular plant nomenclature follows Hultén (1968). Moss and lichen nomenclature follows (Vitt et al. 1988). Common names follow the Chugach National Forest plant species list (*unpublished*, Anchorage, AK).

[12] a = recorded in 2003 and 2004 field plots sampled towards developing this establishment record; b = additional taxa observed outside of field plots in 2003 and 2004 surveys; c = additional species recorded by Herrema (1965); and d = additional species observed within Forest Inventory and Analysis plots (http://fia.fs.fed.us/).

Table 5 – (continued)

Scientific Name	Common Name	Source
FORBS		
Achillea borealis	yarrow	a
Aconitum delphiniifolium	monkshood	a
Anemone narcissiflora	narcissus anemone	a
Angelica lucida	wild celery	a
Apargidium boreale	apargidium	a
Aquilegia formosa	western columbine	b
Arabis lyrata	lyrate rockcress	c
Arnica latifolia	broadleaf arnica	b
Artemisia arctica	boreal sagebrush	a
Aruncus sylvester	goatsbeard	b
Chrysanthemum arcticum	arctic daisy	b
Circaea alpina	enchanter's nightshade	b
Claytonia sibirica	Siberian springbeauty	b
Cochlearia officinalis	scurvygrass	c
Conioselinum chinense	Chinese hemlockparsley	b
Coptis aspleniifolia	fernleaf goldthread	a
Coptis trifolia	threeleaf goldthread	b
Cornus canadensis	bunchberry dogwood	a
Dactylorhiza aristata	keyflower	c
Delphinium glaucum	Sierra larkspur	c
Dodecatheon jeffreyi	tall mountain shootingstar	c
Dodecatheon pulchellum	pretty shootingstar	b
Drosera anglica	English sundew	a
Drosera rotundifolia	roundleaf sundew	a
Epilobium angustifolium	tall fireweed	a
Epilobium latifolium	dwarf fireweed	c
Erigeron peregrinus	subalpine fleabane	a
Fauria crista-galli	deercabbage	a
Fritillaria camschatcensis	chocolate lily	a
Galium triflorum	fragrant bedstraw	b
Gentiana douglasiana	swamp gentian	a
Gentiana platypetala	broadpetal gentian	a
Geranium erianthum	northern geranium	b
Geum calthifolium	calthaleaf avens	a
Geum macrophyllum	largeleaf avens	b
Heracleum lanatum	cow parsnip	b
Heuchera glabra	alpine heuchera	b

Table 5 – (continued)

Scientific Name	Common Name	Source
Hieracium triste	woolly hawkweed	b
Honckenya peploides	seaside sandplant	a
Impatiens noli-tangere	western touch-me-not	a
Iris setosa	wild iris	c
Lathyrus maritimus	beach pea	c
Leptarrhena pyrolifolia	fireleaf leptarrhena	c
Ligusticum scothicum	beach lovage	b
Listera cordata	heartleaf twayblade	a
Lupinus nootkatensis	Nootka lupine	a
Lysichiton americanum	skunkcabbage	a
Menyanthes trifoliata	buckbean	b
Moneses uniflora	single delight	a
Osmorhiza purpurea	purple sweetroot	b
Oxyria digyna	alpine mountainsorrel	c
Parnassia fimbriata	fringed grass of Parnasus	b
Pedicularis parviflora	smallflower lousewort	a
Plantago maritima	goosetongue plantain	b
Platanthera chorisiana	Choris bog orchid	b
Platanthera dilatata	boreal bog orchid	a
Platanthera saccata	slender bog orchid	b
Polemonium acutiflorum	tall Jacobsladder	c
Potentilla egedii	Pacific silverweed	a
Prenanthes alata	western rattlesnakeroot	a
Ranunculus bongardii	Idaho buttercup	b
Rhinanthus minor	little yellowrattle	a
Rubus chamaemorus	cloudberry	b
Rubus pedatus	strawberryleaf raspberry	a
Rumex fenestratus	western dock	b
Sanguisorba stipulata	Sitka burnet	b
Saxifraga ferruginea	rustyhair saxifrage	d
Saxifraga punctata	heart-leaved saxifrage	b
Senecio triangularis	arrowleaf groundsel	b
Spiranthes romanzoffiana	hooded ladiestresses	b
Streptopus amplexifolius	claspleaf twistedstalk	a
Swertia perennis	star gentian	b
Tellima grandiflora	bigflower tellima	b
Tiarella trifoliata	threeleaf foamflower	a
Tofieldia glutinosa	sticky false-asphodel	b

Table 5 – (continued)

Scientific Name	Common Name	Source
Valeriana sitchensis	Sitka valerian	a
Veratrum viride	false hellebore	a
Viola epipsila	marsh violet	c
Viola glabella	yellow violet	b
Viola langsdorfii	Alaska violet	c
GRAMINOIDS		
Agrostis alascana	Alaska bentgrass	a
Calamagrostis canadensis	bluejoint reedgrass	a
Calamagrostis nutkaensis	Pacific reedgrass	a
Carex anthoxanthea	grassyslope arctic sedge	a
Carex canescens	silvery sedge	c
Carex livida	livid sedge	a
Carex lyngbyei	Lyngbye's sedge	b
Carex macrochaeta	longawn sedge	a
Carex mertensii	Mertens' sedge	a
Carex microglochin	fewseeded bog sedge	a
Carex pauciflora	star sedge	a
Carex pluriflora	manyflower sedge	a
Carex sitchensis	Sitka sedge	c
Cinna latifolia	drooping woodreed	b
*Deschampsia caespitosa (*incl. *D. beringensis)*	tufted hairgrass	b
Elymus arenarius	beach rye	b
Eriophorum angustifolium	tall cottongrass	a
Hordeum brachyantherum	meadow barley	b
Juncus stygius ssp. *americanus*	moor rush	a
Luzula parviflora	smallflowered woodrush	b
Poa eminens	largeflower speargrass	b
Puccinellia nutkaensis	Nootka alkaligrass	b
Trichophorum caespitosum	tufted bulrush	a
Trisetum cernuum	nodding oatgrass	b
Vahlodea atropurpurea	mountain hairgrass	b
Vahlodea atropurpurea	mountain hairgrass	a
FERNS AND FERN ALLIES		
Adiantum pedatum	northern maidenhair	c
Athyrium filix-femina	common ladyfern	a

Table 5 – (continued)

Scientific Name	Common Name	Source
Blechnum spicant	deer fern	a
Dryopteris dilatata	wood fern	a
Equisetum arvense	common horsetail	b
Gymnocarpium dryopteris	western oakfern	a
Lycopodium alpinum	alpine clubmoss	b
Lycopodium alpinum	alpine clubmoss	a
Lycopodium annotinum	stiff clubmoss	b
Lycopodium clavatum	running clubmoss	a
Lycopodium selago	fir clubmoss	a
Polystichum braunii	Braun's hollyfern	c
Thelypteris limbosperma	maiden fern	b
Thelypteris phegopteris	beech fern	a
PRIMARILY NON-EPIPHYTIC MOSSES		
Climacium dendroides	tree climacium moss	a
Dicranum scoparium	dicranum moss	a
Hylocomium splendens	splendid feather moss	a
Plagiomnium insigne	plagiomnium moss	a
Pleurozium schreberi	Schreber's big red stem moss	a
Polytrichum commune	polytrichum moss	a
Ptilium crista-castrensis	knights plume moss	a
Rhizomnium glabrescens	rhizomnium moss	a
Rhytidiadelphus loreus	loreus goose neck moss	a
Rhytidiadelphus triquetrus	rough goose neck moss	a
Sphagnum girgensohnii	Girgensohn's sphagnum	a
Sphagnum lindbergii	Lindberg's sphagnum	a
Sphagnum papillosum	papillose sphagnum	a
PRIMARILY NON-EPIPHYTIC LICHENS		
Cladina rangiferina	graygreen reindeer lichen	a
Cladina stellaris	star reindeer lichen	b
Peltigera aphthosa	felt lichen	a

common during the spawning season.

Other predatory mammals observed in the RNA include gray wolves (*Canis lupus*), coyotes (*C. latrans*), and wolverines (*Gulo gulo*). Other carnivores potentially present are American marten (*Martes americana*), ermine (*Mustela erminea*), mink (*Mustela vison*), and river otter (*Lutra canadensis*).

Birds

Birds have not been systematically surveyed in Olsen Bay Creek RNA. However, given the diversity and productivity of habitats available, well over 100 species could potentially occur. Coastal and river environments provide habitat for a variety of aquatic associates such as glaucous-winged gull (*Larus glaucescens*), greater yellowlegs (*Tringa melanoleuca*), spotted sandpiper (*Actitis macularia*), wandering tattler (*Heteroscelus incanus*), harlequin duck (*Histrionicus histrionicus*), belted kingfisher (*Ceryle alcyon*), and American dipper (*Cinclus mexicanus*). Upland species likely include Steller's jay (*Cyanocitta stelleri*), bald eagle (*Haliaeetus leucocephalus*), chestnut-backed chickadee (*Parus rufescens*), winter wren (*Troglodytes troglodytes*), varied thrush (*Ixoreus naevius*), golden-crowned kinglet (*Regulus satrapa*), orange-crowned warbler (*Vermivora celata*), and dark eyed junco (*Junco hyemalis*).

Amphibian and Reptiles

Two amphibian species potentially occur in the Olsen Bay Creek RNA. These are the wood frog (*Rana sylvatica*) and boreal toad (*Bufo boreas boreas*). Both species utilize terrestrial habitats as adults, and hibernate during winter. The wood frog is the most widely distributed frog in Alaska. Individuals have been observed from southeastern Alaska to the North Slope region, inhabiting diverse vegetation types that include forest, muskeg, and tundra. The boreal toad reaches its northernmost range extent in Prince William Sound. It is generally found in open, non-forested areas near fresh water, suggesting habitat may be very limited within the RNA.

No reptiles are expected to occur in the RNA.

Fish

Pink Salmon – The Olsen Bay Creek RNA is known to support large spawning populations of pink salmon (*Oncorhynchus gorbuscha*). According to Helle (1970), the Olsen Creek complex is one of the major pink spawning streams in Prince William Sound. Pink salmon are economically very important, and they are commercially harvested in

Olsen Bay and other waters of Port Gravina.

There are two spawning runs (early and late) in Olsen Bay each summer (Helle et al. 1964). The early run peaks in late July, and the late run peaks in late August. Pink salmon spawn and die when they are two years old. Therefore, spawners from consecutive years do not interbreed, and the odd and even years constitute separate genetic lines. The late-run salmon of the even-year line spawn almost entirely within the intertidal zones of the East and West Forks of Olsen Bay Creek. The early spawners of both lines, and the late spawners of the odd-year line spawn in both freshwater and intertidal environments.

Pink salmon distribution in the East and West Forks are limited by stream gradient. The West Fork has two falls within the first mile upstream from the intertidal zone. Pink salmon can usually negotiate the first falls, but never the second (Helle 1970). During droughts the first falls can also become a barrier.

Coho salmon (*Oncorhynchus kisutch*), dolly varden (*Salvelinus malma*), and cutthroat trout (*Salmo clarki*) spawn in the area as well. Chum salmon (*Oncorhynchus kita*) are confined to the intertidal area of Olsen Bay and do not enter creek waters of the RNA (Jack Helle, *personal communication*). Chum salmon require upwelling water for spawning, which is not provided in the RNA.

See the "Research/Education Use & Interest" section for more information on fisheries research that has been conducted in the area.

Geology

The geology of the Chugach National Forest has been mapped by Nelson et al. (1985). About 85% of the Olsen Bay Creek RNA is mapped as sedimentary rocks of the Orca group (Eocene and Paleocene) and the remaining 15% as undifferentiated Quaternary surficial deposits (in the valley bottoms)[13].

Soils

Soils of the Olsen Bay Creek RNA were described for a range of sites during field surveys for developing this establishment record. These data are on file with the Forest Ecologist (Supervisors Office, Chugach NF, Anchorage, AK). The principle soil subgroups (Soil Survey Staff 2003) described among 25 samples are:

[13] Data from the "Geology" data theme of the Chugach National Forest GIS.

Order	Subgroup
Entisol	
	Lithic Cryorthent
	Typic Cryaquent
	Typic Cryorthent
Inceptisol	
	Lithic Dystrochrept
	Typic Dystrochrept
Spodosol	
	Lithic Haplocryod
	Typic Haplocryod
	Typic Humicryod
	Oxyaquic Haplocryod
Histosol	
	Typic Cryohemist
	Typic Cryosaprist
	Typic Haplosaprist

About half of the samples are in "Lithic" subgroups and, in general, feature bedrock within 20 inches (50 centimeters) of the mineral soil surface. Lithic Cryorthents were the most common soils found in the area (50% of samples) and can be crudely described as cold, thin soils in the early stages of development.

Topography

The Olsen Bay Creek RNA is characterized by three distinctive physical settings: 1) low relief valley bottoms; 2) generally steep tree and tall shrub covered slopes; and 3) rugged, rocky, ridges. The terrain forms are primarily the result of glaciation and stream erosion.

Aquatic / Riparian

As shown in the table below summarized from the National Wetlands Inventory[14], 95% of the Olsen Bay Creek RNA is non-wetland, upland systems:

Wetland System	Acres	Hectares	Percent
Estuarine	3	1	0
Palustrine	367	149	5
Upland	6476	2621	95
TOTAL	6847	2771	100

[14] The "USF&WS National Wetlands Inventory" data theme of the Chugach National Forest GIS.

The East and West Forks of Olsen Bay Creek run clear, and are not glaciated. The two forks currently flow separately without converging before entering Olsen Bay. Prior to the late 1990's, the streams did converge at or near of the intertidal zone. Stream measurements in the early 1960's (prior to the Great Alaska Earthquake of 1964) showed the convergence at the 11 foot (3.4 meter) tide level. During that period, the main stem Olsen Bay Creek was inundated with tidewater about 7 percent of the time at the 11 foot (3.4 meter) tide level, and 80 percent of the time at the 3 foot (0.9 meter) level (Helle et al. 1964). The 1964 earthquake uplifted the area, and created new freshwater environments where tidal waters had occurred. However, subsequent stream regrading has resulted in both the East and West Forks emptying directly into Olsen Bay, and a loss of the main stem Olsen Bay Creek. The intertidal areas of the two forks are just outside the RNA.

Rare, Threatened, Endangered or Sensitive Species

No endangered or threatened species are known to occur within the Olsen Bay Creek RNA. Peale's peregrine falcon (*Falco peregrinus pealei*), an Alaska Region sensitive wildlife species[15], may occur in the RNA based on the known distribution of the species.

The Alaska Region sensitive plant species (Stensvold 2005) listed in Table 6 potentially occur within the RNA based on the presence of favorable habitat. However, their presence has not yet been verified. *Platanthera chorisiana*, a species previously listed on the sensitive list, was observed during field surveys of the RNA.

Rare Elements & Rare Plant Communities

No rare elements and rare plant communities are known to occur within the Olsen Bay Creek RNA.

Resource Information

Minerals

There are no known mineral values within Olsen Bay Creek RNA and no present or historic mining activity. Based on information in Nelson et al. (1984), portions of the area have potential for copper, gold, lead, silver, and zinc. This favorability is determined largely by the comparison of the geologic environment in the area in question with available geologic, geochemical, and geophysical criteria from areas of known deposits.

The Final Environmental Impact Statement (FEIS) for the Forest Plan (USDA Forest Service 2002c) states that oil and gas leasing is unavailable in the RNA and further notes that none of the areas designated as RNA (including the Olsen

[15] The Alaska region sensitive species lists are posted at the following USDA Forest Service intranet site: http://fsweb.r10.fs.fed.us/staffs/wfew/wfew_documents/sensitive_species_list.doc

Table 6 – Sensitive plant species potentially occurring in Olsen Bay Creek RNA[16].

Scientific Name	Common Name	Habitats
Aphragmus eschscholtzianus	Eschscholtz's little nightmare	A
Arnica lessingii ssp. *norbergii*	Norberg arnica	AFMT
Botrychium tunux	no common name	B
Botrychium yaaxudakeit	no common name	B
Carex enanderi	goose-grass sedge	AW
Ligusticum caldera	Calder lovage	AFM
Papaver alboroseum	pale poppy	AM
Puccinellia glabra	sooth alkali grass	B
Puccinellia kamtschatica	Kamchatka alkali grass	B
Romanzoffia unalaschcensis	Unalaska mist-made	FRW
Stellaria ruscifolia ssp. *aleutica*	circumpolar starwort	ARW

[16] Nomenclature follows Hulten (1968) except for *Ligusticum calderi*, which follows Calder and Taylor (1968). Common names follow Stensvold (2005). Habitats are generalized from Stensvold (2005) as follows:

A = alpine and subalpine
B = maritime beach
F = forests (or forest edge)
T = tall shrubland
M = meadows
R = rock outcrops
W = marshy areas (or streamsides)
S = shallow freshwater.

Bay Creek area) are within areas that have been identified as having potential for oil and gas development. Similarly, the FEIS and the Forest Plan (USDA Forest Service 2002c and 2002b, respectively) state that extraction of salable minerals (sand, gravel, hard rock for crushing, and landscape materials) will not be allowed in RNAs.

Grazing
No domestic livestock are on the Olsen Bay Creek RNA, and there is no history of livestock grazing. Grazing by domestic stock will be prohibited.

Plants
Because of its status as RNA, commercial and personal use timber harvest in the area is not allowed under the Forest Plan (USDA Forest Service 2002b). The FEIS for the Forest Plan (USDA Forest Service 2002c) lists 980 acres (397 hectares) of tentatively suitable timberlands in the area.

Watershed Values
All flowing surface waters of Olsen Bay Creek RNA enter directly into Olsen Bay in Port Gravina, Prince William Sound. A small kettle lake with no surface outflow is perched in an intermountain basin near the center of the RNA (Figure 3). Sport fish occurring in the RNA include pink salmon, Coho salmon, dolly varden, and cutthroat trout. Establishment of the RNA at this location will not conflict with watershed values or uses. Establishment of the RNA would maintain current water quality and flow.

Recreation Use
Olsen Bay Creek RNA provides a variety of recreational opportunities. The spectacular scenery and abundant wildlife associated with Prince William Sound are increasingly sought by outdoor adventurers. Recreational boating is in itself a reason to visit the area, and it provides subsequent foot access to the RNA. Sport hunting and fishing are not restricted in the RNA, and the area is known to be used by bear hunters. People seeking non-consumptive bear and salmon viewing opportunities are also drawn to the area. The potential for significant human-induced impacts within the RNA is likely minimal given the remoteness from population centers, difficult access, rugged terrain, thick vegetation, and lack of trails.

Under the Forest Plan (USDA Forest Service 2002b), no recreational developments will be constructed within the RNA. Given the high bear densities in Olsen Bay during salmon season, and increasing recreational demand in Prince William Sound, it is possible that bear viewing facilities (e.g., platforms) could be developed near but outside of the RNA. If such opportunities are pursued, consideration would be given to potential impacts on the RNA.

Also, under the Forest Plan (USDA Forest Service 2002b), no motorized recreational use will be allowed within the RNA. Non-vehicular use will be

allowed except when it interferes with the purpose of the RNA.

Wildlife

The Olsen Bay Creek RNA features a diversity of wildlife and plant species and communities. Establishment of the RNA will in no way adversely affect wildlife and plant values in the area. RNA designation will be beneficial in protecting wildlife and floristic values.

As stated in the Forest Plan FEIS (USDA Forest Service 2002c), habitat manipulations for wildlife is not allowed unless specifically needed to restore natural ecosystem conditions or specifically designed for the protection of threatened, endangered or sensitive species. Such manipulations are not presently called for or anticipated in the RNA.

Transportation / Road System

The Forest Plan (USDA Forest Service 2002b) does not allow new Forest Service roads to be built in RNAs and new trail construction is prohibited (unless the new trail contributes to the objectives or to the protection of the RNA). There are no plans for road or trail construction within the Olsen Bay Creek RNA. Establishment of the RNA would not affect any existing or proposed road access system on the Chugach National Forest.

Historical Information

Research / Education Use & Interest

Research activities have occurred within and adjacent to Olsen Bay since at least the 1930's. The Bureau of Commercial Fisheries (now National Marine Fisheries Service) has conducted anadromous fisheries research in the area throughout much of this time period. The Bureau constructed and operated a research facility adjacent to the intertidal area to facilitate their activities (see Cultural / Heritage section for more information). Data from the fisheries research is housed with the National Marine Fisheries Service, Auke Bay Laboratories, Juneau, Alaska. Other research has been conducted on black bears (Frame 1974), sea otters (*Enhydra lutris*), glaucous-winged gulls (Moyle 1966), and aquatic invertebrates.

Cultural / Heritage[17]

Limited archaeological surveys have been conducted in the Olsen Bay Creek RNA. One prehistoric site (a possible village) has been recorded to date. The site boundary has not been fully delineated. The Alaska Heritage Resource Survey (AHRS) site number is COR-00408.

Culturally-modified trees exist within the RNA boundary. These are typically spruce or hemlock trees that have visible scars from prehistoric bark peeling

[17] Information in this section provided by Linda Yarborough, Forest Archaeologist, Chugach NF, Anchorage, AK.

activities.

A field research station was present near the historic main stem of Olsen Bay Creek (shown as the cluster of black squares near the confluence of Olsen Bay Creek and Olsen Bay in Figure 3). The first building was constructed by the US Bureau of Commercial Fisheries during the 1930's, and over time, additional buildings were added. Due to maintenance and environmental concerns, all facilities were fully removed in 2005. The AHRS site number for this is COR-551.

Disturbance History

The East Fork and West Fork of Olsen Bay Creek were greatly affected by the March 27, 1964 Great Alaska Earthquake that was epicentered in Prince William Sound. The effects of this quake are documented in Thorsteinson et al. (1971). Prior to the earthquake, the two forks of Olsen Bay Creek converged at the 11-foot tide level to form the main channel in the intertidal zone. The earthquake uplifted the area approximately 4 feet (1.2 meters). This uplift changed some of the intertidal areas to freshwater environments. Despite relocation of intertidal spawning beds in relation to tidal levels, the areas occupied by spawning pink and chum salmon were at approximately the same levels as before the earthquake. The distribution of spawners and survival of eggs at different tide levels in the new intertidal spawning beds were similar to those observed before the earthquake. Stream slope adjustments caused by changes in elevation created silty, unstable streambed conditions. The resultant channel shifts increased mortality of eggs and yolk-sac fry (alevins) from burial in the streambed. Also, the larger the amount of scour or fill, the higher the number of eggs or alevins that were transported away from the spawning beds. Thorsteinson et al. (1971) estimated that these secondary effects of the earthquake caused the disappearance of over 7.25 million pink salmon eggs, and 1.1 million chum salmon eggs one year after the earthquake. The area continues to undergo a gradual adjustment toward equilibrium, but effects today are of much smaller magnitude than those that occurred within the first few years of the quake.

The channel adjustments that have occurred over time have resulted in a loss of the main channel above the tidal zone. Since about the late 1990's, the East and West Forks no longer merge in the tidal zone as they did prior to the 1964 earthquake (Jack Helle, *personal communication*). Instead, the two forks maintain separate channels, and a single freshwater mainstem does not exist.

Olsen Bay has been influenced by man-caused disturbances as well. On March 24th, 1989, the oil tanker *Exxon Valdez* spilled nearly 11 million gallons of crude oil into Prince William Sound. Some of the oil drifted into Olsen Bay. Cleanup efforts attempted to remove as much oil as possible, but the spill did have negative effects to marine habitats as well as to wildlife and fish populations. On July 21, 2007, the commercial fishing vessel *Nordic Viking* ran aground in Olsen Bay, spilling up to 12,000 gallons of diesel fuel into the water. Effects of this spill

are not yet quantified.

Occurrence of Exotic Species

Existing surveys on the Chugach National Forest (DeVelice et al. 1999; DeVelice 2003; Duffy 2003) found that most areas of exotic plant occurrence on the Forest are presently in areas of intensive human-caused disturbance such as road edges, visitor facilities, trailheads, and trails. Exotic plants are presently rare within natural communities on the Forest.

No exotic plant records were found within the Olsen Bay Creek RNA in a query of the Alaska Exotic Plant Information Clearinghouse database (AKEPIC[18]). In addition, no exotic plants were recorded during field surveys of the area in the development of this establishment record. It is likely that scattered populations of exotics are present but the extent and number of individuals is likely small.

Other Information

Permanent Research Plots and/or Photo Points

The only known permanent plots in the Olsen Bay Creek RNA are the two Forest Inventory and Analysis[19] plots installed by USDA Forest Service Pacific Northwest Research Station.

Potential Research Topics

Among the research opportunities in the Olsen Bay Creek RNA are:

- Analysis of pink salmon genetic structure comparing early-run versus late-run, East Fork versus West Fork, and intertidal versus freshwater.
- Documenting on-going changes to stream dynamics due to the 1964 Great Alaska Earthquake.
- Quantifying the pattern and magnitude of salmon-derived nutrient transport from stream to upland systems (e.g., as described by Wilkinson et al. 2005).
- Various watershed studies that could benefit from paired streams within a fully protected watershed.

Evaluation of Specific Management Recommendations

Potential or Existing Conflicts

See the “Resource Information” section above for a summary of potential and existing conflicts. In summary, there are no known conflicting uses within the Olsen Bay Creek RNA for minerals, grazing, commercial or personal timber harvest, watershed values, recreation use, wildlife and floristic values, and transportation systems.

[18] http://akweeds.uaa.alaska.edu/
[19] http://fia.fs.fed.us/

Special Management Area
The Olsen Bay Creek RNA does not lie within or adjacent to any congressionally designated wilderness, wild and scenic river, or national recreation area.

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APPENDIX

Management Area Prescription

The following text is from the Revised Land and Resource Management Plan of the Chugach National Forest (USDA Forest Service 2002b) and summarizes the management area prescription for Research Natural Areas:

141 - Research Natural Area Management Area – Category 1

Theme - Research Natural Areas (RNAs) emphasize non-manipulative research, monitoring, education, and the maintenance of natural diversity, allowing natural physical and biological processes to prevail without human intervention. RNAs serve as baseline reference areas for measuring long-term ecological change. This management area prescription specifies management area direction for designated Research Natural Areas.

Management Intent

Ecological Systems Desired Condition - RNAs are characterized by essentially unaffected environments in which natural ecological processes dominate, largely undisturbed by human activity. Management activities on other lands are compared to the RNA to measure the effectiveness of various standards, guidelines and mitigation measures in reducing or preventing adverse environmental effects. Specific management direction, consistent with the purpose, will be developed for each RNA as it is established.

Social Systems Desired Condition – Management for recreation uses, habitat improvement or restoration and resource development are not emphasized. Recreation uses that interfere with the purpose of the RNA may be restricted. RNAs will provide outstanding opportunities for research, study, observation, monitoring, and those educational activities that maintain unmodified conditions. The Recreation Opportunity Spectrum will range from Primitive to Semi-primitive Nonmotorized. While a pristine condition is the goal in the selection of an RNA, there may be some evidence of past human use in this area, such as primitive trails or historic structures. Heritage resources will remain in an undisturbed state, with data recordation as the preferred method to mitigate the loss of heritage resources. Cabins and other historic, aboveground features will be present in their natural state, with no on-site interpretation.

There will be no roads, trails, fences, or signs in these areas unless they contribute to the RNA objectives or the protection of the area. Mining activities may occur on existing claims. In order to implement this prescription as intended, the Forest Service may request that the Bureau of Land Management withdraw areas, subject to the establishment of valid existing rights, within this management area prescription from location and entry under the United States mining laws.

Research Natural Area Management Area - Activities Table

Physical Elements			
Soil/Watershed Projects	C		
Biological Elements			
Vegetation Management	N	Integrated Pest Management	C
Wildlife Habitat Projects	C	Management Ignited Prescribed Fire	C
Fish Habitat Projects	C		
Resource Production			
Forest Products		**Minerals/ Mining**	
Commercial Timber Harvest ASQ	N	Mineral Activities – Locatable	C
Commercial Timber Harvest - nonchargeable	N	Mineral Activities – Salable	N
Commercial Special Forest Products	N		
Personal Use Timber Harvest	N		
Personal Use Special Forest Products	N		
Use and Occupancy Activities			
Recreation/Tourism Activities			
Recreational Gold Panning	N	Forest Service Recreational Cabins	N
Maximum ROS Class [1]	SPNM	Campgrounds	N
Nonmotorized Recreation Use - Summer	C	Minimum SIO [2]	VH
Nonmotorized Recreation Use - Winter	C	Hardened Dispersed Camping Sites	N
Day-use Facilities	N	Viewing Sites	N
Transportation/Access			
Marine Transfer Facilities	N	New Roads Built by Others	C
Boat Docks and Ramps	N	New Trails	C
Mode Changes: Parking Lots at Trailheads, Ferry Terminals, etc.	N	Administrative and Permitted Motorized Access	C
New FS Built Roads	N		
Lands/Special Uses			
Electronic Sites	N	SUP Recreation Equipment Storage/Cache	N
Utility Systems	N	Outfitter/Guide Capacity Allocation (%)	NA
SUP Destination Lodges	N	Administrative Facilities	C
SUP "Hut-to-Hut" Type Recreation Cabins	N		

Y - the activity is allowed consistent with the management intent

C - the activity is allowed consistent with the management intent, standards and guidelines

N - the activity is not allowed in the management area

N/A - not applicable

[1] ROS (Recreation Opportunity Spectrum) classes: P - Primitive I and II; SPNM - Semi-primitive Nonmotorized; SPG - Semi-primitive Groups; SPM - Semi-primitive Motorized; RN - Roaded Natural; RM - Roaded Modified; R - Rural

[2] SIO (Scenic Integrity Objective) classes: VH - Very High; H - High; M - Moderate; L - Low; VL - Very Low

Standards and Guidelines

Soil/Watershed – Fisheries – Wildlife

Standards	1.	Allow soil/watershed restoration projects and wildlife and fish habitat manipulation for the protection of threatened, endangered or sensitive species or where it is necessary to perpetuate or restore natural conditions for which the RNA was established.

Integrated Pest Management

Guidelines	1.	Treatment measures may be taken on exotic plants and animals to minimize their impacts on ecological processes.

Fire and Fuels

Standards	1.	Allow natural fires to burn to accomplish the objectives of the specific research natural area.
	2.	Use management prescribed fire as necessary to accomplish RNA objectives.

Minerals

Guidelines	1.	RNAs may be withdrawn, subject to the establishment of valid existing rights, from mineral entry for locatable minerals.
	2.	Mineral activities may be limited, modified or restricted to maintain, to the extent possible, the natural values of the area.

Recreation

Standards	1.	Allow non-vehicular recreation, except when it interferes with the purpose of the RNA.

Access and Transportation

Standards	1.	Prohibit the construction of new trails unless they contribute to the objectives or to the protection of the RNA.
Guidelines	1.	Close or obliterate existing roads, except where they provide necessary access for scientific or educational purposes.
	2.	Existing trails may remain unless they are not consistent with the purpose of the RNA.
	3.	Administrative and non-recreational motorized access (e.g., helicopter landings) may be allowed if such activities do not interfere with the objectives for which the RNA was established.

Access and Transportation (Continued)

Guidelines

4. If no other reasonable access exists, provide such access, including roads for conducting mineral operations under a mining plan of operations. Aircraft access is allowed for minerals exploration and will be coordinated with the responsible line officer to minimize impacts to the natural character of the area.
5. If no other reasonable access exists elsewhere, provide reasonable access to private lands.

Special Uses (Recreation)

Standards

1. No competitive group events are allowed.

Administrative Facilities

Standards

1. Administrative facilities are not allowed. Temporary facilities may be permitted to support approved research projects.

FIGURES

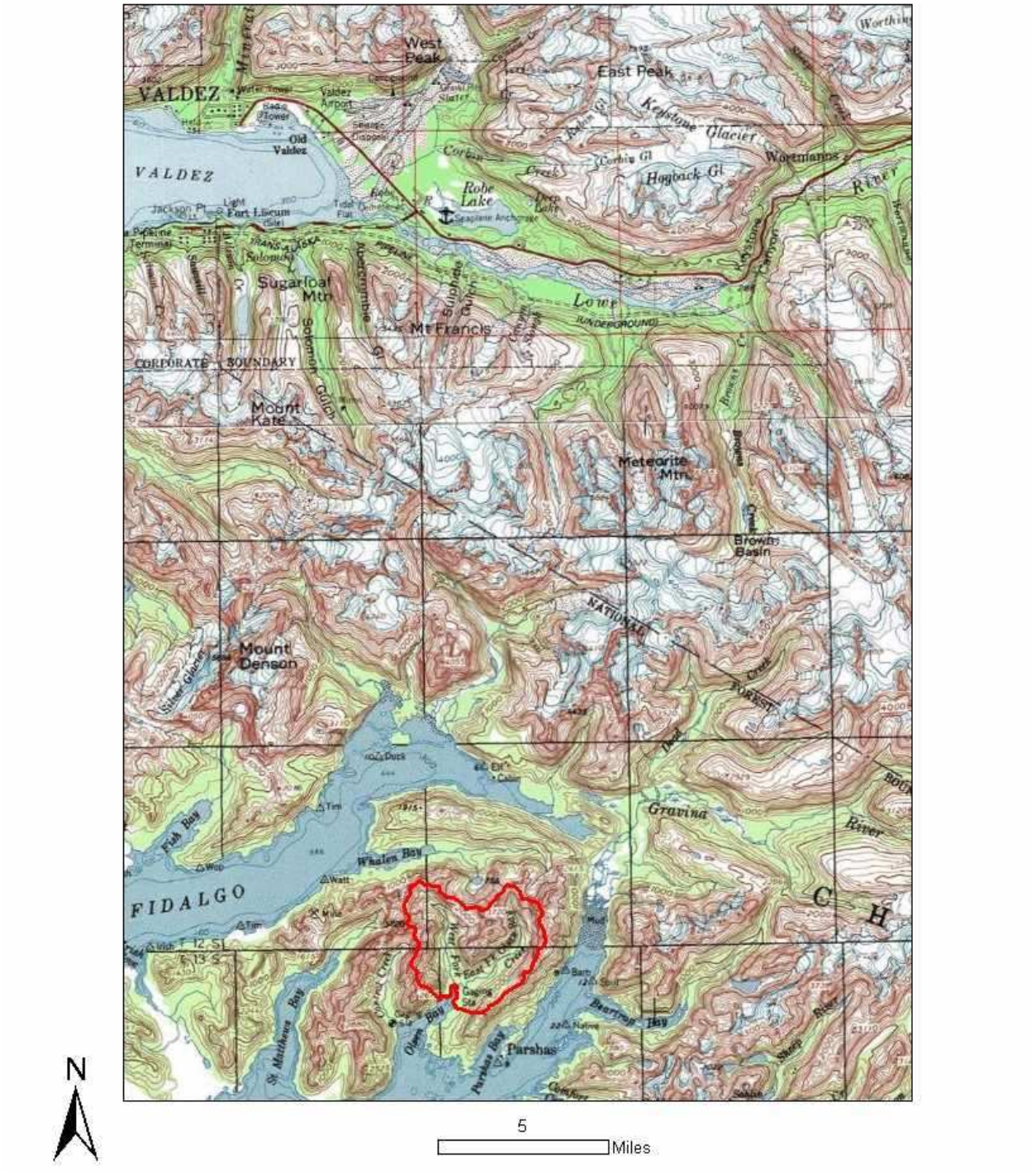

Figure 1 – Location of Olsen Bay Creek RNA south-southeast of the city of Valdez, Alaska.

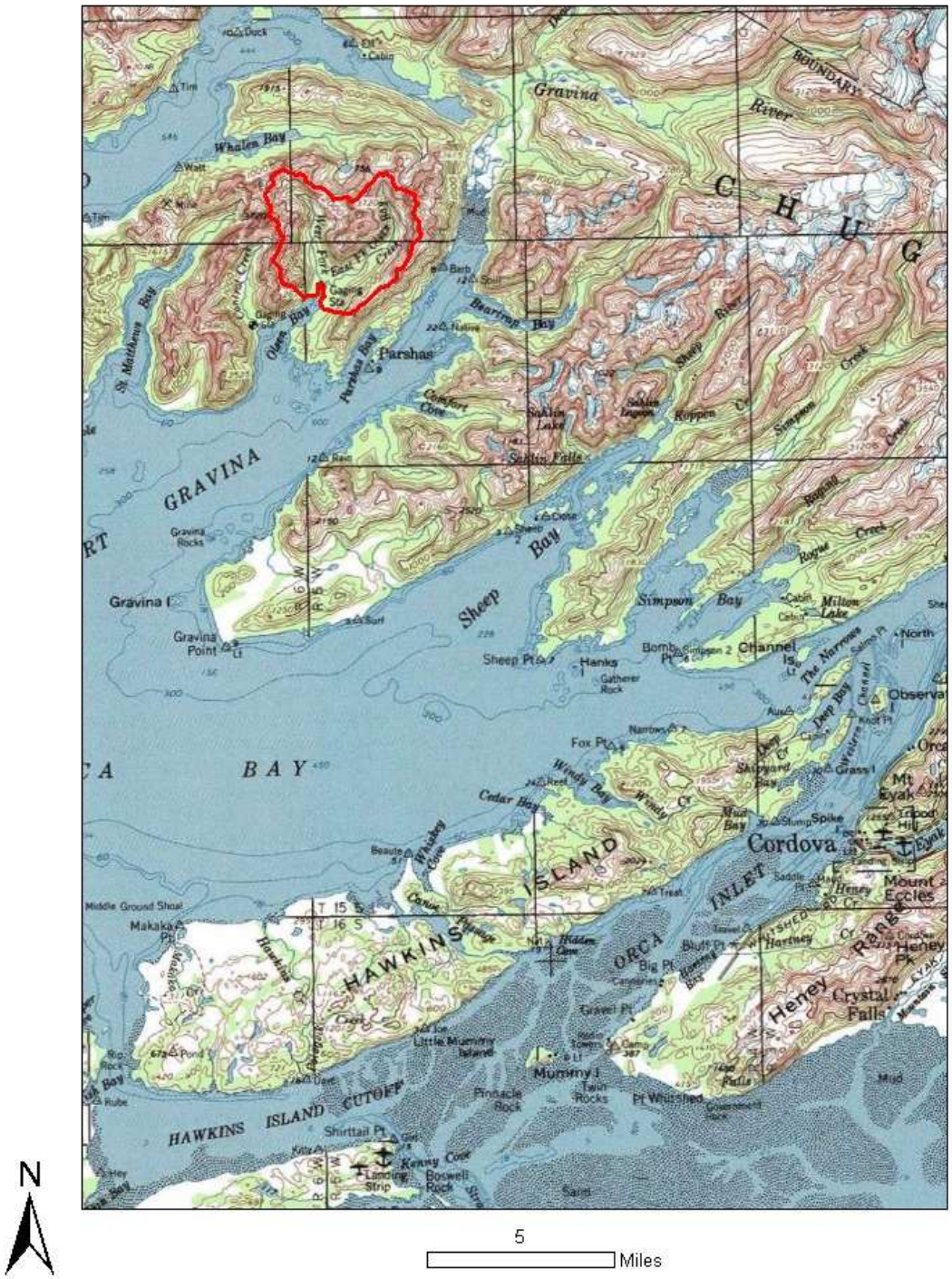

Figure 2 – Location of Olsen Bay Creek RNA northwest of the city of Cordova, Alaska.

Figure 3 – Location of Olsen Bay Creek RNA within the public land survey system (with certification by licensed land surveyor).

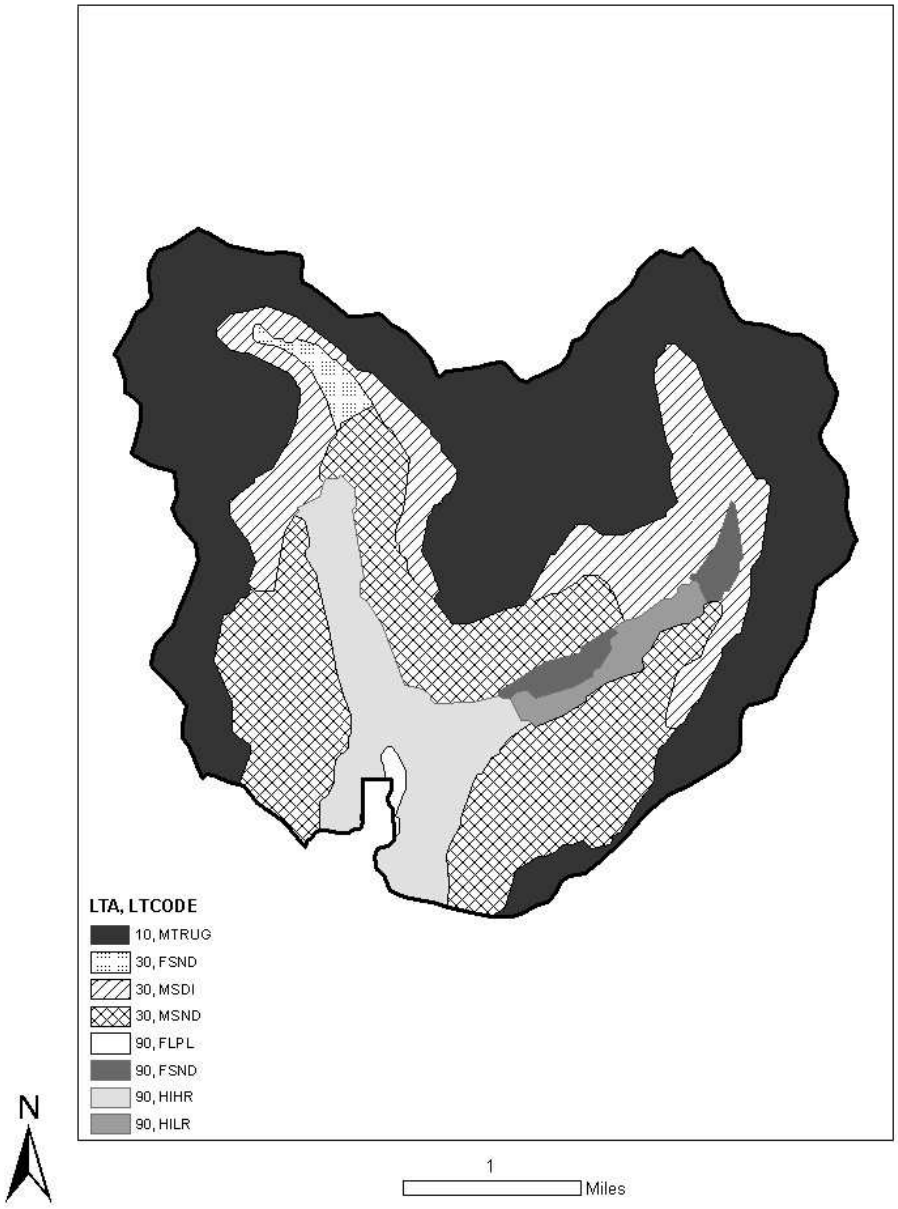

Figure 4 – Landtype associations and landtypes of Olsen Bay Creek RNA[20].

[20] Data from the "Landsystem Types" data theme of the Chugach National Forest GIS. Landtype Association 10 = mountain summits; 30 = mountain sideslopes; and 90 = hills. Landtype FLPL = flood plains; FSND = foot slopes – non disturbed; HIHR = hills - high relief; HILR = hills - low relief; MSDI = mountain sideslopes - disturbed; MSND = mountain sideslopes - non disturbed; MTRUG = mountains – rugged (glacier landtypes in the GIS data were merged into MTRUG since glaciers are not present in the RNA).

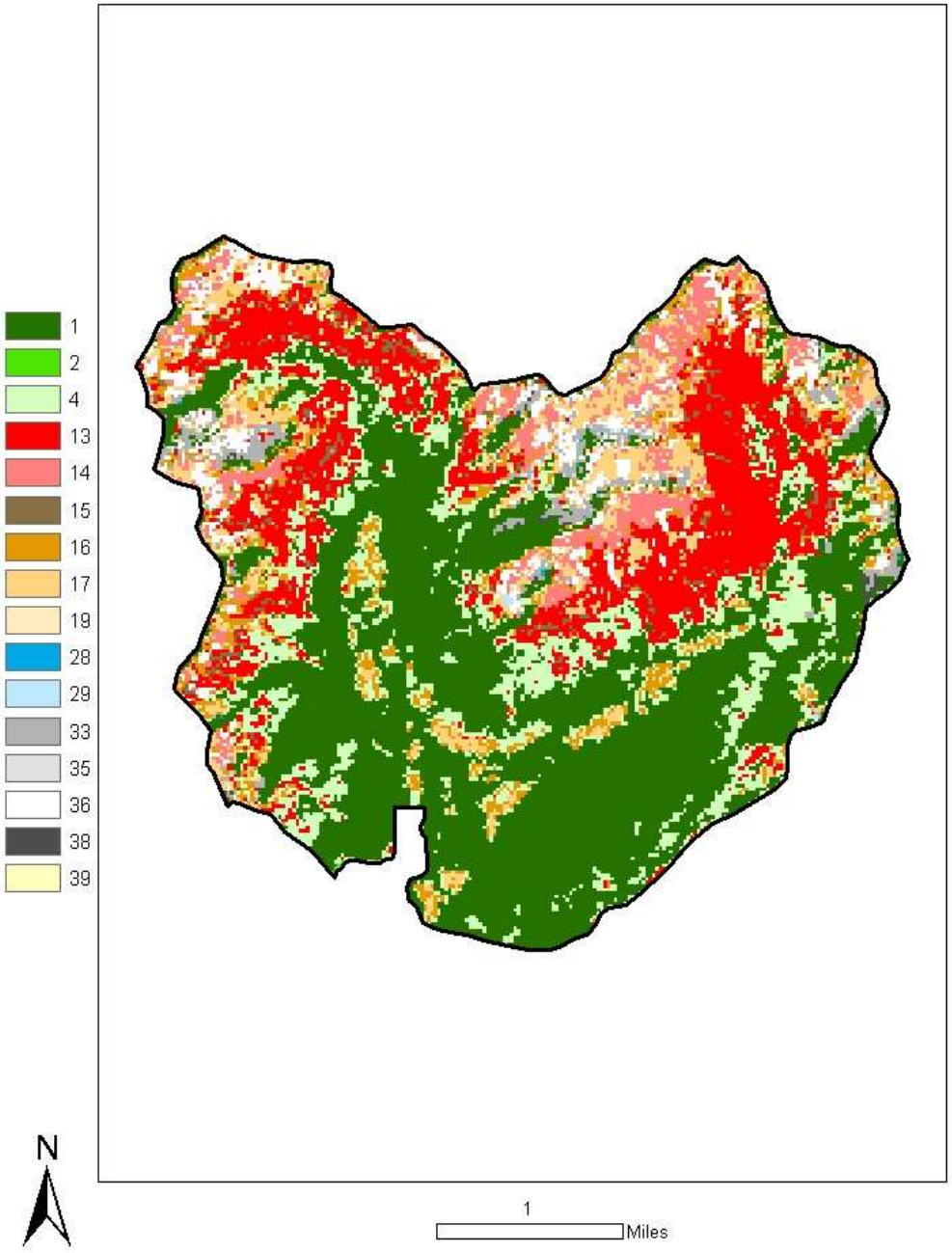

Figure 5 – Landcover classes of Olsen Bay Creek RNA[21]. See Table 3 for the description of cover class values.

[21] Data from the "Land Cover Classification" data theme of the Chugach National Forest GIS.

PHOTOGRAPHS[22]

Photo 1 – View of Olsen Bay Creek watershed from northwestern shore of Olsen Bay. The East Fork ascends the valley on the right.

Photo 2 – West Fork of Olsen Bay Creek near where it enters the bay (note the fish carcasses).

22 These digital images are archived with the Forest Ecologist, USDA Forest Service, Chugach National Forest, Anchorage, Alaska

Photo3 – Looking towards the valley of the West Fork Olsen Creek across a meadow on the East Fork Olsen Creek.

Photo 4 – Zone of intergradation between heath and forest vegetation on rugged mountain topography at about 2,000 foot elevation (about 600 meters).