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A subsidiary of Bethel Native Corporation

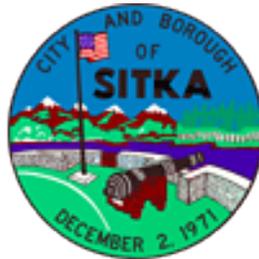
**FINAL
BOTANICAL RESOURCES RECONNAISSANCE SURVEY REPORT
TAKATZ LAKE HYDROELECTRIC PROJECT
FEDERAL ENERGY REGULATORY COMMISSION NO. 13234**

Bethel Environmental Solutions LLC Project No. 220115003

May 2012

Prepared for:

**The City and Borough of Sitka
100 Lincoln Street
Sitka, Alaska 99835**



Prepared by:

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This Botanical Resources Reconnaissance Report has been prepared by Bethel Environmental Solutions LLC (Bethel) and has been reviewed and approved for distribution.

General Manager:



Sean P. Thomas, RES

Project Manager:



Jenna Fredenhagen

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Acronyms and Abbreviations

ac-ft	acre-feet
AKEPIC	The Alaska Exotic Plants Information Clearinghouse
AKNHP	Alaska Natural Heritage Plant Tracking list
Bethel	Bethel Environmental Solutions LLC
Bethel Team	Bethel Environmental Solutions LLC and USKH Inc.
City	City and Borough of Sitka
FERC	Federal Energy Regulatory Commission
hp	horsepower
MWh	megawatt-hours
Project	Takatz Lake Hydroelectric Project
USDA	United States Department of Agriculture
USFS	United States Forest Service
USFWS	United States Fish and Wildlife Service
UAF	University of Alaska Fairbanks

1.0 INTRODUCTION

This report presents the results of a botanical resources reconnaissance survey conducted by Bethel Environmental Solutions LLC (Bethel) and USKH Inc. (Bethel Team), in support of the Takatz Lake Hydroelectric Project (the Project) (Figure 1). The objective of this reconnaissance survey was to identify any rare, sensitive, or invasive plants along the project corridor to determine if a more detailed botanical resource survey is recommended or required by regulation in areas that may be disturbed by construction or long-term operation of the Project. This report includes descriptions of the survey areas, the methods used, and results of the literature reviews and field surveys.

1.1 Project Background

The Project would occupy lands within the Tongass National Forest that are administered by the United States Forest Service (USFS). Two dams would raise the elevation of Takatz Lake 200 feet, providing a total storage capacity of 124,000 acre-feet (ac-ft), of which 82,000 ac-ft would be active storage. A proposed tunnel, approximately 2,800 feet long, along with a 1,000-foot-long penstock would discharge the lake flows into a 4,000 square foot powerhouse, with two 18,600 horsepower (hp) Francis turbines on the shore of Takatz Bay. It is estimated that operation of the Project would produce 97,100 megawatt-hours (MWh) of energy each year.

Operation of the Project would supplement energy generated by the City and Borough of Sitka's (City) two existing hydroelectric projects, which include the Blue Lake Project (FERC No. 2230) and the Green Lake Project (FERC No. 2818). The City operates these projects to meet base- and peaking-load requirements within the City's service area. Currently, the Blue Lake Project generates base-load energy and the Green Lake Project provides energy at peaking capacity. The Project would be used to meet base- or peaking-load depending on reservoir management and frequency control. Generation would be optimized by following a curve reflecting seasonal inflow, spill capacity, and drawdown limitations.

The City holds a Federal Energy Regulatory Commission (FERC) Preliminary Permit for the Project under which it is required to conduct various studies and impact analyses. As part of which, the City must have the background information needed to evaluate all potentially impacted resources, including botanical resources, to obtain the necessary FERC license to construct and operate the Project.

BARANOF ISLAND

SITKA

**BOTANICAL
SURVEY AREA**



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SITE VICINITY

PROJECT: Takatz Lake
 Botanical Resources Reconnaissance Survey
 Near Sitka, Alaska

CLIENT: City and Borough of Sitka

PROJECT MANAGER: J. FREDENHAGEN

SCALE: BAR

FIGURE:

PROJECT NO.: 20115003

DRAWN BY: K. RUSSELL

DATE: MAY 2012

2.0 STUDY AREA

The Study Area is situated within the Tongass National Forest on Baranof Island southeast of Sitka (Figure 1), and is divided into the Baranof Valley and Medvejie Valley segments. Both segments are densely vegetated. There are no established trails within Baranof Valley and one man-made trail in Medvejie Valley.

Areas surveyed followed the proposed path for the electrical transmission lines. The proposed transmission corridor in the study area runs from the Baranof Lake west through the Baranof Valley, to a 2-mile long tunnel passing north of Indigo Lake and south of Mount Bassie. Beyond the tunnel, the proposed transmission line would continue, either buried or above ground, through the Medvejie Valley to the interconnection with the existing 69-kV Green Lake Project transmission line (Figure 2).

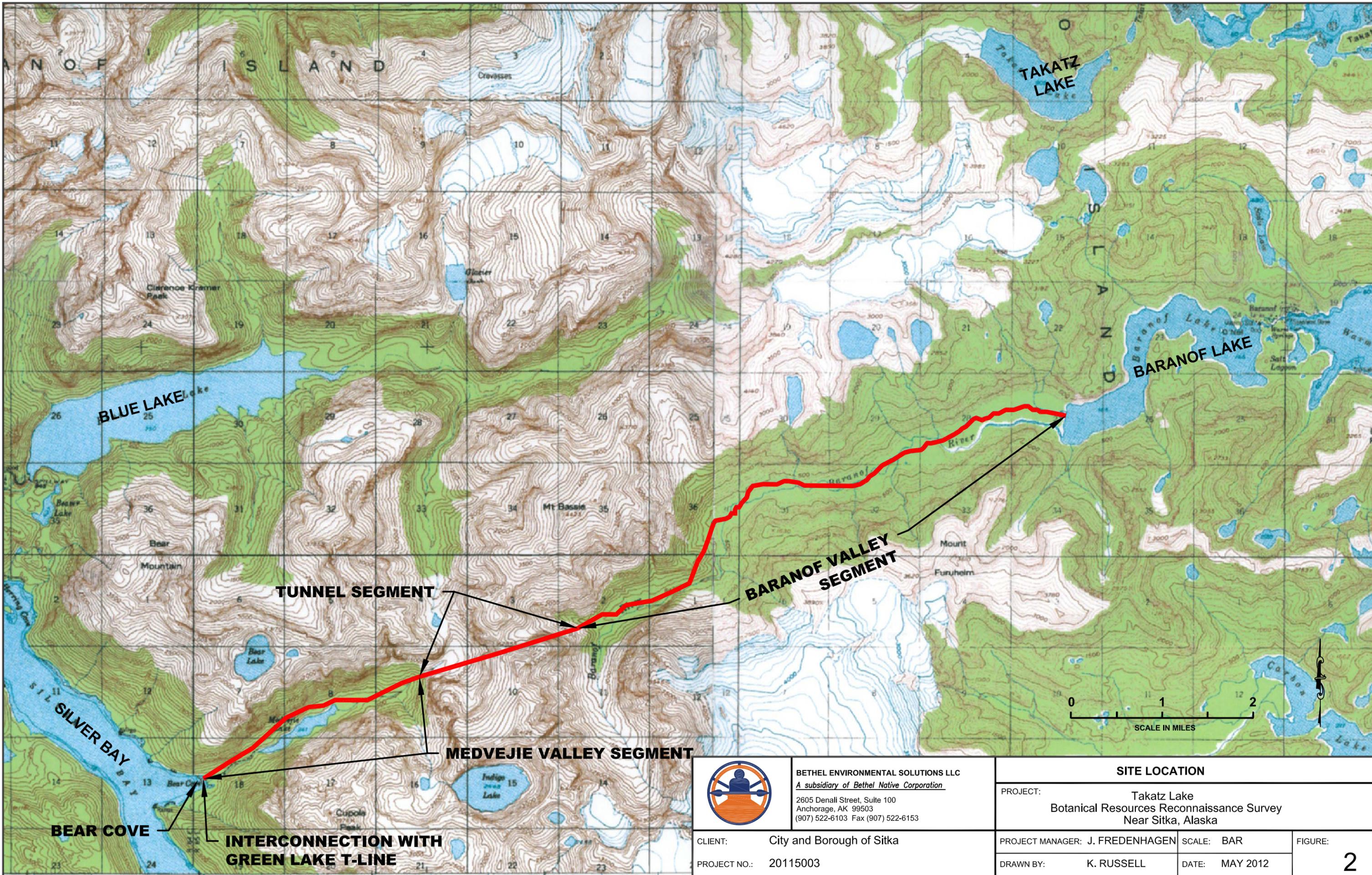
2.1 Baranof Valley segment

The first field survey was conducted in the Baranof Valley segment, situated approximately 17 air miles southeast of Sitka and accessible only by float plane. Baranof Valley is bisected by the glacially-fed Baranof River and outlets into Baranof Lake. The small community of Warm Springs is located on the east side of Baranof Island in Warm Springs Bay. The Baranof Valley Segment is comprised of dense forested vegetation on either side of the river. Terrain in the area is irregular with steep slopes to terraces above the valley floor.

2.2 Medvejie Valley Segment

The Medvejie Valley Segment is located approximately 10 miles south-southeast of the City, and southwest of Baranof Valley. It is accessible via Sawmill Creek Road.

Similar to Baranof Valley, the vegetation is very dense, with Medvejie Lake oriented northeast to southwest within the valley floor, with a length of approximately one mile. The narrowness of the valley creates steep talus slopes with large boulder fields accumulating near the edge of the lake.



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CLIENT: City and Borough of Sitka

PROJECT NO.: 20115003

SITE LOCATION

PROJECT: Takatz Lake
 Botanical Resources Reconnaissance Survey
 Near Sitka, Alaska

PROJECT MANAGER: J. FREDENHAGEN

DRAWN BY: K. RUSSELL

SCALE: BAR

DATE: MAY 2012

FIGURE:

2



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3.0 METHODS

Prior to field work in the Baranof and Medvejie Valleys, a pre-field review was conducted to identify vegetation resources and sensitive species of special interest in the adjacent and immediate areas of Takatz Lake. The purpose of the pre-field review was to identify potential sensitive species and habitats present in the study area, and to plan field efforts to target those habitats. A regulatory-compliant botanical resources study was not within the scope of work because such a study was determined to be impracticable given time and budget constraints. A general botanical resources reconnaissance survey was performed in areas most likely to contain sensitive species. While every effort was made to survey all applicable potentially sensitive habitats within the study area, not all sensitive habitats were surveyed due to inaccessibility along the transmission route.

Pre-field review of contour mapping, interviews with local residents and USFS staff determined that all sensitive habitat targets would not be accessible during the field reconnaissance due to travel challenges (river crossings, steep terrain, dense vegetation, etc.) or potentially unsafe circumstances (dense vegetation combined with transient bear populations). Therefore, field sampling methods were modified to adapt to the various difficulties encountered while still addressing the goals of the contract.

3.1 Pre-Field Review

A literature review and a desktop botanical resources reconnaissance survey were performed prior to field work to identify potential sensitive species and habitat present in the proposed project areas and to plan the field approach. The following resources were reviewed as part of the pre-field effort (see Section 6 for full citations as applicable):

- USFS Region 10 Sensitive Plant List;
- United States Fish and Wildlife Service (USFWS) National Wetlands Inventory mapping;
- United States Department of Agriculture (USDA) Web Soil Survey;
- Southeast Alaska Geo Portal vegetation data;
- Contour mapping;
- Aerial photography;
- Area photos (from web and City and Borough of Sitka);
- Alaska Natural Heritage Plant Tracking list (AKNHP) - Rare (BIOTICS);
- AKNHP- Non-native Alaska Exotic Plants Information Clearinghouse (AKEPIC);
- Museum of the North ARCTOS Database;
- Flora of Alaska, Hulten;
- USDA Plants database;
- USFS personnel interviews, Stensvold, Anderson, and Dillman; and
- Chapter 4, Southeast Alaska Conservation Assessment (West Baranof and East Baranof Province only).

The pre-field review indicated the presence of several possible sensitive habitat types within the Study Area, the majority of which would be either along the valley bottom within riparian zones and wetlands, or within higher elevation alpine scree and forest edge areas. Human disturbance was also noted as a habitat type known to occur along the Medvejie Lake trail on the east end of Medvejie Valley segment (USFS).

The *Region 10 USFS Sensitive Plant List* and additional previously published USFS reports and surveys (full citations in bibliography) pertaining to the Baranof and Medvejie Valleys were reviewed. These surveys and reports were used to prepare a composite list of sensitive species and their habitats that are most likely to occur within the Study Area. Not all species listed in the *Region 10 USFS Sensitive Plant List* that occur in the Tongass National Forest were expected to be found within the Baranof and Medvejie Valleys. Table 1 lists sensitive species and habitats expected to occur within the Study Area.

According to the *Final Vegetation Investigations Report for 2008* for the Blue Lake Hydroelectric Project (LaBounty, 2010), there are no federally listed rare or endangered plant species in the Tongass National Forest (LaBounty, 2010). The *Region 10 USFS Sensitive Plant List* identifies nine sensitive vascular plants and one sensitive lichen species either known to occur or suspected to occur on Baranof Island (Table 1).

A total of 15 botanical surveys have been completed by the USFS in the Blue Lake, Heart Lake, and Thimbleberry Lake areas in the last 25 years (LaBounty, 2010). These survey areas are located within approximately 10 miles of the Baranof and Medvejie Valleys. Preferred habitat for listed plants was obtained from prior survey reports and personal communication with USFS personnel (Stensvold, Anderson, and Dillman). In addition, USFS botanist Ellen Anderson was interviewed to determine if any other rare or other plants of interest may occur in the project area that survey crews should include in their survey. Three additional Genus were added to the list based on USFS guidance (*Papaver*, *Sedum*, *Sidalcea*). Based on past surveys, the *Region 10 USFS Sensitive Plant List*, and habitat requirements, the most likely sensitive plants likely to be found in the Study Area are:

- *Romanzoffia unalaschcensis*,
- *Polystichum kruckebergii*, and
- *Ligusticum caldera*.

Table 1: Sensitive Plants and Habitats Expected to Occur Within the Study Area

Scientific Name*	Common Name	General Habitat															
		Human disturbance	Upper beach meadow	Well drained open areas	Beach/ forest ecotone	Forest edge	Open forest	Streamside, riverbank	Bog	Heath	Dry meadow	Wet meadow	Alpine and subalpine	Talus slopes	Rock outcrop	Ultramafic	Calcareous
<i>Botrychium spathulatum</i>	Spatulate moonwort	x	x	x								x					x
<i>Botrychium tunux</i>	Moosewort fern	x	x	x								x					x
<i>Botrychium yaaxudakeit</i>	Moonwort fern	x	x	x								x					x
<i>Ligusticum calderi</i>	Calder's loveage					x				x	x	x					x
<i>Lobaria amplissima</i>	Lichen				x												
<i>Piperia unalascensis</i>	Alaska rein orchid						x	x	x	x							x
<i>Polystichum kruckebergii</i>	Kruckeberg's swordfern												x	x	x		
<i>Romanzoffia unalascensis</i>	Unalaska mist-maid		x			x		x							x		
<i>Sidalcea hendersonii</i>	Henderson's checkermallow		x		x												
<i>Tanacetum bipinnatum subsp. huronense</i>	Dune tansy		x														

*Species list adapted from the USFS Alaska Region Sensitive Plants and Habitats, February 2011 list.

The online database, ARCTOS, was reviewed to understand more specific information for each target plant species potentially located in and adjacent to the Study Area on Baranof Island. ARCTOS is an online database containing zoological and botanical specimen resources from universities and museums, including the University of Alaska Museum (ARCTOS, 2011).

Habitats listed on the sensitive species list (Table 1, General Habitat) that coincided with target species were reviewed by taking the habitat listed (e.g. upper beach meadow) and looking through existing aerial photography, soils and other GIS data to determine if the listed habitats were likely to occur within the study area. Aerial photos and GIS layers were also used to examine potential wetlands (NWI, 2011), vegetation regimes, and soil types (Web Soil Survey, 2011). This review gave the Bethel Team an idea of the expected sensitive habitats that may be present in the Study Area. The AKNHP BIOTICS tracking list includes vascular plants that are considered sensitive or rare within Alaska. The AKNHP AKEPIC tracking list was reviewed and covers known invasive species within the area. Table 2 lists invasive species that could potentially occur within the Study Area, according to the AKNHP AKEPIC database.

Table 2: Invasive Species that Could Occur Within the Study Area

Scientific Name	Common Name
<i>Agrostis stolonifera</i>	creeping bentgrass
<i>Cerastium fontanum</i> Baumg. ssp. <i>vulgare</i>	big chickweed
<i>Digitalis purpurea</i>	purple foxglove
<i>Galeopsis tetrahit</i>	brittlestem hempnettle
<i>Hieracium umbellatum</i>	narrowleaf hawkweed
<i>Leucanthemum vulgare</i>	oxeye daisy
<i>Matricaria discoidea</i>	pineappleweed
<i>Phalaris arundinacea</i>	reed canarygrass
<i>Plantago major</i>	common plantain
<i>Poa annua</i>	annual bluegrass
<i>Poa compressa</i>	Canada bluegrass
<i>Poa pratensis</i> . ssp. <i>irrigata</i>	Kentucky bluegrass
<i>Ranunculus repens</i>	creeping buttercup
<i>Rumex obtusifolius</i>	bitter dock
<i>Sagina procumbens</i>	birdeye pearlwort
<i>Schedonorus arundinaceus</i>	tall fescue
<i>Stellaria media</i>	common chickweed
<i>Taraxacum officinale</i> ssp. <i>officinale</i>	common dandelion
<i>Trifolium hybridum</i>	alsike clover
<i>Trifolium repens</i>	white clover

3.2 Field Survey and Sampling Methods

To aid in the identification of sensitive plant species, field sampling efforts were conducted in August 2011 prior to the end of the growing season. The rate and extent to which areas were surveyed in the Baranof and Medvejie Valley segments were determined by the amount of dense vegetation and rough terrain that made certain habitats in those areas inaccessible. In the Baranof Valley segment, the Baranof River bisects the valley and has strong currents that made it unsafe to cross in many areas. This, coupled with the dense vegetation along the river banks, proved to make travel very slow and difficult when walking transects within selected areas. Furthermore, surveying mountain habitats with boulder fields and dense shrub vegetation made finding rare and sensitive species more difficult. The Bethel Team focused on habitats that were accessible, could be surveyed more completely, and were representative of the project area. Surveys conducted along the Baranof Valley segment covered a distance of approximately two miles on the north side of the valley and approximately two miles on the south side (transect distances based on round trip distance to survey area and base camp). Transects were walked on each side of the river valley, originating from a base camp established near a USFS Cabin that lies along the southwestern end of Baranof Lake.

The Medvejie Valley segment was more accessible due to the presence of a man-made recreational and hunting trail leading to Medvejie Lake. A boat was provided for transport across the lake, which made it possible to survey the majority of the various habitat types in the valley. A few habitats of interest (alpine, subalpine, and talus slopes) were inaccessible due to dense vegetation, dangerous terrain, and dangerous animal hazards in Medvejie Valley. Surveys were conducted at the north and south end of Medvejie Lake, as well as along the eastern side of the lake, wherein a boat was used to traverse the length of the lake.

Sensitive habitats identified during pre-field review as potentially containing target sensitive plant species were chosen based on their ability to support an individual or population of sensitive and/or rare species. Investigators walked along transects to the extent practicable given terrain or obstruction impediments until they came to a targeted habitat. Targeted habitat areas were visually surveyed by both field team leaders for targeted rare, sensitive, and invasive plant species. Field protocols were based on USFS guidance regarding sensitive species survey methodologies with modifications given the reconnaissance-level of detail anticipated for the survey. Modifications included:

- Field crews surveyed as far along the transmission corridor as possible given time constraints.
- Transects deviated from the project corridor in places where accessibility was an issue due to terrain obstructions or safety concern.
- Only a cursory review of invasives was conducted, an aerial extent mapping was not completed due to time constraints.

The following USFS guidance documents were used to plan data gathering activities (see Section 6 for full citations as applicable):

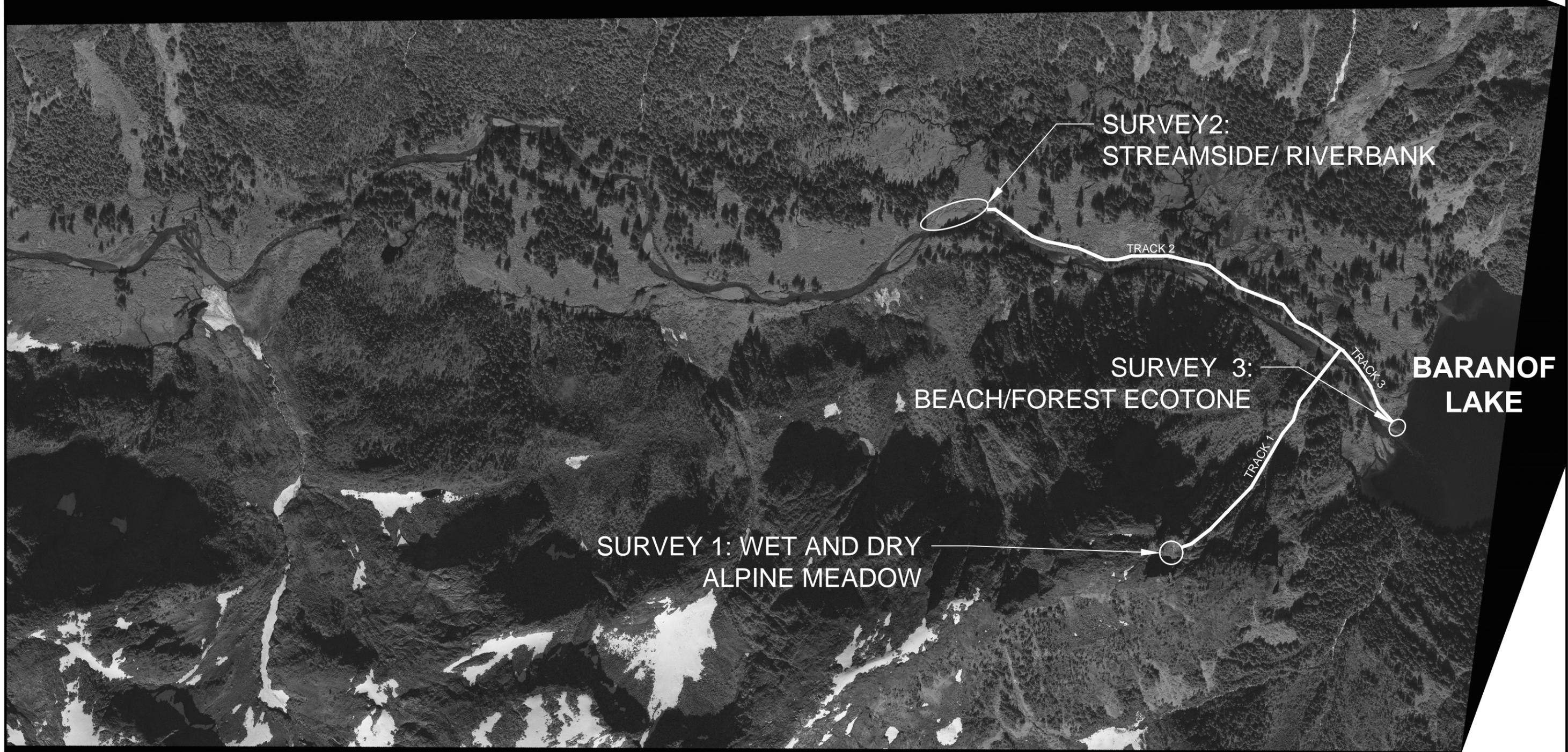
- USFS Threatened, Endangered and Sensitive Plants Element Occurrence Field Guide,
- Tongass National Forest- Guidance for Biological Evaluations: Sensitive Plants,
- USFS Threatened, Endangered and Sensitive Plants Survey Field Guide, and
- USFS Plant Survey Field Forms.

The surveys were conducted using a timed meander method on foot and consisted of both leaders beginning at opposite ends of the survey area and stopping to identify each new species they encountered. Once the area was surveyed for all unknown species, field teams performed a 3-minute meander to ensure no new species were overlooked. Transects walked and areas surveyed were marked with a handheld Garmin GPS unit.

Figures 3 and 4 show the locations of survey areas and transects.

If a potentially rare or sensitive species was encountered, the field team completed the appropriate Pre-Field Review Worksheet for Sensitive Plants; R-10 Daily Sensitive Plant Survey Forms; and the R-6 Threatened, Endangered, and Sensitive Plant Sighting Form. Sensitive or rare plants would be mapped using a handheld GPS and documented following the guidelines set forth in USFS Handbook, FSM 2600 R10, Supplement Number 2672.42, Procedures for Conducting Biological Evaluations, dated September 21, 2005 (USFS, 2005).

A sample of each unknown species encountered was collected, photographed, and recorded. Samples were transported to Fairbanks and given to a Senior Botanist for further identification and classification in the office. Unknown or potentially rare species were provided to the University of Alaska Fairbanks herbarium for identification.



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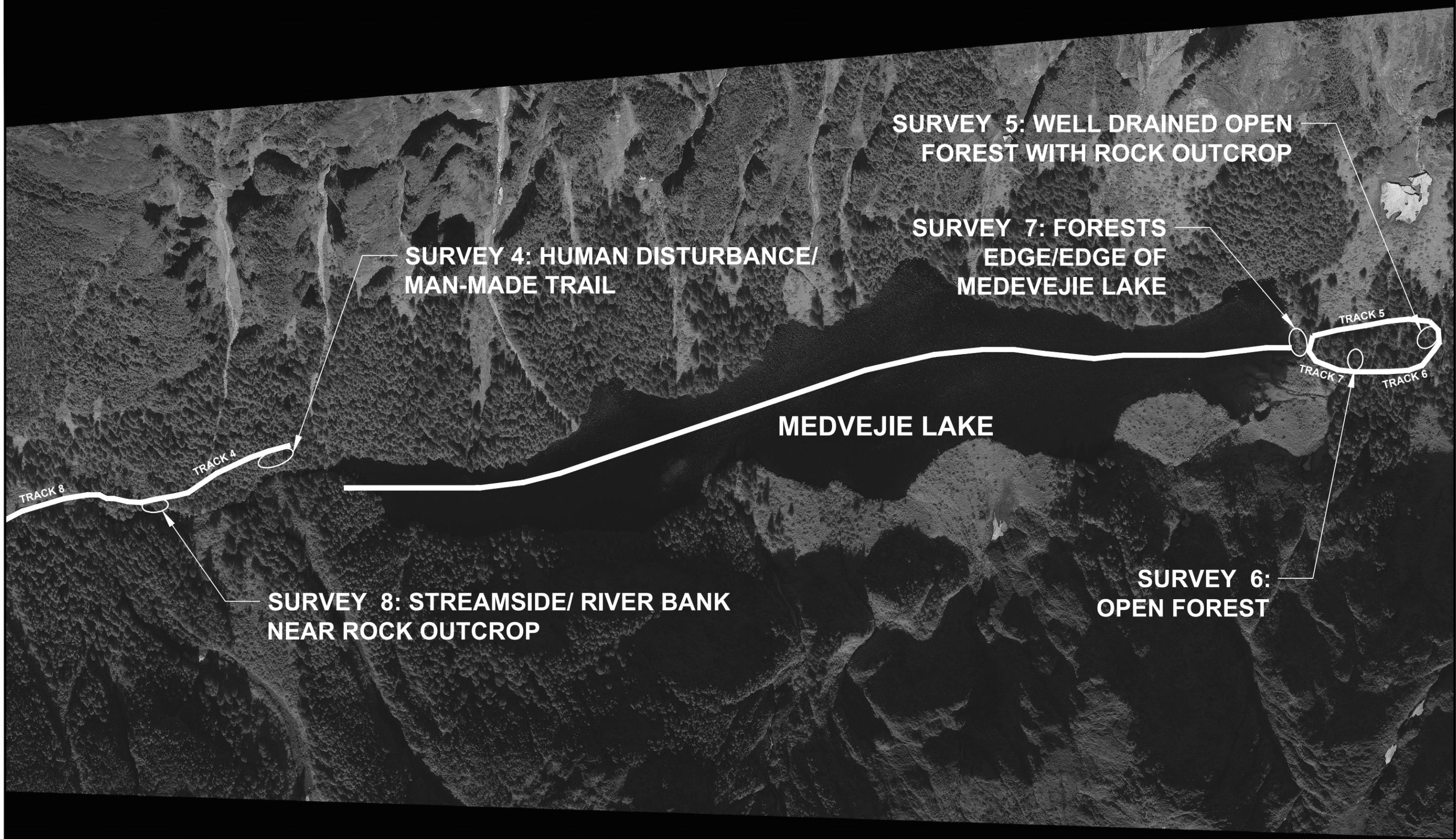
CLIENT: City and Borough of Sitka
 PROJECT NO.: 20115003

BARANOF LAKE SURVEY AREAS

PROJECT: Takatz Lake
 Botanical Resources Reconnaissance Survey
 Near Sitka, Alaska

PROJECT MANAGER: J. FREDENHAGEN SCALE: NTS
 DRAWN BY: K. RUSSELL DATE: MAY 2012

FIGURE:
3



BES Project Files (V:\City & Borough of Sitka\20115003\Takatz Lake Botanical Resources Study-Area 2\CAD or Drawings of Figure\T\Takatz Lake Final\report.dwg, 1=100, 04/16/12, at 12:28 by klr FIG 4



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CLIENT: City and Borough of Sitka
 PROJECT NO.: 20115003

MEDVEJIE LAKE SURVEY AREAS		
PROJECT: Takatz Lake Botanical Resources Reconnaissance Survey Near Sitka, Alaska		
PROJECT MANAGER: J. FREDENHAGEN	SCALE: NTS	FIGURE: 4
DRAWN BY: K. RUSSELL	DATE: MAY 2012	

4.0 RESULTS

No sensitive, rare or invasive plant species targeted for the Study Area were encountered during the limited field surveys, nor were they identified from specimen collection in office. Additional surveys in habitats not covered by this reconnaissance report may be warranted if determined necessary by the USFS (see Section 5). A list of all flora identified by the field team or in the office, along with approximated percent ground cover, is listed in Table A-1 (Appendix A). Figure 3 and Figure 4 show the locations of survey areas within the Study Area.

4.1 Baranof Valley Survey results

A total of three surveys were performed in the Baranof Valley segment. Survey areas were chosen based on their potential for species diversity and sensitivity. In spite of limited accessibility and time constraints, the field team was able to survey approximately one mile up into Baranof Valley to the west of Baranof Lake.

The Baranof Valley Segment consists mainly of *Alnus* species; high and low bush shrubs, mosses, various flowering plants, as well as multiple tree species including *Tsuga heterophylla*, *Picea sitchensis*, and *Callitropsis nootkatensis*. The terrain is irregular, even along the valley floor, with steep slopes to terraces above the valley floor. Survey 1 is located within an alpine wetland. The first transect traversed and climbed up through a boulder slide to the top of a terrace situated on the south side of the valley. Survey 2 is located approximately one mile up the Baranof River, on the north side along the river gravel bank. Survey 3 on the Baranof Valley segment is located near the field team's base camp, along the edge of Baranof Lake.

4.1.1 Survey 1

Survey 1 is located approximately one mile south of the field team's base camp, on top of a terrace (Figure 3). Base camp was located at the west edge of Baranof Lake, where Baranof River inlets. The goal was to survey changes in habitat with elevation and to survey sub-alpine, open meadow, and talus-slope vegetative communities. Changes in habitat were immediately apparent with the sharp increase in elevation. Communities changed from densely vegetated forest with tall shrubs and trees, to low shrub and alder habitats. The most predominant species found throughout changing habitats was *Oplopanax horridus* and various *Alnus* species (Photo 1). A change (decrease) in percent cover occurred when entering into boulder fields, and increases in elevation (Photo 2).

In Survey 1, the habitat is an open, wet alpine meadow with the predominant species being *Fauria crista-galli* with an approximated 50% ground cover in the survey area (Photo 3). This area is open and did not have any canopy cover. No rare or sensitive species were identified in Survey 1. A list of species encountered and their percent cover is shown in Table A-1.



Photo 1: *Oplopanax horridus* is predominant through changing habitats and changes in elevation.



Photo 2: Boulder field below Survey 1.



Photo 3: *Fauria crista-galli* in Survey 1, Baranof Valley Segment.

4.1.2 Survey 2

Survey 2 is located approximately one mile from the west end of Baranof Lake, following along the north side of the Baranof River. This habitat is a riparian meadow and is listed as one of the USFS Alaska Region Sensitive Plants and Habitats (USFS, 2011) list as a streamside/riverbank. The field team sought two sensitive species likely to occur in this habitat; *Piperia unalascensis* and *Romanzoffia unalascensis*. Ground cover is mainly needle duff, mosses and a few sparse species of grass. Survey 2 was chosen for its potential to contain sensitive species that thrive in well drained, gravelly, sandy areas near water (Photo 4). This area is sparsely vegetated and does not have any canopy cover (30 plant species present). A population of *Romanzoffia sitchensis* was also found in small clumps in no discernible pattern along the gravel bar (Photo 5). Initially this species was misidentified as *Romanzoffia unalascensis*, but upon further identification in office, it was identified as *Romanzoffia sitchensis*. The plant sample was sent to the University of Alaska Fairbanks (UAF) for positive identification. UAF Herbarium botanist Carolyn Parker confirmed the identification of the plant specimen. A list of species encountered and their percent cover is shown in Table A-1.



Photo 4: Survey 2 is a sparsely vegetated, sandy, gravel bar adjacent to moving water.



Photo 5: *Romanzoffia sitchensis* in Survey 2 (August 2011).

4.1.3 Survey 3

Survey 3 is located on the west edge of Baranof Lake, within approximately 250 feet of the field team's base camp. This habitat is a beach/forest ecotone and was chosen due to its potential to contain sensitive species *Lobaria amplissima* and *Sidalcea hendersonii* as listed on the USFS Alaska Region Sensitive Plants and Habitats (USFS, 2011), (Photo 6). Survey 3 focused on the beach area. Few plant communities were found in this area. This area is open and did not have any canopy cover. *Calamagrostis canadensis* and *Deschampsia cespitosa* were the dominant grasses. Flowering species include *Aster subspicatus* (Photo 7) and *Epilobium latifolium* (Photo 8). A list of species encountered and their percent cover is shown in Table A-1.



Photo 6: Survey 3 is a fine-sand beach, with little vegetation ground cover.



Photo 7: *Aster subspicatus* in Survey 3.



Photo 8: *Epilobium latifolium* in Survey 3.

4.2 Medvejie Valley Survey Results

Survey areas in Medvejie Valley were easier to access due to the presence of a man-made hunting and recreational use trail. As a result, a total of five surveys were conducted in the Medvejie Valley Segment. Despite limited accessibility due to the density of vegetation and terrain obstructions at the east side of the lake, the field team was able to survey approximately two miles up into Medvejie Valley (distance includes length of Medvejie Lake) to the bottom of a steep slope leading up to the tunnel segment. Survey areas were chosen based on vegetative habitat and their potential for species diversity and sensitivity.

The Medvejie Valley Segment is comprised of dense vegetation consisting of alders; high and low bush shrubs, mosses, and various flowering plants, as well as multiple tree species, including *Tsuga heterophylla*, *Picea sitchensis*, and *Callitropsis nootkatenensis*. Survey 4 is located near the western edge of Medvejie Lake, directly off the man-made trail. Survey 5 is located across Medvejie Lake (eastern shore) in a well-drained, rock slide. Survey 6 and 7 are also located across the lake, in a human-disturbed forested area and at the forest edge next to Medvejie Lake, respectively. Survey 8 is located on the western end of the lake, on the edge of a creek that outlets the lake into Silver Bay. Figures 3 and 4 show the locations of the survey areas.

4.2.1 Survey 4

Survey 4 is located in the Medvejie Valley, near the western-end of Medvejie Lake. The habitat in this area is described as human disturbance by the USFS Alaska Region Sensitive Plants and Habitats (USFS, 2011). Sensitive species most likely to occur in areas with human disturbance are: *Botrychium spathulatum*, *Botrychium tunux*, and *Botrychium yaaxudakeit*.

Survey 4 is located off of a man-made trail, on a slope of approximately 10 degrees and about 50 to 60 feet away from a fast moving creek that drains out of Medvejie Lake. A granite rock slide is present through Survey 4 that is highly populated with mosses and lichen (Photo 9). The canopy cover is approximately 30% *Alnus rubra*, while the ground cover is mostly mosses and needle duff. *Oplopanax horridus* were present along with many species of grasses, forbs and ferns. *Tiarella trifoliata* (Photo 10) and *Lycopodium selago* (Photo 11) were two species that were identified in both Baranof and Medvejie Valleys. No sensitive species were identified in this area. A list of species encountered and their percent cover is shown in Table A-1.



Photo 9: Survey 4, near Medvejie Lake, is located off of a man-made trail and in a granite rock slide.



Photo 10: *Tiarella trifoliata* in Survey 4.



Photo 11: *Lycopodium selago* is identified in both Baranof and Medvejie Valleys.

4.2.2 Survey 5

Survey 5 is located across Medvejie Lake, near the mountain pass that separates the Medvejie and Baranof Valleys (the Tunnel Segment). This area is a well-drained rock slide that may have previously been a creek bed (Photo 12). This habitat was selected due to its potential to contain sensitive species *Piperia unalascensis*, *Polystichum kruckebergii*, *Botrychium spathulatum*, *Botrychium tunux*, and *Botrychium yaaxudakeit* per the USFS Alaska Region Sensitive Plants and Habitats list. The USFS Alaska Region Sensitive Plants and Habitats (USFS, 2011) describes this habitat as a well-drained open area, as well as a rock outcrop. Canopy cover is approximately 20-30% from *Picea sitchensis* and *Tsuga heterophylla*. Ground vegetation mainly consisted of ferns, herbs, grasses, mosses, and lichens. No sensitive species were identified. A list of species encountered and their percent cover is shown in Table A-1. Areas beyond Survey 5 toward the proposed Tunnel Segment were not surveyed due to inaccessibility and safety concerns (dangerous terrain and wildlife populations).



Photo 12: Survey 5 is a well-drained open area with a rock outcrop.

4.2.3 Survey 6

Survey 6 was a human disturbed habitat. Human disturbance was classified by a worn game trail that traversed through the area, and evidence of recently used fire pits. This habitat was chosen due to its potential to contain sensitive species per the USFS Alaska Region Sensitive Plants and Habitats (USFS, 2011). This habitat is defined as an open forest, possibly containing *Piperia unalascensis*. *Athyrium filix-femina* covered approximately 40-50% of the ground, with about 10% canopy cover from *Picea sitchensis* and *Tsuga heterophylla* (Photo 13). The area is relatively flat with fallen trees. Needle duff and other organics covered the ground. No sensitive species were identified. A list of species encountered and their percent cover is shown in Table A-1.



Photo 13: Survey 6 is mainly *Athyrium filix-femina*, covering approximately 40% of the forest floor.

4.2.4 Survey 7

Survey 7 is located at the forest's edge and at the edge of Medvejie Lake (Photo 14). This habitat was chosen for its proximity to the forest's edge and its potential to contain sensitive species *Ligusticum calderi* and *Romanzoffia unalaschcensis* per the USFS Alaska Region Sensitive Plants and Habitats (USFS, 2011). The area is open with no canopy cover, with non-woody species (grasses and forbs) composing most of the vegetation (Photo 14). A population of *Saxifraga nelsoniana* is found in small groups near rocks and water (Photo 15). Initially, this species was misidentified as possibly being *Romanzoffia unalaschcensis*, but upon further identification in office, it was identified as *Saxifraga nelsoniana*. The plant sample was also sent to UAF for positive identification. UAF Herbarium botanist Carolyn Parker confirmed the identification of the plant specimen. No sensitive species were identified in this area. A list of species encountered and their percent cover is shown in Table A-1.



Photo 14: Survey 7 is located at the edge of Medvejie Lake and next to the forest.



Photo 15: *Saxifraga nelsoniana* in Survey 7 (August 2011).

4.2.5 Survey 8

Survey 8 is located on the side of a fast moving creek that outlets Medvejie Lake. The area is a narrow stretch of land, made up of gravel and small to large rocks (Photo 16). This habitat was selected due to its potential to contain *Piperia unalascensis* and *Romanzoffia unalascensis*, both species that can be found near streams and rivers. The area is very damp and contained many mosses. Alders are overhanging, creating a small canopy cover of approximately 35% of the survey site. Understory vegetation consists of various forbs, including *Romanzoffia sitchensis*. Positive identification of *Romanzoffia sitchensis* was verified by UAF herbarium staff. No sensitive species were identified in this area. A list of species encountered and their percent cover is shown in Table A-1.



Photo 16: Survey 8 is located at the edge of a creek that served as the outlet for Medvejie Lake.

4.3 Invasive Plants

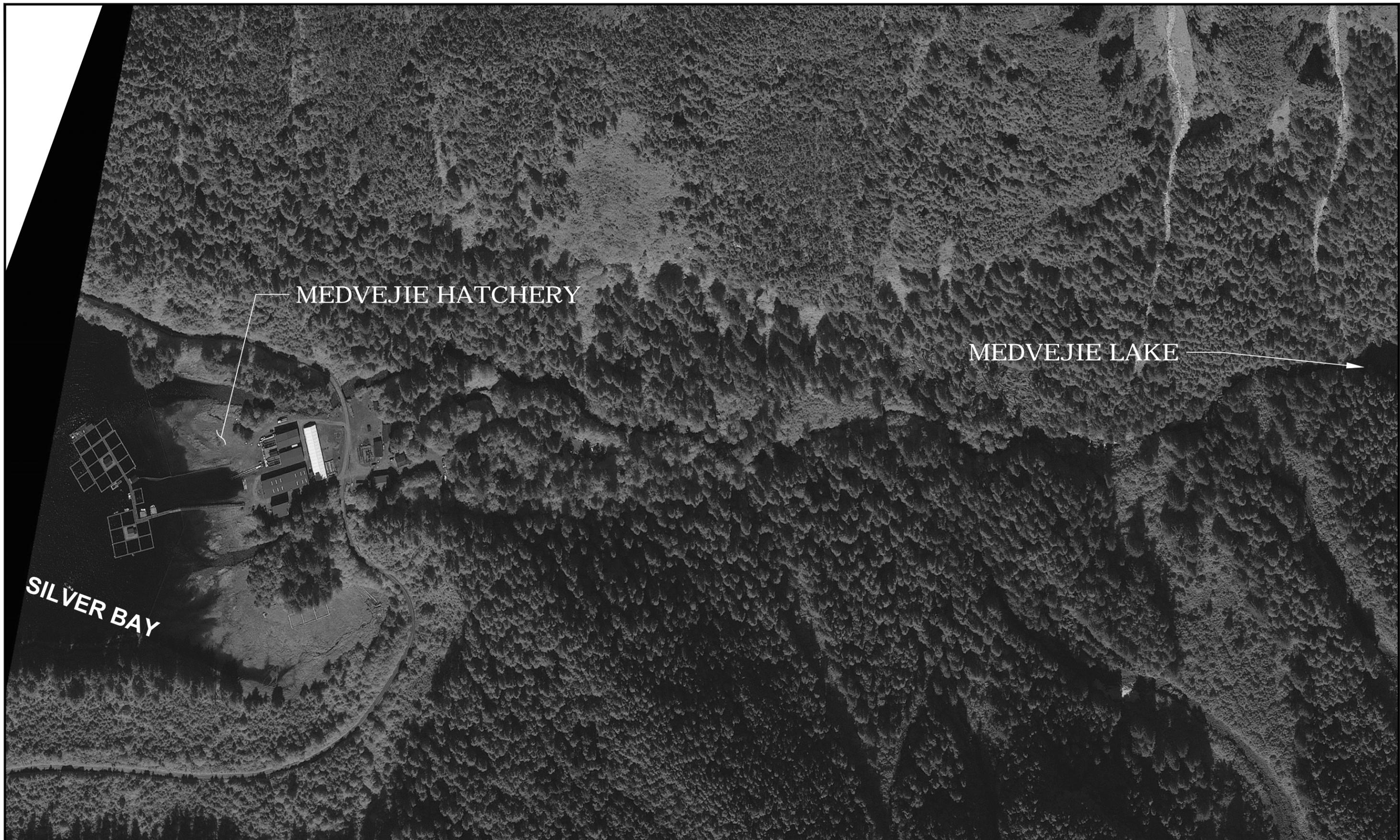
A survey for invasive plants was conducted near the Medvejie Valley Study Area where project disturbance may provide a pathway for invasive plants to enter into previously undisturbed areas. The survey did not map aerial extents of species but information was gathered to the extent possible within the allotted timeframes for the survey. Invasive species were noted on the west end of the Medvejie Valley segment near the Medvejie Hatchery (Figure 5). The field team conducted a basic reconnaissance survey to look for potential invasive species. The field team collected specimens that could not be positively identified in the field. During the field team's surveys in Baranof and Medvejie valleys, the field team did not observe any invasive species, nor were any identified during specimen identification in office.

Invasive species found to be growing within gravel pads and on the edge of the surveyed area included:

- *Ranunculus repens*,
- *Plantago major*,

- *Trifolium repens*, and
- *Taraxacum officinale* ssp. *officinale*.

Another cursory-level invasive species survey was conducted on the Baranof Valley segment at the Forest Service cabin near the edge of Baranof Lake. The field team did not observe any invasive species in this area, nor were any identified by the senior botanist during species identification.



MEDVEJIE HATCHERY

MEDVEJIE LAKE

SILVER BAY

BES Project Files (V:\City & Borough of Sitka\220115003\Takatz Lake Botanical Resources Study - Area 2\CAD or Drawings of Figures\Takatz Lake-draftreport.dwg, 11/16/06 06:16:12 at 09:25 by kbr
FIG 5



	BETHEL ENVIRONMENTAL SOLUTIONS LLC <i>A subsidiary of Bethel Native Corporation</i>		BLUE LAKE FISH HATCHERY	
	2605 Denali Street, Suite 100 Anchorage, AK 99503 (907) 522-6103 Fax (907) 522-6153		PROJECT: Takatz Lake Botanical Resources Reconnaissance Survey Near Sitka, Alaska	
CLIENT: City and Borough of Sitka	PROJECT NO.: 20115003	PROJECT MANAGER: J. FREDENHAGEN	SCALE: NTS	FIGURE: 5
		DRAWN BY: K. RUSSELL	DATE: MAY 2012	

5.0 CONCLUSION AND RECOMMENDATIONS

5.1.1 Conclusions

Bethel concludes that the potential impact to flora associated with the construction and operation of the Takatz Lake Hydroelectric Project will come from the potential introduction and spread of existing invasive plant species. Bethel concludes the following, in regard to the presence of rare, sensitive, and invasive plants in the Takatz Lake Hydroelectric Project Corridor:

- Rare and endangered plant species are highly unlikely to be present in the corridor. Based on a review of readily recognized literature, rare and endangered plant species have not been identified in the Tongass National Forest or the surrounding region. The USFS has not reported the presence of such species in published literature or in their review of the draft of this document. During the reconnaissance of sections of the corridor, Bethel did not observe rare or endangered plant species.
- Sensitive plant species are possible but unlikely to be present in the corridor. The USFS has identified sixteen habitats that typically support sensitive plant species in this region. During the reconnaissance, nine of these types of habitats were encountered and considered representative of that habitat in the corridor. The habitat encountered was surveyed for sensitive plant species and none were identified. The remaining seven types of habitat may exist in sections of the corridor not reconnoitered in this study.
- Invasive plant species are prevalent in select areas of the corridor. During the reconnaissance, Bethel encountered several areas exposed to obvious anthropogenic influence. These areas supported a prevalence of several species of invasive plants.

The reconnaissance was limited to select sections of the proposed corridor. Approximately 25 percent of the corridor was reconnoitered. Sections of the corridor that were not reconnoitered may include types of habitat not assessed in this study but that typically support sensitive plant species in the region. Likewise, these sections may include habitat that has been assessed as representative and include sensitive plant species that were not observed in the representative habitat.

5.1.2 Recommendations

Bethel recommends the following.

- The City and Borough of Sitka expand the reconnaissance for rare, sensitive, and invasive plants in the Takatz Lake Hydroelectric Project Corridor. It should be expanded to encompass the full extent of the corridor to include the future tunnel sections.
- Construction and operations plans for the project should include provisions to avoid the introduction and mitigate the perpetuation of invasive plant species.

6.0 REFERENCES

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APPENDIX A

Table A-1

Survey Area 1 - Baranof Lake

<i>Scientific Name</i>	<i>Common Name</i>	<i>Percent Cover</i>
<i>Andromeda polifolia</i>	Bog rosemary	1
<i>Blechnum spicant</i>	Deer fern	T
<i>Callitropsis nootkatensis</i>	Alaska Cypress	25%
<i>Carex anthoxanthea</i>	Yellow-flowered sedge	T
<i>Carex gynocrates</i>	Northern bog sedge	T
<i>Cassiope mertensiana</i>	White-mountain heather	T
<i>Cladothamnus pyroliflorus</i>	Copperbush	T
<i>Coptis asplenifolia</i>	Fern-leaved goldthread	T
<i>Cornus canadensis</i>	Bunchberry dogwood	T
<i>Cryptogramma crista</i>	Parsley fern	T
<i>Dryopteris dilatata</i>	Shield fern	T
<i>Empetrum nigrum</i>	Black crowberry	2%
<i>Eriophorum angustifolium</i>	Common Cottongrass	8%
<i>Fauria crista-galli</i>	Deercabbage	50%
<i>Gentiana douglasiana</i>	Swamp gentian	T
<i>Luetkea pectinata</i>	Partridgefoot	T
<i>Phyllodoce glanduliflora</i>	Yellow mountain heather	T
<i>Picea sitchensis</i>	Sitka spruce	2%
<i>Saxifraga nelsoniana</i>	Heartleaf saxifrage	T
<i>Tsuga heterophylla</i>	Western hemlock	3%
<i>Vaccinium alaskaense</i>	Alaskan blueberry	T
<i>Vaccinium caespitosum</i>	Dwarf billberry	1%
<i>Vaccinium uliginosum</i>	Bog blueberry	10%

T = Trace

Survey Area 2 - Baranof Lake

<i>Scientific Name</i>	<i>Common Name</i>	<i>Percent Cover</i>
<i>Alnus rubra</i>	Red alder	5%
<i>Arctagrostis latifolia</i>	Wideleaf polargrass	3%
<i>Artemisia norvegica (sp. Saxatilis)</i>	Mountain sagewort	T
<i>Campanula rotundifolia</i>	Common harebell	1%
<i>Carex mertensii</i>	Mertens' sedge	2%
<i>Carex stylosa</i>	Long-styled sedge	2%
<i>Deschampsia cespitosa</i>	Tufted hairgrass	2%
<i>Epilobium anagallidifolium</i>	Alpine willowherb	T
<i>Epilobeum ciliatum</i>	Purple-leaved willowherb	T
<i>Epilobium latifolium</i>	River beauty	T
<i>Gymnocarpum dryopteris</i>	Oak fern	5%
<i>Heuchera glabra</i>	Alpine heuchera	T
<i>Juncus</i>	Rush species	1%
<i>Juncus supiniformis</i>	Spreading rush	1%
<i>Luzula multiflora</i>	Many-flowered wood-rush	T
<i>Mimulus guttatus</i>	Yellow monkey-flower	T
<i>Osmorhiza chilensis</i>	Mountain sweet-cicely	T
<i>Oxyria digyna</i>	Mountain sorrel	T
<i>Poa species*</i>	Grass species	10%
<i>Poa palustris</i>	Fowl bluegrass	4%
<i>Ribes bracteosum</i>	Stink currant	T
<i>Romanzoffia seitchensis</i>	Sitka mistmaiden	3%
<i>Sagina maxima</i>	Coastal pearlwort	T
<i>Sanguisorba canadensis</i>	Canadian burnet	T
<i>Saxifraga mertensiana</i>	Wood saxifrage	1%
<i>Solidago multiradiata</i>	Northern goldenrod	T
<i>Stellaria calycantha</i>	Northern starwort	T
<i>Tiarella trifoliata</i>	Foamflower	T
<i>Viola palustris</i>	Marsh violet	T
<i>Unknown Forb*</i>	Wildflowers	15%

*= The plant was not identified to species due to time constraints, lack of complete sample or damage to collected sample prior to identification.

T = Trace

Survey Area 3 - Baranof Lake

<i>Scientific Name</i>	<i>Common Name</i>	<i>Percent Cover</i>
<i>Achillea millefolium</i>	Common yarrow	1%
<i>Alnus rubra</i>	Red alder	5%
<i>Arnica amplexicaulis</i>	Streambank arnica	T
<i>Artemisia norvegica</i>	Mountain sagewort	T
<i>Aster subspicatus</i>	Douglas' aster	T
<i>Calamagrostis canadensis</i>	Bluejoint	5%
<i>Deschampsia cespitosa</i>	Tufted hairgrass	5%
<i>Epilobeum latifolium</i>	River beauty	T
<i>Festuca occidentalis</i>	Western fescue	10%
<i>Oxyria digyna</i>	Mountain sorrel	T
<i>Populus balsamifera</i>	Black Cottonwood	T
<i>Prenanthes alata</i>	Western rattlesnake-root	3%
<i>Prunella vulgaris</i>	Self-heal	T
<i>Romanzoffia sitchensis</i>	Sitka mistmaiden	2%
<i>Sanguisorba canadensis</i>	Canadian burnet	T
<i>Saxifraga nelsoniana</i>	Heartleaf saxifrage	T

T = Trace

Survey Area 4 - Medevejie Lake

<i>Scientific Name</i>	<i>Common Name</i>	<i>Percent Cover</i>
<i>Alnus rubra</i>	Red alder	30%
<i>Athyrium filix-femina</i>	Western swordfern	2%
<i>Boschniakia rossica</i>	Northern groundcone	T
<i>Calamagrostis canadensis</i>	Bluejoint	T
<i>Cryptogramma crispera</i>	Parsley fern	T
<i>Dryopteris dilatata</i>	Spreading woodfern	2%
<i>Elymus hirsutus</i>	Hairy wildrye	T
<i>Epilobium ciliatum</i>	Purple-leaved willowherb	T
<i>Galium aparine</i>	Stickywilly	T
<i>Gymnocarpium dryopteris</i>	Western oakfern	1%
<i>Luzula parviflora</i>	Small-flowered wood-rush	T
<i>Lycopodium selago</i>	Fir clubmoss	T
<i>Moneses uniflora</i>	Single delight	T
<i>Oplopanax horridus</i>	Devilsclub	3%
<i>Picea sitchensis</i>	Sitka spruce	4%
<i>Polypodium glycyrrhiza</i>	Licorice fern	1
<i>Prenanthes alata</i>	Western rattlesnake-root	T
<i>Rubus spectabilis</i>	Salmonberry	8%
<i>Sambucus racemosa</i>	Red elderberry	T
<i>Streptopus amplexifolius</i>	Clasping twistedstalk	T
<i>Thelypteris phegopteris</i>	Narrow beech fern	1%
<i>Tiarella trifoliata</i>	Foamflower	T
<i>Tsuga heterophylla</i>	Western hemlock	10%
<i>Vaccinium ovalifolium</i>	Oval-leaf blueberry	T

T = Trace

Survey Area 5 - Medevejie Lake

<i>Scientific Name</i>	<i>Common Name</i>	<i>Percent Cover</i>
<i>Angelica lucida</i>	Sea-watch	T
<i>Athyrium filix-femina</i>	Western swordfern	T
<i>Circaea alpina</i>	Enchanter's nightshade	T
<i>Coptis asplenifolia</i>	Fern-leaved goldthread	T
<i>Dryopteris dilatata</i>	Spreading woodfern	T
<i>Elymus hirsutus</i>	Hairy wildrye	T
<i>Epilobium anagallidifolium</i>	Alpine willowherb	T
<i>Epilobium ciliatum</i>	Purple-leaved willowherb	T
<i>Gymnocarpium dryopteris</i>	Western oakfern	2%
<i>Picea sitchensis</i>	Sitka spruce	2%
<i>Prenanthes alata</i>	Western rattlesnake-root	T
<i>Ranunculus species*</i>	Buttercup species	T
<i>Ribes laxiflorum</i>	Trailing black currant	T
<i>Rubus spectabilis</i>	Salmonberry	T
<i>Sanguisorba canadensis</i>	Canadian burnet	T
<i>Saxifraga mertensiana</i>	Wood saxifrage	T
<i>Streptopus amplexifolius</i>	Clasping twistedstalk	T
<i>Tiarella trifoliata</i>	Foamflower	T
<i>Tsuga heterophylla</i>	Western hemlock	15%

T = Trace

* *Ranunculus* was collected by the field team from Survey Area 5, however the specimen and flower were damaged in transit and were unidentifiable in the office.

Survey Area 6 - Medevejie Lake

<i>Scientific Name</i>	<i>Common Name</i>	<i>Percent Cover</i>
<i>Viola palustris</i>	Marsh violet	T
<i>Athyrium filix-femina</i>	Western swordfern	40%
<i>Circaea alpina</i>	Enchanter's nightshade	T
<i>Dryopteris dilatata</i>	Spreading woodfern	10%
<i>Gymnocarpium dryopteris</i>	Western oakfern	10%
<i>Moneses uniflora</i>	Single delight	T
<i>Lycopodium annotinum</i>	Stiff clubmoss	5%
<i>Oplopanax horridus</i>	Devilsclub	3%
<i>Picea sitchensis</i>	Sitka spruce	5%
<i>Rubus pedatus</i>	Creeping raspberry	T
<i>Streptopus amplexifolius</i>	Clasping twistedstalk	T
<i>Tsuga heterophylla</i>	Western hemlock	5%
<i>Vaccinium ovalifolium</i>	Oval-leaf blueberry	T
<i>Vaccinium parvifolium</i>	Red huckleberry	T

T = Trace

Survey Area 7 - Medevejje Lake

<i>Scientific Name</i>	<i>Common Name</i>	<i>Percent Cover</i>
<i>Angelica lucida</i>	Sea-watch	T
<i>Arnica mollis</i>	Hairy arnica	T
<i>Aster*</i>	Aster species	T
<i>Athyrium filix-femina</i>	Western swordfern	1%
<i>Calamagrostis canadensis</i>	Bluejoint	10%
<i>Carex laeviculmis</i>	Smooth sedge	1%
<i>Carex livida</i>	Pale sedge	1%
<i>Carex mertensii</i>	Mertens' sedge	5%
<i>Deschampsia cespitosa</i>	Tufted hairgrass	5%
<i>Epilobium hornemannii</i>	Hornemann's willowherb	T
<i>Erigeron peregrinus</i>	Subalpine daisy	1%
<i>Fauria crista-galli</i>	Deercabbage	T
<i>Heracleum lanatum</i>	Common cowparsnip	2%
<i>Luzula piperi</i>	Piper's wood-rush	T
<i>Prenanthes alata</i>	Western rattlesnake-root	3%
<i>Romansoffia sitchensis</i>	Sitka mistmaiden	T
<i>Rubus spectabilis</i>	Salmonberry	T
<i>Salix species*</i>	Willow species	1%
<i>Sanguisorba canadensis</i>	Canadian burnet	1%
<i>Saxifraga nelsoniana</i>	Heartleaf saxifrage	T
<i>Stellaria crispa</i>	Crisp sandwort	T

*= The plant was not identified to species due to time constraints, lack of complete sample or damage to collected sample prior to identification.

T = Trace

Survey Area 8 - Medevejie Lake

<i>Scientific Name</i>	<i>Common Name</i>	<i>Percent Cover</i>
<i>Alnus rubra</i>	Red alder	35%
<i>Athyrium filix-femina</i>	Western swordfern	T
<i>Cardamine occidentalis</i>	Western bitter-cress	T
<i>Claytonia sibirica</i>	Siberian miner's-lettuce	T
<i>Dryopteris dilatata</i>	Spreading woodfern	T
<i>Epilobium ciliatum</i>	Purple-leaved willowherb	T
<i>Festuca occidentalis</i>	Western fescue	T
<i>Geum macrophyllum</i>	Large-leaved avens	T
<i>Gymnocarpium dryopteris</i>	Western oakfern	T
<i>Heuchera glabra</i>	Smooth alumroot	T
<i>Luzula paviflora</i>	Small-flowered wood-rush	T
<i>Poa species*</i>	Grass species	T
<i>Prenanthes alata</i>	Western rattlesnake-root	T
<i>Ribes laxiflorum</i>	Trailing black currant	1%
<i>Romanzoffia sitchensis</i>	Sitka mistmaiden	5%
<i>Salix species*</i>	Willow species	1%
<i>Stellaria crispa</i>	Crisp sandwort	T
<i>Vaccinium parvifolium</i>	Red huckleberry	T

*= The plant was not identified to species due to time constraints, lack of complete sample or damage to collected sample prior to identification.

T = Trace

APPENDIX B

Field Logs



"Rite in the Rain"

ALL-WEATHER
UNIVERSAL

No. 371

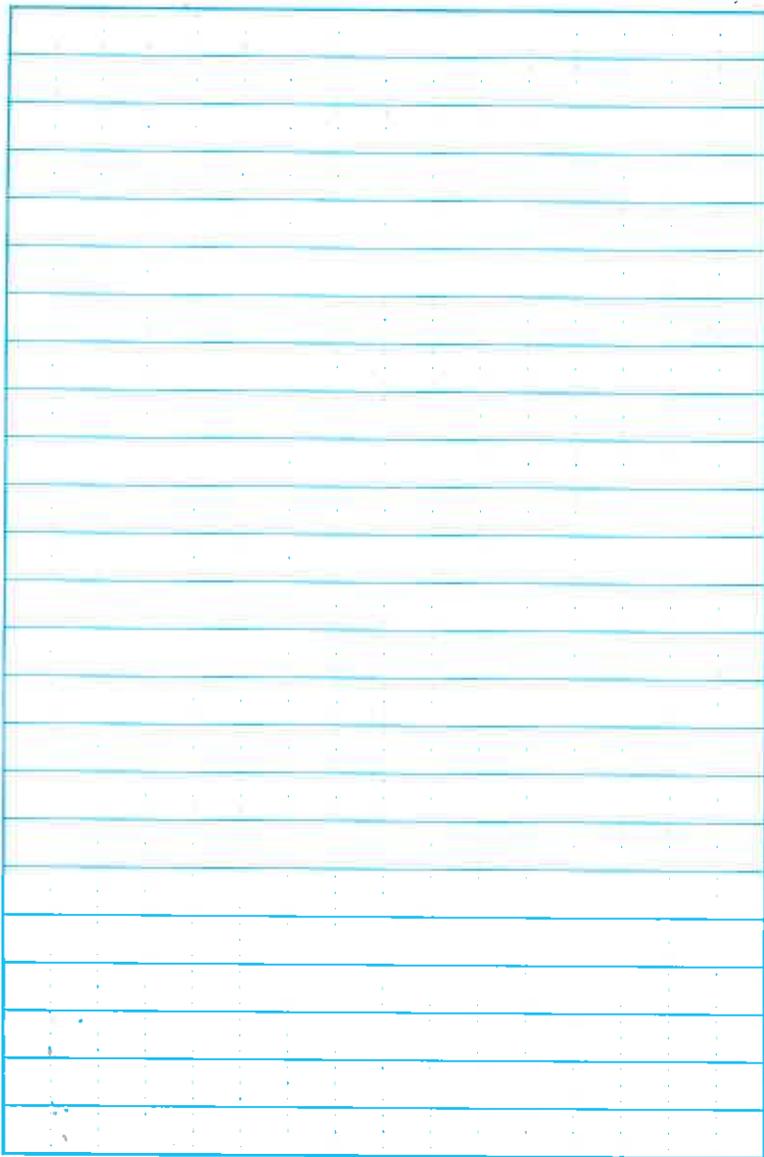
Takatz Lake Botanical Survey

City and Borough of Sitka

Project #: 220115003

Jenna Fredenhagen

August 1, 2011 - August 6, 2011



Scale: 1 square=_____

Takatz Lake Survey 8/1/2011
 Arrive at airport 6:00A
 Arrive Sitka 11:00A

Harris Air flight to Baranof Lake
 at 16:30

Stay one night in U.S Forest Service
 Cabin

Camp set-up and plant identification
 until 21:00

Immediate habitat area is densely
 wooded, with some human-made
 trails.

Weather is mostly cloudy with
 no precipitation.

No rare plants were identified in
 immediate area near cabin.



J

Scale: 1 square=_____

4 Takatz Lake Survey 8/2/2011

8:30am Mostly cloudy, no precip
Field team leaders: Dianne, Daniel
Field techs: Meghan, Jenna

Pack-up and move from forestry cabin to base camp (NW of cabin across lake).

Slow going with lots of gear. Crossed shallow areas of Lake to reach base camp.

Camp set-up, gear re-pack and head out to conduct first survey at 11:00A.

Hiking is very slow due to dense vegetation. Fallen trees, salmonberry bushes, alders (*Alnus*), Devil's Club (*Oplanax horridus*) are most difficult to maneuver through.

Saw bear and deer scat, as well as some tracks for both (elev. ~300ft)

Machete was used but was not too

Scale: 1 square=

J

5 Takatz Lake Survey 8/2/2011

helpful.

Goal is to survey sub-alpine communities, note changes in habitats and communities as we hike up to "Bench". Also to reach Bench and find an easier, less vegetated path that leads up the valley.

GPS track code from base camp to bench: "Track1BNCH0802" on GPS2

Weather change approx 12:00P, intermittent sunny breaks through clouds. No precip.

12:15P

Reached potential survey area but do to time constraints area is marked in GPS1 as "SSlide01"

Elevation: 322ft.

Waypoint: N57°04.176'

W 134°54.355'

J

Scale: 1 square=

Takatz Lake Survey 8/2/2011

Rock slide area appears to be very old. Approximately 800-2000 years old. Age indicated by heavy vegetation growth on rocks inside area.

Change in habitat with elevation gain (approx every 75ft)

13:15 Cloud ceiling high, light, no precip

Approx 800-900ft. in elevation noticed first grass species since leaving the lake area

Hiking is slow until breaking through vegetation into large boulder field.

Reached boulder field approx 14:00

Took photo of yellow flower on my camera: #'s 146 & 147

Scale: 1 square = _____

F

Takatz Lake Survey 8/2/2011

Reached Bench at 14:39

Begin Survey #1 Partly sunny, no precip
→ 15:00

Habitat: wet alpine meadow with small areas of standing water. Area is mostly flat with perimeter slightly sloping upward

Many bear signs. Skat, paw prints, a well-traveled game trail and areas where veg. is depressed from animal laying down.

GPS Polygon (of area surveyed)

Name: "S2 Bench"

Elevation: ~1100ft

Also see...

GPS: "02 AUG 2 Bench" → double check

Boundaries of survey area are shear cliff to the NW, large boulders to the south, wooded area/game trail to the west, wooded (heavily) area to the east.

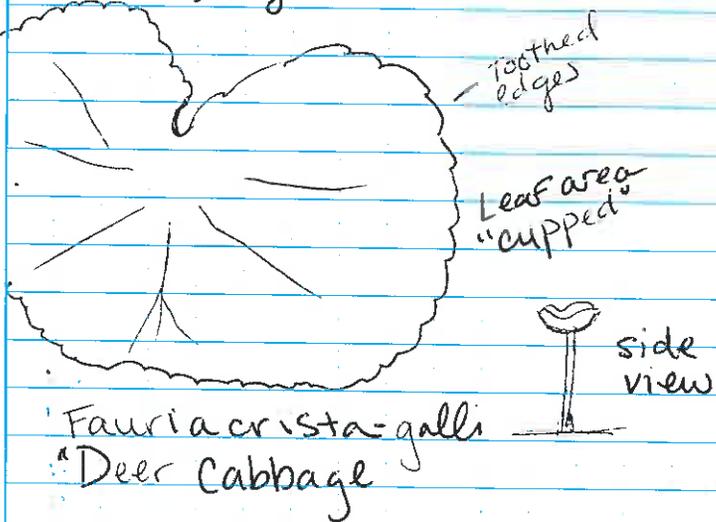
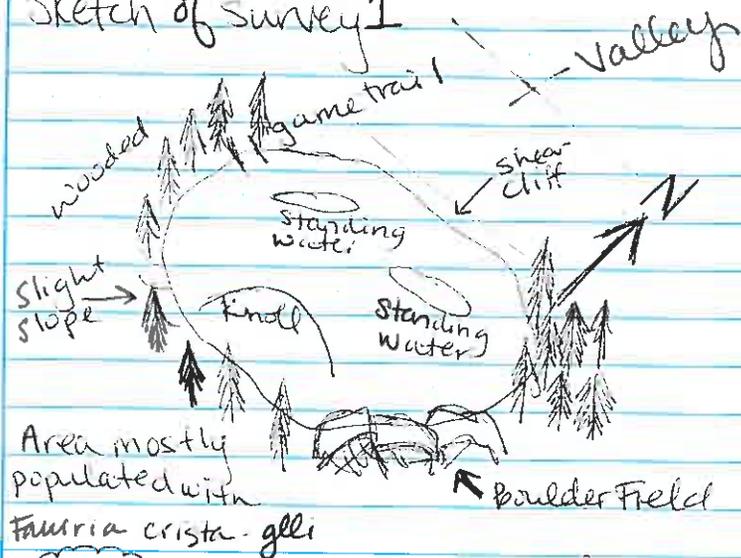
F

Scale: 1 square = _____

Takatz Lake Survey

8/2/2011

Sketch of Survey 1



Scale: 1 square= _____

J

Takatz Lake Survey

8/2/2011

Jobs:

Dianna and Daniel are responsible for plant identification and description.

Meghan is main note-taker and will be responsible for full list of known and unknown species.

I am responsible for the GPS tracking, plant collection and photographing of each specimen as well as correlating photo numbers with Meghan's species list.

Approx 17:00 Partly sunny, no precip
Started down to base camp with intention of marking potential survey areas

Scale: 1 square= _____

J

Takatz Lake Survey 8/2/2011

10:45 Base Camp Cloudy

Due to time constraints, an additional sampling survey could not be completed

*Goal for 8/3 is to hike along Baranof River, up valley, west, to sample creekside/riverside communities.



J

Scale: 1 square= _____

Takatz Lake Survey 8/3/2011

9:00A

Partly Sunny

Left Base Camp to survey along Baranof River.

- Goal for 8/3: Locate areas along water with gravel/sandy habitats, any open areas seen on SAT and topo maps, well-drained areas and any bogs. open forest areas

Will be looking for potential survey areas to survey on our way back to Base Camp

Vegetation is still dense in some areas, but nothing compared to 8/2. Appears to be an established human-made trail marked with green-flagging ... Forest Service?

Decided to follow markers as they appear to follow

J

Scale: 1 square= _____

12 Takatz Lake Survey 8/3/2011
...along river up valley.

10:00 A Partly sunny
Stop for potential survey area.
Potential Survey Area = PSA
PSA 1

GPS: N57°04.322', W134°54.265'
Accuracy: ±24 ft.
Elevation: 185 ft.
Photos: 155, 158-161

Many fallen trees, open forest +
floor. Signs of beaver and bear (skat,
trees)

PSA 2
GPS: N57°04.308', W134°54.592'
Accuracy: ±18 ft.
Elevation: 197 ft.
Photos: 171-175
Name of Waypoint: "G01"

Scale: 1 square=

✓

13 Takatz Lake Survey 8/3/2011

Area: Small gravel, sand area
with fallen trees, intermittent
grass and mosses.

PSA 3
GPS: N57°07.217', W134°9.1192'
Accuracy: ±21 ft.
Elevation: 196 ft.
Photos: 180
Name of Waypoint: "OpenFOR01"

Area: old growth, open forest area.
Area most likely to be impacted
by project (North side of river) due to
location of Takatz.

PSA 4
GPS: N57°04.303', W134°54.804'
Accuracy: ±14 ft.
Elevation: 188 ft.
Photos: 181-189
Name of Waypoint: "R01"

Scale: 1 square=

✓

Takatz Lake Survey 8/3/2011

Area: Another rocky/gravel/sandy area with overhanging Alnus, beaver signs

PSAS

GPS: N57°04.268', W134°55.045'

Accuracy: ±20 ft

Elevation: 182 ft

Photos: 193

Name of Waypoint: "coolf2"

Area: Similar rocky/gravel/sand location. Some species of veg. not seen elsewhere. Many purple flowers

12:13 Found Survey Site #2

High cloud ceiling, no sun breaks, no precip.

Area description (Habitat):

Riverside at forest's edge. Very rocky terrain. Rocks are sharp.

Scale: 1 square=

J

Takatz Lake Survey 8/3/2011

jagged, instead of smoothly eroded. Veg. is approx 6-7ft from water's edge and is overhanging and low to ground

Two sample areas along gravel bar.

Dianna, Daniel: Identifying, calling out descriptions.

Meghan: note-taker, composing species list

Me: GPS coordinates, photos, collection.

GPS: N57°04.270', W134°55.079'

Accuracy: ±21 ft

Elevation: 192 ft

Photos: 198-201 + 197, 275

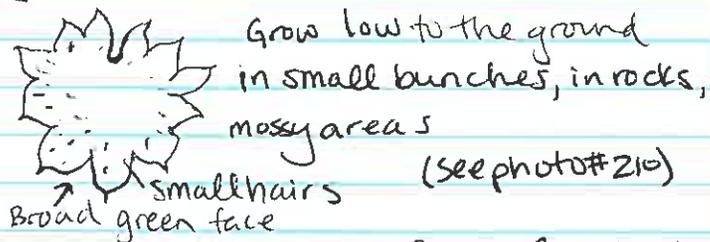
Names of Survey Polygons: "Area 1GV"
"Area 2GV"

Scale: 1 square=

J

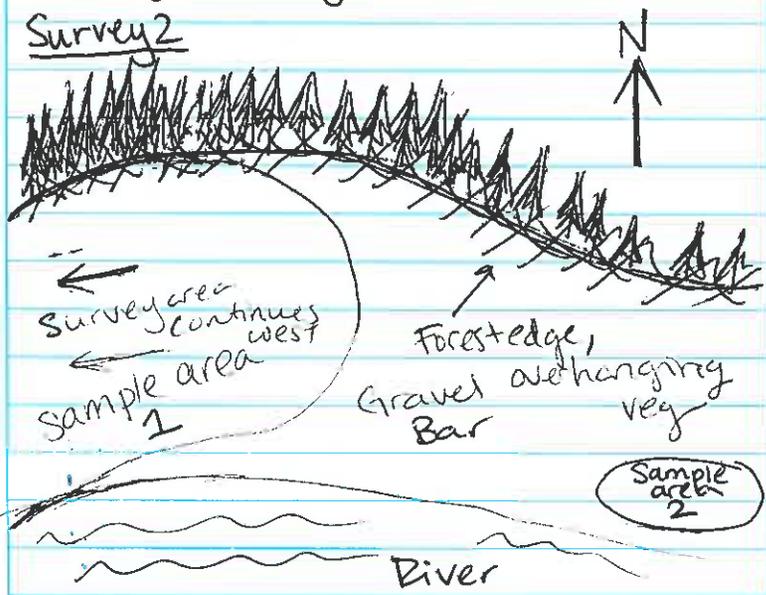
Takatz Lake Survey 8/3/2011

May have found rare species
Romanzoffia unalaschensis



*Element occurrence form filled out in Meghan's log book.

Survey 2



Scale: 1 square=

F

Takatz Lake Survey 8/3/2011

I Surveyed area for total rare species count. Approx 50-55 species total

Left Survey area 2 at 15:15 to head back to Base Camp, with possibility of Survey 3 on the way.

Arrived Base Camp approx 17:30. Time spent for log entry, rest.

*Survey was not taken on way back to Base Camp. GPS points available for future survey areas.

19:30 Cloudy, slight precip. Choose Survey Site B at sandy area (Beach) at west end of Lake.

GPS: N 57° 04.202', W 134° 54.007'

Accuracy: ±17ft

Elevation: 164ft.

Photos: 309-316

Area name: "Beach"

F

Scale: 1 square=

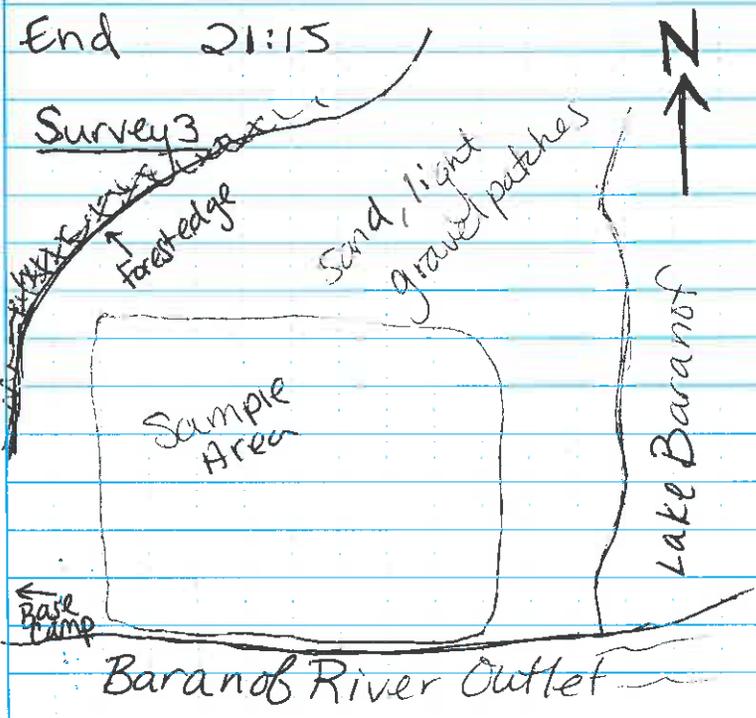
Takatz Lake Survey 8/3/2011

Area: Large sandy area close to Base Camp at west end of Baranof Lake.

Area approx 20-30 ft from lake edge.

* Quick survey due to lack of light. No rare species identified.

End 21:15



Scale: 1 square = _____

J

Takatz Lake Survey 8/4/2011

Travel day to Sitka, Medevjeje

8:30 cloudy, light rain

Broke down camp, packed gear, checked equipment.

Harris Air flight pickup time was earlier than expected.
↳ approx 9:00

Arrive Sitka at 10:30.

Check into Super 8 12:00

Re-pack, check equipment head to Blue Lake Hydro Plant to receive keys for Green Lake.

* Utility employee Frank advised Bethel to NOT begin our field work at Medevjeje due to high concentration of bears, until we purchased air horns.*

Scale: 1 square = _____

J

Takatz Lake Survey 8/4/2011

Drove back to Sitka, purchased 2, mile-range air horns from Murray-Pacific.

15:26 overcast, no precip

Started on trail from hatchery at Green Lake to Medevejie.

Hatchery worker "Mike" guided us onto trail.

Trail is well established, human-impacted. Total time, one-way, from van to Medevejie Lake side approx 30-40 minutes.

Found Trailside/Forest edge habitat for Survey 4

Scale: 1 square = _____

J

Takatz Lake Survey 8/4/2011

16:30 Survey 4 Cloudy, light precip.

GPS: N57°01.154', W135°08.007'

Accuracy: ±48 ft

Elevation: 300 ft.

Photos: 51-61

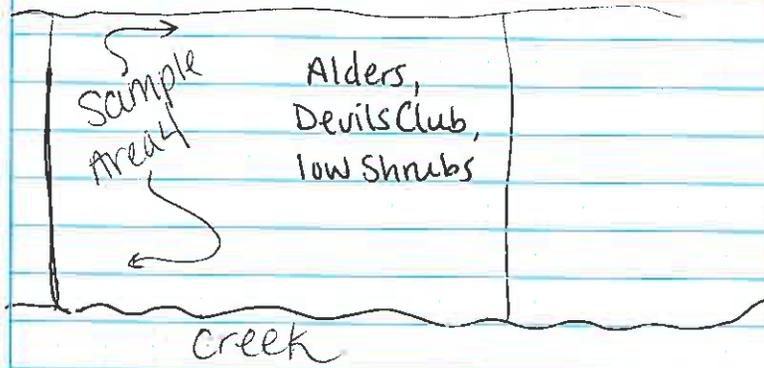
Name of survey area: "Area 1M"

Area: off of trail near edge of lake. Limited sunlight penetrates canopy (approx 20%). ~~Area~~ Area

50-60 ft away from creek side.

Area is on slope with dominating veg. being moss. Rock slide area with granite rocks.

Survey 4 Trail Rock slide area



J

Scale: 1 square = _____

Takatz Lake Survey 8/4/2011

No rare species found

18:05: End survey

18:45: Back to van

19:15: Back in town

Survey 4 was successful concerning time management. Vegetation density was low so hiking, sampling was more efficient compared to Baranof.

Anticipate 3 completed surveys for 8/5 conducted at east end of Medevjeie. Will reach by boat.



F

Scale: 1 square = _____

Takatz Lake Survey 8/5/2011

7:15

High cloud ceiling,
No precip

Headed to Medevjeie lake

Goals for day:

Complete 3 surveys at east end of Medevjeie.

Use boat to cross lake

Habitat types to survey:

- Sub-alpine
- Boulder field
- Lakeshore forest

8:00: Acquired paddles for canoe from hatchery personnel.

8:30 Mostly cloudy
↳ started out on trail.

9:30 Boat launch

10:10 Arrive at east end of Lake

10:30 Found tracked trail used mostly by munters

F

Scale: 1 square = _____

Takatz Lake Survey 8/5/2011

11:06 Survey 5

GPS: N57°01.675' W135°05.912'

Accuracy: ±44ft

Elevation: 390ft

Photos: 110-112, 133-138

Name of survey area: "Survey 5"

Area: A historic well-drained old rock-slide that may have been a creek bed at one time. Canopy cover is thick. Some sandy areas.

*GPS track name from vanto Survey 5: "toSurvey5"

NOTE: Methodology for survey areas has been, and will further be conducted as follows:

- Dianna, Daniel: plant identification, plant/species descriptions dictated to Meghan

- Meghan: Note taker, writes down all species and populates...

Scale: 1 square=

J

Takatz Lake Survey 8/5/2011

... element occurrence list
When rare species is found (via dictation from Dianna and Daniel)

Me: Take photos of survey area, collected samples of plants, GPS tracking.

- Dianna and Daniel will outline area perimeter.

- Each begins on one side of area, dictating to Meghan species found.

- After all species are recorded, percent cover is performed by Daniel.

- Dianna and Daniel then do a 3-minute meander.

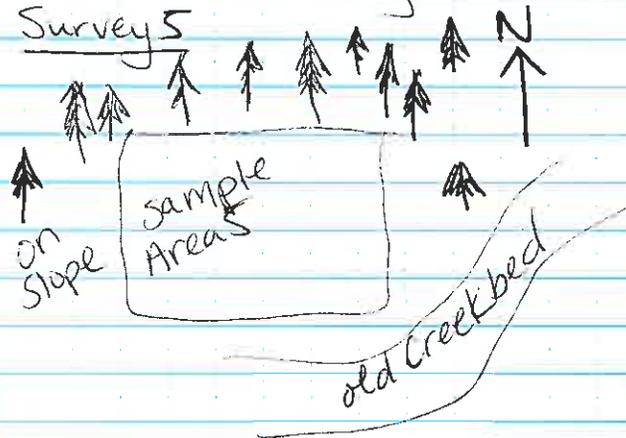
- All unknown species are collected and dated in gallon ziploc.

Scale: 1 square=

J

Takatz Lake Survey 8/5/2011

Survey 5



12:23 Finished Survey 5

* No rare species found in Survey 5

14:08 Survey 6

GPS: N57°01'54.5" W135°06.550'

Accuracy: ±69ft

Elevation: 281ft

Photos: 155-158

Name of survey area: "Survey Area 6"

Area: Some human disturbance with recently used fire pit. Trail runs through survey areas. Sword ferns are dominant vegetation cover...

Scale: 1 square = _____

F

Takatz Lake Survey 8/5/2011

Canopy cover is thick with approx 60%. Not much light reaches floor.

Habitat built on needle duff.

Survey 6 Forest Area



15:00 End survey 6 Mostly Cloudy

* Track from Survey 5 to Survey 6 = "SS-56"

Will do Survey 7 at Lakeside near boat.

3:10 Survey 7

GPS: No way point taken

Name of survey area: "Survey Area 7"

Area: Lakeside near forest and boat. No canopy cover. Many grasses.

Scale: 1 square = _____

F

Takatz Lake Survey 8/5/2011
 Photos taken on my personal
 camera: 257-259

Rare species identified
Romanzoffia unalaschensis

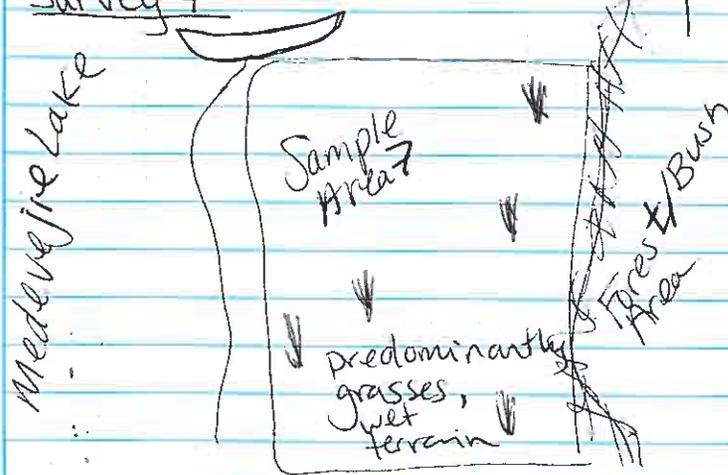
16:57 wind is picking up,
 team decides in interest of time
 and safety to head back.

17:25 Arrive at west end

17:30 Head back to van

18:00 Arrive at van

Survey 7



Scale: 1 square = _____

J

Takatz Lake Survey 8/5/2011
 Potential Survey Areas at
 east end of Medevje

1)

GPS: N57°01.533' W135°06.613'

Accuracy: ±20ft

Elevation: 221ft

Area Name: "Wetland"

Area: Bog/wetland, lots of
 Sphagnum moss and
Conocephalum conicum

2)

GPS: N57°01.553', W135°06.613'

Elevation: 242ft

Accuracy: ±25ft

Name: "Boulder Field"

Photos: 146-148

Area: Moss covered hemlocks,
 heavy vegetation, shrubs,
 sword ferns.



Scale: 1 square = _____

J

Takatz Lake Survey 8/6/2011

7:00 - 8:00A Mostly cloudy
no precip
→ Pack, check-out of Super 8

Goal: Complete last survey
before de-mob from Sitka.

9:15A On trail

9:40A Arrive Survey 8

GPS: N 57° 01.090', W 135° 08.211'

Accuracy: ± 32 ft.

Elevation: 209 ft

Photos: 203, 204, 206, 219, 222,

228-230, 236-241

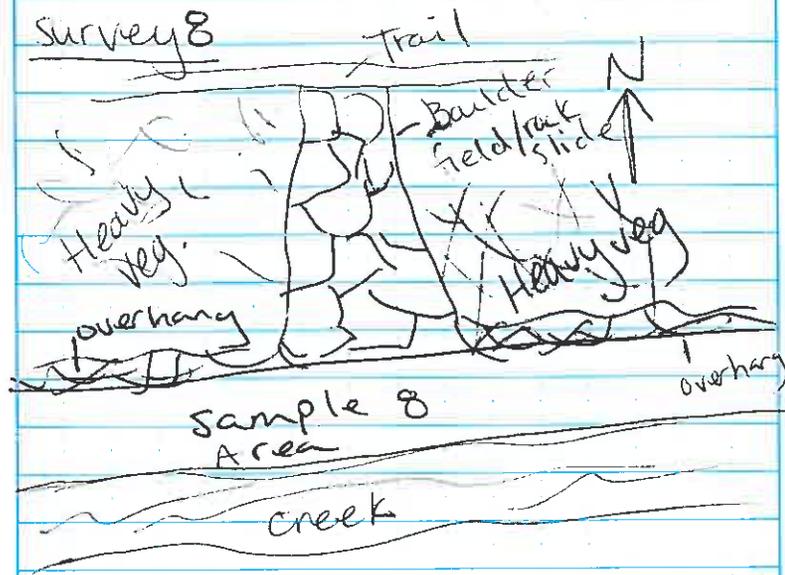
Name of survey area: "Survey Area 8"

Rare plant: *Romanzoffia*
unalaschensis

Area: Along creekside, intermittent
rock sizes ranging from
sand to boulders, mostly mid-
sized rocks. other debris includes

Takatz Lake Survey 8/6/2011

logs, fallen branches.
Over-hanging Alnus canopy
with Devil's Club. Very damp
with cool temps. Partly shaded



13:00 Back in Sitka
Gear breakdown and pack up.

Arrive Anchorage at 22:00

Scale: 1 square=

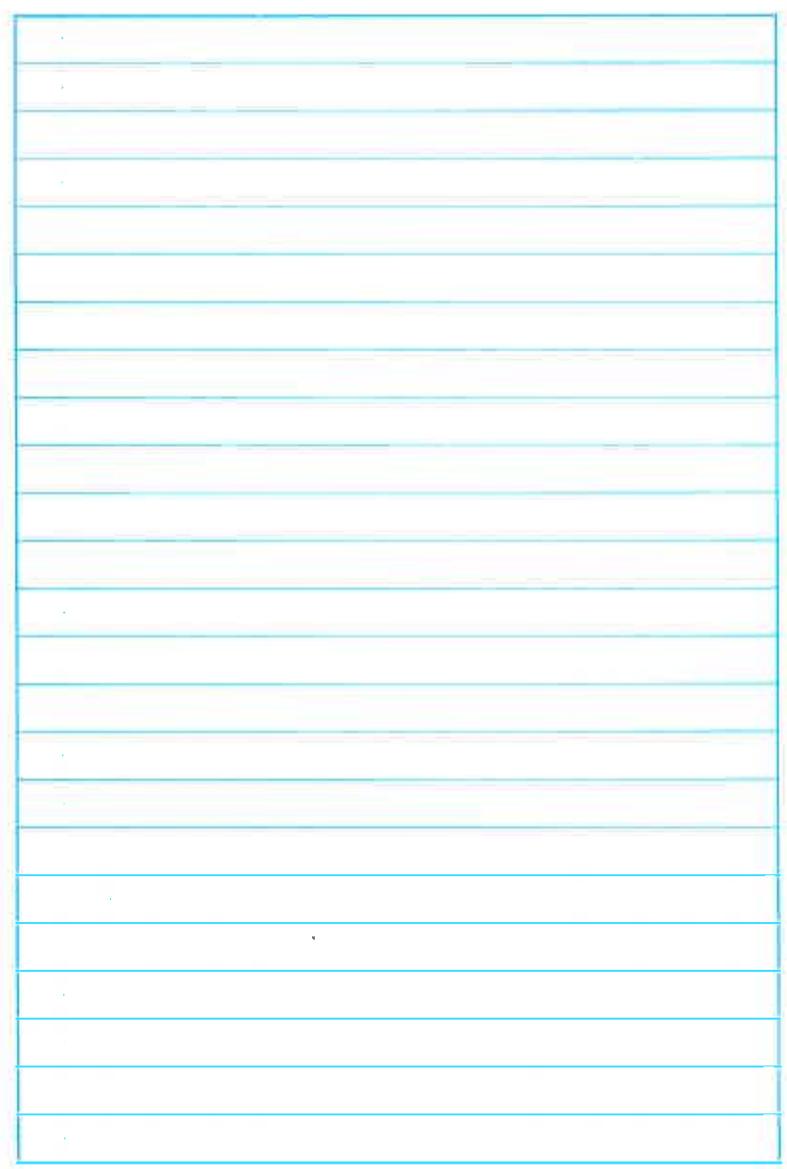
J

Scale: 1 square=

J

END Takatz Lake Survey
Notes for Jenna-Fredenhagen

Scale: 1 square= _____



Scale: 1 square= _____



"Rite in the Rain"[®]

ALL-WEATHER
UNIVERSAL

No. 371

Takatz Lake Botanical Survey
City and Borough of Sitka

Proj#: 220115003

Meghan Humphrey

Baranof Aug 1, 2011 - Aug 3, 2011



"Rite in the Rain"[®]

ALL-WEATHER
UNIVERSAL

No. 371

Takatz Lake Botanical Survey
City and Borough of Sitka

Proj#: 220115003

Meghan Humphrey

Baranof Aug 1, 2011 - Aug 3, 2011

8/2/11

Field day #1

Goal: reach subalpine habitat:
open meadows, talus or scree slope.

- daring elevation climb (less than 300 ft) saw bear scat and deer signs.
- brush is INCREDIBLY THICK and we had to use the machete to cut through.
- many fallen trees, bear cave
- 3 different species of blue berries.
- weather was intermittently sunny in the open forest.

TRACK NAME for elevation climb: "TRCK 1 BNCH 0802"

Rock slide area found. Marked w/ GPS: "slide 1"

elevation: 322 ft

coords: N 57° 04.176' W 134° 54.355'

Scale: 1 square = _____

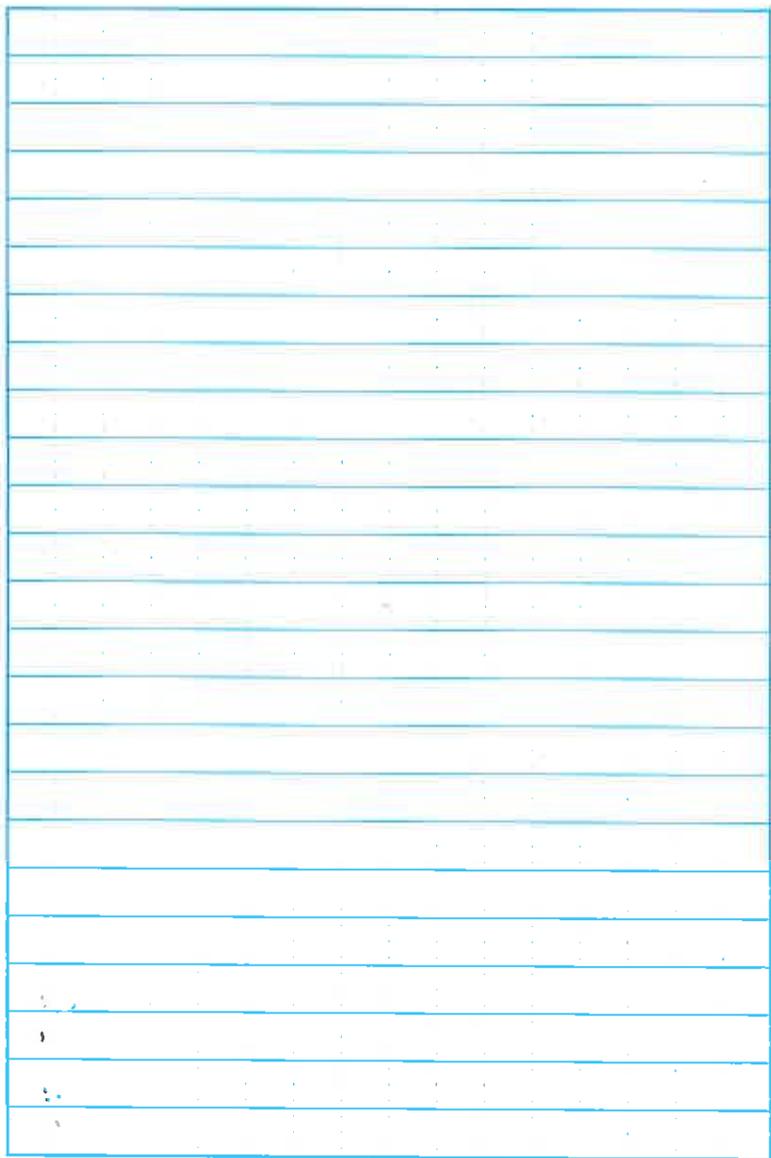
MTT

~~Survey area~~

- rock slide area approx 800-2000 years old.
- every 75 ft appeared to have different vegetation.
- around 800-900 ft elevation sighted first grass since next to the lake.
- yellow flower on Jenna's camera
- Humming bird.
- 3 photo grand pano @ 1033 ft elevation.
- Plant similar to arrowleaf colds foot.

Scale: 1 square = _____

MTT



Scale: 1 square=_____

MT

Survey site 1

Habitat: wet alpine meadow
 "pockets" of standing H₂O
 relatively flat @ the bench.
 Open area, wind blown trees
 partial / lots of sun. Top of
 the saddle. 90% moss cover

360° photo taken (ref: 8/2)

GPS: track/polygon name:
 "02AUG 2 BENCH"
 elevation: ≈ 1100 ft.

Also see: "S1 BENCH"

(on the way to the bench)

▶ (Photo part 1: old granite
 rock slide areas. Boulder
 sized.

Alder (coca 13?) Trace

Shrub spruce + Hemlock dominated
 large trees are banding, should
 be able to delimitate by satellite.)

MT

Scale: 1 square=_____

Species List

#1: *Vaccinium uliginosum*

cover: 10%

common: Bog Blueberry

#2 *Gentiana douglasiana*

cover: Trace

common: Swamp Gentian

#3 *Eriophorum russeolum*

cover: 8% E.

Syn: *chamissonis*

(Check for rhizomes)

#4

unk SS

dark green toothed, leathery
reddish tone

cover: 1%

Scale: 1 square=_____

mat

#5 *Luetkea pectinata*

cover: Trace

common: Partridge foot

~~#6~~

#6

cover: 5%

unk: SS (sub shrub)

#7 *Empetrum nigrum*

cover: 2%

#8 *Tsuga heterophylla* ?

cover: 2%

- check sample

- possibly *T. mertensiana*

mat

Scale: 1 square=_____

#9 *Fauxia crista-galli*

cover: 50%

#10

cover: 25%

UNK: cedar species?

Spreading/prostrate/drooping
up to 10-15ft tall

#11 IDENTIFIED as same
as #3

grass w/ red tips, rolled in
folded, tubular base - (white)
pointed. located in marsh.

Scale: 1 square=

mtt

#12 *Andromeda polifolia*

cover: 1%

common: Bog rosemary

- check sample for alternate or
opposite leaves (*Kalmia* sp?)

#13

#14 *Dryopteris dilatata* (?)

cover: Trace

common: wood fern

- check sample

mtt

Scale: 1 square=

#15

cover: Trace

UNK subshrub

carrot like, dark green
(found below)

check sample: Coptis?

#16

cover: Trace

UNK Lycopodium? Spreading
leaves.

#17

cover: Trace

UNK sedge

dark dense terminal spike
brown, tufted.

Scale: 1 square=

.mH

#18

cover: Trace

UNK Fern,

slightly overlapping, tufted

#19 Blechnum spicant?

cover: Trace

#20 Vaccinium sp.

cover: Trace

Red stemmed Blueberry

mH

Scale: 1 square=

#21 *Cornus canadensis*

cover: trace

#22

cover: Trace

unk grass

purple seed, 1 stem leaf,
spread pannicle

#23

cover: Trace

unk sub shrub

curved pistil, pink star flower
5 petals

Scale: 1 square=_____

MH

#24 *Picea sitchensis*

cover: 2%

#25

cover: Trace

unk sedge

narrow elongate head, brown

#26

cover: Trace

unk sub shrub

(like *Eup nig*) tufted terminal
flowers on long stalk

Scale: 1 square=_____

MH

8/3/11

GPS: "Track 1080311"
walking track for trail

Field day #2

Goal: locate gravelly sandy areas, open areas on the map, well drained areas, bog areas

Potential survey area #1

GPS: N 57° 04.322' W 134° 54.265'
accuracy: ± 24 ft
elevation: 185 ft
photos: 155, 158-161

It appears that there is a semi-established human/animal trail. Beaver signs / fallen trees.

Potential survey area #2

GPS: N 57° 04.308' W 134° 54.592'
accuracy: ± 18 ft
elevation: 197 ft
photo: 171-175 Name: "G01"

Scale: 1 square = _____ M/H

Description: Sand bar/gravel area. Fallen trees, small grass patches and some moss growing on the rocks, and some on the sand. Few species of grass.

Potential survey area #3

GPS: N

accuracy: ± 26 ft.

elevation: 196 ft

Name: "open FOR 01"

photo: 180? ~~183-184~~

Description: Potential open forest this is on the side of the river more likely to be impacted. This side is old growth, fallen "nurse" trees facilitating new growth. A few trails that look decently established, possibly by hunters in past years.

M/H

Scale: 1 square = _____

Potential survey area #4

GPS: N 57° 04.303' W 134° 54.804'

accuracy: ±14 ft

elevation: 188 ft

photo: 181-189

name: "R01"

Description: Point location on riverbank. Some overhanging Alders, beaver signs. Sandy + Rocky terrain. Water velocity appears slower @ this location

Potential Survey area #5

GPS: N 57° 04.268' W 134° 55.045'

accuracy: ±20 ft

elevation: 182 ft

photo: 193 Name: "coolflow1"

Description: Rocky location some unk purple flowers. Also there are several other species that we have not seen elsewhere.

Scale: 1 square=

mft

Survey site #2

Habitat: Creekside/Forests' edge. Trace Sphagnum Moss Rocky terrain, river bed has receded. Vegetation begins about 6-7 ft from the water. Most vegetation low to the ground. Open/sunny/windy. Split into 2 areas.

Trace moss + liverwort in area

GPS: N 57° 04.270' W 134° 55.079

accuracy: ±21 ft

elevation: 192 ft

photo: 277-288 ??

names: "Area 1GV", "Area 2GV"

Rare plant potential:

Romanzoffia malaschensis

! Plant is pressed in Daniels emergency guide in the first aid kit!

mft

Scale: 1 square=

Element occurrence field form

5) *Romanzoffia unalaschensis*

22) 1

26) 50-55

27) 0

28) estimate

32) vegetative: 96.5%

Flower/bud: 0.5%

Fruit dispersed: 3%

seedlings/juvenile: 0%

39) level

⊕ #30: pollenator
is a fly40) River bed / streamside /
gravel bed

41) level (N/A)

49) Direct full sun

Scale: 1 square=_____

mH

56) High

57) high

58) low

(64) attempted complete

(66-67) Associated species

#1

photo: 215

unk poa

loose spreading pannide, tufted
segmented, sheathed. (mature)

#2

unk poa (identified as juvenile
#1)ascending pannide, purplish
seed cover, loosely tufted, uppermost
leaf taller than spike, brownish
⊕ segment.

mH

Scale: 1 square=_____

#3

photo: 217/235/236

unk poa/grasslike

short stiff leaves, branched,
leaves are curling. margins +
center light, rest purplish brown

#4

unk poa

disperse pannicle

#5

unk sub shrub

Dark leathery leaf 5" long.

#6

photo: 216

unk liverwort

#7

photo: 218, 219

unk Forstoe

carrot like, flowers on raceme
flower stalks. Sepal, brown
margin / frilly

#8

photo: 220

unk sub shrub

leaves elliptical + erect, stem
reddish. Alternate branches +
leaves.

#9.

photo: 221

unk carex/rush

terminal tufted head, dark purplish
brown. Awn larger than
spike

Scale: 1 square=_____

MAA

MAA

Scale: 1 square=_____

#10

photo: 223

unk forbe

pink purplish flowers, elliptical leaf, pointed on end.

#11

photo: 224

silicle for fruiting body
unk forbe (ASK DANIEL)

#12

photo: 225/226

unk carex

bract about the same as spike. Seed cover: purplish brown center, green margins. Nodding pannicle. Awn longer than seed cover.

Scale: 1 square=

m+

#13

photo 227, 228

unk grass

purple pannicle stems, disperse head. 1 stem leaf approx.

midway

#14 Alder SS

photo:

#15

photo: 229

unk sub shrub

fine stem red terminal seed head. Red elongate, growing out of moss. Alternate leaves

m+

Scale: 1 square=

#16 *Picea sitchensis*
less than 6"

#17 *Rubus spectabilis*
less than 6"

#18

photo: 230

unk Forbe

dainty white flower, 5 petals
branched or creeping, alternate
leaves.

#19 *Sanguisorba canadensis*

#20

photo: 231, 232, 238, 239

unk forbe

linear veins, tooth margined,
purplish from base, pubescent
flowers from leaf axil on
long stalk

#21

photo: 233, 234

unk grasslike/rushlike

leaves green, stem reddish
short terminal leaf stem,
invol. shorter than pannicle
flower clusters terminal on
pannicle stalks.

#22 *Saxifragia ferruginea*
basal rosette, tubed, some
hairs.

Scale: 1 square=_____ mH

mH Scale: 1 square=_____

#23

photo: 237

unk Forbe

prostrate, flat creeping
alternate leaves

#24

photo: 240, 241, 246

unk forbe: Viola sp.?

margins rolled upward ~~and~~
smooth teeth to lobed.

Kidney/heart shaped leaf.

#25

unk forbe(?)

raspberry like plant

Scale: 1 square=

mH

#26

photo:

yarrow

#27

photo: 242, 244

unk forbe: (Monkey flower?)

alternate leaves, some
branching, seed pod terminal
(little shop of horrors) 2 flowers
large.

#28

photo: 245

unk forbe

creeping, red stem, bunched
leaves, larger basal leaves
+ stalked (on stem sessile)

mH

Scale: 1 square=

#29

photo: 247, 248

unk grass

golden like flowering part,
very thin lance-like leaves,
primarily basal

#30

photo: 249, 250

unk Forbe

red whorled leaves, 4 leaves
+ green inner alternate leaves,
tiny.

#31

photo: 251, 252

unk grasslike

indiv. to loosely tufted seed pod
on mid-stem, slightly wavy/
spiraled stem. Fruit = dk reddish
brown seed covers w/ light center
below fruit / tiny bract

Scale: 1 square = _____

mtt

#32

photo: 253, 254

unk Forbe

long flower stalk, sessile leaf
mid-stem flowered w/ long
upturning lip.

#33

photo: 255

unk Forbe

linear narrow leaves, alternate
becoming narrower up stem.
Basal leaves rander/larger
star shaped seepel, curving
back from (trumpet shaped?)
purple bloom

mtt

Scale: 1 square = _____

#34

photo: 256

unk Forbe

leaves on long stalks from base
white bell shaped bloom.terminal / tiny leaves toothed x2
branching veins, stem reddish
@ base. Flowers in pannicle
or branched.#35 *Oxyria dignia* (?)

photo: 257

unk reniform

red margins, reddish veins,
stem waxy on edges.

#36

photo: 258

unk grass

whorled blades, to sharp point
reddish brown from mid tip, some
long white hairs towards base.

Scale: 1 square = _____

mH

#37

photo: 259, 261

unk Forbe

flower stalk separate from leaves
reniform, fleshy flower in
raceme, dense tiny white blooms

Area #2

smaller sander area. willow mass
detritus facilitating growth.

#38

photo: 262-263

unk Carex sp?

long nodding stalks, dark seed
cover, invol. longer than spike
leaves all basal.

mH

Scale: 1 square = _____

#39

photo: 264, 265

unk Forbe

oval basal leaves, long, pubescent
 flower stalk bract below,
 stalk is leaf like + shorter
 than inflorescence (fluffy,
 creamish/brown) leaf stalk =
 hard, pithy, purpleish brown
 pointed/hollow, hard.

#40 Epilobium sp?

photo: 266

unk forbe

red stem, large sessile leaves
 smaller branched leaves

Scale: 1 square=

mm

@ = repeat plant suspected 33

#41

photo: 267

@ ♡ shaped reniform branched
 veins, flowers from leaf axil
 (white?)

#42

photo: 268

unk forbe

ovate leaves, pubescent/hairy on
 both sides of leaves. End stem
 has white hairs

@ #43

photo: 269

identified as #32

trifoliate leaf, oscillon stem
 tiny white flowers. Ask Daniel

mm

Scale: 1 square=

#44

photo: 270

unk

leaflets alternate, somewhat wavy, flowers from leaf axil in cluster, slightly pubescent inflorescence leaf like.

seed pod from base of inflorescence
seed pods open by curling upwards

#45 Ribes sp.?

photo: 271, 272

unk shrub

leaf stalks alternate, some hairs @ base of leaf stalk, no spikes.

Scale: 1 square=_____ mH

#46

photo: 273

unk Fern

3 frond segments, brown rachies. Leaflets wavy, fronds curve upwards + inwards
black sori

#47

(Devils club/willow, not rooted part of old habitat/pronding habitat)

#48

unk Furbe

arrow leaf.

#49 Salix sp.

photo: 276

unk willow.

mH

Scale: 1 square=_____

— NOT SURE OF REFERENCE —

On trail? From survey #23

Large wetland area towards waterfall

344° NW 200yds

Vaccinium sp.

Oplopanax horr.

Gymnocarpium dryopteris

Streptopus sp.

— ASK DANIEL! —

Scale: 1 square = _____ MIT

Survey site #3

Habitat: Large sandy area near base camp. Approx 20-30 ft from edge of lake. Beach/sandy Open/sunny

GPS: N 57° 04.202' W 134° 54.007'

accuracy: ± 17 ft

elevation: 164 ft

photo: (look to see)

name(s): "Beach"

MIT

Scale: 1 square = _____

Species List

①

#1 *Epilobium* sp.

photo: 292

NOT river beauty
pinkish stem, multiple terminal
blooms.

②

#2 *Sanguisorba canadensis*

#3

photo: 288-289

unk *Aster* sp.

purple ray bloom
alternate linear leaves
reddish brown stem

#4 *Prunella vulgaris*

photo: 290-291

unk Forbe

snap dragon like flower (purple)
spike in florescence
in florescence from axil
(crazy purple flower)

#5

②

photo 293, 294

unk rushlike

~~seaweed~~ in florescence @ mid-stem

#6

photo: 295

unk *Salix*? willow-like?

reddish brown stem
leaves on short stalks

#7

photo: 296

unk grass

disperse pannide, 1 short
leaf mid-stem purplish
stalks, light colored axil,
purplish seed cover.

#8 *Alnus* sp.

photo: 297

young

#9

@

photo: 298

unk carrot like forbe

flowers on a recene, dk.
margins on seeples.

#10 *Achillea millefolium*

No bloom

Scale: 1 square=

mm

#11

photo: 299

unk grass

tufted, short robust blades,
no fluorescence, fleshy tubular
base, all leaves basal

#12 *Saxifraga ferruginea*

#13 @

raspberry like small forbe

#14

photo: 301

unk forbe

raceme, pubescent leaves on
both sides opposite up the
stem. erect lantern like seed
pods with central linear
indentations

mm

Scale: 1 square=

#15

photo: 302

mK grass

wavy purple stalks, ^{shorter} purple
seed cover.

Short leaf midstem.

tufted grass / lance like leaves

#16 Aster

photo: 303

gold / yellow (2) blooms

terminal from leaf axil.

Pubescent.

#17

photo: 304

mK

arrow leaf irregularly toothed
robust leaf with ~~coarse~~
coarse sharp toothed.

Scale: 1 square=

mH

② #18 *Oxyria digyna* ?

photo 305

Reniform forb reddish

around margins, tubular stalk

multiple smaller flower ~~stems~~

stalks. Seed pods on nodding

stalks with pink margined

wings.

#19

photo

mK grass

tufted purplish @ base

leaves mostly close together

near base, Corn like,

(purplish color could be from
the sun)

mH

Scale: 1 square=

#20

photo:

unk grass

short basal leaves branching
one below mid-stem
erect panicle
golden color.

#21 *Romanzoffia unalaschensis*

Scale: 1 square=_____

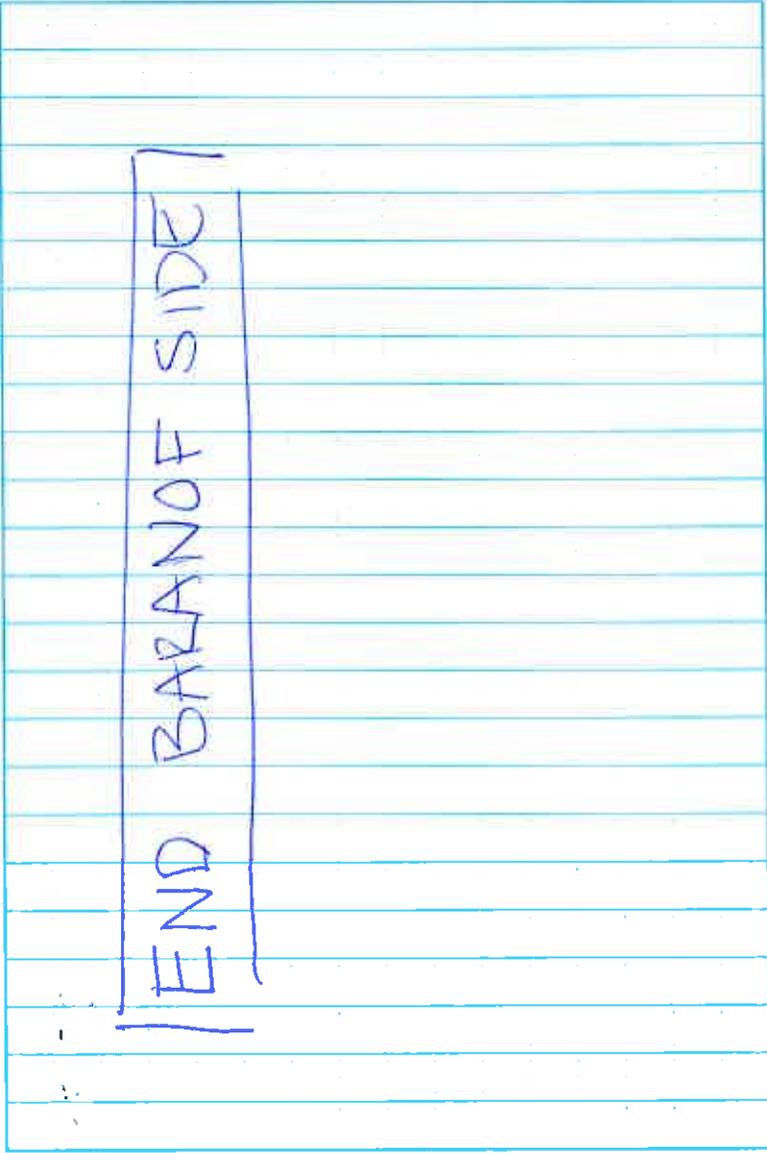
mtt

8/3/11 summary

- moved easier: the brush was still dense
- we were capable of identifying some potential habitat areas
- found a rare species
- have GPS points for future surveys.

Scale: 1 square=_____

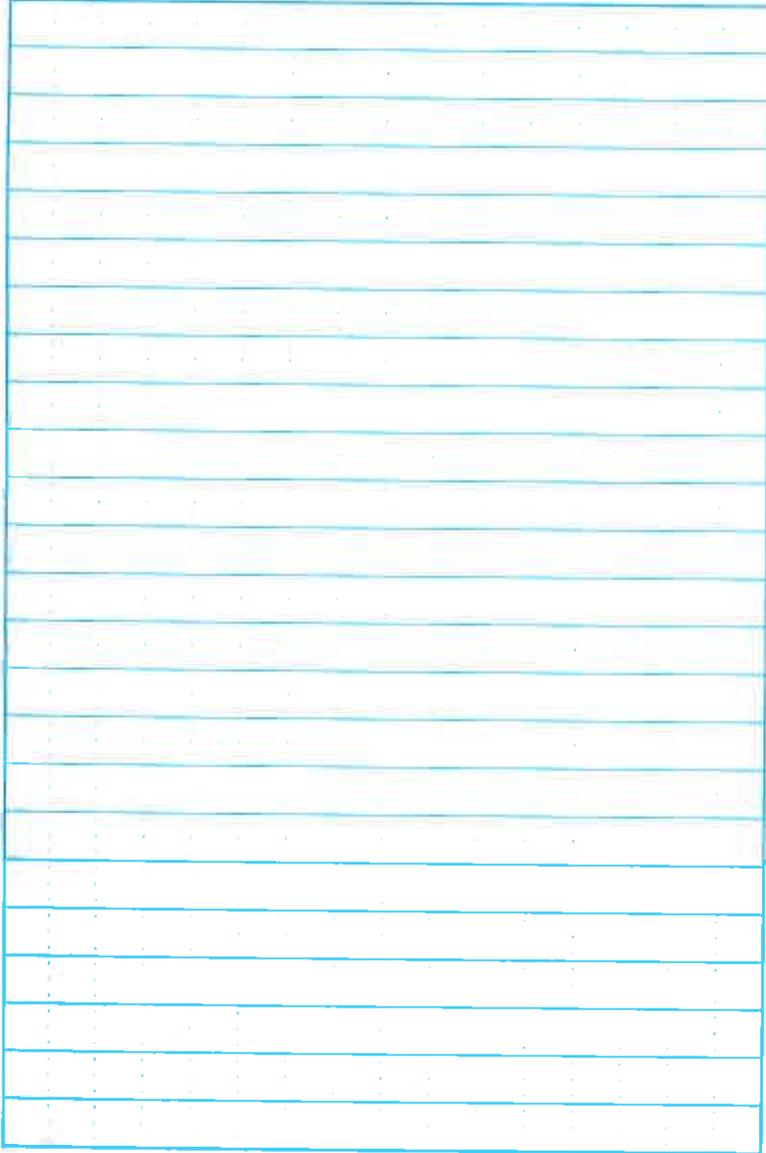
mtt



END BARANOF SIDE

Scale: 1 square= _____

mt



Scale: 1 square= _____



"Rite in the Rain"

ALL-WEATHER
UNIVERSAL

No. 371

Takatz Lake Botanical Survey
City and Borough of Sitka

Proj#: 220115003

Meghan Humphrey

Medevejie Aug 4, 2011 - Aug 6, 2011

"Rite in the Rain"
ALL-WEATHER WRITING PAPER



MEDEVEJIE LAKE

8/4/2011 - 8/6/2011

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Bethel Environmental Services

Address 2605 Denali Street

Anchorage, AK 99503

Phone (907) 522-6311

Project Takatz Lake Hydro

Project for city + Borough
of Sitka

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Photos #73 + 152 did NOT transfer

PAGE

REFERENCE

DATE

mt

8/4/11

Survey area #4

Habitat: Trailside / forests edge

Rock slide area @ end of the lake side @ least 1500-1800 years old based on the size of trees and types of vegetation found, lichen/moss on boulders.

↗ 20% sunlight thru the canopy for the lower vegetation. Trail used mostly for hunting by locals. Approx 50-60 ft (check) away from the creek / lakeside directly uphill from the lake outlet. Granite rock, 90% moss lots of liverworts (A)

GPS: N 57° 01.154' W 135° 08.007'

accuracy: ±40-30 ft

elevation: 300ft

photo:

name: "area 1M"

(A) sample area by foot pacing 20-30 ft.

Scale: 1 square=_____

mtt

@ = repeat UNK
Species List

#1 *Oplopanax horridus*
cover: 3%

#2 *Boschniakia rossica*
cover: ~~2%~~ Trace
photo: 14

#3 *Alnus tenuifolia*
cover: 30%

#4
cover: trace
photo: 16, 17, 18
UNK forb

basal raspberry like leaves
pubescent on top, flowers
on raceme. Purple stalks
flowers nodding

Scale: 1 square=_____

mtt

#5 Galium aparine
cover: trace

#6 Polystichum ~~unitum~~ ^{unitum} (?)

cover 2%

photo 20

sword fern?

leaves alternate, basal
frond slightly overlapping
stem

#8

cover: trace

photo: 23, 24

ink fern

tufted from ball, wavy pinnae
shallowly indented, triangular

Scale: 1 square=_____

mtt

#7

cover 1%

photo 21, 22

ink fern

~~tufted~~ basal fronds angled inward
mostly triangular, elongated
tip. leaflets fused. Pinnae
almost pubescent

#9 Rubus spectabilis

cover: 8%

#10 Gymnocarpium dryopteris?

cover: 1%

foxface?

#11 Picea sitchensis

cover: 4%

shrub, not tree

mtt

Scale: 1 square=_____

#12 *Tsuga abterophylla?*
heterophylla?

cover: 10%

#13

cover: Trace

photo: 25, 27

unk forb

alternate leaves linear to
elliptical coarse dispersed toothed
elongate seed pods from
uppermost leaf axils

* representative sample taken
@ gate.

#14

cover Trace

photo 28, 29

unk grass

loosly tufted to solitary,
all basal leaves, wider
blade. Directly next to trail

Scale: 1 square=_____

MAA

#15

cover trace

photo 30

unk grasslike

short robust leaves, slightly
rolled inward. Reddish brown
base, all basal
directly next to trail

#16

cover Trace

photo 31, 32

unk grass

loosly tufted, slender, narrow
leaves, bright green, white
near base. Leaves mostly basal
somewhat bunched.

Scale: 1 square=_____

MAA

②

#17

cover trace

photo 33, 34

unk herb

has arrow shaped leaves

3" - 1/2"

#18

cover trace

photo 35, 36

unk grass

The whole stem nods, 2

spikes, coarse feeling, single stems (solitary stems)

seeds sessile, short + stalked
not spreading

Scale: 1 square = _____ mm

#19

cover trace

photo 37-39

unk forb/grass like

alternate disperse leaves

elliptical to lance shaped

linear veined

disperse pannicle w/nodding

seed pod / flowers?

#20 *Vaccinium ovalifolium*

cover trace

#21

cover trace

photo 40, 41

unk forb

3 basal leaves, branch veins
toothed margin, glabrous
dark on top, paler beneath

mm

Scale: 1 square = _____

#22 *Dryopteris dilatata*

cover 2%

pinnae alternate, lower pinnae much longer than upper pinnae on basal leaves. Pinnae alternate/wavy. Sori = black closer to rachis.

#23

cover trace

photo 45, 46, 47

mk lycopodium

leaves sharp/pointed @ terminus the leaves are broader

#24 *Streptopus amplex?*

cover 49, 50 ↓

photo trace ↓

no flower, stem has tiny prickly hairs, no obvious toothed margin or hairs

Scale: 1 square=

mtt

#25

cover 1%

photo 64-70

mk fern

round yellowish sori, thick woody rhizome (yellowish/gold)
leaves are ~~opposite~~ 1/2 alternate overlapping. Not double pinnated. Dark rachis on pinnae. lowest fronds turn inwards, slightly wavy and reduced.

#26 *Sambucus racemosa*

cover trace

photo 62, 63

mtt

Scale: 1 square=

8/5/11

Goal: find oars for canoe
and save 2 hours by crossing
the lake by boat.

3 Surveys on E side of lake

- Sub Alpine
- Boulder field
- Lakeshore

or

- forest

weather looks good for crossing
if necessary, but if we
can't cross the lake it will
be very slow.

Travel track: "to Survey 5"

Scale: 1 square=

mt

Survey #5

Habitat: historic well drained
possibly creek bed / rockslide.
Open forest. Many liverworts
partly / well shaded, old forest
some areas very sandy (#14?)
step moss

GPS. N 57° 01.675' W 135° 05.912'

accuracy: ± 44 ft

elevation: 390 ft

photo: 110-112, 133-138

name: "survey 5" polygon

mt

Scale: 1 square=

Species List

#1 *Polystichum unitum*
cover trace

#2 @

cover trace

photo 113-115

unk forb

raspberry like leaves, long curved hood on flower.

#3

cover trace

photo 116, 117

unk grass

disperse leaves upstem, nodding (multiple) panicles narrow elongate seed covering with long awns

#4 *Gymnocarpium dryopteris*
cover 2%

Scale: 1 square= _____

mtt

#5

cover trace

photo 118

unk

Arrow leaf coarsely toothed branched veins

#6 *Romanzoffia sitchensis?*

cover trace

photo 119

#7

cover trace

photo 120, 121

unk forb

Alternate leaves, disperse sharp tooth, terminal bloom dainty pinkish white flowers

mtt

Scale: 1 square= _____

#8 *Rubus spectabilis*
salmon berry

cover trace

photo 122

on boulder side edge of
habitat

#9

cover trace

photo 123

unk fern

alternate pinnae, leaflets
shallowly indented, wavy
margin.

#10

cover trace

photo 124

unk forb

single dk green leaf, narrow
elliptical to lance shaped,
linear veins

Scale: 1 square = _____ mtt

#11

cover trace

photo 125-126

unk shrub

Ribes speciosum (laxiflorum?)

no spines, some hairs near
leaf axil.

#12 (R)

cover trace

photo 127

unk forb

alternate leaves, older leaves
lance like, younger more
spatchulate, elongated seed
pods from axil. Rep. sample
from gate.

#13 *Sanguisorba Canadensis*
cover trace

mtt

Scale: 1 square = _____

#14

cover: trace

photo: 128

unk forb

grand basal leaves on short
petioles, slender creeping
viney parts, w/ tiny alternate
stem leaves

#15

cover: trace

photo 129

unk herb

tripart leaves, hollow stem,
no basal leaves.

#16

cover: trace

photo 130

unk herb

trifoliate, multilobed, branched?
veination

Scale: 1 square=

mm

#17 Streptopus

cover

(twisted stalk)

#18

cover: trace

photo: 131

unk

fern leaf (golden thread?)

#19 1

cover: trace

photo: (132? possibly no photo)

unk herb

has round shape leaf with
lobes, stems have long white
hairs mostly downward
pointed.

Scale: 1 square=

mm

#20 *Dryopteris dilatata*
cover: trace

#21 *Tsuga heterophylla*
cover: 15%

#22 *Picea sitchensis*
cover: 2%

Scale: 1 square=_____

mtt

GPS: "55-56" from survey 5
to survey 6

Potential survey area #6

GPS: N 57° 01.533' W 155° 06.613'

accuracy: ±20ft

elevation: 221ft

name: wetland

photo.

Description: Bog area/wetland

Spagnum moss everywhere

snake liverwort

Conocephalum conicum

Scale: 1 square=_____

mtt

Potential survey area #7
 GPS: N 57° 01.553' W 135° 06.613'
 accuracy!
 elevation: 242
 name: "Boulder field"
 photo: 146-148

Description: moss covered
 hemlock (some dead) mossy
 downed trees, very vegetated.
 sword fern, *Streptopus amplexifolius*
Gymnocarpium dryopteris, *Dryopteris*
dilatata, rasp-like leaf, moss
 shrubby.

Survey site #6

Habitat: Moderately human
 disturbed, with fire pit near/
 on trail. Trail thru survey
 area. sword ferns signify
 a majority of habitat (40%)
 not a lot of open space.
 60% tree canopy cover. Scaly
 warty hornwort lives here.
 Majority of habitat built on
 needle duff.

GPS: N 57° 01.545' W 135° 06.550'
 accuracy! ±69ft
 elevation: 281ft
 photo: 155-158
 name: "survey area 6"

Scale: 1 square=_____

mt

mt

Scale: 1 square=_____

Species List

#1

photo: 149

UNK forb

▽ shaped reniform, two
point, gently toothed

#2 Polystachum monitum

cover: 40%

#3 Gymnocarpium dryopteris

#4 ⊙

UNK forb

Raspbery like leaf

#5 Streptopus roseus?

photo: 150

#6 Streptopus amplexifolius

Scale: 1 square = _____ mtt

#7 Rubus spectabilis

#8 ⊙

(#7 from survey #5)

photo 120, 121

#9 Oplopanax horridum

#10

photo 157

UNK forb

5 leaflets, sharply lobed or
toothed, creeping.

#11 Dryopteris dilatata

#12 Picea sitchensis

#13 Tsuga heterophylla

#14 Vaccinium ovalifolium
growing out of Picea sitchensis

* (#17 survey #6) *

Scale: 1 square = _____
mtt

#15 @

photo 152

unk forb

3 leaves (trifoliate leaf)
w/ basal leaves, shallowly
toothed, 1 flower on long
stalk 1 mid-stem bract -
Also off of *Picea sitchensis*

#16

photo: 153-154

unk lycopodium

growing off *Picea sitchensis*

#17

photo 160

unk shrub (ss)

dark green, robust leaves,
green robust stems, branching
toothed, glabrous above

* Ref #14 survey 6 *
Same species?

Scale: 1 square = _____

mt

Survey site #7

Habitat: lakeside/near forest
habitat, no canopy cover

GPS "Survey area 7"

No waypoint taken

Photos on Jenna's camera

257-259'

mt

Scale: 1 square = _____

Element occurrence form

5) *Romanzoffia unalaschensis*

22) trace

25) yes

26) 9

27) undetermined

28 estimate

32) vegetative: 97%

Flower/bud: 2%

fruit/dispersed: 1%

seedlings/Juvenile: 0%

39) level

40) level/lakeside

41) none

mt

Scale: 1 square=

49) full sun

(64) attempted complete

% Covers

Salix 1%

Heracleum lanatum 2%

Sanguisorba canadensis 1%

Trace for the rest

Pressed temporarily in Daniels
field guide

mt

Scale: 1 square=

66-67 Associated species

Scale: 1 square=_____

mH

#1 *Sanguisorba canadensis*

#2

photo: 163

unk Salix

#3 *Achillea millefolium*

#4

photo 164-165

unk grass

Solitary to loosely tufted, dense
multiple spiked, very short
stalks, erect, ascending,
sheathed basal leaf, bract
longer than inflorescence.

#5 *Claytonia sibirica* ?

photo 166, 167

unk forb

fleshy stem, alternate basal leaves
rounded, 2 flowers from leaf axil
stalked 

mH

Scale: 1 square=_____

#5 cont.

stem leaves much reduced
pinkish purple bloom. 5 petals
notched in center.

#6

photo 168, 169

unk grass

disperse pannicle, unique
kink in lower stem (segment?)

young stem found. Terminal
spike extremely dense

#7

photo 170-171

unk forb

tufted basal leaves that are
elongated lance shaped flower
stalk, tubular, fleshy also
leaves are fleshy, flower
stalk naked with 8 terminal
flowers on stalks.

mt

Scale: 1 square=

#8

photo: 172

unk forb

yellow flower, leaves slightly
toothed leaves opposite, has
white hairs on stems & leaves
growing out of lakeside
very light sweet smell. In
a big clump. 10 petals. End
of petal has small indentation

#9 @ *Epilobium hornemannii*

~~photo~~ elongated seed pods from
leaf axil, purplish pink flower
opposite leaves, toothed.

#10 *Romanzoffia unalaschensis*
suspected.

photo: 173-175, 182, 183

mt

Scale: 1 square=

#11,

photo 176

unk forb

leaves whorled, elliptical,
 disperse toothed, pubescent on
 leaves + stem leaves denser @
 tip. Stem reddish

#12

photo: 177-179

unk forb / Aster?

purple bloom whorled alternate
 to leaves. No pedice)

#13

photo 181

unk forb

creeping alternate leaves
 dainty

mtt

Scale: 1 square=_____

#14

photo 180

unk Carex

dense spikes on nodding panicles
 seed covers dark w/ light
 central stripe w/ light green
 to white inner sheath with
 short awn bract not exceeding
 inflorescence.

#15 Farnia-crista-galli

#16 Polystichum unitum

#17 Heracleum lanatum

#18 Rubus spectabilis

#19 Saxifraga ferruginea

mtt

Scale: 1 square=_____

#20

photo: 184-186

unk grasslike/sedge
tufted or bunched
very narrow and bract
flowers dispersed shorter
than inflorescence.

#21

photo 189, 190, 191

unk grasslike
short ~~no~~ basal leaves, few
stem leaves, short nodding
panicles

#22 @

arrow leafed (longer leaves)

Scale: 1 square=_____

MH

#23

photo: 192, 193

unk forb

large tubular stem, leaf stalks
alternate, angled inward,
leaflets alternate. 3 lobes
lobed terminal leaf

#24

photo 194, 195

unk sedge

tufted dense single spiked, short
seed cover dark on margin

#25 *Equisetum arevense*

#26

photo

unk grass

kinked @ segment, sheathed
mid stem leaf, panicle dispersed
leaf stem. Fruits golden +
pinkish tips

MH

Scale: 1 square=_____

#27

photo 260, 261

unk grasslike

dense terminal spike,

cat-tail like

Scale: 1 square=_____

mtt

Survey site #8 8/6/2011

Habitat: creekside.Along creekside mid sized
rocks, gravel, sand. 5ft-15ft
narrow (wide) area.lots of moss, logs + overhanging
canopy. Damp, cool. Partly
shady.

GPS: N 57° 01.090' W 135° 08.211"

accuracy: ± 32

elevation: 209 ft

photo: 203, 204, 206, 219-222, 228-230,

names: "survey area 8"

236-241

Rare plant potential

Romanzoffia unalaschensis

mtt

Scale: 1 square=_____

Element occurrence form

5) *Romanzoffia unalaschensis*

26) 30-35

27) undet.

28) estimate

32) veg = 15%

flower = 0%

fruit = 0%

Seed/Juv = 85%

39) 5%

40) tow of creekside

41) SW 192°

49) partial shade

64) complete attempt

MTH

Scale: 1 square = _____

66-67 Associated Species

#1

pink forb

raspberry like leaf w/ hooded
flower (long)

cover trace - 1%

#2 *Romanzoffia unalaschensis*

cover: 1%

#3 *Rubus spectabilus*

cover: 2%

1% = outside of plot

1% = canopy (in plot)

#4 *Picea sitchensis*

less than 6" seedlings

cover: trace

#5 *Tsuga heterophylla*

less than 6" seedling

cover: trace

MTH

Scale: 1 square = _____

#6

unk grass

too young to ID, no collection

#7 @

cover trace

unk forb

alternate leaves, narrow
elongated seed pod from
leaf axil, purple pinkish
flower.#8 *Cardamine occidentalis*?

cover: trace

photo: 208+210

unk forb

in sandy substrate + moss
basal rosette, terminal
leaflet w/ 3 lobes, terminal
lobe rounded + largest
'dark green glabrous on both
sides. Has 4 tiny white petals
flowers with narrow elongated

seed pod.

Scale: 1 square =

mm

#9

photo 209

cover trace

unk grass

pannicle has a kink, one
leaf after the kink, basal
leaves very thin. Sample has
4 together#10 *Polystichum ~~serotinum~~ minutum*

cover: trace

#11 @ (wood rush / *Lyzula*?)

cover trace

photo 211-213

unk grass

robust short basal leaves,
disperse pannicle w/ reddish
brown seed pods on stalks
alternate dispersed stem
leaf

mtt

Scale: 1 square =

#12 @ (Oxyria digyna)?
cover!

#13

photo: 216, 217

cover: trace

unk grass

multiple nodding spikes
somewhat dense seeds,
alternate to whorled stem
leaves segmented and
course stem.

#14

cover trace

photo 218

unk Salix (too young to ID?)
alternate leaves, shiny on
top, lighter on bottom,
somewhat reticulated.

#15 @

cover trace

unk arrowleaf has large +
small leaves

Scale: 1 square = _____

#16 Alnus tenuifolia

cover trace

Shrub bordering survey area
seedlings less than 6"

#17 Alnus tenuifolia

cover: 35%

tree sized, shading site
slightly (canopy only)

#18 @

cover trace

unk forb

everywhere, dry + wet spots
has maple like basal leaves
w/ tiny white star flowers

#20 Gymnocarpium dryopteris

cover: trace

mtt

Scale: 1 square = _____

#19

cover trace

photo 223-224

disperse stem leaves, looks like the stem continues past last inflorescence. seeds green and ascending. very short stalk. No basal leaves, segmented reddish@base

#21Ⓜ Claytonia sibirica?

leaves similar to purslane

cover trace

unk forb

rounded to elliptical basal leaves on large stalk.

Flower stem has round alternate leaves w/ 2 flower stalks protruding from axil.

pinkish purple flower w/ notch in petal tip.

Scale: 1 square=_____

mH

#22Ⓜ

cover trace

photo 225, 226

unk creeping forb w/ small opposite leaves adventitious? (ask Daniel)
roots 

#23

cover trace

photo 227

unk forb

looks like from the rumex/aceae family. Tripart leaf, deep margins

#24 Dryopteris dilatata

trace

#25 Vaccinium Ⓜ (parifolium?)

cover trace

photo 231-232

oval leaves slightly toothed
unk blueberry

mH

Scale: 1 square=_____

#26

cover 190

ink willow

photo 234

#27 Ribes laxiform

cover 190

overhanging canopy only
outside of survey area.Please see original field
notes for the invasives
@ the hatchery.

Scale: 1 square=

mtt

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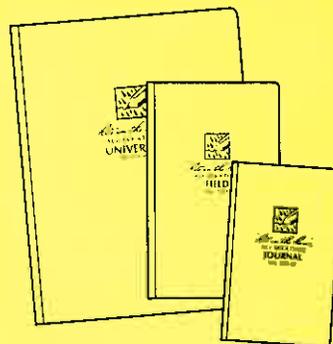


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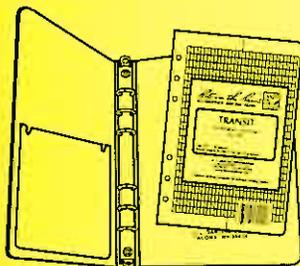
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