COEUR ALASKA®

January 28, 2016

Brad Orr
USDA Forest Service
Tongass Nat'l Forest
Juneau Ranger District
8510 Mendenhall Loop Road
Juneau, AK 99801

RE: Kensington Gold Project 2015 Plan of Operations Annual Report.

Dear Mr. Orr:

Coeur Alaska is pleased to submit the attached Annual Report for calendar year 2015 as partial fulfillment of the requirements of the Kensington Gold Mine Plan of Operations.

Should you have any questions or require clarification regarding the document or on any other issue, please contact me at (907) 529-3328.

Best regards,

Kevin Eppers

Kevin Eppers
Environmental Manager

Cc: Will Collingwood, ADEC
Matthew Brody, ACOE
Kyle Moselle, ADNR

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Kensington Gold Project
2015 Annual Report

Prepared by:
Coeur Alaska, Inc.
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Juneau, AK 99801

For:
U.S. Forest Service
Alaska Region (R-10)
Tongass Minerals Group
Juneau Ranger District
8510 Mendenhall Loop Road
Juneau, AK 99801

February 2016

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1. Coeur Alaska, Inc., 2015, Kensington Gold Project NPDES Permit AK-005057-1 Annual Water Quality Monitoring Summary Volume 1: Aquatic Resource Surveys 2015.
2. Coeur Alaska, Inc., 2015, Kensington Gold Project NPDES Permit AK-005057-1 Annual Water Quality Monitoring Summary 2015 Volume 2: Water Quality Data.

Introduction

The Kensington Gold Project is owned and operated by Coeur Alaska, Inc. (Coeur) a wholly owned subsidiary of Coeur Mining. The project is located on the western and southern flanks of Lions Head Mountain; between Berners Bay and Lynn Canal; and in the drainages of Johnson, Sherman, and Slate Creeks (See Figures 1-10). Coeur Alaska has prepared this annual report to comply with requirements of the U.S. Forest Service (USFS) Plan of Operations (POO) for the Kensington Gold Project.

The Kensington Gold Project received authorization under the POO on June 13, 2005. The Final Supplemental Environmental Impact Statement, U.S. Forest Service Record of Decision and all necessary major permits were issued prior to year-end 2005. Coeur Alaska issued construction contracts and ground breaking was initiated during July 2005.

Following a suspension of construction activities during the litigation process for the 404 Permit, construction activities at the TTF that resumed in 2009 were completed in the third quarter of 2010 and operations of the facility began in June of 2010. Gold production operations continued throughout 2015 consistent with the approved POO.

Section 1.0 contains a synopsis of the activities conducted at the Kensington Gold Project during calendar year 2015, and Section 2.0 contains projections of activities planned for calendar year 2016.

Summary of 2015 Activities

1.0 Public Safety

Public access to the project site is managed as defined in the established Public Access Control Plan. Public access to the site must be controlled to ensure the safety of the public. During the construction and operational phases of the Project, hazards such as truck traffic, blasting, barge and tug operations, and earthwork could result in physical harm to unauthorized visitors.

During 2015, personnel accessed the site via boat and rotary wing aircraft. Agency inspections and other public personnel generally accessed the site by fixed winged aircraft and boat.

Supplies and equipment for the facility are delivered by barge to the Slate Creek Cove Marine Terminal.

2.0 Construction Activities

Stage 2 construction activities at the Tailings Treatment Facility (TTF) were completed in 2012, thus no construction at the TTF was conducted in 2015.

Construction of an additional portal and associated down ramp to access a mineralized vein system was started in July 2015. This new vein system lies between the historic Jualin workings developed in the early 1920's, and the existing Kensington portal system. Approximately 1,500 feet of development face advance was conducted in 2015.

Graphitic Phyllite that was excavated during the construction of the stage 1 and 2 Tailings Treatment Facility is currently stored in sealed containments at Pit 4 and the Mud dump area. A pug mill plant was partially constructed in 2015 to help facilitate the mixing of the graphitic phyllite with cement prior to placement into underground open stopes as final disposal of the material.

The majority of the surface disturbance associated with construction was completed in 2005 and 2006 as outlined in the project disturbance summary Table 1. An additional 0.3 acres of wetlands were filled as part of the construction of the avalanche berm road. New disturbance associated with the construction of the road occurred in 2014 and no new disturbance occurred in 2015.

2.1 Storm Water Controls

Construction operations on both the Jualin and Comet sides of the Kensington Gold Project were conducted in compliance with the Storm Water Pollution Prevention Plan (SWPPP) requirements. Both temporary construction Best Management Practices (BMPs) and sediment pond BMPs were utilized to control excess sediment production from disturbed areas that otherwise might enter waters of the state. A full description of storm water controls can be found in the Storm Water Pollution Prevention Plan (SWPPP) for the Kensington Gold Project, May 2015. Coverage was gained under the new MSGP 2015 general permit number AKR06000 during 2015.

Sediment ponds and silt fences were maintained, and existing check dams were also maintained throughout the site. Designs for these construction BMPs are discussed in the SWPPP. Most operational (long-term) sediment ponds were constructed during 2005, and all were constructed as designed in the SWPPP Addendum B.

The nature of construction BMPs is transitory; i.e., they change in response to site conditions and the rapidly evolving ground conditions encountered during construction. Therefore, designs are dependent on site conditions, which may change day by day. However, as construction elements are completed, operational BMP sediment ponds have been developed, which discretely demonstrate compliance with the SWPPP as amended.

In addition to SWPPP monitoring and inspections, site receiving water monitoring was also conducted in accordance with the current site APDES permit to further document compliance with state water quality standards. Receiving water sampling data are discussed below under APDES monitoring (section 9.1).

2.2 Corps of Engineers Wetland Disturbance

An annual summary of wetland areas impacted and reclaimed is a requirement of the Corps of Engineers (COE) 404 fill permit. Wetland areas impacted are tallied in Table 2. Overall, total fill in waters of U.S. as of December 2015 is 73.8 acres. An additional 0.3 acres of wetland fill occurred in 2015.

2.3 Access Corridors

Road improvements during 2015 were an ongoing priority of the project. Continued road surfacing and interim reclamation seeding were major improvements to the road projects in 2015. The maintenance of storm water BMPs along the Jualin and Kensington access corridors were also a major ongoing priority for 2015.

3.0 Mine Operations

3.1 Ore Production

Mine operations occurred in all 12 months during 2015. Approximately 669,837 tons of ore was mined in 2015.

3.2 Development Rock Production

A total of approximately 281,782 tons of development rock was mined in 2015. Approximately 205,151 tons of development rock was brought to the surface and placed into stockpiles and 76,631 tons were placed underground as backfill. Development rock sample results for 2015 are contained in Table 4.

3.3 Dust Suppression Activities

Road watering was conducted as required via a water wagon to control any fugitive dust. Dust suppression activities occurred on a limited number of occasions during the summer months of 2015.

3.4 Surface and Underground Drilling

A total of 109,802 feet of core drilling was completed in the period of January through December of 2015. The drilling was comprised of production and exploration programs.

The 2015 underground production drilling program included 71,210 feet. This drilling was completed by contracted drilling company using NQ and HQ core drill tooling. This program was accessed in the Kensington up-ramp and down-ramp.

The 2015 underground exploration drilling program included 38,592 feet. This was also completed under a drilling contract and used NQ and HQ core tooling. The underground exploration drilling was completed from various drill stations including the 520 level, 990 level, and 1170 level exploration drill sites.

No surface exploration drilling was completed in 2015.

4.0 Mill Operations

Mill operations occurred in all 12 months during 2015. Approximately 659,786 tons of ore was processed through the mill facility in 2015.

Over the past 2 years, coarse pebble reject rock with little value (0.040 ounces per ton) has been produced from the mill facility. Testing of X-Ray Transmission (XRT) sorting on pebble reject has been shown to be successful in separating the valuable rock from the low grade bulk material. A XRT machine was ordered in 2014 and began processing of the material in the third quarter of 2015.

4.1 Gold Production

Approximately 21,829 tons of concentrate was shipped from the Kensington mine to an off-site refinery. Of the 21,829 tons of concentrate shipped off-site, approximately 128,865 ounces of gold was contained.

4.2 Tailing Production

Approximately 342,967 tons of tailings were conveyed to the Tailings Treatment Facility and 237,208 tons of tailings were conveyed to the underground paste plant for disposal in the underground stopes during 2015. Tailings samples were collected in each of the four quarters of 2015 and there results are contained in Table 5.

5.0 Solid/Hazardous Waste Generation and Transport

An Integrated Waste Management and Disposal Plan dated November 2013 provides a description for the disposal of wastes from the Kensington Mine in accordance with the regulations in 18 AAC 60. A Waste Management Permit was issued by ADEC on September 20, 2013.

Solid waste was generated from the Comet and Jualin sides of the Kensington Gold Project, including: incinerator ashes, construction debris, worn cable, tires, and scrap metal. This material was managed in accordance with the approved ADEC Waste Management Permit. Coeur Alaska generated approximately 503 tons of solid waste, approximately 360 tons of scrap metal, 2.7 tons of batteries, and 22,570 gallons of used oil was recycled from the site. These materials were shipped to Juneau, then transported to disposal facilities or otherwise managed according to controlling regulations and permits.

Hazardous waste, including Universal waste, generated at the site included:

- Lead/acid, nickel, cadmium, and lithium ion batteries
- Florescent and metal halide lamps
- Paint and paint related waste

- Wastes associated with the Assay Laboratory
- Water Treatment Plant laboratory waste
- Computer backup power supplies

6.0 Tailings Treatment Facility

Following the favorable decision from the Supreme Court, the Army Corp of Engineers (ACOE) issued Permit Modification POA-1990-592-M6 and lifted the suspension of Permit Modification POA-1190-592-M on August 14, 2009. Construction activities on the tailings treatment facility began after the issuance of the permit modification and continued until the 3rd quarter of 2010 at which time operation of the facility began. Stage 2 construction of the facility was conducted in 2012. Operation of the facility began in June of 2010 and continued throughout 2015.

Engineering and permitting of the Stage 3 dam raise was conducted throughout 2015 with a preliminary design report submitted to Alaska Dam Safety in August 2015. The final design report was submitted to Alaska Dam Safety, ADNR, and Forest Service in January 2016.

7.0 Compliance

No notices of violations were issued to Coeur Alaska during 2015. All reporting was completed as required by permit conditions. One component of this document is the reporting of spills. Each spill that occurred during 2015 was taken very seriously and all site resources were utilized, as appropriate for each occurrence. The spills were all properly reported and cleaned up in accordance with ADEC guidelines (Table 3).

During the 2015 year, the following eight guidelines were updated in various aspects of environmental management at the site to ensure permit compliance:

- Bear Avoidance SOP
- Coeur Assay Lab Waste SOP
- Hazardous and Non-Hazardous Waste Handling SOP
- Spill Response Notification SOP
- Coeur Shotgun SOP
- Purchasing New Products or Chemicals or Materials SOP
- Paste Plant Opacity SOP
- Environmental Samples Shipping SOP
- Outfall 002 TSS Sampling SOP
- Hazardous Waste Manifest Procedure SOP

The Intelex tracking system was populated with new and/or revised permit requirements and reminders during 2015. The tracking system sends email reminders to employees responsible for the completion of the permit requirements to ensure site permit compliance.

8.0 Reclamation

No permanent concurrent reclamation was performed in 2015; however, interim seeding stabilization associated with topsoil stockpiles, road ditches, area adjacent to Tailings Treatment Facility, access roads, and tailings conveyance pipeline route was performed as a BMP under the approved SWPPP plan.

Approval was issued by the Forest Service and State of Alaska for the revised reclamation plan dated April 2013. A financial guarantee in the amount of $28,727,011 was submitted and approved by the Forest Service in 2013. An amendment was approved by ADNR and the Forest Service on June 8, 2015 for the Jualin exploration portal and an additional financial guarantee in the amount of $684,115 was posted on July 9, 2015 for the reclamation plan amendment.

8.1 Revegetation Test Plots

Revegetation test plots were constructed in July of 2013 in the Snow-Slide Gulch area to evaluate the reclamation methods proposed in the reclamation and closure plan. Reclamation test plot monitoring was conducted spring through late fall of 2015. All sites demonstrated stable conditions with slight to no erosion noted. Moderate growth of grass occurred throughout the season at all plots. Overall, Plot #1 demonstrated the most grass growth and best soil stability, followed by Plot #3 and Plot #2. Similar to 2014, in late July 2015 Plot #1 exhibited slightly more than 50% coverage. However, by early September the coverage had dropped to less than 50% grass cover. The monitoring results are contained in attachment 4. On-going monitoring of the test plots are planned for 2016.

9.0 Monitoring

9.1 APDES

Alaska Pollutant Discharge Elimination System (APDES) permit number AK0050571 was issued on July 29, 2011 and became effective on September 1, 2011. Results of the extensive monitoring program are contained in the Kensington Gold Project APDES permit AK-005057-1 Volume 1: Aquatic Resource Surveys and Volume 2: Water Quality Data of the APDES Annual Water Quality Monitoring Summary 2015 (Coeur, 2015). These reports will be submitted to the US Forest Service, Juneau under separate cover.

9.2 Fresh Water

Fresh water monitoring requirements are contained within the USFS POO. Monitoring performed for the APDES permit are summarized in the Kensington Gold Project APDES Permit AK-005057-1 Annual Water Quality Monitoring Summary 2015 Volume 2. Water Quality Data are inclusive of the requirements under the USFS POO. This report will be submitted to the Forest Service, Juneau and the Alaska Department of Environmental Conservation (ADEC) under separate cover, as the APDES 2015 Annual Report.

9.3 Water Usage

Under requirements of the ADNR water rights, certain water usage and stream flow submittals are prepared. Some of these filings are made monthly while others are submitted quarterly. These reports are available at ADNR offices, Juneau.

9.4 Aquatic Resource Surveys

The USFS POO references aquatic resource surveys, which are to include:

- Annual photographs of stream habitat types.
- Fish surveys and minnow trapping in Upper Slate Lake.
- Salmon escapement surveys in Sherman, Slate, and Johnson Creeks.

Annual photographs of stream habitat types are included in the Kensington Gold Project APDES Permit AK-005057-1 Annual Water Quality Monitoring Summary Volume 1: Aquatic Resource Surveys 2015.

Adult salmon escapement surveys were performed in 2015 on Sherman, Slate, and Johnson Creeks. Tabulations of these data are presented in the Kensington Gold Project APDES Permit AK-005057-1 Annual Water Quality Monitoring Summary Volume 1: Aquatic Resource Surveys 2015. These reports will be submitted to the Forest Service, Juneau under separate cover.

9.5 Marine

The Forest Service Plan of Operations Appendix 4.d. contains a marine monitoring program for Berners Bay.

Between April 28 and May 19, one hundred and thirty two marine mammal observation surveys were completed aboard the M/V Majestic Fjord. The official eulachon run transportation regulations as determined by Coeur Alaska and NMFS were put into effect on April 28, 2015. Special measures taken during the eulachon run included: having a marine observer on the vessel during all trips and maintaining a maximum speed of 13 knots within Berners Bay. Regular transit speed is approximately 21-25 knots. Transportation vessel trips during the eulachon run were limited to 3 trips daily. No more than 3 trips per day were conducted during the 2015 eulachon spawning window.

A total of 474 Steller sea lions were counted during the observation period; 150 of these sightings (31.6%) occurred within Berners Bay. The vast majority (99.6%) of the 1565 harbor seal sightings also occurred within Berners Bay. Most of these sightings were at pinniped haul out areas, such as the entrance to Slate Cove and Point Saint Mary. Gatherings of up to 20 harbor seals on haul outs were observed. Pinniped activity was highest on April 30 through May 7. No recordable encounters with marine mammals occurred during the 2015 eulachon spawning season. Please refer to Attachment 1 for additional information related to the marine surveys.

9.6 Air

During the reporting period, bi-annual Facility Operating Reports, including fuel use summaries, were submitted to the Fairbanks office of ADEC Air Permits Program (610 University Avenue) in compliance with ADEC air quality permits. These reports are not reproduced here, but can be provided upon request.

9.7 Archeology

Surface disturbance activities within historic areas were completed during 2005. No additional surface disturbance occurred in 2015.

Archaeological testing, monitoring, and data recovery activities were conducted at the Kensington-Jualin mine during 2013. A final report was submitted in December 2015 for comment.

Training was conducted for all new employees as part of the new-hire environmental awareness training program in addition to the recurring annual refresher training for all Coeur employees in 2015. Additionally, all construction workers were provided this training as part of the construction environmental awareness training program. Newly hired employees and construction workers are not allowed to work on-site until they receive this training. The training clearly states Coeur Alaska's policy regarding unauthorized collections from private and public lands. Approximately 1500 hours of training, which included the Cultural Resource training was conducted in 2015 with employees and contractors.

9.8 Tailings Treatment Facility Ecological Monitoring Plan

The Tailings Treatment Facility Ecological Monitoring Plan was revised in June 2013 and an approval of the plan was received from the Forest Service in June of 2013. The tailings habitability study was commenced in August of 2013 as described in the approved plan. On-going monitoring was conducted by AK Fish and Game in 2015 and results will be presented in the Kensington Gold Project APDES permit AK-005057-1 Volume 1: Aquatic Resource Surveys (Coeur, 2015).

9.9 Berners Bay Transportation Plan

Marine vessel transport occurred between Juneau and Slate Cove or Comet Beach. Heavy equipment and supplies were transported via barge or landing craft and were received at Slate Cove or Comet Beach. Additionally, mine employees were transported via boat and were also received at Slate Cove. Marine waters located around the marine facilities discussed above were open to public access.

It is a requirement of the Berners Bay Transportation Policy, Mitigation, and BMP Plan to collect information on company marine vessel encounters with special fish, marine mammals, and important bird species during the eulachon spawning season in Berners Bay. This information is documented in Attachment 1.

9.10 Development Rock, Borrow Source, and Tails Material

Development rock and tailing sampling for acid base accounting (ABA) is a requirement of the POO. Development Rock sample results for 2015 are contained in Table 4. Development rock acid-base accounting results indicate minimal potential to generate acid rock drainage.

Quarterly tailings sample results for acid base accounting is contained in Table 5. Acid-base accounting results indicate that the tailings solids are net-neutralizing, thus minimal potential exists for acid rock drainage.

The following background information is included in the SEIS for the site development rock and tailings:

Waste Rock:
SAIC (1997) compiled ABA results for 108 samples originally reported by Geochemica Inc. and Kensington Venture (1994) and SRK (1996b) (Figure 3-1). Seventy-five samples were representative of waste rock in the expected development area (Group 1A and 1B samples), while the remainder represented waste rock from nearby areas outside the expected development area (Group 2 samples). All samples had NP:AP values exceeding 3, and 42 of the 75 Group 1 samples had NP:AP values greater than 50, indicating minimal potential to generate acid rock drainage.

Tailings:
Acid-base accounting tests showed the tailing solids to be net-neutralizing. As sulfide is removed from the tailings during processing, this material is more strongly neutralizing than waste rock produced during project operations (SRK, 1996b). Montgomery Watson (1996b) determined the total sulfur content to be 0.04 percent, corresponding to an NP: AP of 83, while SRK (1996b) measured total sulfur content of 0.02 percent, corresponding to an NP:AP of 166. As is the case for ore and waste rock characterization, potential acidity was conservatively determined based on total sulfur, rather than sulfide sulfur, concentration.

The ABA results for the current development rock and tailings are consistent with what was seen in the background samples as they all have a very high neutralization potential to acid potential. All samples had NPR values, calculated as NP/AP, exceeding 2. According to the Mine Environment Neutral Drainage Program, samples with an NPR>2 are considered non-acid forming.

9.11 Construction/Excavation Dewatering (Non-Stormwater)

No construction/excavation dewatering (Non-Stormwater) occurred at the site during 2015.

Groundwater intercepted in the mine workings is treated and discharged to Sherman creek. This discharge is authorized under ADEC APDES permit AK-005057-1.

Tailings water was decanted and pumped from the TTF to the TTF Water Treatment Plant (WTP) where it was treated and discharged to East Fork of Slate Creek. This discharge is authorized under ADEC APDES permit AK-005057-1.

9.12 Tailings Treatment Facility Monitoring

Monitoring of the TTF was conducted according to the approved Operation and Maintenance (O&M) manual dated December 2012. The O & M Manual describes procedures for operating the Lower Slate Lake Tailings Dam under normal and extreme reservoir level and flow conditions. Additionally, the O&M manual describes the daily, weekly and quarterly inspections that are required to be conducted at the dam along with any actions and maintenance activities that are necessary as a result of the inspection observations.

9.13 Wildlife

9.13.1 ADFG Goat Monitoring

Mountain goat monitoring in the Lions Head Mountain area associated with the Kensington Gold Project has been conducted intermittently since the late 1980's, in part to help determine potential future mine impacts on this population. An updated ADFG goat study is included as Attachment 3. Additionally, ADFG is planning on presenting the results of the study at the annual project meeting.

9.13.2 Terrestrial Wildlife Monitoring – Slate Lakes Basin

Wildlife Monitoring was conducted during 2015 in accordance with the Kensington Project Terrestrial Wildlife Monitoring Plan. This plan was designed to ensure that environmental impacts to wildlife resources in the Slate Lakes basin area are mitigated during both construction and operation of the Kensington Project and that the reclamation process includes a plan to support and encourage use by local wildlife. See Attachment 2 for the 2015 Terrestrial Wildlife Report.

10.0 Avalanche Safety Plan

Coeur Alaska maintains an avalanche hazard awareness and mitigation safety plan during the winter season. A qualified Avalanche Program Director is retained to:

- Identify and quantify the snow avalanche safety hazard
- Prepare recommendations on managing that hazard
- Train employees and contractors in pertinent requirements of the resulting safety plan
- Prepare daily hazard forecasts and perform potential avalanche control activities

Because of the steep terrain adjacent to the site and large quantities of snow-fall, risk avoidance cannot be accomplished in all cases. Therefore, an active avalanche risk mitigation program has been conducted at the site. This involves the use of explosives to initiate controlled release of smaller avalanches so as to reduce the risk of naturally triggered larger and more destructive avalanches.

During 2015, no active control work was required or performed due to the limited quantity of snowfall during the year. During the 2015 reporting period,

- Areas of avalanche risk were placarded
- Crews were informed of avalanche hazards and the appropriate responses to those hazards
- Avalanche rescue equipment was located on-site
- Crews were trained in their role in avalanche rescue operations and the use of the rescue equipment – as appropriate

During the reporting period, site activities were not curtailed as a result of identified avalanche hazards and no personnel were caught or injured in avalanches.

11.0 Dam Safety Oversight Status

A Certificate of Approval to Operate a Dam for the stage 2 dam was issued by Department of Natural Resources (DNR) – Alaska Dam Safety (ADS) on February 13, 2015. As required by Condition #9 of the Certificate of Approval to Operate a Dam dated February 13, 2015, an annual performance report was prepared by AECOM Inc. for the Lower Slate Lake Tailings Dam and submitted to ADS on October 14, 2015.

Projected Activities for 2016

Key Issues and Permitting Activities

Graphitic Phyllite that was excavated during the construction of the stage 1 and 2 Tailings Treatment Facility are currently stored in sealed containments at Pit 4 and the Mud dump area. A pug mill plant was partially constructed in 2015 and planned to be completed in 2016. The graphitic phyllite that is currently being temporarily stored in the sealed containments is planned to be mixed with cement and waste rock in the pug plant and placed into open stopes as backfill, beginning in the second quarter of 2016.

Water quality monitoring from the toe of the stockpile located at the north end of the TTF will continue in 2016. Monitoring will continue until such time as the seepage from the stockpile is similar to background water quality results and approval is received from the Forest Service and State of Alaska to discontinue the monitoring.

Four field-scale test cells were constructed in August of 2013 to assess the environmental stability of the graphitic phyllite material. The testing program is aimed at providing an evaluation of the weathering behavior of the graphitic phyllite present at the TTF west abutment under ambient conditions. On-going water quality monitoring of these field cells occurred during 2015 and will continue throughout 2016.

On-going permitting of the proposed fuel depot will continue in 2016. Upon receipt of approval from the state and federal agencies for the fuel depot, construction of the fuel depot will begin.

1.0 Public Safety

No revisions to the Public Access Control Plan are contemplated for 2016.

2.0 Mine Operations

Ore production is planned throughout the entire year of 2016.

On-going construction of the Jualin exploration portal and down ramp will continue throughout 2016 in order to access a mineralized vein system. This vein system lies between the historic Jualin workings developed in the early 1920's, and the existing Kensington portal system. The 2016 project will consist of approximately 7,000 feet of development face advance.

3.0 Mill Operations

Mill Operations are planned to be at full production throughout 2016.

Over the past 2 years, coarse pebble reject rock with little value (0.040 ounces per ton) has been produced from the mill facility. Testing of X-Ray Transmission (XRT) sorting on pebble reject has been shown to be successful in separating the valuable rock from the low grade bulk material. A XRT machine was ordered in 2014 and began processing of the material in the third quarter of 2015. Approximately 25,000 tons of pebble reject rock was processed in 2015. On-going processing is planned for 2016.

4.0 Tailings Treatment Facility

Engineering and permitting of the Stage 3 dam raise which began in 2015 is planned to continue into 2016. The final design report for the construction of the stage 3 raise was submitted to Alaska Dam Safety, ADNR, and Forest Service in January 2016.

5.0 Access Corridors

Most access road and corridor upgrades were completed in 2006. Road maintenance of the access corridors will continue in 2016.

6.0 Reclamation

No final reclamation is anticipated to occur in 2016. On-going monitoring of the revegetation test plots will continue throughout 2016.

7.0 Surface Exploration

A surface exploration work plan was submitted to the Forest Service in December 2015 for the 2016 drilling season. The work plan proposes a maximum of sixty-one (61) sites to be utilized in 2016. Of the sixty-one sites, thirty-eight (38) of the proposed sites would

be located on patented lode mining claims and twenty-three (23) would be located on Forest Service lands.

8.0 Proposed Modifications to Monitoring Plans for 2016

No further revisions to the monitoring plans are anticipated for 2016.

9.0 Bonding

A financial guarantee in the amount of $28,727,011 was submitted and approved by the Forest Service in 2013. An additional financial guarantee in the amount of $684,115 was posted on July 9, 2015 for the Jualin exploration portal reclamation amendment. The current cost estimate includes costs to reclaim the current site configuration and includes current contractor and material costs.

Figures

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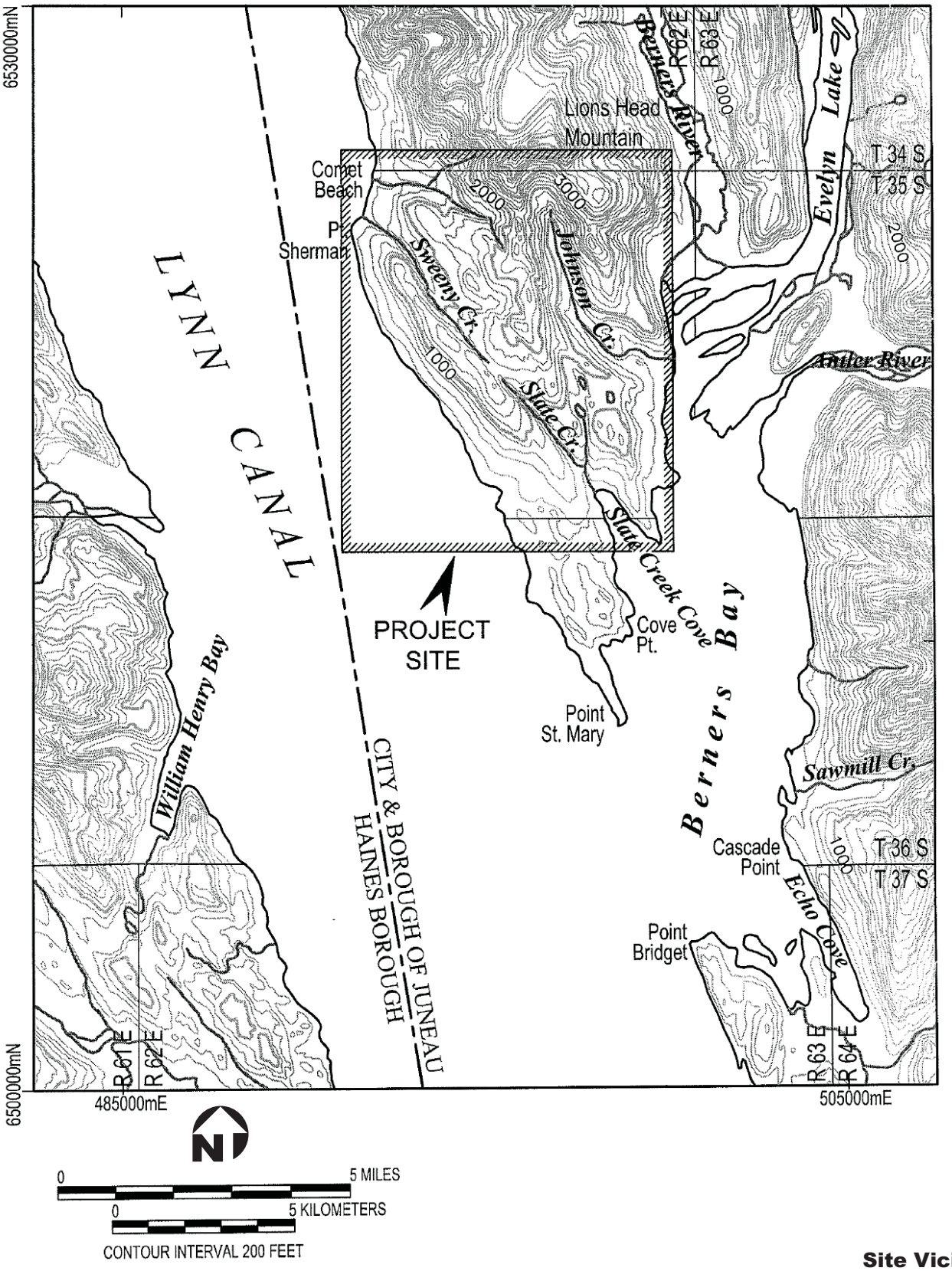


Site Vicinity

Applicant: Couer Alaska, Inc.
Permit No:

Location Address: Approximately Lynn Canal at Berners Bay, Juneau, Alaska

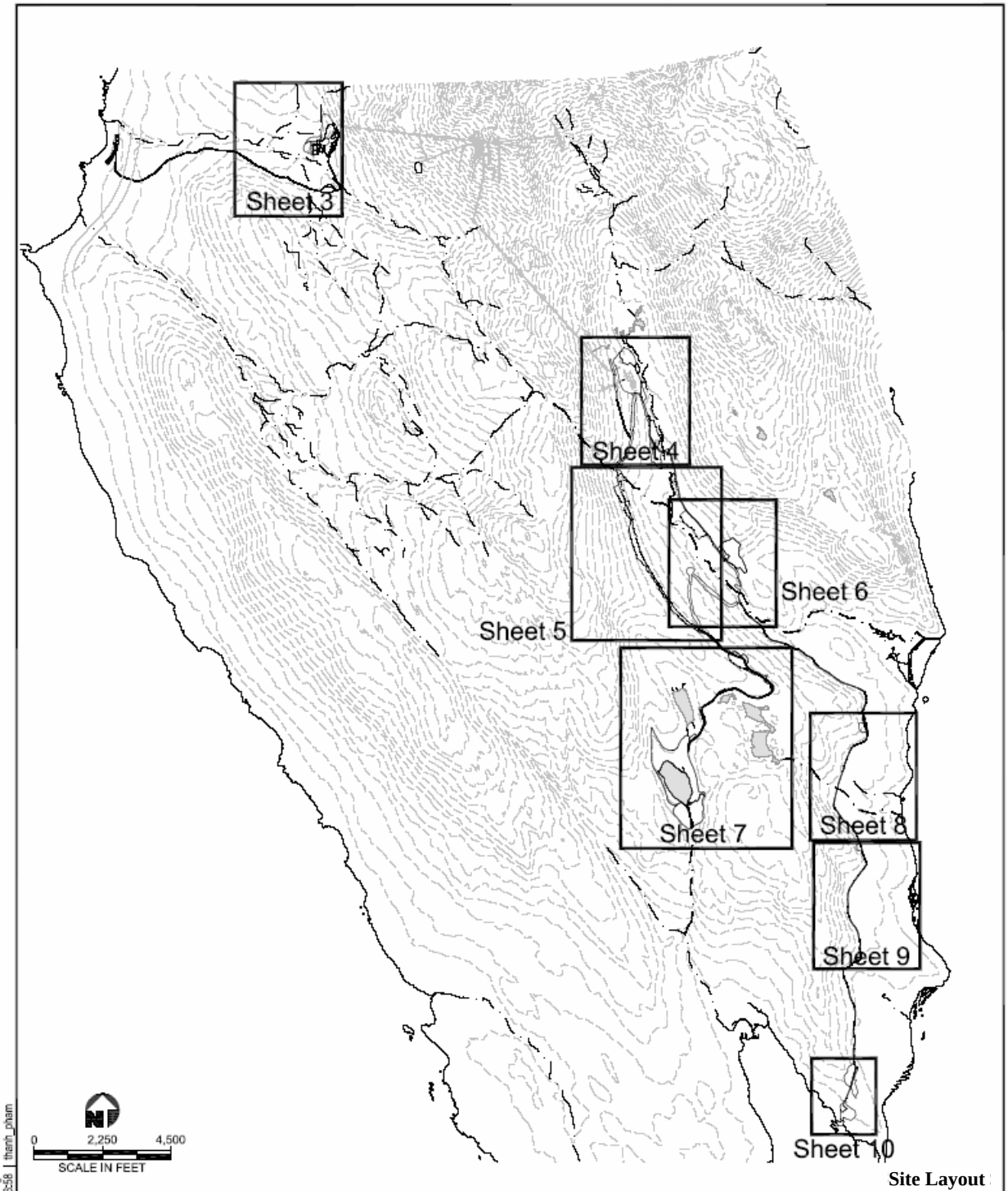
Adjacent Property Owners:
1. U.S. Forest Service

Proposed: Kensington Gold Project

Purpose: Construction of mining related facilities and appurtenances

Near/At: T35S, R62E
Municipality: City and Borough of Juneau
State: Alaska

Sheet: 1 of 10
Date: December 2008



Site Layout

Applicant: Coeur Alaska, Inc
Permit No:

Location Address: Approximately Lynn Canal at Berners Bay, Juneau, Alaska

Adjacent Property Owners:
1. U.S. Forest Service

Datum: Alaska State Plane Zone 1
NAD 83 on a NAD 27 Baseline

Proposed: Kensington Gold Project

Purpose: Construction of mining related facilities and appurtenances.

Near/At: T35S, R62E
Municipality: City and Borough of Juneau
State: Alaska

Sheet: 2 of 10
Date: December, 2008

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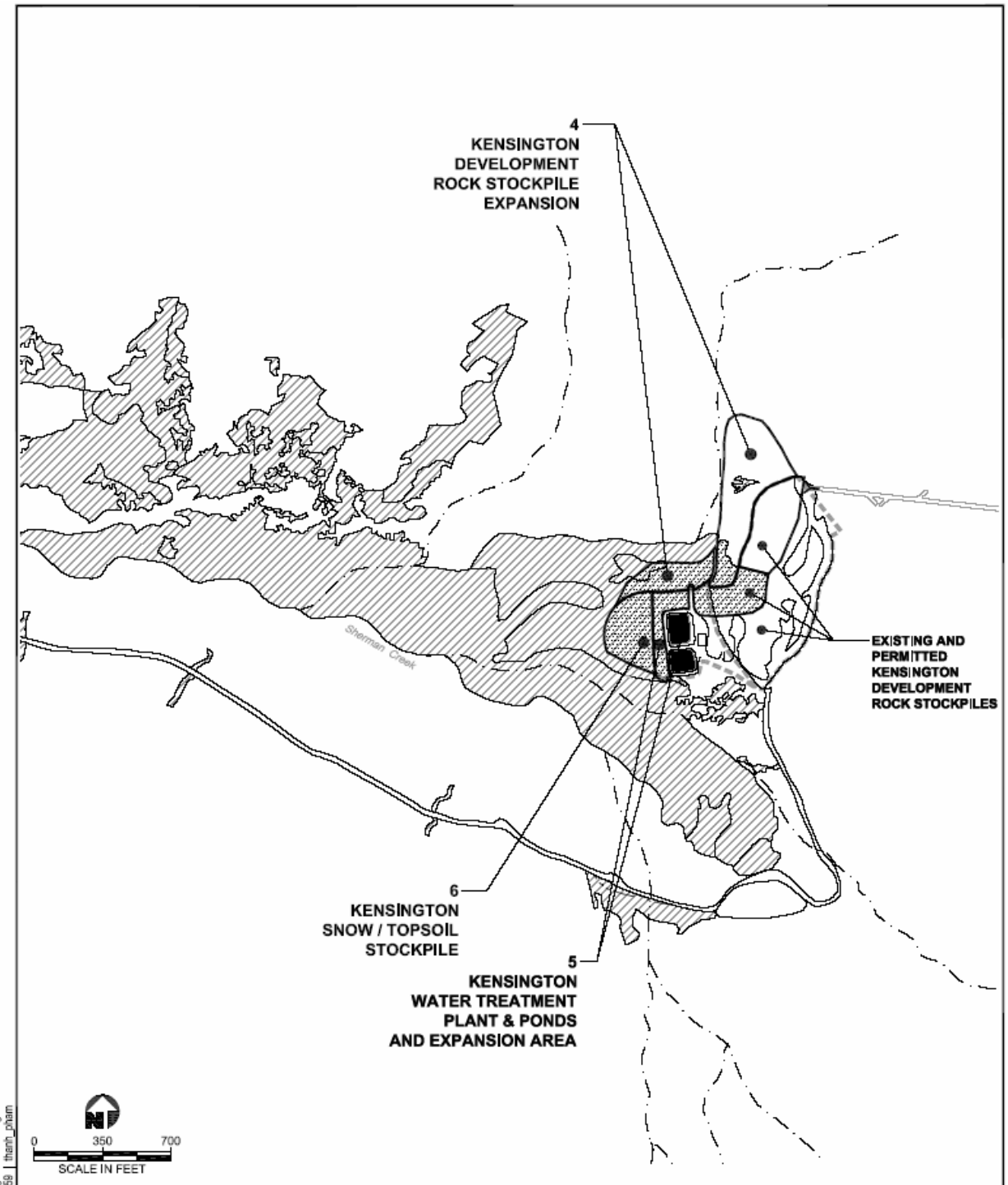

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Legend

- Work Area Boundary
- Wetland
- 25% Wetland Mosaic
- Upland or Bay
- Fill Impact
- Cut Impact
- Existing Prior to Permitting

Applicant: Coeur Alaska, Inc
Permit No:

Location Address: Approximately Lynn Canal at Berners Bay, Juneau, Alaska

Adjacent Property Owners:
1. U.S. Forest Service

Datum: Alaska State Plane Zone 1
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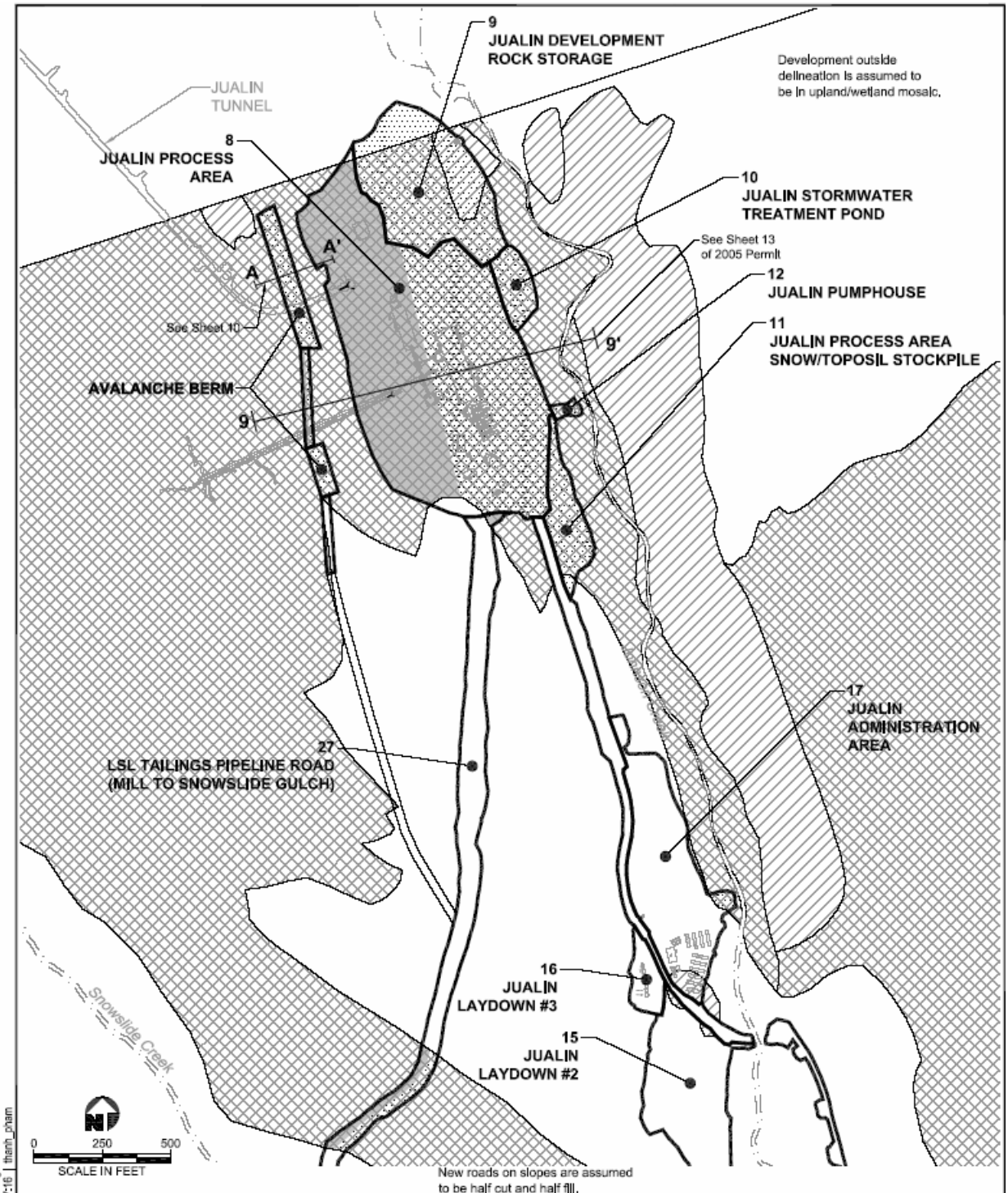
Near/At: T35S, R62E
Municipality: City and Burough of Juneau
State: Alaska

Sheet: 3 of 10
Date: December, 2008



Legend

- Work Area Boundary
- Wetland
- 25% Wetland Mosaic
- Upland or Bay
- Fill Impact
- Cut Impact

Applicant: Coeur Alaska, Inc
Permit No:

Location Address: Approximately Lynn Canal at Berners Bay, Juneau, Alaska

Adjacent Property Owners:
1. U.S. Forest Service

Datum: Alaska State Plane Zone 1 NAD 83 on a NAD 27 Baseline

Proposed: Kensington Gold Project

Purpose: Construction of mining related facilities and appurtenances.

Near/At: T35S, R62E
Municipality: City and Burough of Juneau
State: Alaska

Sheet: 4 of 10
Date: December, 2008

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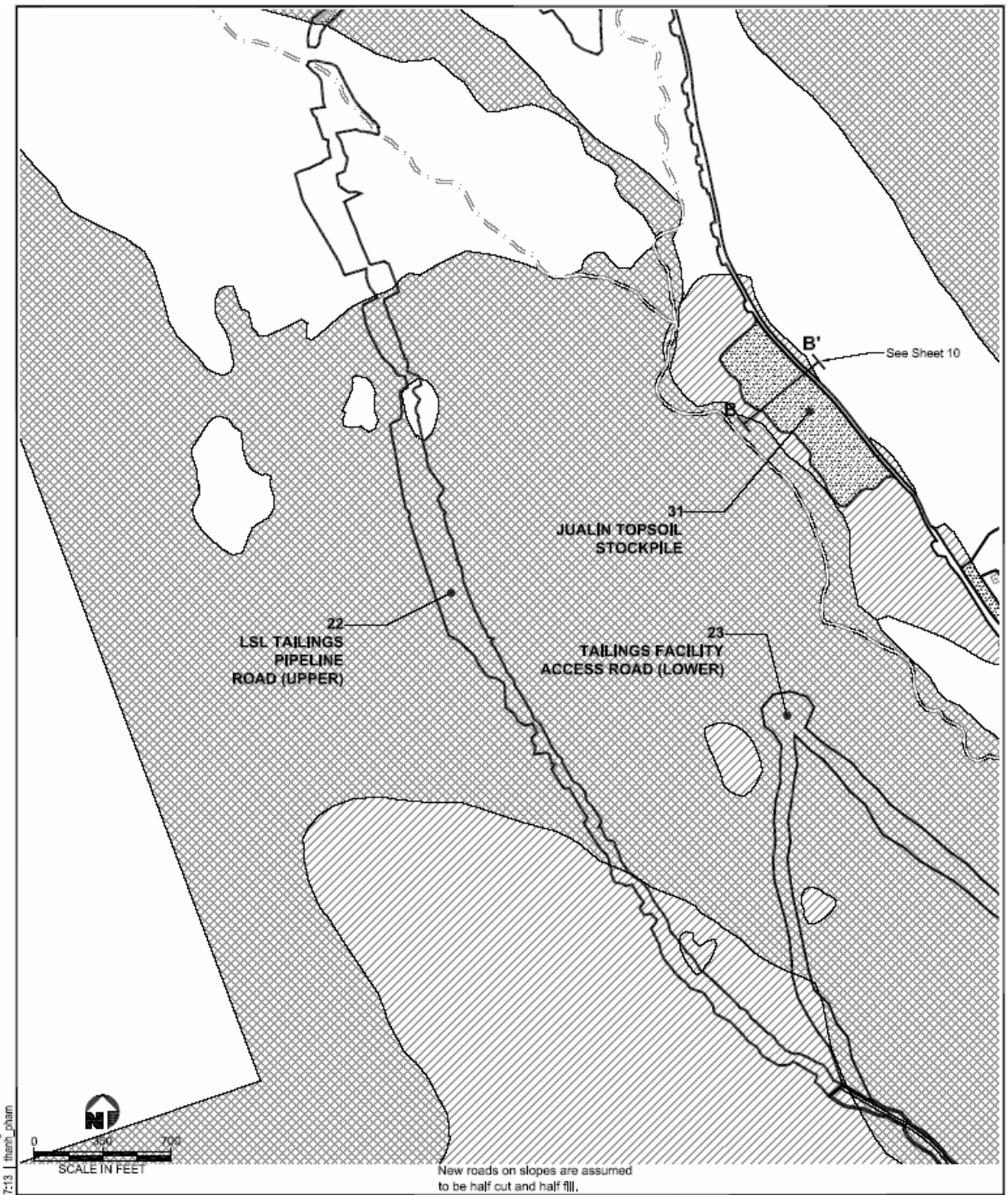

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Legend

- Work Area Boundary
- Wetland
- 25% Wetland Mosaic
- Upland or Bay
- Fill Impact
- Cut Impact

Applicant: Coeur Alaska, Inc
Permit No:

Location Address: Approximately Lynn Canal at Berners Bay, Juneau, Alaska

Adjacent Property Owners:
1. U.S. Forest Service

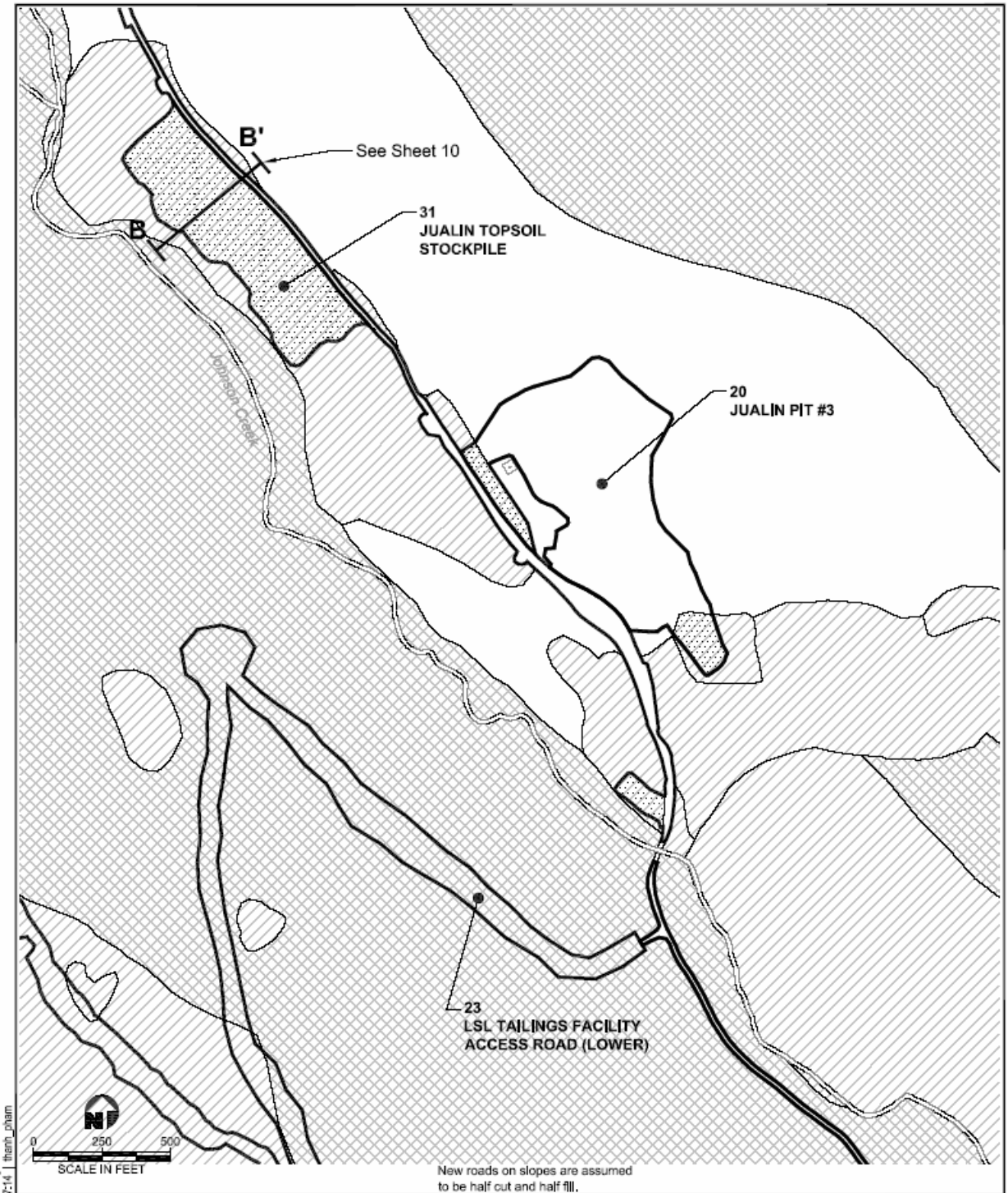
Datum: Alaska State Plane Zone 1
NAD 83 on a NAD 27 Baseline

Proposed: Kensington Gold Project

Purpose: Construction of mining related facilities and appurtenances.

Near/At: T35S, R62E
Municipality: City and Burough of Juneau
State: Alaska

Sheet: 5 of 10
Date: December, 2008



Legend

- Work Area Boundary
- Wetland
- 25% Wetland Mosaic
- Upland or Bay
- Fill Impact
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Applicant: Coeur Alaska, Inc
Permit No:

Location Address: Approximately Lynn Canal at Berners Bay, Juneau, Alaska

Adjacent Property Owners:
1. U.S. Forest Service

Datum: Alaska State Plane Zone 1
NAD 83 on a NAD 27 Baseline

Proposed: Kensington Gold Project

Purpose: Construction of mining related facilities and appurtenances.

Near/At: T35S, R62E
Municipality: City and Borough of Juneau
State: Alaska

Sheet: 6 of 10
Date: December, 2008

T:\Misc-Jobs\Coeur Alaska\JARPA\Sheet 5 Jualn.dwg
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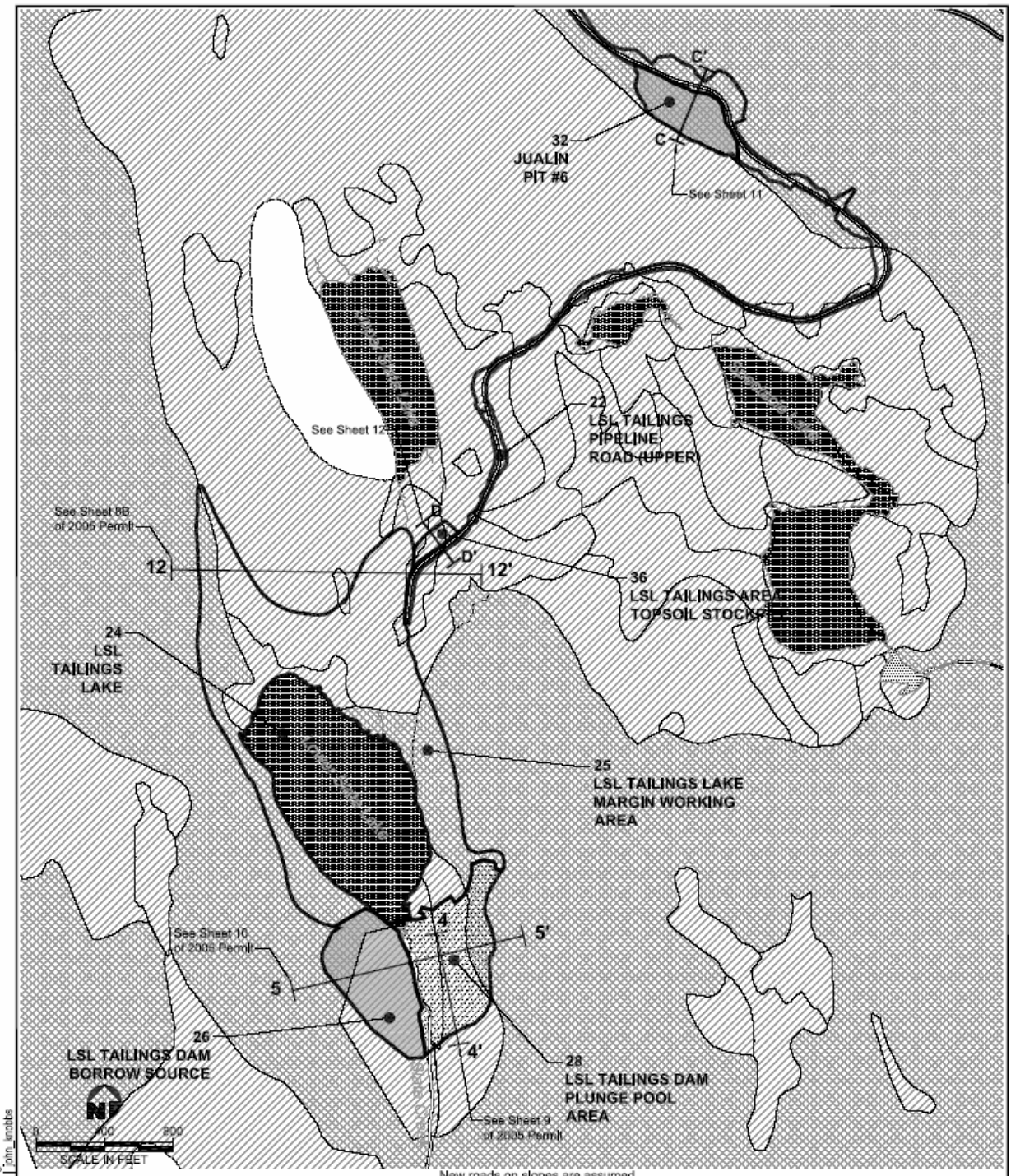

Legend

- Work Area Boundary
- Wetland
- 25% Wetland Mosaic
- Upland or Bay
- Fill Impact
- Cut Impact

Applicant: Coeur Alaska, Inc
Permit No:

Location Address: Approximately Lynn Canal at Berners Bay, Juneau, Alaska

Adjacent Property Owners:
1. U.S. Forest Service

Datum: Alaska State Plane Zone 1
NAD 83 on a NAD 27 Baseline

Proposed: Kensington Gold Project

Purpose: Construction of mining related facilities and appurtenances.

Near/At: T35S, R62E
Municipality: City and Borough of Juneau
State: Alaska

Sheet: 7 of 10
Date: December, 2008

T:\Misc-Jobs\Coeur Alaska\JAR\PA\Sheet 7 Tailings.dwg
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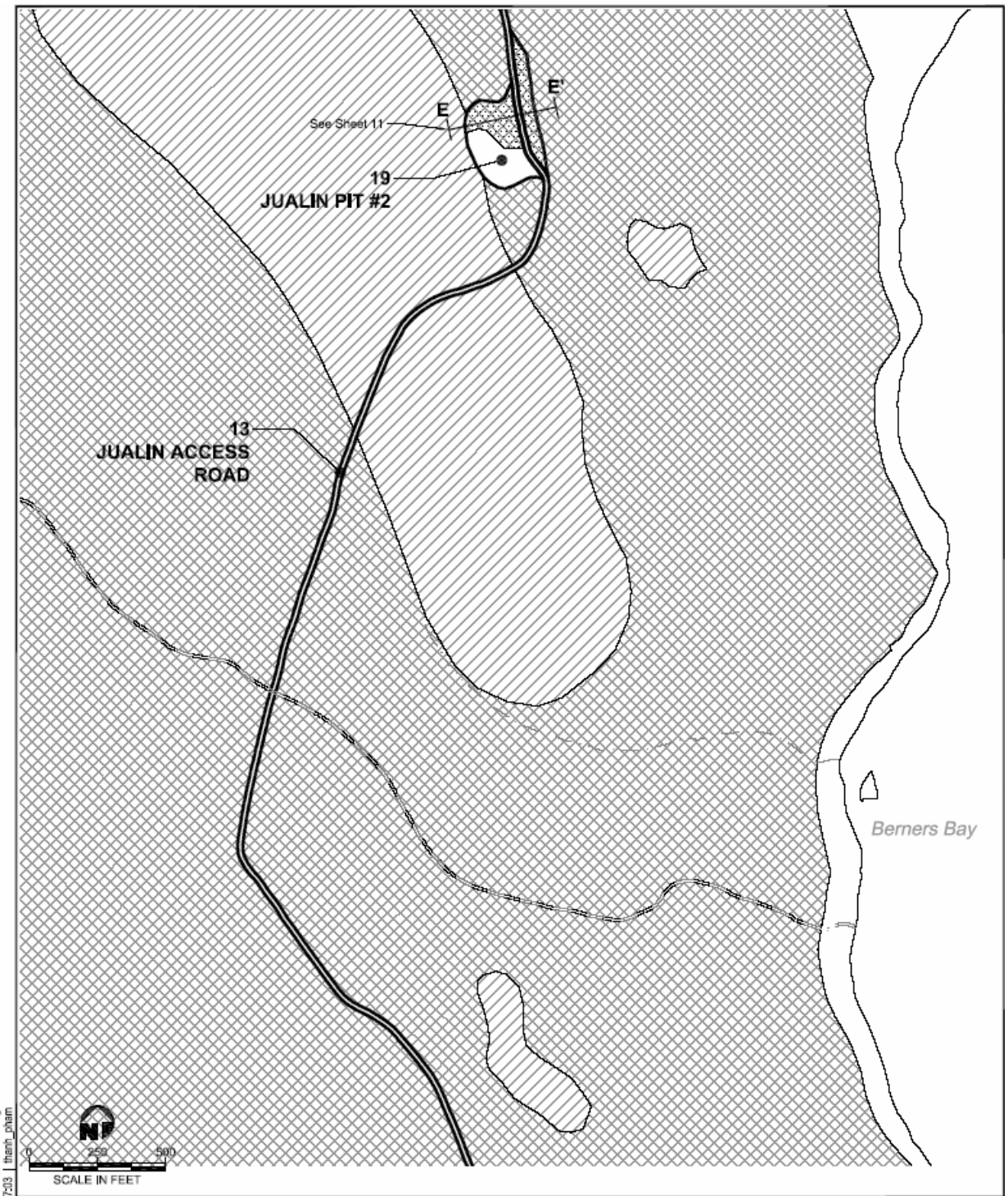

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Legend

- Work Area Boundary
- Wetland
- 25% Wetland Mosaic
- Upland or Bay
- Fill Impact
- Cut Impact

Applicant: Coeur Alaska, Inc
Permit No:

Location Address: Approximately Lynn Canal at Berners Bay, Juneau, Alaska

Adjacent Property Owners:
1. U.S. Forest Service

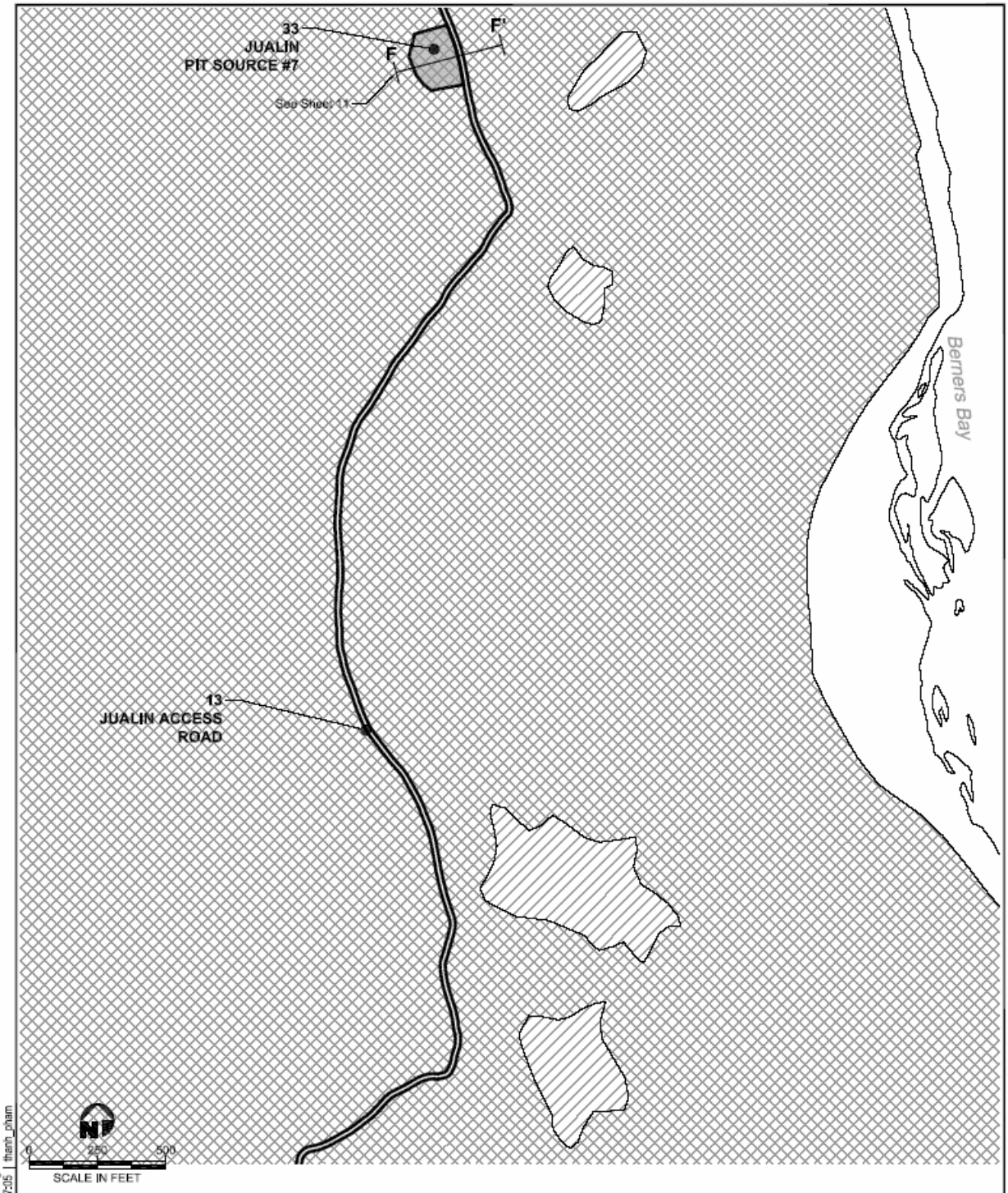
Datum: Alaska State Plane Zone 1
NAD 83 on a NAD 27 Baseline

Proposed: Kensington Gold Project

Purpose: Construction of mining related facilities and appurtenances.

Near/At: T35S, R62E
Municipality: City and Burough of Juneau
State: Alaska

Sheet: 8 of 10
Date: December, 2008



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Legend

- Work Area Boundary
- Wetland
- 25% Wetland Mosaic
- Upland or Bay
- Fill Impact
- Cut Impact

Applicant: Coeur Alaska, Inc
Permit No:

Location Address: Approximately Lynn Canal at Berners Bay, Juneau, Alaska

Adjacent Property Owners:
1. U.S. Forest Service

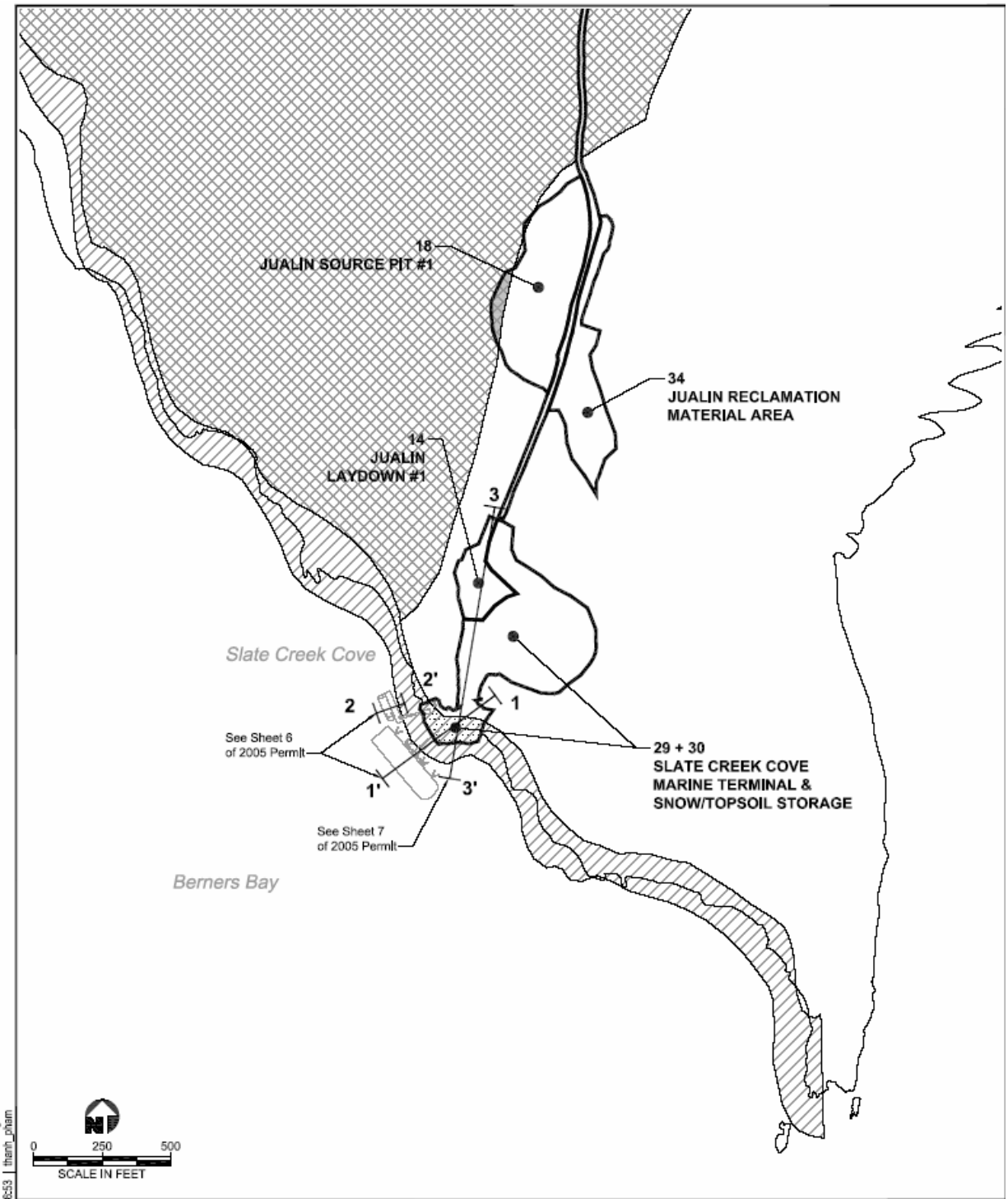
Datum: Alaska State Plane Zone 1
NAD 83 on a NAD 27 Baseline

Proposed: Kensington Gold Project

Purpose: Construction of mining related facilities and appurtenances.

Near/At: T35S, R62E
Municipality: City and Burough of Juneau
State: Alaska

Sheet: 9 of 10
Date: December, 2008



T:\Misc-Jobs\Coeur Alaska\JARPA\Sheet 9 Slate Creek Cove.dwg
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Legend

- Work Area Boundary
- Wetland
- 25% Wetland Mosaic
- Upland or Bay
- Fill Impact
- Cut Impact

Applicant: Coeur Alaska, Inc
Permit No:

Location Address: Approximately Lynn Canal at Berners Bay, Juneau, Alaska

Adjacent Property Owners:
1. U.S. Forest Service

Datum: Alaska State Plane Zone 1
NAD 83 on a NAD 27 Baseline

Proposed: Kensington Gold Project

Purpose: Construction of mining related facilities and appurtenances.

Near/At: T35S, R62E
Municipality: City and Burough of Juneau
State: Alaska

Sheet: 10 of 10
Date: December, 2008

Tables

Table 1 Kensington Gold Project – Surface Disturbance

Area	Description	Status 2015	Actual Disturbance - Acreage- Total
1	Kensington Comet Beach Camp	Existing / Permitted	3.2
2	Kensington Access Road	Existing / Permitted	5.7
4	Kensington Development Rock Stockpile	Existing / Permitted	13.0
5	Kensington Water Treatment Plant & Ponds	Existing / Permitted	3.7
6	Kensington Snow / Topsoil Stockpile	Existing / Permitted	3.2
7	Kensington 2050 Level Portal Development Rock Storage	Existing / Permitted	1.5
8	Jualin Process Area	Built	17.4
8A	Jualin Avalanche Berms & Road	Partially built	0.4
9/9A	Jualin Development Rock Storage	Mostly Built	4.7
10	Jualin Storm Water Treatment Pond	Built	0.7
11	Jualin Process Area Snow/Topsoil Stockpile Area	Built	1.3
12	Jualin Pumphouse	Built	0.1
13	Jualin Access Road	Existing / Built	28.4
14	Jualin Laydown #1	Built	0.9
15	Jualin Laydown #2	Built	3.7
16	Jualin Laydown #3	Built	0.6
17	Jualin Administration Area	Built	4.5
18	Jualin Pit Source #1	Built	3.8
19	Jualin Pit Source #2	Built	1.3
20	Jualin Pit #3	Built	11
22	LSL Tailings Pipeline & Access Road (Upper)	Built	9.6
23	LSL Tailings Facility Access Road (Lower)	Built	9.1
24	LSL Tailings Lake	Partially occupied	23.5
25	LSL Tailings Lake Margin Working Area	Partially occupied	49.8
26	LSL Tailings Dam Borrow Source	Partially built	4.9
27	LSL Tailings Pipeline Road (Mill to Snowslide Gulch)	Built	20.7
28	LSL Tailings Dam & Plunge Pool Area	Built	5.4

Area	Description	Status 2015	Actual Disturbance - Acreage- Total
29	Slate Creek Cove Marine Terminal	Built	4.1
30	Slate Creek Cove Snow/Stockpile Area	Built	0
31	Jualin Topsoil Stockpile	Built	6.8
32	Jualin Borrow Source #6	Partially built	3.5
34	Jualin Reclamation Materials Area	Built	2.1
36	Tailings Area Topsoil Stockpile	Built	0.6
	TOTALS		**249.2**

Table 2 - Kensington Gold Project – Wetlands Disturbance

Area	Description	Status 2015	Permitted Acres of Fill in Waters of the U.S. per 2005 Permit Table 1	Actual Waters of U.S. Acres Filled as of December 2015	Requested Acres of Total Fill in Waters of the U.S. 2009 update	Fill Volume (Cubic Yards)	Acres to be Reclaimed as Wetlands or Waters
1	Kensington Comet Beach Camp	Existing / Permitted	0	0	0	0	NA
2	Kensington Access Road	Existing / Permitted	0.9	0	0	0	NA
3	Kensington Borrow Pit #1	Not built	0.3	0	0	0	NA
4	Kensington Development Rock Stockpile Expansion	Existing / Permitted	5.1	1.1	4.5	220,000	8
5	Kensington Water Treatment Plant & Ponds and Expansion Area	Existing / Permitted	2.6	2.9	3.5	85,000	3.5
6	Kensington Snow / Topsoil Stockpile	Existing / Permitted	2.1	0	2.1	10,000	2.1
7	Kensington 2050 Level Portal Dev. Rock Storage	Existing / Permitted	0	0	0	0	0
8	Jualin Process Area	Built	1.1	2.0	2.0	97,000	NA
8A	Jualin Avalanche Berms & Road	Partially built		0.3	0.3	23,000	NA
9/9A	Jualin Development Rock Storage	Mostly Built	4.3	2.0	2.5	121,000	1.7
10	Jualin Storm Water Treatment Pond	Built	0	0.1	0.1	1,500	NA
11	Jualin Process Area Snow/Topsoil Stockpile	Built	0	0.2	0.2	3,000	0.6
12	Jualin Pumphouse	Built	0.1	0.1	0.1	1,500	NA
13	Jualin Access Road	Existing / Built	8.2	7.7	7.7	37,000	0.6
14	Jualin Laydown #1	Built	0.4	0	0	0	NA
15	Jualin Laydown #2	Built	3.5	0	0	0	NA
16	Jualin Laydown #3	Built	0.8	0	0	0	NA
17	Jualin Admin. Area	Built	2.5	0.1	0.1	1,500	2.5
18	Jualin Borrow Source #1	Built	0	0	0		0.2
19	Jualin Borrow Source #2	Built	0.1	1.1	1.1	10,500	
20	Jualin Borrow Source #3	Built	2.4	1.2	1.2	11,500	6.0
21	Jualin Borrow Source #4	Not built	0.7	0	0	0	NA

Area	Description	Status 2015	Permitted Acres of Fill in Waters of the U.S. per 2005 Permit Table 1	Actual Waters of U.S. Acres Filled as of December 2015	Requested Acres of Total Fill in Waters of the U.S. 2009 update	Fill Volume (Cubic Yards)	Acres to be Reclaimed as Wetlands or Waters
22	LSL Tailings Pipeline & Access Road (Upper)	Built	4.7	4.3	4.3	41,500	4.3
23	LSL Tailings Facility Access Road (Lower)	Built	0.3	1.3	1.4	13,500	2.8
24	LSL Tailings Lake (tailings as fill)	Occupied	23.5	23.5	23.5	3,920,000	(23.5)
25	LSL Tailings Lake Margin Working Area	Partially occupied	8.5	10.9	10.9	500	8.7 (38.5)
26	LSL Tailings Dam Borrow Source	Partially built	0.3	0.3	0.3	3,000	0
27	LSL Tailings Pipeline Road (Mill to Snowslide Gulch)	Partially built	3.0	0.4	0.4	3,500	2.2
28	LSL Tailings Dam & Plunge Pool Area	Built	5.9	6.1	6.1	236,000	2.4
29	Slate Creek Cove Marine Terminal	Built	1.9	0.5	0.5	12,000	3.2
30	Slate Creek Cove Snow/Stockpile Area	Built	0.2	0	0	0	0.5
31	Jualin Topsoil Stockpile	Built	0	6.8	6.8	300,000	6.8
32	Jualin Borrow Source #6	Partially built	0	0.1	0.1	1,500	0
33	Jualin Borrow Source #7	Not Built	0	0	0	0	NA
34	Jualin Reclamation Material Area	Built	0	0.8	0.8	0	0
36	LSL Tailings Area Topsoil Stockpile	Not built	0	0	0.6	14,500	0.6
	TOTALS		**83.4**	**73.8**	**80.3**	**5,168,500**	**110.0**

TABLE 3: ALASKA DEPARTMENT OF ENVIRONMENTAL CONSERVATION

ANNUAL SPILL LOG

FACILITY NAME, ADDRESS & Phone #: Coeur Alaska - Kensington Gold Mine, (907) 523-3337

REPORT MONTH/YR: 2015 Summary

Date of Spill	Time of Spill	Product Spilled	Quantity Spilled	Location of Spill	Cause of Spill or additional information	Area(s) Affected	Clean Up (Y/N)	Reported to State
1/27/2015	8:00 AM	Diesel Fuel	12 gallons	Mill Bench	One spill of approximately 12 gallons of diesel fuel occurred on the Mill Bench. The spill was the result of over-filling an auxiliary tank located in the bed of a pick-up truck.	Mill Bench	Adsorbent pads were utilized to clean-up the diesel fuel. The fuel spill occurred on compact ground that was frozen thus all of the spilled fuel was cleaned up utilizing adsorbent pads. The spent adsorbent pads were placed in the site incinerator for disposal.	Yes, reported to SPAR on January 28, 2015 at 12:50 PM.
2/1/2015	11:00 AM	Hydraulic Fluid	15 gallons	Portal Pad	One spill of approximately 20 gallons of hydraulic fluid occurred on the Portal Pad. The spill was the result of a blown hydraulic hose on a haul truck.	Potal Pad	Adsorbent pads were utilized to clean-up the hydraulic fluid. The spill occurred on compacted ground where ore is stored. The ground was frozen thus all of the spilled hydraulic oil was cleaned up utilizing adsorbent pads. The spent adsorbent pads were placed in the site incinerator for disposal.	Yes, reported to SPAR on February 2, 2015 at 11:15 AM.
2/14/2015	5:00 AM	Hydraulic Fluid	40 gallons	Portal Pad	One spill of approximately 40 gallons of hydraulic fluid occurred on the Portal Pad. The spill was the result of a blown hydraulic hose on a haul truck.	Potal Pad	Adsorbent pads were utilized to clean-up the hydraulic fluid. The spill occurred on compacted ground where ore is stored. The ground was frozen thus all of the spilled hydraulic oil was cleaned up utilizing adsorbent pads. The spent adsorbent pads were placed in the site incinerator for disposal.	Yes, reported to SPAR on February 15, 2015 at 6:42 PM.
2/15/2015	10:00 AM	Hydraulic Fluid	2.25 gallons	Portal Pad	One spill of approximately 2.25 gallons of hydraulic fluid occurred on the Portal Pad. The spill was the result of a blown hydraulic hose on a	Potal Pad	Adsorbent pads were utilized to clean-up the hydraulic fluid. The spill occurred on compacted ground where ore is stored. The ground was frozen thus all of the spilled hydraulic oil was cleaned up utilizing	Yes, monthly report.
3/25/2015	10:45 AM	Grey Water Sewage Spill	1 Quart	Tailings Treatment Facility	The Pacific Waste operator removed a pipe patch from the pipe area that was leaking and a small amount of residual grey water spilled onto the ground next to the Pacific Waste conex. The pumper truck was returned to Juneau	Area adjacent to Pacific Waste connex at Tailings Treatment Facility	The area was immediately flagged-off to prevent access to the area. The spill occurred on frozen ground so the spilled material was cleaned up utilizing the pumper truck. The spill area was disinfected with a 5% chlorine solution and the area remained flagged-off for 24 hours.	Yes, reported to DEC - Compliance and Enforcement on March 26, 2015 at 8:30 AM.
5/23/2015	6:30 PM	Hydraulic Oil	Approximately 4 gallons	Portal Bench	Blown Hydraulic Line on an excavator	Portal Bench compacted area	Yes, adsorbent pads were utilized to clean-up the spilled hydraulic oil. The spill occurred on compacted ground thus the adsorbent pads were adequate to clean up the spilled oil. The spent adsorbent pads were disposed of in the site incinerator.	Yes, Monthly Report
5/28/2015	3:40 PM	Grey Water	3 gallons	Sewer Treatment Plant	Mechanical Failure on the pumper truck caused grey water to back flow out of the truck into the hose and onto the ground.	Sewer Treatment Plant	The area was immediately flagged-off to prevent access to the area. The spilled material was vacuumed up utilizing the pumper truck. The spill area was disinfected with a 5% chlorine solution and the area remained flagged-off for 24 hours.	Yes, reported to DEC - Compliance and Enforcement on May 28, 2015 at 5:15 PM.

Date of Spill	Time of Spill	Product Spilled	Quantity Spilled	Location of Spill	Cause of Spill or additional information	Area(s) Affected	Clean Up (Y/N)	Reported to State
6/27/2015	10:35 AM	Hydraulic Oil	9 gallons	Comet Waste Rock Stockpile	The spill was the result of a blown hydraulic hose on a haul truck.	Comet Waste Rock Stockpile	Adsorbent pads were utilized to clean-up as much of the free hydraulic fluid as possible. The contaminated soil was excavated and placed into 55-gallon drums. Three - 55 gallon drums of contaminated soil was excavated as a result of the spill. The drums are planned to be sent off-site for disposal. The spent adsorbent pads were placed in the site incinerator for disposal.	Yes, Monthly Report
6/30/2015	6:50 AM	Grey Water	8 gallons	Sewer Treatment Plant	Overflow valve on the pumper truck malfunctioned causing grey water to overflow out of the truck and onto the ground.	Sewer Treatment Plant	The area was immediately flagged-off to prevent access to the area. The spilled material was vacuumed up utilizing the pumper truck. The spill area was disinfected with a 5% chlorine solution and the area remained flagged-off for 24 hours.	Yes, reported to DEC - Compliance and Enforcement on June 30, 2015 at 10:20 AM.
7/4/2015	6:30 PM	Hydraulic Oil	9 gallons	Jualin Portal Pad	The spill was the result of a loose hydraulic oil filter on a haul truck.	Jualin Portal Pad	Adsorbent pads were utilized to clean-up as much of the free hydraulic fluid as possible. The contaminated soil was excavated and placed into 55-gallon drums. Three - 55 gallon drums of contaminated soil was excavated as a result of the spill. The drums are planned to be sent off-site for disposal. The spent adsorbent pads were placed in the site incinerator for disposal.	Yes, Monthly Report
7/6/2015	6:15 AM	Diesel Fuel	8 gallons	Mill Fuel Pad	The spill was the result of overfilling the fuel tank on an underground haul truck.	Mill Fuel Pad	Yes, adsorbent pads were utilized to clean-up the spilled diesel fuel. The spill occurred on compacted ground thus the adsorbent pads were adequate to clean up the spilled diesel fuel. The spent adsorbent pads were disposed of in the site incinerator.	Yes, Monthly Report
7/11/2015	10:45 AM	Hydraulic Oil	5 gallons	Jualin Portal Pad	The spill was the result of a blown hydraulic hose on a haul truck.	Jualin Portal Pad	Yes, adsorbent pads were utilized to clean-up the spilled hydraulic oil. The spill occurred on compacted ground thus the adsorbent pads were adequate to clean up the spilled hydraulic oil. The spent adsorbent pads were disposed of in the site incinerator.	Yes, Monthly Report
7/15/2015	9:30 PM	Hydraulic Oil	2 gallons	Jualin Portal Pad	The spill was the result of hydraulic fluid leaking from rock prick.	Jualin Portal Pad	Yes, adsorbent pads were utilized to clean-up the spilled hydraulic oil. The spill occurred on compacted ground thus the adsorbent pads were adequate to clean up the spilled hydraulic oil. The spent adsorbent pads were disposed of in the site incinerator.	Yes, Monthly Report

Date of Spill	Time of Spill	Product Spilled	Quantity Spilled	Location of Spill	Cause of Spill or additional information	Area(s) Affected	Clean Up (Y/N)	Reported to State
7/28/2015	12:30 PM	Ferric Chloride	9 gallons	Comet Mine Water Treatment Plant	While attempting to pull a ferric chloride tote from the chemical connex, the forks on the forklift caught the lower edge of the tote cage and slid causing the fork to puncture the lower corner of the plastic tote.	Comet Mine Water Treatment Plant	The contaminated soil was excavated and placed into a drum. Approximately 1/2 of a barrell of soil was excavated. The soil will be rinsed with water and the rinsate will be utilzied in the water treatment plant.	Yes, Reported to SPAR on 7/28/15 at 2:45 PM.
10/15/2015	5:30 PM	Hydraulic Oil	3 gallons	Upper Lay-down yard at Port	The spill was the result of a blown hydraulic hose on the bull forklift.	Upper Lay-down Pad	Yes, adsorbent pads were utilized to clean-up the spilled hydraulic oil. The spill occurred on compacted ground thus the adsorbent pads were adequate to clean up the spilled hydraulic oil. The spent adsorbent pads were disposed of in the site incinerator.	Yes, Monthly Report
10/27/2015	9:30 PM	Sodium Hypochlorite, 12.5%	9 gallons	Upper Camp Parking Lot	The spill was the result of a staple from a pallet being driven into a drum as it was being cinched down for transport.	Upper Camp Parking Lot	Yes, chemical adsorbent pads were utilized to clean-up the spilled material. The spill occurred on compacted ground thus the adsorbent pads were adequate to clean up the spilled sodium hypochlorite. The spent adsorbent pads are planned to be disposed of off-site.	Yes, Reported to SPAR on 10/28/15 at 6:20 AM.
10/28/2015	8:58 AM	Diesel Fuel	1 gallon	Mill Bench	The spill was the result a faulty transfer valve on a iso-container which allowed seepage of diesel fuel out of the valve to occur over-night which exceeded the catch bucket capacity and over-flowed onto the ground.	Mill Bench	Yes, adsorbent pads were utilized to clean-up the spilled hydraulic oil. The spill occurred on compacted ground thus the adsorbent pads were adequate to clean up the spilled hydraulic oil. The spent adsorbent pads were disposed of in the site incinerator.	Yes, Monthly Report
10/30/2015	5:20 PM	Hydraulic Oil	5 gallons	Underground, between passing bay 3 and 4	The rear driveline came apart on the underground lube truck which caused damage to the hydraulic brake hoses. The damage to the brake hoses resulted a spill of hydraulic oil.	Underground	Yes, adsorbent pads were utilized to clean-up the spilled hydraulic oil. The spill occurred on rock thus the adsorbent pads were adequate to clean up the spilled hydraulic oil. The spent adsorbent pads were disposed of in the site incinerator.	Yes, Monthly Report
11/8/2015	8:30 AM	Hydraulic Oil	30 gallons	Portal Pad	A haul truck blew a seal on the hydraulic oil filter and leaked hydraulic oil onto the portal pad	Portal Pad	Yes, adsorbent pads were utilized to clean-up the spilled hydraulic oil. Additionally, 30 - 55 gallon drums of contaminated rock/soil was excavated as part of the clean-up of the spill. The spent adsorbent pads were disposed of in the site incinerator. The drums of contaminated soil were shipped off-site for disposal.	Yes, Reported to SPAR (Kayley Moen) on 11/9/15 at 2:57 PM.
11/25/2015	4:00 AM	Hydraulic Oil	20 gallons	Portal Pad	A hydraulic hose was blown on the rock prick which was being utilzed to break up the larger rocks.	Portal Pad	Yes, adsorbent pads were utilized to clean-up the majority of the spilled hydraulic oil as the ground was frozen where the spill occrred. Additionally, 2 - 55 gallon drums of contaminated rock/soil was excavated as part of the clean-up of the spill. The spent adsorbent pads were disposed of in the site incinerator. The drums of contaminated soil were shipped off-site for disposal.	Yes, Reported to Spill Hotline on 11/26/15 at 6:00 AM.

Date of Spill	Time of Spill	Product Spilled	Quantity Spilled	Location of Spill	Cause of Spill or additional information	Area(s) Affected	Clean Up (Y/N)	Reported to State
12/3/2015	6:05 PM	Diesel Fuel	2 gallons	Mill Pad	Approximately 2 gallons of diesel fuel was spilled onto the ground at the mill fueling station as the result of a mechanical failure of the fueling nozzle on the fuel pump.	Mill Pad	Yes, adsorbent pads were utilized to clean-up the spilled diesel fuel. The spent adsorbent pads were disposed of in the site incinerator.	Yes, Monthly Report

Table 4

2013/2014/2015 Development Rock MWMP Results	TDS (mg/L)	pH	NH_3 (mg/L)	Al (ug/L)	Ar (ug/L)	Cd (ug/L)	Cr (ug/L)	Cu (ug/L)	Fe (ug/L)	Pb (ug/L)	Hg (ug/L)	Ni (ug/L)	Se (ug/L)	Ag (ug/L)	Zn (ug/L)	Nitrate as N (mg/L)	Sulfate as SO4 (mg/L)
2013 Development Rock 1st Quarter	91	7.98	0.71	96	ND	ND	ND	1.02	ND	ND	ND	ND	ND	ND	ND	3.76	25.2
2013 Development Rock 2nd Quarter	174	8.42	1.15	314	ND	ND	ND	ND	ND	ND	ND	1.09	ND	ND	ND	13.1	38.8
2013 Development Rock 3rd Quarter	221	7.58	1.00	114	ND	ND	ND	1.36	ND	ND	ND	ND	ND	ND	ND	5.27	97.6
2013 Development Rock 4th Quarter	97	7.45	1.07	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	5.28	37.2
2014 Development Rock 1st Quarter	73	7.58	0.9	81.00	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	4.37	17.0
2014 Development Rock 2nd Quarter	164	7.65	2.95	ND	ND	ND	ND	1.23	ND	ND	ND	1.00	ND	ND	ND	7.27	64.8
2014 Development Rock 3rd Quarter	ND	7.30	0.31	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.59	1.7
2014 Development Rock 4th Quarter	80	7.52	1.87	ND	ND	ND	ND	ND	ND	ND	ND	1.71	ND	ND	ND	6.77	7.81
2015 Development Rock 1st Quarter	134	7.58	1.09	ND	ND	ND	ND	2.31	ND	ND	ND	1.00	ND	ND	ND	7.76	43.9
2015 Development Rock 2nd Quarter	71	7.88	1.09	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	8.22	4.19
2015 Development Rock 3rd Quarter	48	7.66	0.59	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	3.28	ND
2015 Development Rock 4th Quarter	48	7.48	1.8	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

2013/2014/2015 Development Rock ABA Results	*Sulfur, Total*	*Sulfur Forms (Acid Extractable and Non-extractable Sulfur) 3.2.6*			*Acid Potential*	*Neutralization Potential*	*Acid - Base Accounting*
	3.2.4	*Sulfate*	*Pyritic*	*Non-extractable*	*1.3.1*	*3.2.3*	*1.3.1*
	wt%	*wt%*	*wt%*	*wt%*	*t CaCO3/1000t*	*t CaCO3/1000t*	*t CaCO3/1000t*
2013 Development Rock 1st Quarter	0.15	ND	0.16	0.16	4.9	39.2	34.3
2013 Development Rock 2nd Quarter	0.03	0.03	ND	ND	ND	85.9	85.9
2013 Development Rock 3rd Quarter	0.04	0.02	0.02	ND	0.5	9.3	8.8
2013 Development Rock 4th Quarter	0.15	0.07	0.09	ND	2.7	91.2	88.5
2014 Development Rock 1st Quarter	0.03	0.03	ND	ND	ND	78.4	78.4
2014 Development Rock 2nd Quarter	0.17	0.03	0.14	ND	4.4	71.1	66.7
2014 Development Rock 3rd Quarter	0.02	0.02	ND	ND	ND	65.3	65.3
2014 Development Rock 4th Quarter	0.07	0.04	0.03	ND	0.8	65	64.2
2015 Development Rock 1st Quarter	0.115	0.07	0.05	ND	1.4	115	113.6
2015 Development Rock 2nd Quarter	0.15	0.06	0.09	ND	2.9	96.1	93.2
2015 Development Rock 3rdQuarter	0.09	0.07	0.02	ND	0.6	71.9	71.3
2015 Development Rock 4th Quarter	0.08	0.04	0.03	ND	1.1	111	109.9

2013/2014/2015 Tails MWMP Results	TDS (mg/L)	pH	NH_3 (mg/L)	Al (ug/L)	Ar (ug/L)	Cd (ug/L)	Cr (ug/L)	Cu (ug/L)	Fe (ug/L)	Pb (ug/L)	Hg (ug/L)	Ni (ug/L)	Se (ug/L)	Ag (ug/L)	Zn (ug/L)	Nitrate as N (mg/L)	Sulfate as SO4 (mg/L)
2013 Tails 1st Quarter	2380	7.8	ND	ND	ND	ND	ND	ND	ND	ND	ND	18.3	ND	ND	ND	5.26	1580
2013 Tails 2ndQuarter	1720	7.84	0.52	489	ND	ND	ND	1.07	ND	ND	ND	16.2	31.8	ND	ND	ND	1240
2013 Tails 3rd Quarter	1700	7.53	0.28	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	4.11	1120
2013 Tails 4th Quarter	2440	7.52	0.14	ND	ND	ND	ND	ND	ND	ND	ND	16.3	ND	ND	ND	4.50	1690
2014 Tails 1st Quarter	2360	7.44	9.53	ND	ND	ND	ND	ND	ND	ND	ND	21.2	ND	ND	ND	5.47	1710
2014 Tails 2nd Quarter	316	7.92	1.16	ND	ND	ND	ND	ND	ND	ND	ND	2.46	ND	ND	ND	ND	190
2014 Tails 3rd Quarter	891	7.87	0.47	ND	ND	ND	ND	ND	ND	ND	ND	6.3	ND	ND	ND	11.00	543
2014 Tails 4th Quarter	1240	7.72	1.72	ND	ND	ND	ND	ND	ND	ND	ND	0.81	ND	ND	ND	4.98	829
2015 Tails 1st Quarter	1160	7.78	2.67	ND	ND	ND	ND	ND	ND	ND	ND	7.00	ND	ND	ND	7.58	698
2015 Tails 2ndQuarter	1560	7.99	1.26	ND	ND	ND	ND	ND	ND	ND	ND	13.20	ND	ND	ND	3.36	1030
2015 Tails 3rd Quarter	947	7.78	2.43	ND	ND	ND	ND	ND	ND	ND	ND	6.60	ND	ND	ND	3.85	577
2015 Tails 4th Quarter	567	7.74	2.76	ND	ND	ND	2.3	ND	ND	ND	ND	3.40	ND	ND	ND	3.79	337

2013/2014/2015 Tails ABA Results	*Sulfur, Total*	*Sulfur Forms (Acid Extractable and Non-extractable Sulfur) 3.2.6*			*Acid Potential*	*Neutralization Potential*	*Acid - Base Accounting*
	3.2.4	*Sulfate*	*Pyritic*	*Non-extractable*	*1.3.1*	*3.2.3*	*1.3.1*
	wt%	*wt%*	*wt%*	*wt%*	*t CaCO3/1000t*	*t CaCO3/1000t*	*t CaCO3/1000t*
2013 Tails 1st Quarter	0.16	0.14	0.02	0.02	0.5	110	110
2013 Tails 2ndQuarter	0.54	0.24	0.3	ND	9.3	88.9	79.7
2013 Tails 3rd Quarter	0.09	0.08	0.01	ND	0.3	115	115
2013 Tails 4th Quarter	0.22	0.18	0.03	ND	1.1	121	120
2014 Tails 1st Quarter	0.14	0.14	ND	ND	ND	120	120
2014 Tails 2nd Quarter	0.05	0.05	ND	ND	ND	93.5	93.5
2014 Tails 3rd Quarter	0.05	0.05	ND	ND	ND	116	116
2014 Tails 4th Quarter	0.18	0.11	0.07	ND	2.2	95.6	93.3
2015 Tails 1st Quarter	0.11	0.05	0.05	ND	1.7	103	101.3
2015 Tails 2nd Quarter	0.07	0.06	0.01	ND	0.4	123	122.6
2015 Tails 3rd Quarter	0.13	0.09	0.04	ND	1.3	111	109.7
2015 Tails 4th Quarter	0.26	0.09	0.17	ND	5.3	104	98.7

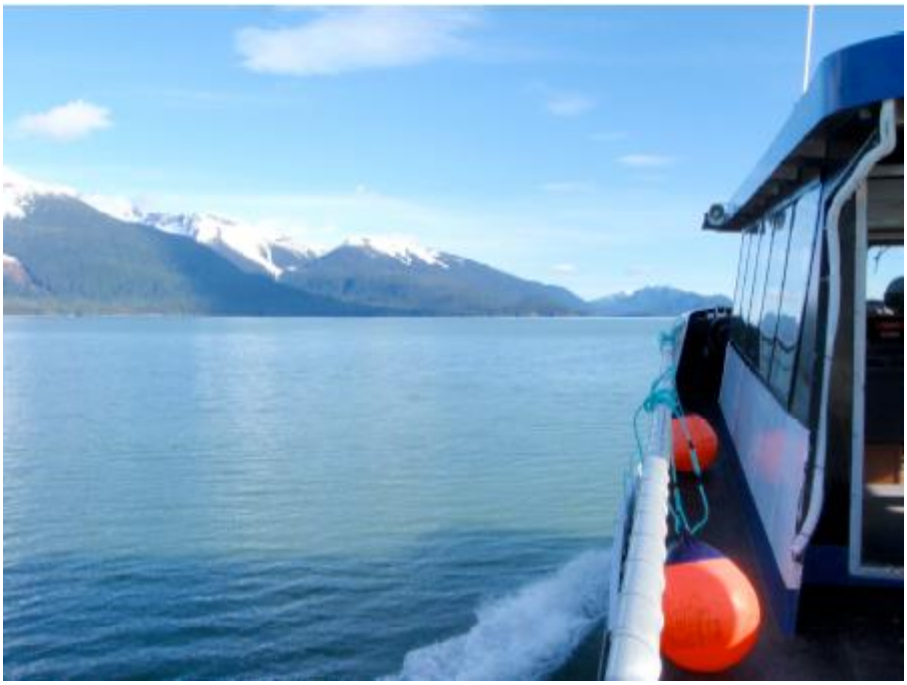
Attachment 1

Marine Mammal Monitoring Report - 2015

2015 Transportation Action Strategy

Marine Mammal
Survey Report

Coeur Alaska
Kensington Mine



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May 2015

Introduction

Coeur Alaska's Berners Bay/Lynn Canal Transportation Plan (January 2008) includes the adoption of standard operating guidelines to ensure minimal disruption of marine mammals in the area from marine traffic. Some guidelines are designed to minimize impacts throughout the year, while others are specific to the spring eulachon and herring spawning runs when marine mammals congregate in large groups within Berners Bay. This report describes monitoring activities conducted during the April/May 2015 eulachon spawning season. The Coeur Alaska crew transportation vessel during this period was the M/V Majestic Fjord, a 65ft catamaran with four inbound diesel jet engines and crew of three people that transited between Yankee Cove and Slate Cove daily (Figure 1). A one-way trip from Yankee Cove to Slate Cove takes approximately 40 minutes and consumes around 55-60 gallons of fuel (personal comm. Clint Songer, F/V Majestic Fjord captain).

Methods

Designation of the eulachon spawning season requires some information to be gathered regarding marine mammal activity within Berners Bay as this is a good indicator that eulachon migration is underway. One source of this information is the ADFG herring spawning aerial survey data for Lynn Canal posted on the internet. These updates usually include a brief summary of the location of marine mammal concentrations. Coeur also conducts marine based surveys to monitor marine mammal numbers within Berners Bay. These surveys are undertaken by Coeur environmental personnel or contractors with marine mammal observation experience. Survey results were emailed to the NMFS Office of Protected Resources within 48 hours. When Coeur's marine mammal surveys and ADFG herring surveys show a substantial increase in marine mammals within Berners Bay the eulachon spawning season is declared to have commenced.

During the eulachon spawning run a marine mammal observer accompanies the Coeur transportation vessel on all crew transfers to help adjust the daily routing into Slate Cove to avoid congregations of fish and marine mammals. The marine observer keeps

watch from the bridge of the vessel and uses binoculars as needed to identify marine mammals.

Vessel trips are also kept to no more than three per day (except for emergency environmental or safety situations), and the vessel is required to maintain a maximum speed of 13 knots within the bay (with Berners Bay designated as the area inside of Point St. Mary and Point Bridget, see Figure 1). Fuel and, if possible, concentrate shipments by barge are also restricted during the eulachon spawning period. The spawning period typically occurs approximately April 15 to May 15, typically about 2-3 weeks. Marine mammal observations are categorized into two zones: Berners Bay and outside Berners Bay. All observations, including date, time, observer, weather, visibility, wave height/conditions, and counts of marine mammals, are recorded on a data sheet (see Figure 2). Each one-way trip is recorded on its own sheet.

Results

Between April 28 and May 19, one hundred and thirty two marine mammal observation surveys were completed aboard the M/V Majestic Fjord (see Table 2). The official eulachon run transportation regulations as determined by Coeur Alaska and NMFS were put into effect on April 28, 2015. Special measures taken during the eulachon run included: having a marine observer on the vessel during all trips and maintaining a maximum speed of 13 knots within Berners Bay. Regular transit speed is approximately 21-25 knots. Transportation vessel trips during the eulachon run were limited to 3 trips daily (see Table 1). No more than 3 trips per day were conducted during the 2015 eulachon spawning window.

The majority of pinniped activity was observed inside Berners Bay (see Table 3). A total of 474 Steller sea lions were counted during the observation period; 150 of these sightings (31.6%) occurred within Berners Bay. The vast majority; (99.6%) of the 1565 harbor seal sightings occurred within Berners Bay. Most of these sightings were at pinniped haulout areas, such as the entrance to Slate Cove and Point Saint Mary. Gatherings of over 20 harbor seals on haulouts were observed. Pinniped activity was highest on April 30 through May 7.

The majority of cetaceans were observed outside of Berners Bay with 350 humpback whale, 140 porpoise, and 40 killer whale sightings (79.4%, 37.8% and 83.3% of the total sightings respectively). Humpback sightings were fairly consistent through the observation period, with at least one humpback being spotted most days and 15 or more humpbacks sighted April 29. Killer whales were first seen on April 28 and were most commonly seen moving in small pods. Porpoise sightings were inconsistent and sporadic, ranging in group size from 1-2 for most of the season, to 100+ spotted scattered across the mouth of Berners Bay on May 8. No recordable encounters with marine mammals occurred during the 2015 eulachon spawning season.

Discussion

Historic records showed eulachon arriving in the Berners Bay area usually in late April and early May (Harris et al 2005). .

The three week restrictions were placed at the right time in 2015 to cover the greatest marine mammal activity surrounding the herring run. Careful observation of marine mammals and birds from the end of March is necessary in order to prepare for the official three-week period of transportation restrictions and ensure the goal of minimizing marine mammal encounters is achieved. The speed restriction is based on NMFS recommendations for Coeur Alaska vessels and may minimize potential impacts to marine mammals. The population of humpback whales in the North Pacific increased at around 7% per year since commercial whaling ceased in 1966 (Calambokidis et al 2008), but they are still considered endangered species owing to a worldwide population estimate being at only 8% of the historical population size (NMFS 1991). The Steller sea lion population east of Cape Suckling is not considered endangered, but vessel operations must still comply with the Marine Mammal Protection Act of 1972. The measures taken under Coeur's Transportation Action Strategy are designed to ensure compliance with this Federal law.

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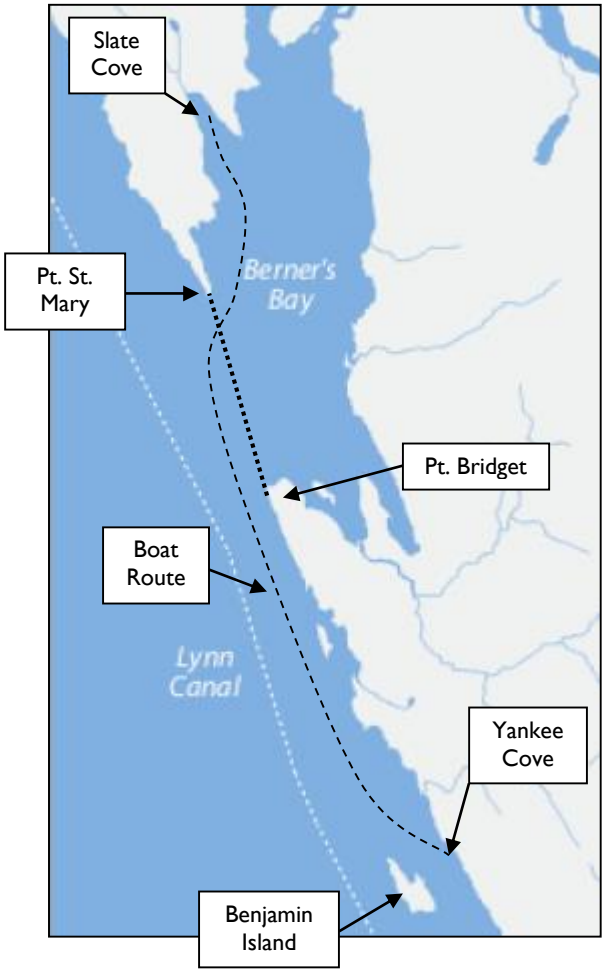

Figure 1: Boat route to Slate Cove from Yankee Cove. Line between Pt Bridget and Pt St Mary defines the area inside which the 13 knot speed limit applies.

Table 1: M/V Majestic Fjord Schedule, Spring/Summer 2015

Day	**Morning Boat Departure**	**Evening Boat Departure 1st Run**	**Evening Boat Departure 2nd Run**	**Departure**	**Total trips**
Monday	05:35	16:05	17:45	Yankee Cove	3
Tuesday	05:35	16:05	17:45	Yankee Cove	3
Wednesday	05:35	16:05	17:45	Yankee Cove	3
Thursday	05:35	16:05	17:45	Yankee Cove	3
Friday	05:35	16:05	17:45	Yankee Cove	3
Saturday	05:35	16:05	17:45	Yankee Cove	3
Sunday	05:35	16:05	17:45	Yankee Cove	3

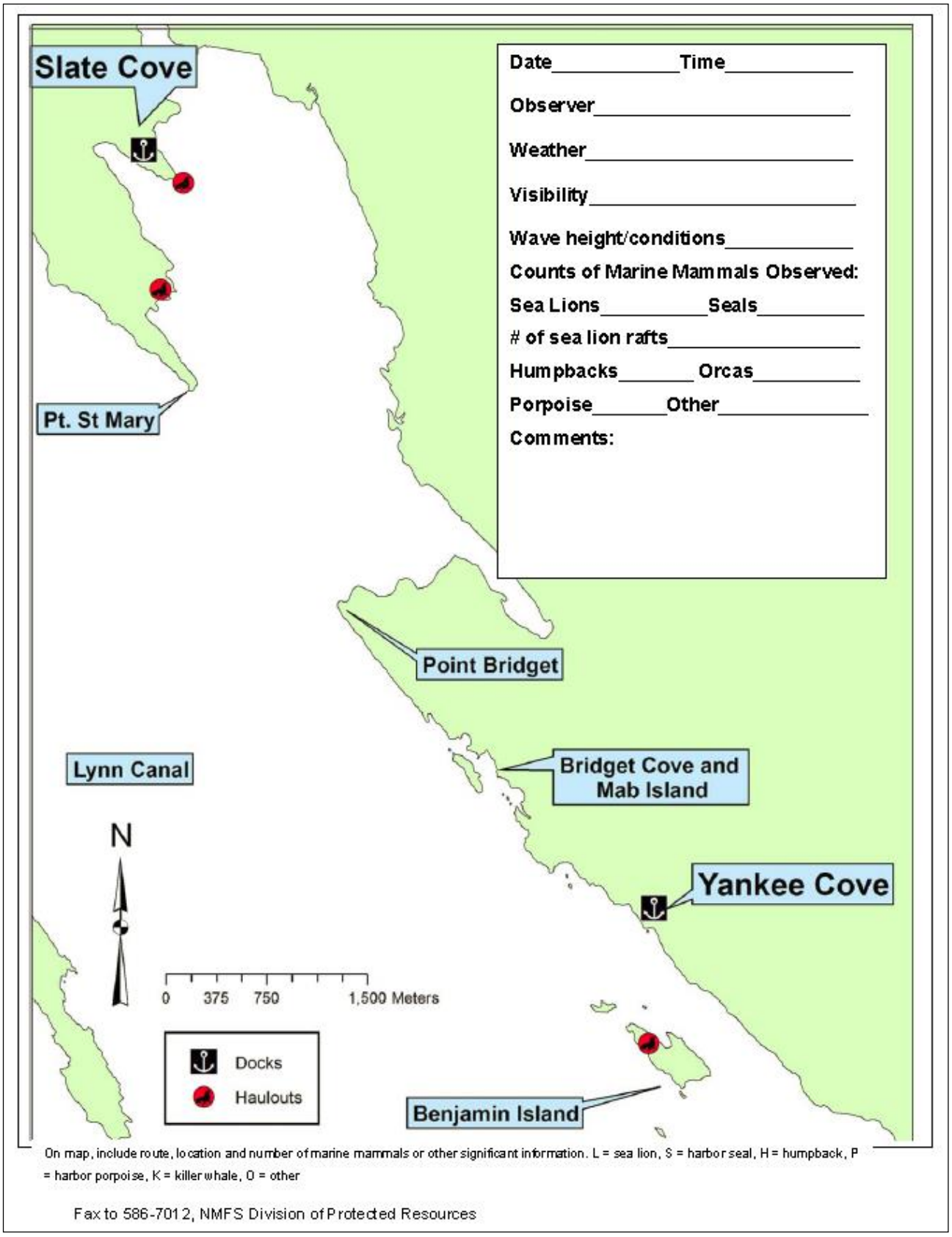

Figure 2: Data sheet

Table 2: Summary of Marine Mammal Observations

No.	Date	Time	Observer	Vessel	Route	Weather	Visibility	Wave Ht
1	4/28/2015	5:35	Sarah Ryan	M/V Majestic Fjord	Yankee Cove to Slate Cove	Overcast	10+ miles	3-4 ft
2	4/28/2015	6:26	Sarah Ryan	M/V Majestic Fjord	Slate Cove to Yankee Cove	Overcast/Rain	10 miles	3-4 ft
3	4/28/2015	15:53	Sarah Ryan	M/V Majestic Fjord	Yankee Cove to Slate Cove	Overcast/Rain	6 miles	2-3ft
4	4/28/2015	17:06	Sarah Ryan	M/V Majestic Fjord	Slate Cove to Yankee Cove	Overcast/Rain	5 miles	5-7 ft
5	4/28/2015	18:02	Sarah Ryan	M/V Majestic Fjord	Yankee Cove to Slate Cove	Overcast/Rain	5 miles	5-6 ft
6	4/28/2015	18:53	Sarah Ryan	M/V Majestic Fjord	Slate Cove to Yankee Cove	Overcast/Rain	6 miles	3-5 ft
7	4/29/2015	5:35	Sarah Ryan	M/V Majestic Fjord	Yankee Cove to Slate Cove	Overcast/Rain/Fog	5 miles	1-2 ft.
8	4/29/2015	6:25	Sarah Ryan	M/V Majestic Fjord	Slate Cove to Yankee Cove	Overcast/Rain/Fog	6 miles	1-2 ft.
9	4/29/2015	16:24	Sarah Ryan	M/V Majestic Fjord	Yankee Cove to Slate Cove	Overcast/Rain	6 miles	1-2 ft.
10	4/29/2015	17:05	Sarah Ryan	M/V Majestic Fjord	Slate Cove to Yankee Cove	Overcast/Rain	10 miles	1-2 ft.
11	4/29/2015	17:51	Sarah Ryan	M/V Majestic Fjord	Yankee Cove to Slate Cove	Overcast/Partly Sunny	10+ miles	0-1 ft.
12	4/29/2015	18:35	Sarah Ryan	M/V Majestic Fjord	Slate Cove to Yankee Cove	Mostly Cloudy	10+ miles	0-1 ft.
13	4/30/2015	5:36	Sarah Ryan	M/V Majestic Fjord	Yankee Cove to Slate Cove	Mostly Cloudy	10+ miles	0-1 ft.
14	4/30/2015	6:24	Sarah Ryan	M/V Majestic Fjord	Slate Cove to Yankee Cove	Mostly Cloudy	10+ miles	0-1 ft.
15	4/30/2015	16:07	Sarah Ryan	M/V Majestic Fjord	Yankee Cove to Slate Cove	Mostly Cloudy	10+ miles	0-1 ft.
16	4/30/2015	17:06	Sarah Ryan	M/V Majestic Fjord	Slate Cove to Yankee Cove	Overcast/Rain	10+ miles	0-1 ft.
17	4/30/2015	17:52	Sarah Ryan	M/V Majestic Fjord	Yankee Cove to Slate Cove	Overcast/Rain	10+ miles	0-1 ft.
18	4/30/2015	18:32	Sarah Ryan	M/V Majestic Fjord	Slate Cove to Yankee Cove	Overcast	10+ miles	0-1 ft.
19	5/1/2015	5:40	Sarah Ryan	M/V Majestic Fjord	Yankee Cove to Slate Cove	Overcast/Rain	8 miles	0-1 ft.
20	5/1/2015	6:24	Sarah Ryan	M/V Majestic Fjord	Slate Cove to Yankee Cove	Overcast/Rain	8 miles	0-1 ft.
21	5/1/2015	16:01	Sarah Ryan	M/V Majestic Fjord	Yankee Cove to Slate Cove	Partly cloudy/Sun	10+ miles	0-1 ft.
22	5/1/2015	16:05	Sarah Ryan	M/V Majestic Fjord	Slate Cove to Yankee Cove	Partly Cloudy/Sun	10+ miles	0-1 ft.
23	5/1/2015	17:47	Sarah Ryan	M/V Majestic Fjord	Yankee Cove to Slate Cove	Partly cloudy/Sun	10+ miles	0-1 ft.
24	5/1/2015	18:29	Sarah Ryan	M/V Majestic Fjord	Slate Cove to Yankee Cove	Partly cloudy/Sun	10+ miles	0-1 ft.
25	5/2/2015	5:39	Sarah Ryan	M/V Majestic Fjord	Yankee Cove to Slate Cove	Mostly Cloudy	10+ miles	0-1 ft.
26	5/2/2015	6:24	Sarah Ryan	M/V Majestic Fjord	Slate Cove to Yankee Cove	Mostly Cloudy	10+ miles	0-1 ft.
27	5/2/2015	16:05	Sarah Ryan	M/V Majestic Fjord	Yankee Cove to Slate Cove	Partly cloudy/Sun	10+ miles	0-1 ft.
28	5/2/2015	17:04	Sarah Ryan	M/V Majestic Fjord	Slate Cove to Yankee Cove	Partly cloudy/Sun	10+ miles	0-1 ft.

Table 2: Summary of Marine Mammal Observations

No.	Date	Time	Observer	Vessel	Route	Weather	Visibility	Wave Ht
29	5/2/2015	17:47	Sarah Ryan	M/V Majestic Fjord	Yankee Cove to Slate Cove	Partly cloudy/Sun	10+ miles	0-1 ft.
30	5/2/2015	18:30	Sarah Ryan	M/V Majestic Fjord	Slate Cove to Yankee Cove	Partly Cloudy	10+ miles	0-1 ft.
31	5/3/2015	5:32	Sarah Ryan	M/V Majestic Fjord	Yankee Cove to Slate Cove	Sunny	10+ miles	0-1 ft.
32	5/3/2015	6:18	Sarah Ryan	M/V Majestic Fjord	Slate Cove to Yankee Cove	Sunny	10+ miles	0-1 ft.
33	5/3/2015	16:03	Sarah Ryan	M/V Majestic Fjord	Yankee Cove to Slate Cove	Sunny	10+ miles	1-2 ft.
34	5/3/2015	17:03	Sarah Ryan	M/V Majestic Fjord	Slate Cove to Yankee Cove	Sunny	10+ miles	1-2 ft.
35	5/3/2015	17:45	Sarah Ryan	M/V Majestic Fjord	Yankee Cove to Slate Cove	Sunny	10+ miles	1-2 ft.
36	5/3/2015	18:28	Sarah Ryan	M/V Majestic Fjord	Slate Cove to Yankee Cove	Sunny	10+ miles	0-1 ft.
37	5/4/2015	5:38	Sarah Ryan	M/V Majestic Fjord	Yankee Cove to Slate Cove	Sunny	10+ miles	2-3 ft.
38	5/4/2015	6:27	Sarah Ryan	M/V Majestic Fjord	Slate Cove to Yankee Cove	Sunny	10+ miles	0-1 ft.
39	5/4/2015	15:48	Sarah Ryan	M/V Majestic Fjord	Yankee Cove to Slate Cove	Sunny	10+ miles	1-2 ft.
40	5/4/2015	17:01	Sarah Ryan	M/V Majestic Fjord	Slate Cove to Yankee Cove	Sunny	10+ miles	0-1 ft.
41	5/4/2015	17:44	Sarah Ryan	M/V Majestic Fjord	Yankee Cove to Slate Cove	Sunny	10+ miles	0-1 ft.
42	5/4/2015	18:27	Sarah Ryan	M/V Majestic Fjord	Slate Cove to Yankee Cove	Sunny	10+ miles	0-1 ft.
43	5/5/2015	5:37	Sarah Ryan	M/V Majestic Fjord	Yankee Cove to Slate Cove	Sunny	10+ miles	0-1 ft.
44	5/5/2015	6:24	Sarah Ryan	M/V Majestic Fjord	Slate Cove to Yankee Cove	Sunny	10+ miles	0-1 ft.
45	5/5/2015	16:02	Sarah Ryan	M/V Majestic Fjord	Yankee Cove to Slate Cove	Overcast	10+ miles	0-1 ft.
46	5/5/2015	17:01	Sarah Ryan	M/V Majestic Fjord	Slate Cove to Yankee Cove	Overcast/Sun	10+ miles	0-1 ft.
47	5/5/2015	17:44	Sarah Ryan	M/V Majestic Fjord	Yankee Cove to Slate Cove	Sunny	10+ miles	0-1 ft.
48	5/5/2015	18:27	Sarah Ryan	M/V Majestic Fjord	Slate Cove to Yankee Cove	Sunny	10+ miles	0-1 ft.
49	5/6/2015	5:36	Sarah Ryan	M/V Majestic Fjord	Yankee Cove to Slate Cove	Overcast/Sun	10+ miles	0-1 ft.
50	5/6/2015	6:23	Sarah Ryan	M/V Majestic Fjord	Slate Cove to Yankee Cove	Overcast/Sun	10+ miles	0-1 ft.
51	5/6/2015	16:06	Sarah Ryan	M/V Majestic Fjord	Yankee Cove to Slate Cove	Overcast/Sun	10+ miles	0-1 ft.
52	5/6/2015	17:02	Sarah Ryan	M/V Majestic Fjord	Slate Cove to Yankee Cove	Sunny	10+ miles	0-1 ft.
53	5/6/2015	17:47	Sarah Ryan	M/V Majestic Fjord	Yankee Cove to Slate Cove	Sunny	10+ miles	0-1 ft.
54	5/6/2015	18:29	Sarah Ryan	M/V Majestic Fjord	Slate Cove to Yankee Cove	Overcast/Sun	10+ miles	0-1 ft.
55	5/7/2015	5:37	Sarah Ryan	M/V Majestic Fjord	Yankee Cove to Slate Cove	Mostly Cloudy	10+ miles	0-1 ft.
56	5/7/2015	6:22	Sarah Ryan	M/V Majestic Fjord	Slate Cove to Yankee Cove	Mostly Cloudy	10+ miles	0-1 ft.

Table 2: Summary of Marine Mammal Observations

No.	Date	Time	Observer	Vessel	Route	Weather	Visibility	Wave Ht
57	5/7/2015	16:07	Sarah Ryan	M/V Majestic Fjord	Yankee Cove to Slate Cove	Overcast	10+ miles	0-1 ft.
58	5/7/2015	17:03	Sarah Ryan	M/V Majestic Fjord	Slate Cove to Yankee Cove	Overcast	10+ miles	0-1 ft.
59	5/7/2015	17:49	Sarah Ryan	M/V Majestic Fjord	Yankee Cove to Slate Cove	Overcast	10+ miles	0-1 ft.
60	5/7/2015	18:34	Sarah Ryan	M/V Majestic Fjord	Slate Cove to Yankee Cove	Overcast	10+ miles	0-1 ft.
61	5/8/2015	5:37	Sarah Ryan	M/V Majestic Fjord	Yankee Cove to Slate Cove	Mostly Cloudy	10+ miles	0-1 ft.
62	5/8/2015	6:23	Sarah Ryan	M/V Majestic Fjord	Slate Cove to Yankee Cove	Mostly Cloudy	10+ miles	0-1 ft.
63	5/8/2015	16:04	Sarah Ryan	M/V Majestic Fjord	Yankee Cove to Slate Cove	Mostly Cloudy	10+ miles	0-1 ft.
64	5/8/2015	17:01	Sarah Ryan	M/V Majestic Fjord	Slate Cove to Yankee Cove	Partly cloudy	10+ miles	0-1 ft.
65	5/8/2015	17:43	Sarah Ryan	M/V Majestic Fjord	Yankee Cove to Slate Cove	Mostly Cloudy	10+ miles	0-1 ft.
66	5/8/2015	18:29	Sarah Ryan	M/V Majestic Fjord	Slate Cove to Yankee Cove	Mostly Cloudy	10+ miles	0-1 ft.
67	5/9/2015	5:32	Sarah Ryan	M/V Majestic Fjord	Yankee Cove to Slate Cove	Overcast/Rain	6 miles	0-1 ft.
68	5/9/2015	6:15	Sarah Ryan	M/V Majestic Fjord	Slate Cove to Yankee Cove	Overcast/Rain	10+ miles	0-1 ft.
69	5/9/2015	16:01	Sarah Ryan	M/V Majestic Fjord	Yankee Cove to Slate Cove	Overcast/Rain	10+ miles	0-1 ft.
70	5/9/2015	16:59	Sarah Ryan	M/V Majestic Fjord	Slate Cove to Yankee Cove	Overcast/Rain	10+ miles	0-1 ft.
71	5/9/2015	17:41	Sarah Ryan	M/V Majestic Fjord	Yankee Cove to Slate Cove	Mostly Cloudy	10+ miles	0-1 ft.
72	5/9/2015	18:21	Sarah Ryan	M/V Majestic Fjord	Slate Cove to Yankee Cove	Mostly Cloudy	10+ miles	0-1 ft.
73	5/10/2015	5:32	Sarah Ryan	M/V Majestic Fjord	Yankee Cove to Slate Cove	Partly Cloudy	10+ miles	0-1 ft.
74	5/10/2015	6:15	Sarah Ryan	M/V Majestic Fjord	Slate Cove to Yankee Cove	Partly Cloudy	10+ miles	0-1 ft.
75	5/10/2015	16:02	Sarah Ryan	M/V Majestic Fjord	Yankee Cove to Slate Cove	Mostly Cloudy	10+ miles	0-1 ft.
76	5/10/2015	17:00	Sarah Ryan	M/V Majestic Fjord	Slate Cove to Yankee Cove	Overcast	10+ miles	0-1 ft.
77	5/10/2015	17:43	Sarah Ryan	M/V Majestic Fjord	Yankee Cove to Slate Cove	Overcast	10+ miles	0-1 ft.
78	5/10/2015	18:24	Sarah Ryan	M/V Majestic Fjord	Slate Cove to Yankee Cove	Overcast	10+ miles	0-1 ft.
79	5/11/2015	5:36	Sarah Ryan	M/V Majestic Fjord	Yankee Cove to Slate Cove	Overcast/Rain	10+ miles	0-1 ft.
80	5/11/2015	6:24	Sarah Ryan	M/V Majestic Fjord	Slate Cove to Yankee Cove	Overcast/Rain	10+ miles	0-1 ft.
81	5/11/2015	16:08	Sarah Ryan	M/V Majestic Fjord	Yankee Cove to Slate Cove	Overcast	10+ miles	0-1 ft.
82	5/11/2015	17:00	Sarah Ryan	M/V Majestic Fjord	Slate Cove to Yankee Cove	Mostly Cloudy	10+ miles	0-1 ft.
83	5/11/2015	17:49	Sarah Ryan	M/V Majestic Fjord	Yankee Cove to Slate Cove	Mostly Cloudy	10+ miles	0-1 ft.
84	5/11/2015	18:29	Sarah Ryan	M/V Majestic Fjord	Slate Cove to Yankee Cove	Overcast	10+ miles	0-1 ft.

Table 2: Summary of Marine Mammal Observations

No.	Date	Time	Observer	Vessel	Route	Weather	Visibility	Wave Ht
85	5/12/2015	5:35	Sarah Ryan	M/V Majestic Fjord	Yankee Cove to Slate Cove	Sunny	10+ miles	0-1 ft.
86	5/12/2015	6:21	Sarah Ryan	M/V Majestic Fjord	Slate Cove to Yankee Cove	Sunny	10+ miles	0-1 ft.
87	5/12/2015	16:20	Sarah Ryan	M/V Majestic Fjord	Yankee Cove to Slate Cove	Sunny	10+ miles	1-2 ft.
88	5/12/2015	17:03	Sarah Ryan	M/V Majestic Fjord	Slate Cove to Yankee Cove	Sunny	10+ miles	1-2 ft.
89	5/12/2015	17:47	Sarah Ryan	M/V Majestic Fjord	Yankee Cove to Slate Cove	Sunny	10+ miles	1-2 ft.
90	5/12/2015	18:32	Sarah Ryan	M/V Majestic Fjord	Slate Cove to Yankee Cove	Sunny	10+ miles	0-1 ft.
91	5/13/2015	5:34	Sarah Ryan	M/V Majestic Fjord	Yankee Cove to Slate Cove	Sunny	10+ miles	0-1 ft.
92	5/13/2015	6:20	Sarah Ryan	M/V Majestic Fjord	Slate Cove to Yankee Cove	Sunny	10+ miles	0-1 ft.
93	5/13/2015	16:11	Sarah Ryan	M/V Majestic Fjord	Yankee Cove to Slate Cove	Sunny	10+ miles	0-1 ft.
94	5/13/2015	17:02	Sarah Ryan	M/V Majestic Fjord	Slate Cove to Yankee Cove	Sunny	10+ miles	0-1 ft.
95	5/13/2015	17:47	Sarah Ryan	M/V Majestic Fjord	Yankee Cove to Slate Cove	Sunny	10+ miles	0-1 ft.
96	5/13/2015	18:30	Sarah Ryan	M/V Majestic Fjord	Slate Cove to Yankee Cove	Sunny	10+ miles	0-1 ft.
97	5/14/2015	5:35	Sarah Ryan	M/V Majestic Fjord	Yankee Cove to Slate Cove	Sunny	10+ miles	0-1 ft.
98	5/14/2015	6:21	Sarah Ryan	M/V Majestic Fjord	Slate Cove to Yankee Cove	Sunny	10+ miles	0-1 ft.
99	5/14/2015	16:11	Sarah Ryan	M/V Majestic Fjord	Yankee Cove to Slate Cove	Sunny	10+ miles	0-1 ft.
100	5/14/2015	17:03	Sarah Ryan	M/V Majestic Fjord	Slate Cove to Yankee Cove	Sunny	10+ miles	0-1 ft.
101	5/14/2015	17:48	Sarah Ryan	M/V Majestic Fjord	Yankee Cove to Slate Cove	Sunny	10+ miles	0-1 ft.
102	5/14/2015	18:02	Sarah Ryan	M/V Majestic Fjord	Slate Cove to Yankee Cove	Sunny	10+ miles	0-1 ft.
103	5/15/2015	5:34	Sarah Ryan	M/V Majestic Fjord	Yankee Cove to Slate Cove	Sunny	10+ miles	0-1 ft.
104	5/15/2015	6:19	Sarah Ryan	M/V Majestic Fjord	Slate Cove to Yankee Cove	Sunny	10+ miles	0-1 ft.
105	5/15/2015	16:07	Sarah Ryan	M/V Majestic Fjord	Yankee Cove to Slate Cove	Sunny	10+ miles	0-1 ft.
106	5/15/2015	17:00	Sarah Ryan	M/V Majestic Fjord	Slate Cove to Yankee Cove	Sunny	10+ miles	0-1 ft.
107	5/15/2015	17:42	Sarah Ryan	M/V Majestic Fjord	Yankee Cove to Slate Cove	Sunny	10+ miles	0-1 ft.
108	5/15/2015	18:23	Sarah Ryan	M/V Majestic Fjord	Slate Cove to Yankee Cove	Sunny	10+ miles	0-1 ft.
109	5/16/2015	5:34	Sarah Ryan	M/V Majestic Fjord	Yankee Cove to Slate Cove	Sunny	10+ miles	0-1 ft.
110	5/16/2015	6:24	Sarah Ryan	M/V Majestic Fjord	Slate Cove to Yankee Cove	Sunny	10+ miles	0-1 ft.
111	5/16/2015	16:08	Sarah Ryan	M/V Majestic Fjord	Yankee Cove to Slate Cove	Sunny	10+ miles	0-1 ft.
112	5/16/2015	17:03	Sarah Ryan	M/V Majestic Fjord	Slate Cove to Yankee Cove	Sunny	10+ miles	0-1 ft.

Table 2: Summary of Marine Mammal Observations

No.	Date	Time	Observer	Vessel	Route	Weather	Visibility	Wave Ht
113	5/16/2015	17:44	Sarah Ryan	M/V Majestic Fjord	Yankee Cove to Slate Cove	Sunny	10+ miles	0-1 ft.
114	5/16/2015	18:28	Sarah Ryan	M/V Majestic Fjord	Slate Cove to Yankee Cove	Sunny	10+ miles	0-1 ft.
115	5/17/2015	5:31	Sarah Ryan	M/V Majestic Fjord	Yankee Cove to Slate Cove	Sunny	10+ miles	0-1 ft.
116	5/17/2015	6:16	Sarah Ryan	M/V Majestic Fjord	Slate Cove to Yankee Cove	Sunny	10+ miles	0-1 ft.
117	5/17/2015	16:04	Sarah Ryan	M/V Majestic Fjord	Yankee Cove to Slate Cove	Sunny	10+ miles	0-1 ft.
118	5/17/2015	17:02	Sarah Ryan	M/V Majestic Fjord	Slate Cove to Yankee Cove	Sunny	10+ miles	0-1 ft.
119	5/17/2015	17:44	Sarah Ryan	M/V Majestic Fjord	Yankee Cove to Slate Cove	Sunny	10+ miles	0-1 ft.
120	5/17/2015	18:29	Sarah Ryan	M/V Majestic Fjord	Slate Cove to Yankee Cove	Sunny	10+ miles	0-1 ft.
121	5/18/2015	5:35	Sarah Ryan	M/V Majestic Fjord	Yankee Cove to Slate Cove	Sunny	10+ miles	0-1 ft.
122	5/18/2015	6:29	Sarah Ryan	M/V Majestic Fjord	Slate Cove to Yankee Cove	Sunny	10+ miles	0-1 ft.
123	5/18/2015	16:10	Sarah Ryan	M/V Majestic Fjord	Yankee Cove to Slate Cove	Sunny	10+ miles	0-1 ft.
124	5/18/2015	17:02	Sarah Ryan	M/V Majestic Fjord	Slate Cove to Yankee Cove	Sunny	10+ miles	0-1 ft.
125	5/18/2015	17:48	Sarah Ryan	M/V Majestic Fjord	Yankee Cove to Slate Cove	Sunny	10+ miles	0-1 ft.
126	5/18/2015	18:30	Sarah Ryan	M/V Majestic Fjord	Slate Cove to Yankee Cove	Sunny	10+ miles	0-1 ft.
127	5/19/2015	5:34	Sarah Ryan	M/V Majestic Fjord	Yankee Cove to Slate Cove	Sunny	10+ miles	0-1 ft.
128	5/19/2015	6:21	Sarah Ryan	M/V Majestic Fjord	Slate Cove to Yankee Cove	Sunny	10+ miles	0-1 ft.
129	5/19/2015	16:13	Sarah Ryan	M/V Majestic Fjord	Yankee Cove to Slate Cove	Sunny	10+ miles	0-1 ft.
130	5/19/2015	17:02	Sarah Ryan	M/V Majestic Fjord	Slate Cove to Yankee Cove	Sunny	10+ miles	0-1 ft.
131	5/19/2015	18:03	Sarah Ryan	M/V Majestic Fjord	Yankee Cove to Slate Cove	Sunny	10+ miles	0-1 ft.
132	5/19/2015	18:34	Sarah Ryan	M/V Majestic Fjord	Slate Cove to Yankee Cove	Sunny	10+ miles	0-1 ft.

Table 3: Summary of Marine Mammal Counts

			Counts of MM Observed Berners Bay							Counts of MM Observed Outside Berners Bay							Counts of MM Observed - Total							
No.	Date	Time	L	S	Rafts	H	P	K	O	L	S	Rafts	H	P	K	O	L	S	Rafts	H	P	K	O	Notes
1	4/28/2015	5:35		20		1			1				6				0	20	0	7	0	0	1	Brown Bear on Beach in Slate Cove
2	4/28/2015	6:26		20		3				2			4				2	20	0	7	0	0	0	
3	4/28/2015	15:53				1				1							1	0	0	1	0	0	0	
4	4/28/2015	17:06				2											0	0	0	2	0	0	0	
5	4/28/2015	18:02				1							1				0	0	0	2	0	0	0	
6	4/28/2015	18:53				1		2						2	2		0	0	0	1	2	4	0	
7	4/29/2015	5:35				6							2				0	0	0	8	0	0	0	
8	4/29/2015	6:25				12							3				0	0	0	15	0	0	0	
9	4/29/2015	16:24		15		2											0	15	0	2	0	0	0	
10	4/29/2015	17:05		15		3											0	15	0	3	0	0	0	
11	4/29/2015	17:51		8													0	8	0	0	0	0	0	
12	4/29/2015	18:35		9		5											0	9	0	5	0	0	0	
13	4/30/2015	5:36		28		2							7	21			0	28	0	9	21	0	0	
14	4/30/2015	6:24		49		3							8	22			0	49	0	11	22	0	0	
15	4/30/2015	16:07		11									6	4			0	11	0	6	4	0	0	Gulls and bladder kelp
16	4/30/2015	17:06	1	11			6		1				2			2	1	11	0	2	6	0	3	Surf Scoters and gulls
17	4/30/2015	17:52	1	8									1				1	8	0	1	0	0	0	
18	4/30/2015	18:32		11									3				0	11	0	3	0	0	0	
19	5/1/2015	5:40		36		2							4	2			0	36	0	6	2	0	0	
20	5/1/2015	6:24		48		1				4			6				4	48	0	7	0	0	0	Marbled Murrelets and Scoters
21	5/1/2015	16:01		17		5				1			5				1	17	0	10	0	0	0	
22	5/1/2015	16:05		15									6				0	15	0	6	0	0	0	
23	5/1/2015	17:47											11			1	0	0	0	11	0	0	1	Lunge feeding and Scoters
24	5/1/2015	18:29				1							8		2		0	0	0	9	0	2	0	
25	5/2/2015	5:39	1	20		1		2					7		4		1	20	0	8	0	6	0	Rafts of bladder kelp
26	5/2/2015	6:24		20		1							6	6	9		0	20	0	7	6	9	0	Rafts of bladder kelp
27	5/2/2015	16:05		35									4	2			0	35	0	4	2	0	0	Bonaparte gulls
28	5/2/2015	17:04		36		1							5	3	1		0	36	0	6	3	1	0	
29	5/2/2015	17:47		20									3	3			0	20	0	3	3	0	0	
30	5/2/2015	18:30		20		1							2		2		0	20	0	3	0	2	0	
31	5/3/2015	5:32		20		3			1	2			2				2	20	0	5	0	0	1	Wolf on beach in Slate Cove

Table 3: Summary of Marine Mammal Counts

			Counts of MM Observed Berners Bay							Counts of MM Observed Outside Berners Bay							Counts of MM Observed - Total							
No.	Date	Time	L	S	Rafts	H	P	K	O	L	S	Rafts	H	P	K	O	L	S	Rafts	H	P	K	O	Notes
32	5/3/2015	6:18		20		1							1				0	20	0	2	0	0	0	
33	5/3/2015	16:03		21									2				0	21	0	2	0	0	0	
34	5/3/2015	17:03		20		1							1				0	20	0	2	0	0	0	
35	5/3/2015	17:45		20		1							4				0	20	0	5	0	0	0	
36	5/3/2015	18:28		20									4				0	20	0	4	0	0	0	Breaching
37	5/4/2015	5:38		20		1							5				0	20	0	6	0	0	0	
38	5/4/2015	6:27		20		4							5				0	20	0	9	0	0	0	
39	5/4/2015	15:48		20									2				0	20	0	2	0	0	0	
40	5/4/2015	17:01		24									2				0	24	0	2	0	0	0	
41	5/4/2015	17:44		20									9				0	20	0	9	0	0	0	
42	5/4/2015	18:27		20									3				0	20	0	3	0	0	0	
43	5/5/2015	5:37		20									2	5			0	20	0	2	5	0	0	
44	5/5/2015	6:24		20		2	2						8		3		0	20	0	10	2	3	0	
45	5/5/2015	16:02		38									9	8			0	38	0	9	8	0	0	
46	5/5/2015	17:01		16						2			5	12			2	16	0	5	12	0	0	
47	5/5/2015	17:44		40		1	5						4				0	40	0	5	5	0	0	Scattered loons off Mab Island
48	5/5/2015	18:27		40		1								12			0	40	0	1	12	0	0	
49	5/6/2015	5:36		20									3				0	20	0	3	0	0	0	
50	5/6/2015	6:23	1	20		2							6				1	20	0	8	0	0	0	
51	5/6/2015	16:06		25		1			1	1							1	25	0	1	0	0	1	16 eagles on Pt Bridget
52	5/6/2015	17:02		17		1				2			3				2	17	0	4	0	0	0	
53	5/6/2015	17:47		32		1				5			2				5	36	0	3	0	0	0	
54	5/6/2015	18:29	2	33			2						2	9			2	33	0	2	11	0	0	
55	5/7/2015	5:37	1	11		1							3	7			1	11	0	4	7	0	0	
56	5/7/2015	6:22	1	18			4						7				1	18	0	7	4	0	0	
57	5/7/2015	16:07		3		1				4			6				4	3	0	7	0	0	0	
58	5/7/2015	17:03	1	1						1			9				2	1	0	9	0	0	0	Breaching and Scoters
59	5/7/2015	17:49		6		1							7				0	6	0	8	0	0	0	Breaching
60	5/7/2015	18:34		23							1		3				0	24	0	3	0	0	0	
61	5/8/2015	5:37	1	6			100		1	12			6				13	6	0	6	100	0	1	Dall's and Harbor Porpoise, brown bear
62	5/8/2015	6:23	1	17			100			2			8				3	17	0	8	100	0	0	Lunge feeding, Dall's and harbor porpoise

Table 3: Summary of Marine Mammal Counts

			Counts of MM Observed Bay Berners							Counts of MM Observed Berners Bay Outside							Counts of MM Observed - Total							
No.	Date	Time	L	S	Rafts	H	P	K	O	L	S	Rafts	H	P	K	O	L	S	Rafts	H	P	K	O	Notes
63	5/8/2015	16:04		1						4			5			1	4	1	0	5	0	0	1	Heron on rock, scattered loons
64	5/8/2015	17:01											6				0	0	0	6	0	0	0	Scoters
65	5/8/2015	17:43		17									3			1	0	17	0	3	0	0	1	Heron on rock, scattered loons
66	5/8/2015	18:29		7									6			1	0	7	0	6	0	0	1	Heron on rock, scattered loons
67	5/9/2015	5:32	1	6						6			9				7	6	0	9	0	0	0	
68	5/9/2015	6:15	6	2	1					3			4	4			9	2	1	4	4	0	0	
69	5/9/2015	16:01	17	1	1	3				6			1	2			23	1	1	4	2	0	0	
70	5/9/2015	16:59	9		1					17			2				26	0	1	2	0	0	0	Scoters
71	5/9/2015	17:41	2	7		1				8			1				10	7	0	2	0	0	0	Eagles on rocks and Scoters
72	5/9/2015	18:21	2							6			1	5			8	0	0	1	5	0	0	Eagles on rocks and Scoters
73	5/10/2015	5:32	5	4	1	3				12		1		10			17	4	2	3	10	0	0	
74	5/10/2015	6:15		12		1		3		12		2	4	1	3		12	12	2	5	1	6	0	
75	5/10/2015	16:02	8	2	1		7			4			8			1	12	2	1	8	7	0	1	Scoters and Loons
76	5/10/2015	17:00	5				3			10		1	4				15	0	1	4	3	0	0	
77	5/10/2015	17:43	3	2						29		3	4				32	2	3	4	0	0	0	
78	5/10/2015	18:24								5			3				5	0	0	3	0	0	0	
79	5/11/2015	5:36	10		1					7							17	0	1	0	0	0	0	
80	5/11/2015	6:24	8		1	1				2			4				10	0	1	5	0	0	0	
81	5/11/2015	16:08	2	1					1	16			4				18	1	0	4	0	0	1	20+ eagles on rocks at Pt Bridget
82	5/11/2015	17:00	5							2			4				7	0	0	4	0	0	0	Scoters
83	5/11/2015	17:49		5						3			3				3	5	0	3	0	0	0	Scoters
84	5/11/2015	18:29	5	1						6			5				11	1	0	5	0	0	0	
85	5/12/2015	5:35	3							3			1				6	0	0	1	0	0	0	
86	5/12/2015	6:21	1	1						4			5				5	1	0	5	0	0	0	
87	5/12/2015	16:20	2	5						1			3				3	5	0	3	0	0	0	Three large flocks of gulls
88	5/12/2015	17:03	1	3						1			2				2	3	0	2	0	0	0	Scoters at Yankee
89	5/12/2015	17:47	1	1		1							5				1	1	0	6	0	0	0	
90	5/12/2015	18:32	6							1			2				7	0	0	2	0	0	0	
91	5/13/2015	5:34	5	2									1		1		5	2	0	1	0	1	0	Scoters and old buoy
92	5/13/2015	6:20	5		1			1		3			1				8	0	1	1	0	1	0	
93	5/13/2015	16:11	2	1						3							5	1	0	0	0	0	0	Gulls and Eagles on Pt Bridget

Table 3: Summary of Marine Mammal Counts

			Counts of MM Observed Berners Bay							Counts of MM Observed Outside Berners Bay							Counts of MM Observed - Total							
No.	Date	Time	L	S	Rafts	H	P	K	O	L	S	Rafts	H	P	K	O	L	S	Rafts	H	P	K	O	Notes
94	5/13/2015	17:02	1	2							1						1	3	0	0	0	0	0	Gulls on Pt Bridget
95	5/13/2015	17:47		4						9		1					9	4	1	0	0	0	0	Gulls on Pt Bridget
96	5/13/2015	18:30		3						4							4	3	0	0	0	0	0	
97	5/14/2015	5:35	6	20						2					4		8	20	0	0	0	4	0	20+ eagles on rocks at Pt St Mary
98	5/14/2015	6:21		25						2							2	25	0	0	0	0	0	10+ eagles and bladder kelp rafts
99	5/14/2015	16:11	4	21							1						4	22	0	0	0	0	0	20+ eagles on Mab, gulls on Bridget
100	5/14/2015	17:03	1	22						3							4	22	0	0	0	0	0	Gulls on Bridget, geese at Yankee
101	5/14/2015	17:48		21						1					4		1	21	0	0	0	4	0	Gulls on Point Bridget
102	5/14/2015	18:02		20						1							1	20	0	0	0	0	0	
103	5/15/2015	5:34		8						2							2	8	0	0	0	0	0	
104	5/15/2015	6:19	1	1						16							17	1	0	0	0	0	0	
105	5/15/2015	16:07	1	20									1		5		1	20	0	1	0	5	0	
106	5/15/2015	17:00		21						2							2	21	0	0	0	0	0	
107	5/15/2015	17:42	1	13						3	1						4	14	0	0	0	0	0	Gulls on Point Bridget
108	5/15/2015	18:23		20						1							1	20	0	0	0	0	0	
109	5/16/2015	5:34		6		1				2							2	6	0	1	0	0	0	20+ eagles on Point Bridget
110	5/16/2015	6:24		5		1				4			1				4	5	0	2	0	0	0	
111	5/16/2015	16:08		3			1			1							1	3	0	0	1	0	0	
112	5/16/2015	17:03		4						1							1	4	0	0	0	0	0	
113	5/16/2015	17:44								2							2	0	0	0	0	0	0	
114	5/16/2015	18:28	1	2									1				1	2	0	1	0	0	0	
115	5/17/2015	5:31								8							8	0	0	0	0	0	0	11 eagles on rocks at Slate
116	5/17/2015	6:16	1							5							6	0	0	0	0	0	0	7 eagles on rocks at Slate
117	5/17/2015	16:04		20													0	20	0	0	0	0	0	
118	5/17/2015	17:02	1	20						3							4	20	0	0	0	0	0	
119	5/17/2015	17:44	3	7						4			1				7	7	0	1	0	0	0	
120	5/17/2015	18:29		10						2	1						2	11	0	0	0	0	0	
121	5/18/2015	5:35		15						4							4	15	0	0	0	0	0	
122	5/18/2015	6:29	3							2							5	0	0	0	0	0	0	
123	5/18/2015	16:10								5			1				5	0	0	1	0	0	0	
124	5/18/2015	17:02		10						5							5	10	0	0	0	0	0	

Table 3: Summary of Marine Mammal Counts

			Counts of MM Observed Berners Bay							Counts of MM Observed Outside Berners Bay							Counts of MM Observed - Total							
No.	Date	Time	L	S	Rafts	H	P	K	O	L	S	Rafts	H	P	K	O	L	S	Rafts	H	P	K	O	Notes
125	5/18/2015	17:48								5			1				5	0	0	1	0	0	0	
126	5/18/2015	18:30	1	5		1				2	1						3	6	0	1	0	0	0	Fish jumping - just off Pt. St. Mary
127	5/19/2015	5:34								2							2	0	0	0	0	0	0	
128	5/19/2015	6:21								2							2	0	0	0	0	0	0	
129	5/19/2015	16:13								3							3	0	0	0	0	0	0	
130	5/19/2015	17:02								2							2	0	0	0	0	0	0	
131	5/19/2015	18:03								1							1	0	0	0	0	0	0	
132	5/19/2015	18:34		26							1						0	27	0	0	0	0	0	
			150	1558	8	91	230	8	6	324	7	8	350	140	40	7	474	1569	16	441	370	48	13	

			Latitude and Longitude Coordinates						
No.	Date	Time	L	S	Rafts	H	P	K	O
1	4/28/2015	5:35		N58.77457 W135.00063		N58.73289 W135.03505; N58.71477 W135.00185; N58.68750 W135.03827; N58.63073 W135.04567; 3(N58.66652 W134.98471)			
2	4/28/2015	6:26	2(N58.59206 W134.91948)	N58.77457 W135.00063		3(N58.68365 W134.97696); 4(N58.65944 W134.98238)			
3	4/28/2015	15:53	N58.59752 W134.93306			N58.70163 W134.98207			
4	4/28/2015	17:06				2(N58.69190 W134.98151)			
5	4/28/2015	18:02				N58.69593 W134.97075; N58.65338 W134.97302			
6	4/28/2015	18:53				N58.69262 W134.94849	N58.69167 W135.00046; N58.62618 W134.94728	2(N58.69551 W134.97885); 2(N58.61301 W134.94601)	
7	4/29/2015	5:35				N58.74378 W134.94408; 2(N58.72882 W135.00330); 2(N58.72565 W135.01675); N58.72200 W135.02861; N58.71325 W134.99051; N58.68856 W135.00696			
8	4/29/2015	6:25				6(N58.72159 W134.95111); 2(N58.72384 W135.02463); 4(N58.69122 W134.95241); 2(N58.69279 W134.99309); N58.67572 W135.08081			
9	4/29/2015	16:24		N58.77824 W135.00317		N58.73235 W134.98305; N58.69467 W134.99564			
10	4/29/2015	17:05		N58.77824 W135.00317		2(N58.71697 W134.99844); N58.70019 W134.97452			
11	4/29/2015	17:51		N58.77824 W135.00313					
12	4/29/2015	18:35		N58.77824 W135.00313		5(N58.69016 W134.95764)			
13	4/30/2015	5:36		20(N58.77824 W135.00317); 8(N58.76027 W135.01529)		N58.72547 W134.98976; N58.68208 W134.98981; 7(N58.64212 W134.96461)	4(N58.69466 W135.02815); 3(N58.67887 W135.01233); 4(N58.67277 W135.00589); 10(N58.66219 W134.98334)		

			Latitude and Longitude Coordinates						
No.	Date	Time	L	S	Rafts	H	P	K	O
14	4/30/2015	6:24		20(N58.77824 W135.00317); 19(N58.76027 W135.01529); 10(N58.73606 W135.02164)		3(N58.68163 W134.98672); 2(N58.67536 W134.99260); N58.66953 W135.00201; 3(N58.66360 W134.98227); N58.63601 W134.96236; N58.62526 W134.95332	10(N58.66800 W134.99075); 10(N58.64083 W134.96515); 2(N58.62526 W134.95332)		
15	4/30/2015	16:07		N58.74485 W135.02455		2(N58.62580 W134.94368); N58.62078 W134.95523; N58.61885 W134.96277; 2(N58.55150 W134.88015)	3(N58.66070 W134.98222); N58.62653 W134.96756		
16	4/30/2015	17:06	N58.77681 W135.01912	N58.7785 W135.02455		N58.71062 W135.03853; N58.64233 W134.96922	N58.69807 W135.02200		N58.73394 W135.02231; N58.69618 W135.01857; N58.66686 W134.97987
17	4/30/2015	17:52	N58.75894 W135.01309	N58.7785 W135.02455		N58.60521 W134.97522			
18	4/30/2015	18:32		N58.7785 W135.02455		N58.59365 W134.91312; 2(N58.59980 W134.92545)			
19	5/1/2015	5:40		20(N58.77824 W135.00317); 15(N58.75977 W135.01773); N58.70563 W134.99428		2(N58.68150 W134.97519); 2(N58.67097 W135.01736); N58.64411 W134.98167; N58.62796 W134.95119	N58.61758 W134.96822		
20	5/1/2015	6:24	2(N58.65168 W134.95889); 2(N58.61183 W134.94434)	20(N58.77824 W135.00307); 28(N58.75977 W135.01773)		N58.68303 W134.98936; N58.66155 W134.98279; 4(N58.64038 W134.98755); N58.62469 W134.95016			
21	5/1/2015	16:01	N58.67344 W134.98857	N58.77648 W135.00903; 16(N58.74235 W135.02594)		N58.75119 W135.01851; N58.73250 W135.01236; N58.70911 W134.98549; 2(N58.67891 W134.96846); N58.66609 W134.96430; 2(N58.64690 W134.96556); N58.64304 W134.97272; N58.64096 W134.95387			
22	5/1/2015	16:05		N58.74235 W135.02594		N58.73057 W135.03317; 2(N58.67197 W134.98985); 2(N58.65681 W134.97723); N58.60799 W134.93881			

			Latitude and Longitude Coordinates						
No.	Date	Time	L	S	Rafts	H	P	K	O
23	5/1/2015	17:47				2(N58.70771 W135.04883); N58.61610 W135.08870; N58.67587 W134.99161; 2(N58.66633 W134.98830); N58.65413 W135.00677; N58.65858 W134.97993; N58.62849 W134.94492; 2(N58.62104 W134.98468)			N58.68787 W135.00447
24	5/1/2015	18:29				N58.72965 W135.02249; N58.68416 W134.98080; 3(N58.67597 W135.00035); N58.66409 W134.98607; N58.66222 W134.98839; N58.65288 W134.97426		2(N58.63670 W134.97975)	
25	5/2/2015	5:39	N58.76466 W135.00383	N58.77824 W135.00314		N58.72390 W134.94835; N58.70191 W135.02734; N58.67368 W134.99020; N58.66329 W134.98511; N58.64285 W134.98793; 2(N58.64973 W134.96938); N58.60399 W134.93465		N58.67965 W135.00148; 2(N58.69713 W134.98439); 3(N58.67193 W134.99147)	
26	5/2/2015	6:24		N58.77824 W135.00317		N58.68226 W134.94995; N58.64537 W135.05089; N58.67308 W134.98814; 3(N58.65167 W134.97188); N58.61533 W134.96393	N58.61687 W134.96623	2(N58.64841 W134.98062); 7(N58.61687 W134.96623)	
27	5/2/2015	16:05		20(N58.77824 W135.00317); 15(N58.73919 W135.02586)		3(N58.73158 W135.02760); N58.64556 W134.96429	N58.64556 W134.96429		
28	5/2/2015	17:04		20(N58.77824 W135.00317); N58.74862 W135.01929; 15(N58.75919 W135.02586)		N58.69281 W134.97342; 2(N58.65464 W134.98167); N58.62444 W134.98325; 2(N58.61101 W134.94739)	N58.63470 W134.97897	N58.65426 W134.97641	
29	5/2/2015	17:47		N58.75919 W135.02586		N58.63762 W135.09673; N58.64368 W134.96178; N58.61294 W134.96088	N58.62434 W134.95724		
30	5/2/2015	18:30		N58.75919 W135.02586		N58.71449 W134.96637; 2(N58.62824 W134.96489)		N58.64561 W134.96819; N58.63823 W134.98380	
31	5/3/2015	5:32	N58.67318 W134.99153; N58.58483 W134.90230	N58.77824 W135.00317		3(N58.73456 W134.93893); N58.74127 W135.03340; N58.67559 W134.99075			N58.79181 W135.03058
32	5/3/2015	6:18		N58.77824 W135.00317		N58.68430 W134.97473; N58.62873 W134.95552			
33	5/3/2015	16:03		20(N58.77824 W135.00317); N58.73361 W135.01640		N58.68915 W135.01108; N58.66428 W134.98341			
34	5/3/2015	17:03		N58.77824 W135.00317		N58.75017 W134.97798; N58.66602 W135.01544			

			Latitude and Longitude Coordinates						
No.	Date	Time	L	S	Rafts	H	P	K	O
35	5/3/2015	17:45		N58.77824 W135.00317		N58.73966 W135.05717; N58.68320 W134.98602; 2(N58.66355 W134.98448); N58.64336 W134.96767			
36	5/3/2015	18:28		N58.77824 W135.00317		2(N58.66652 W135.01428); N58.64878 W134.97372; N58.62856 W134.95360			
37	5/4/2015	5:38		N58.77824 W135.00317		N58.73201 W135.01048; N58.68362 W134.99883; 3(N58.64563 W134.96359); N58.62403 W134.95680			
38	5/4/2015	6:27		N58.77824 W135.00317		N58.75216 W134.99428; N58.74053 W135.02275; 2(N58.68323 W134.97949); N58.65485 W134.97527; 2(N58.64092 W134.96469); 2(N58.60667 W134.94269)			
39	5/4/2015	15:48		N58.77824 W135.00317		N58.62300 W134.95862			
40	5/4/2015	17:01		20(N58.77824 W135.00317); 4(N58.73814 W135.02461)		N58.64245 W134.96574; N58.61140 W134.94882			
41	5/4/2015	17:44		N58.77824 W135.00317		N58.66695 W134.98737; 3(N58.62683 W134.94725); N58.62554 W134.96983; 3(N58.60824 W134.95222); N58.59193 W134.91347			
42	5/4/2015	18:27		N58.77824 W135.00317		N58.64585 W134.97592; 2(N58.62370 W134.95049)			
43	5/5/2015	5:37		N58.73826 W135.02415		N58.72955 W135.02438; N58.63667 W134.96107	3(N58.65168 W134.97264); 2(N58.61824 W134.94301)		
44	5/5/2015	6:24		N58.73826 W135.02415		2(N58.68966 W134.95551); 2(N58.67755 W135.00012); N58.66362 W134.99666; N58.63948 W134.96768; 3(N58.63359 W134.96739); N58.58826 W134.90829	N58.72609 W135.00757	N58.67345 W134.99117	
45	5/5/2015	16:02		16(N58.77824 W135.00317); N58.75297 W135.01288; N58.73582 W135.00774; 20(N58.73394 W135.02231)		N58.66865 W134.98988; N58.65898 W134.98047; 3(N58.62193 W134.96761); 4(N58.60282 W134.93936)	5(N58.67955 W135.00047); 3(N58.62193 W134.96761)		

			Latitude and Longitude Coordinates						
No.	Date	Time	L	S	Rafts	H	P	K	O
46	5/5/2015	17:01	N58.58629 W134.91588	9(N58.77824 W135.00317); 7(N58.73394 W135.02231)		N58.65721 W134.97943; N58.62706 W134.94818; 3(N58.58342 W134.91676)	5(N58.65774 W134.99898); 7(N58.64420 W134.98633)		
47	5/5/2015	17:44		20(N58.77824 W135.00317); 20(N58.73674 W135.02312)		N58.68810 W134.98056; N58.60767 W134.93851; 3(N58.59808 W134.92963)	N58.71860 W135.00073		
48	5/5/2015	18:27		20(N58.77824 W135.00317); 20(N58.73674 W135.02312)		N58.69070 W134.96446	N58.60771 W134.93587		
49	5/6/2015	5:36		N58.77824 W135.00317		N58.64394 W134.96393; 2(N58.62487 W134.94333)			
50	5/6/2015	6:23	N58.72267 W135.01714	N58.77824 W135.00317		2(N58.68185 W134.97597); 2(N58.64563 W135.00482); 2(N58.64139 W134.96550); N58.61632 W134.94994; N58.58964 W134.93532			
51	5/6/2015	16:06	N58.63885 W134.97224	6(N58.77594 W134.99965); N58.76438 W135.01416; N58.74334 W135.00047; 17(N58.73394 W135.02231)		N58.67798 W134.98932			N58.67798 W134.98935
52	5/6/2015	17:02	N58.58788 W134.91516	N58.73394 W135.02231		N58.66773 W135.15645; N58.70535 W135.04050; N58.68693 W134.99173; N58.62811 W134.95096			
53	5/6/2015	17:47	3(N58.60607 W134.93045); 2(N58.59546 W134.91370)	12(N58.77824 W135.00317); 20(N58.73394 W135.02231)		N58.71384 W135.02672; N58.67957 W134.98584; N58.67524 W134.99242			
54	5/6/2015	18:29	N58.68780 W135.00467	12(N58.77824 W135.00317); N58.44785 W135.006389; 20(N58.73394 W135.02231)		N58.66577 W134.98788; N58.63345 W134.96440	2(N58.71750 W135.02458); 2(N58.63345 W134.96440); 7(N58.59557 W134.91548)		
55	5/7/2015	5:37	N58.75734 W134.00899	10(N58.77824 W135.00317); N58.78154 W135.01985		N58.73925 W135.03517; N58.71452 W135.04114; N58.68191 W134.99141; N58.63019 W135.04245	N58.60012 W134.94786		
56	5/7/2015	6:22	N58.76281 W135.00655	14(N58.77824 W135.00317); 4(N58.73598 W135.02257)		N58.73814 W135.05847; N58.73378 W135.02632; N58.67166 W135.01201; 3(N58.65912 W134.98047); N58.61865 W134.94632	N58.69356 W134.99484		
57	5/7/2015	16:07	N58.60430 W134.93712; 3(N58.58418 W134.90341)	N58.77497 W135.00134		N58.68013 W134.99585; 4(N58.63686 W134.96594); N58.62729 W134.96472; N58.62541 W134.94438			

			Latitude and Longitude Coordinates						
No.	Date	Time	L	S	Rafts	H	P	K	O
58	5/7/2015	17:03	N58.72271 W135.01750; N58.63568 W134.96397	N58.76175 W135.00418		N58.74635 W135.05428; N58.67258 W134.99763; N58.66843 W134.98743; N58.63568 W134.96397 2(N58.65356 W134.97401); N58.60539 W134.93973; 2(N58.59009 W134.99983)			
59	5/7/2015	17:49		5(N58.77824 W135.00317); N58.76986 W135.01456		N58.70058 W134.99133; 2(N58.65678 W134.97670); N58.64968 W134.98798; 3(N58.64264 W134.96642); N58.63021 W134.99527			
60	5/7/2015	18:34		3(N58.77824 W135.00317); 20(N58.72609 W135.01961); N58.60859 W134.95265		2(N58.67599 W134.99501); N58.64147 W134.95975			
61	5/8/2015	5:37	N58.73115 W135.02022; 5(N58.72020 W135.02364); N58.72170 W135.01036; 2(N58.66825 W134.98451); 2(N58.60072 W134.91780); 2(N58.59420 W134.90705)	N58.77824 W135.00317		3(N58.66470 W134.98340); N58.65485 W134.97467; N58.64474 W134.96368; N58.60072 W134.91780	N58.70637 W135.00758		N58.77805 W135.02554
62	5/8/2015	6:23	N58.74163 W135.02159; 2(N58.60971 W134.94162)	3(N58.77824 W135.00317); 14(N58.73658 W135.02499)		2(N58.66979 W134.98923); 3(N58.64305 W134.96774); 2(N58.63602 W134.96562); N58.61874 W134.94447	N58.70637 W135.00758		
63	5/8/2015	16:04	N58.67439 W134.99028; 3(N58.66045 W134.97963)	N58.77824 W135.00317		N58.67161 W134.98874; N58.64767 W134.96878; 2(N58.62634 W134.94536); N58.60701 W134.93845			N58.73394 W135.02231
64	5/8/2015	17:01				N58.64848 W134.97028; N58.63824 W135.00163; 2(N58.61660 W134.95137); N58.603078 W134.95512; N58.61407 W134.94382			
65	5/8/2015	17:43		11(N58.77824 W135.00317); 6(N58.73554 W135.02020)		N58.64257 W134.96492; N58.63925 W135.00188; N58.60165 W134.96165			N58.77824 W135.00317
66	5/8/2015	18:29		4(N58.77824 W135.00317); 3(N58.73554 W135.02020)		N58.66039 W134.98323; N58.63773 W134.96336; N58.63235 W134.97292; 3(N58.62663 W134.95026)			N58.77824 W135.00317

			Latitude and Longitude Coordinates						
No.	Date	Time	L	S	Rafts	H	P	K	O
67	5/9/2015	5:32	N58.69447 W134.99550; 4(N58.67026 W134.99182); N58.61522 W134.94380; N58.58833 W134.90703	3(N58.77497 W135.00098); 3(N58.73040 W135.01932)		3(N58.67026 W134.99182); N58.64802 W134.96780; 4(N58.63992 W134.96468); N58.62671 W134.94324			
68	5/9/2015	6:15	5(N58.73037 W135.02104); 3(N58.72417 W135.02341); N58.69941 W135.00453	N58.73437 W135.02724		N58.66269 W134.98286; N58.63594 W134.96469; 2(N58.62727 W134.94740)	N58.65625 W134.99594		
69	5/9/2015	16:01	N58.71712 W135.01570; N58.71370 W134.98274; N58.69308 W135.00378; N58.67139 W134.99022; N58.65206 W134.97308; N58.61158 W134.94328; N58.60335 W134.93304	N58.76711 W135.01665	N58.73563 W135.00691	3(N58.68881 W134.96718); N58.62444 W134.94630	N58.62225 W134.96739		
70	5/9/2015	16:59	5(N58.73179 W135.01566); N58.72601 W135.01015; 2(N58.70750 W135.00497); N58.69180 W134.99725; 2(N58.65693 W134.97821); 2(N58.63741 W134.96478); 3(N58.61318 W134.94400)		N58.68566 W134.97087	N58.71611 W135.03502; N58.68566 W134.97087			
71	5/9/2015	17:41	N58.78504 W135.01968; N58.68131 W134.98814; 2(N58.67377 W134.99045); N58.64429 W134.96315; N58.61845 W134.94547; 4(N58.61328 W134.94232)	3(N58.77485 W135.00037); N58.75681 W135.01675; 3(N58.73129 W135.02087		N58.73204 W135.00604; N58.62587 W134.94702			
72	5/9/2015	18:21	N58.75907 W135.01698; N58.73058 W135.01114; 3(N58.63640 W134.96431); 2(N58.62689 W134.95068); N58.61817 W134.94658			N58.67130 W134.98831	N58.67130 W134.98831		
73	5/10/2015	5:32	5(N58.73544 W135.01805); 6(N58.72575 W135.02199); N58.67562 W134.99049; N58.62654 W134.95076; N58.61989 W134.94417; 2(N58.61147 W134.93996); N58.59005 W134.90613	N58.77709 W135.01239; N58.77318 W135.00392; 2(N58.76003 W135.01312)	N58.72575 W135.02199: N58.73544 W135.01805	N58.70255 W134.97748; 2(N58.68462 W134.99275)	4(N58.66374 W134.98206); 3(N58.64797 W134.97946); 3(N58.61147 W134.93996)		

			Latitude and Longitude Coordinates						
No.	Date	Time	L	S	Rafts	H	P	K	O
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126	5/18/2015	18:30	N58.71991 W135.01396; N58.62469 W134.95442; N58.60760 W1334.95099	3(N58.76183 W135.01445); 2(N58.74613 W135.00992); N58.66579 W135.00502		N58.69172 W134.99893			
127	5/19/2015	5:34	N58.63777 W134.96794; N58.60976 W134.94453						
128	5/19/2015	6:21	N58.72180 W135.02257; N58.62848 W134.95399						
129	5/19/2015	16:13	N58.63358 W134.95988						
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131	5/19/2015	18:03	N58.60948 W134.94710						
132	5/19/2015	18:34		N58.77349 W135.00871; 25(N58.73649 W135.02232); N58.73025 W135.02190					

Attachment 2

Wildlife Monitoring Report – 2015

2015 TERRESTRIAL WILDLIFE MONITORING REPORT OF THE SLATE LAKES BASIN

Coeur Alaska - Kensington Gold Mine
3031 Clinton Drive Suite 202
Juneau, AK 99801

January 2016

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1.0 Introduction

This report describes the 2015 wildlife monitoring season (May through October) in accordance with the Kensington Project Terrestrial Wildlife Monitoring Plan. Coeur Alaska and resource agencies designed this plan to monitor wildlife resources in the Slate Lakes basin. Monitoring recorded the effectiveness of mitigation during mine operations that encourages use by local wildlife.

The Kensington Gold Project Final Supplemental Environmental Impact Statement (FSEIS) (USFS 2004) documented the occurrence of wildlife species in the Slate Lakes basin prior to construction activity. Coeur Alaska conducted a baseline survey in 2005 (Living System Designs 2005). Management indicator species in the Berners Bay area include black and brown bear, Sitka Black-tailed deer, Alexander Archipelago wolf, Bald Eagle, red squirrel, river otter, marten, Red-breasted sapsucker, Brown creeper, and Vancouver Canada goose.

Sightings of wildlife or their sign within the Slate Lakes basin include moose, black bear, brown bear, Canada goose, ducks, red squirrels, porcupine, river otter, old beaver cuttings, Bald Eagles and various mustelid species.

Coeur Alaska monitored wildlife in 2006 and 2007 during the first phase of construction. Due to no construction activity during 2008, no wildlife monitoring was conducted during this period. Wildlife monitoring resumed in early September 2009 at the start-up of constructing the Tailings Treatment Facility (TTF), and continued through the 2011 summer season. Monitoring continued in 2012 during the construction of stage two of the tailings dam. After completion of stage two of the tailings dam, monitoring continued through 2015.

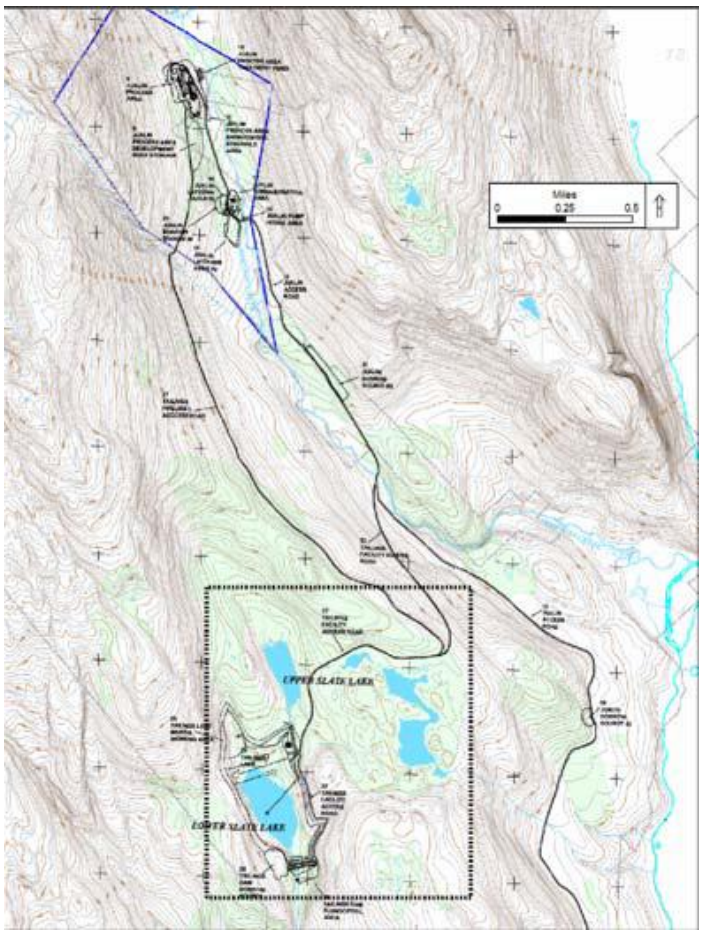

Figure 1: Slate Lakes basin in relation to access roads and the Tailings Treatment Facility (TTF). The access road to the TTF was constructed in 2006. The tailings dam was constructed between August 2009 and August 2010. The TTF was actively in use during the 2015 monitoring season.

1.1 **Wildlife Monitoring Objective**

The objectives of the Kensington Project Wildlife Monitoring Plan are to

- Supplement the regional resource knowledge base with site-specific data
- Gather new information on specific wildlife habitats and species that could be affected by increased activity at the project site with specific attention to sensitive species
- Identify concentrations of wildlife near specific resources (e.g., stream mouth marshes, anadromous streams, lakes, wetlands, bird nesting/feeding areas, large mammal crossing areas, etc.)
- Conduct wildlife observations along an established route surrounding the Slate Lakes basin on a frequent basis from spring through fall
- Collect data and other information that can be used to shape the subsequent year's studies and long-term monitoring

Figure 2: The Slate Lakes basin in 2005, prior to construction of the access road and the Lower Slate Lake Tailings Treatment Facility.

2.0 Survey Area

The wildlife monitoring survey area lies within the confines of the Slate Lakes basin, an area of approximately two square kilometers, ranging in elevation from 200 meters at the mouth of Lower Slate Lake, to 300 meters on the ridge to the west of Lower Slate Lake (Figure 1). Water bodies within the basin include Lower and Upper Slate Lakes to the west and the Spectacle Lakes complex to the east. Both Lower and Upper Slate Lake have steep western slopes, but much of the remaining area around Upper Slate Lake is flat with a mild slope to the east. The area around Spectacle Lake is also fairly flat. There is drainage from the southeast corner of Spectacle Lake into Berners Bay, while Fat Rat Lake drains into Upper Slate Lake (Figure 2). Upper Slate Lake drains to Lower Slate Lake via Mid-Lake Slate Creek and Lower Slate Lake drains to East Fork Slate Creek.

Prior to construction, terrestrial vegetation types around Upper and Lower Slate Lakes were fairly similar and included mixed spruce and hemlock forest to the west of both lakes and to the southeast of Lower Slate Lake. The north and east shores of both lakes were characterized by wetlands containing sedge meadow and scrub muskeg. The periphery timber of Lower Slate Lake was clear-cut by September 2005 and the TTF access road along the north of Spectacle Lakes was constructed by August 2006. The immediate vicinity of Upper Slate Lake has not been impacted by the project. The vegetation around the Spectacle Lake complex included sphagnum bogs and sedge fens with brushy, scrub forest in elevated areas. All of the lakes contained various species of aquatic vegetation, though not in high volume (Living System Designs 2005). Spectacle Lake contained the greatest concentration of aquatic vegetation, mainly in three sloughs and in Fat Rat Lake.

3.0 Methods

Kate Savage, who conducted wildlife monitoring in 2006, 2007, and 2010 established transects that were used in all surveys, including the 2015 season. There are 20 transects around the basin, each transect is 50 meters long and runs in a north-south direction (see Appendix A). The transects provide a systematic method for recording wildlife sign throughout the season. The north, middle and south end of each transect were marked with stakes and survey flagging. GPS coordinates of each transect were also recorded (see list in Appendix B). Coeur Alaska Environmental technicians visited each transect once per week during the 2015 season when possible. Starting at the north end of the transect (zero meters), the technicians walked the length of the transect examining the ground within one meter on either side, ending at 50 meters. The location along the transect of signs such as tracks, scat, or digging were recorded and whether they lay on the left, center or right side of the transect. In this way, the precise location of wildlife sign was recorded so that fresh wildlife sign could be more easily separated from older, previously recorded sign.

Scans with binoculars were also made from the access road to detect the presence of wildlife from afar. This method was most effective for observing waterfowl on the lakes. Lower Slate Lake is easily visible from almost any aspect on the TTF road. Viewing locations were optimum in the Spectacle Lakes area from the western edge of Lower Spectacle Lake, the southern tip of lower Spectacle Lake, which also afforded a good view of the adjacent southern slough, and the northern tip of upper Spectacle Lake.

Environmental technicians collected data on wildlife sign along transects to ensure that observations and data collection were as standardized and unbiased as possible. Other information collected included weather conditions, visibility and the time at the start and end of each survey.

Species of special interest included herons, waterfowl such as Vancouver Canada goose, and raptors such as Bald Eagles and Northern Goshawks. No special surveys to detect the presence of goshawks using standard broadcast methods were conducted in 2015.

Figure 3: Spectacle Lakes basin with access road to the Tailings Treatment Facility (2010)

4.0 Survey Results

Field technicians determined the presence of wildlife within the Slate Lakes basin through actual sightings and identification of wildlife sign (tracks, digs and scat). Data collected during surveys included direct observations of wildlife species with photographs when possible, date and time, location, and behavior. The use of motion sensor trail cameras also helped determine the presence of wildlife within the area. The cameras were moved to various transects throughout the monitoring season. A complete photo log of all monitoring photos during the 2015 season is located in Appendix D. Table 1 through Table 4 summarize wildlife sign by the main species present in the Slate Lakes basin (All species, Bear, Moose, Goose). Charts 1 through 4 compare data collected on these species from 2012 to 2015 by month.

4.1 Mammals

Indications of bear activity included tracks, scat and digs, which were most prevalent in the month of July. The greatest amount of bear sign and sightings were noted at T2, T5, T10 and T13. All transects had sign of bear activity in 2015 with T7 and T20 having the least. Bear activity appeared in high concentrations at those transects located adjacent to the TTF access road and around the Spectacle Lakes. It is likely that bears frequently use this corridor for travel. There were several occasions when bears were sighted crossing the TTF access road primarily between T12 and T13. There were also several other sightings of black bears around the TTF throughout the season. It can sometimes be difficult to distinguish between certain bears and to identify specific characteristics of each individual animal. However, throughout the 2015 monitoring season, environmental technicians sighted what was thought to be no less than six different bears in the area based on size, color and distinctive markings, including at least two black bear sows with two cubs. One brown bear was sighted crossing the TTF access road in July (see photo in Appendix D).

One moose was sighted during a survey on September 9th near T9 (see photo in Appendix D). Moose sign consisted of mostly tracks and scat with no browse or bedding sites observed. The greatest concentration of moose sign was counted at T20. Transects T6, T7, T18 and T1 also had high numbers of sign. The concentrations of moose sign at these transects is consistent with the data obtained from previous years' surveys. The primary areas utilized by moose remain largely unchanged from previous years. Moose tracks can form deep depressions in soft, wet ground that persist for months. A single moose can also leave a large number of signs by simply walking parallel with a transect. These factors were taken into consideration when making any conclusions about levels of activity over time.

4.2 Avian Species

The avian species identified through direct sightings or indirectly through songs or calls included both resident and migratory wading birds, non-passerine land birds, passerines and species of special interest, which include waterfowl, raptors and herons.

A primary summer use of the area was as a refuge for Canada Goose, which arrived in June and were observed frequently through September. High numbers of goose sign were concentrated at T4 and T5 as well as T8 and T14. All of these transects are on large open flats located in close proximity to water. Goose signs observed were in the form of scat, tracks left in mud and feathers. Numerous feathers were often found in one spot which may be an indication of summer molting. As environmental technicians conducted surveys, geese could often be observed swimming in a group on Upper and Lower Spectacle Lakes. The highest number of geese observed at one time was at least thirty, which is higher than noted in previous years.

Sooty Grouse with chicks have been observed in the Slate Lakes basin in previous years. In 2015, at least one male Sooty Grouse's mating call could be heard throughout the Slate Lakes basin in the spring. One adult female Sooty Grouse was observed on June 12 near T10, however no chicks were observed in 2015. A pair of Yellowlegs appeared to be nesting near T12 this monitoring season, which is consistent with previous years. No ground nest or signs of chicks were observed, however the pair behaved very defensively whenever technicians attempted to survey the area. Ducks appear to make some use of Spectacle Lakes and Upper and Lower Slate Lake continually during summer and fall months. Goldeneyes, Mallards, loons and Common Mergansers with chicks were observed throughout the basin. Belted Kingfishers were seen several times throughout the season on Lower Slate Lake. Bald Eagles were sighted soaring over the Slate Lakes basin and observed attempting to ambush loons on Upper Spectacle Lake in July. A Red-tailed hawk was noted hunting in the area as well.

Other bird species observed during 2015 included Dark-Eyed Juncos, Steller's Jays, American Robins, Varied Thrushes, Chestnut-backed Chickadees, American Dippers, Common Ravens, Winter Wrens, Tree Swallows, Olive-sided Flycatchers and song sparrows. A song sparrow nest was found on the ground near T6 on the first of July with two eggs. The nesting area was observed briefly during subsequent surveys otherwise avoided and left alone. The chicks are believed to have fledged successfully (see photo in Appendix D). A complete avian species list is located in Appendix E.

4.3 Other Sightings

Sitka black-tailed deer (Odocoileus hemionus sitkensis) tracks were observed in June and September on T5, T7, T15 and T19. Compared to the 2014 monitoring season, there were more deer signs observed in 2015. Alexander Archipelago wolf (Canis lupus ligoni) sign was observed on T19 in September and at least two individual wolves were photographed on a trail camera located between T19 and T20. Both western toads (Bufo boreas) and wood frogs ((Lithobates sylvaticus) have not been sighted since 2012. Porcupines were often spotted along roadsides, but tend to avoid travel though open areas where most monitoring transects were located.

It is likely that smaller mammals are just as active (if not more so) in summer, but their sign (tracks and scat) show up more in snow. Current monitoring practices were not conducive to obtaining representative data on small mammal and rodent populations within the Slate Lakes basin.

4.4 Human Activity

The access road to the TTF has considerable traffic use at times. Heavy equipment uses the road intermittently. Noise from traffic along the access road is most noticeable at T1, T13, T14, T12, T17, and T18.

5.0 Discussion

The transects are all located in open bog and fen areas around the lakes as opposed to thick brush for ease of finding wildlife sign. Smaller, lighter mammals do not leave visible tracks in firmer ground. This led to some bias with apparent abundance of large mammals relative to smaller mammals.

Bear sign and sightings seemed to peak in July and began steadily tapering off through fall. This is most likely due to bears moving down to creek basins to prey on salmon before returning to upland areas to feed on roots and berries before hibernating for the winter. Most of the bear sign found was in the form of scat and digs, with increased amounts of visible berries in scat towards fall. Moose sign reached a peak in late fall in the 2015 season with less signs recorded in mid-summer months compared to previous years. The peak in fall activity may be due to behavioral habits related to breeding and rut.

Overall, bear and moose signs counted were relatively concentrated on the same transects and in areas similar to 2014. Comparing the number of bear signs counted in total during the 2015 season, numbers in the Slate Lakes basin were down this season. This decline is most likely due to a greater abundance of salmon in local streams compared to the 2014 season.

Goose signs counted in 2015 were relatively consistent to previous years' surveys. However, a flock of up to thirty geese had been noted swimming on Lower Spectacle Lake which is higher than previous years' group sighting numbers. Use of the Slate Lakes basin as a refuge for Canada geese has previously been documented in 2000 (ABR 2000), 2004 (USFS 2004), in 2005 (Living System Designs 2005), 2006, 2007 (Savage 2007), 2012, 2013 and 2014. The no-fly zone over the Spectacle Lakes basin, instigated through Coastal Helicopters in 2007 to minimize disturbance to geese, continued through 2015.

6.0 Conclusions

In total, signs of bear, moose and geese within the Slate Lakes basin showed similar trends to previous survey years. Wildlife populations within the Slate Lakes basin generally appear healthy, and abundant. Comparisons with baseline studies conducted in 2004 and 2005, mining operations have had little impact on the abundance or habits of terrestrial wildlife in the area.

7.0 References

ABR. Inc. 2000 *A Review of Selected Wildlife Species, Jualin Mine Project, Alaska*. Prepared for Coeur Alaska, Inc., by B.A. Anderson, ABR, Inc. – Environmental Research and Services.

Aquatic Science, Inc. 2011. *Coeur Alaska Kensington Project: USFS Annual Report 2010, Terrestrial Wildlife Monitoring Slate Lakes Basin.* Prepared for Coeur Alaska by K. Savage.

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Murie O.J and Elbroch M. 2005. The Petersen Field Guide to Animal Tracks. 3rd edition. Houghton Mifflin Company, New York. 391 pp.

National Geographic Society 1987. Field Guide to the Birds of North America. 2nd Edition. 464pp.

Savage 2007. Kensington Terrestrial Wildlife Monitoring Annual Report, Slate Lakes Basin, 2007. Prepared for Coeur Alaska by K. Savage. 2007.

USFS 2004. Kensington Gold Project Final Supplemental Environmental Impact Statement (FSEIS) USFS 2004.

Table 1: Total Wildlife Sign Data (highlighted cells = highest counts)

ALL	5/13	5/20	5/29	6/4	6/12	6/19	6/24	7/1	7/7	7/17	7/22	7/30	8/7	9/2	9/9	9/30	10/7	10/25	10/29	TOTAL
T1						1	1	1							2	2	1	4		**12**
T2	1						1	2	2	2		1			3			1	2	**15**
T3											1				1	2				**4**
T4						3	2	3	1	1		1				1	1	2		**15**
T5		1					2	1	4	2	1	2	2		1	1		2		**19**
T6	2	2				2		2			1					1		1		**11**
T7						1									2	2	2	1	1	**9**
T8								1	3							2				**6**
T9			1			1	1	2		3	1	1						1		**11**
T10	1			1		1	1	4		1	1		1		1	2		2		**16**
T11		1				2		3	1						2					**9**
T12					1		1	1	1		1	1					1		1	**8**
T13				1		1	1	5	1	1	2					1	1	1	1	**16**
T14	1			2	1	1		2		1	1		1					1		**11**
T15						1		1	2			1				1		1		**7**
T16		1		1		1	2								1	1	1	1	1	**10**
T17							1	1					2		1	1				**6**
T18					1	1				3		2				1	3		2	**13**
T19							2	1												**3**
T20	2				1	1			1						1	1	4	1	1	**13**
TOTAL	**7**	**5**	**1**	**5**	**4**	**17**	**15**	**30**	**16**	**15**	**9**	**9**	**6**	**0**	**15**	**19**	**14**	**19**	**9**	**215**

Table 2: Bear Sign Data

BEAR	5/13	5/20	5/29	6/4	6/12	6/19	6/24	7/1	7/7	7/17	7/22	7/30	8/7	9/2	9/9	9/30	10/7	10/25	10/29	TOTAL
T1								1							2			1		**4**
T2							1	2	2	2		1			3			1		**12**
T3											1					1				**2**
T4							1	2	1			1								**5**
T5		1					1	1	4	1	1	1			1					**11**
T6						2		2												**4**
T7															1					**1**
T8								1	1							1				**3**
T9							1	2		2	1	1						1		**8**
T10						1	1	3		1	1				1	2				**10**
T11		1				2		3	1	1										**8**
T12					1		1	1	1		1	1								**6**
T13							1	5	1	1	2									**10**
T14	1			1							1									**3**
T15									2			1				1				**4**
T16				1		1	1	2									1	1		**7**
T17							1								1	1				**3**
T18										2		2								**4**
T19							2													**2**
T20									1											**1**
TOTAL	**1**	**2**	**0**	**2**	**1**	**6**	**11**	**25**	**14**	**10**	**8**	**8**	**0**	**0**	**9**	**6**	**1**	**4**	**0**	**108**

Table 3: Moose Sign Data

MOOSE	5/13	5/20	5/29	6/4	6/12	6/19	6/24	7/1	7/7	7/17	7/22	7/30	8/7	9/2	9/9	9/30	10/7	10/25	10/29	TOTAL
T1						1	1									2	1	3		**8**
T2	1																		2	**3**
T3															1	1				**2**
T4						2										1	1	2		**6**
T5		1																2		**3**
T6	2	2									1	1				1		1		**8**
T7						1									1	2	2	1	1	**8**
T8																				
T9			1			1				1										**3**
T10	1			1														2		**4**
T11															2					**2**
T12																	1		1	**2**
T13				1		1										1	1	1	1	**6**
T14				1	1	1												1		**4**
T15						1												1		**2**
T16															1	1			1	**3**
T17																				
T18					1	1										1	3		2	**8**
T19																				
T20	2				1	1										1	4	1	1	**11**
TOTAL	6	3	**1**	3	3	10	**1**	0	0	**1**	**1**	**1**	0	**0**	5	11	13	15	9	83

Table 4: Goose Sign Data

GOOSE	5/13	5/20	5/29	6/4	6/12	6/19	6/24	7/1	7/7	7/17	7/22	7/30	8/7	9/2	9/9	9/30	10/7	10/25	10/29	TOTAL
T1																				
T2																				
T3																				
T4						1	1	1		1										4
T5							1			1			2			1				5
T6																				
T7																				
T8									2							1				3
T9																				
T10								1					1							2
T11																				
T12																				
T13																				
T14								1		1			1							3
T15																				
T16							1													1
T17								1					2							3
T18										1										1
T19								1												1
T20															1					1
TOTAL	0	0	0	0	0	1	3	5	2	4	0	0	6	0	1	2	0	0	0	24

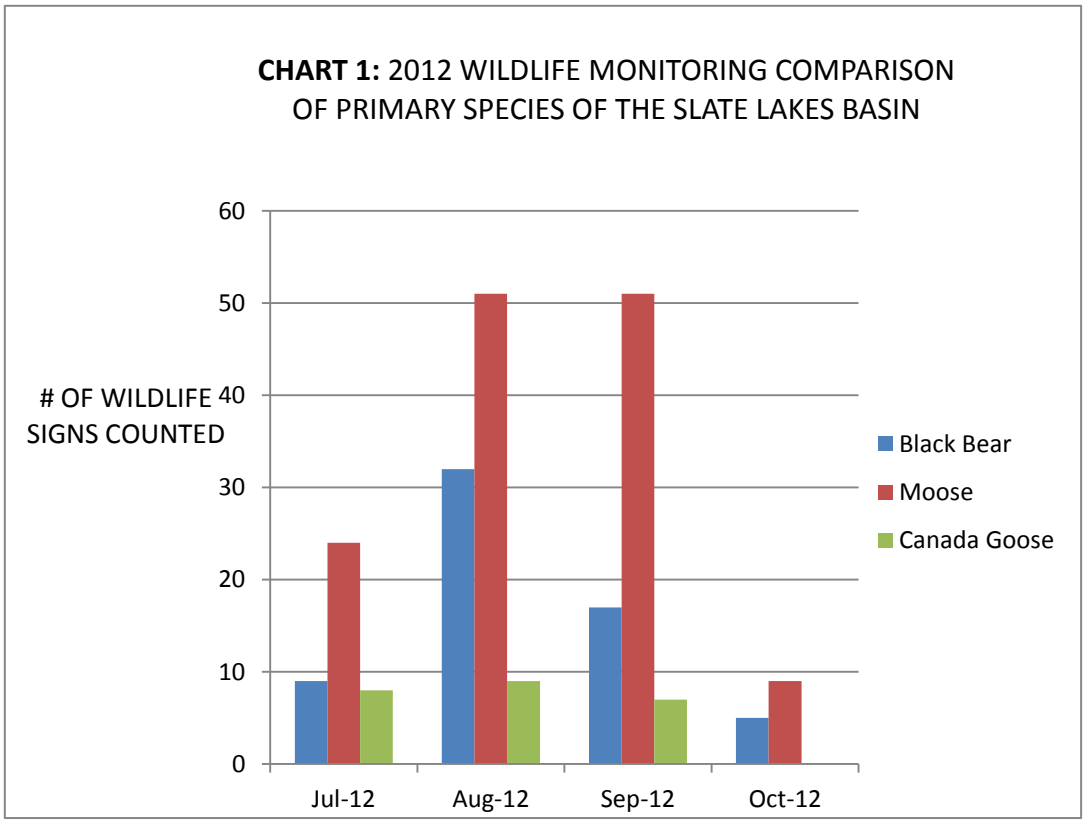


CHART 1: 2012 WILDLIFE MONITORING COMPARISON OF PRIMARY SPECIES OF THE SLATE LAKES BASIN
OF WILDLIFE SIGNS COUNTED
60
50
40
30
20
10
0
Jul-12
Aug-12
Sep-12
Oct-12
Black Bear
Moose
Canada Goose

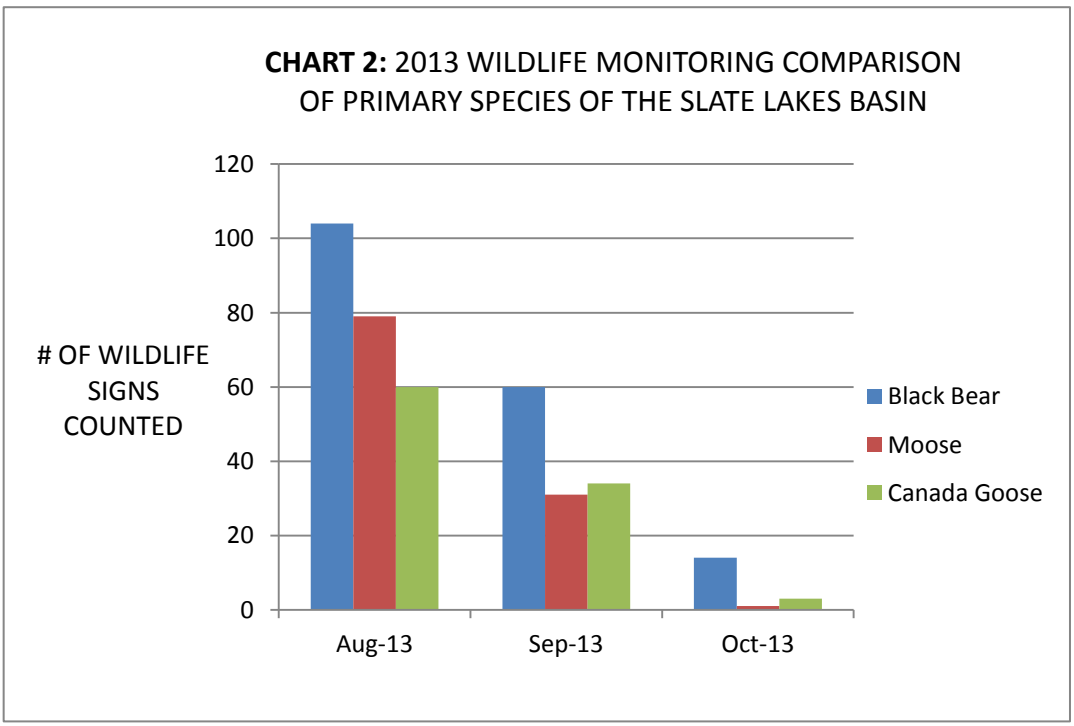


CHART 2: 2013 WILDLIFE MONITORING COMPARISON OF PRIMARY SPECIES OF THE SLATE LAKES BASIN
OF WILDLIFE SIGNS COUNTED
120
100
80
60
40
20
0
Aug-13
Sep-13
Oct-13
Black Bear
Moose
Canada Goose

CHART 3: 2014 WILDLIFE MONITORING COMPARISON OF PRIMARY SPECIES OF THE SLATE LAKES BASIN

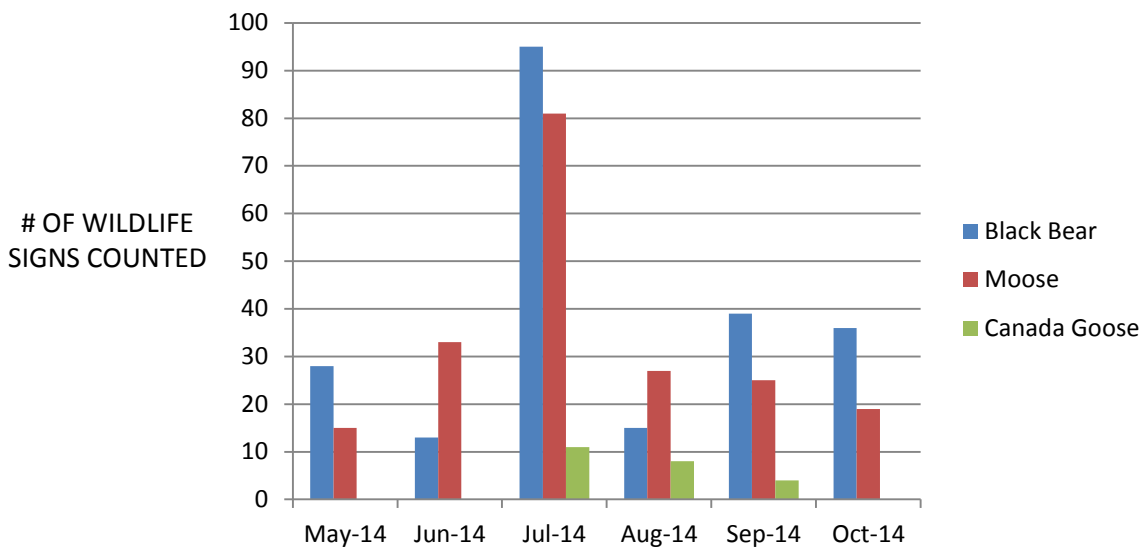
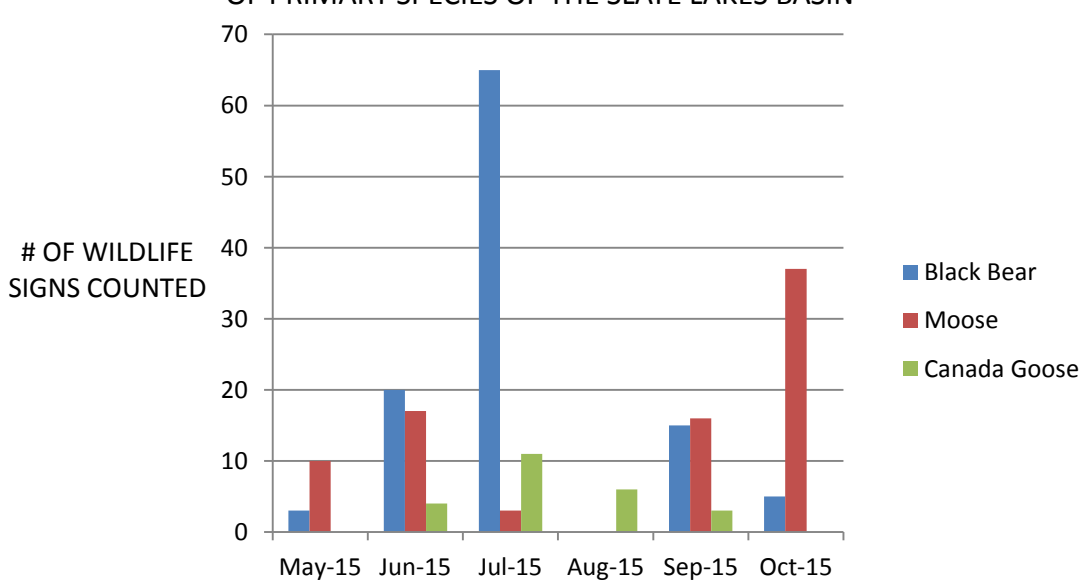
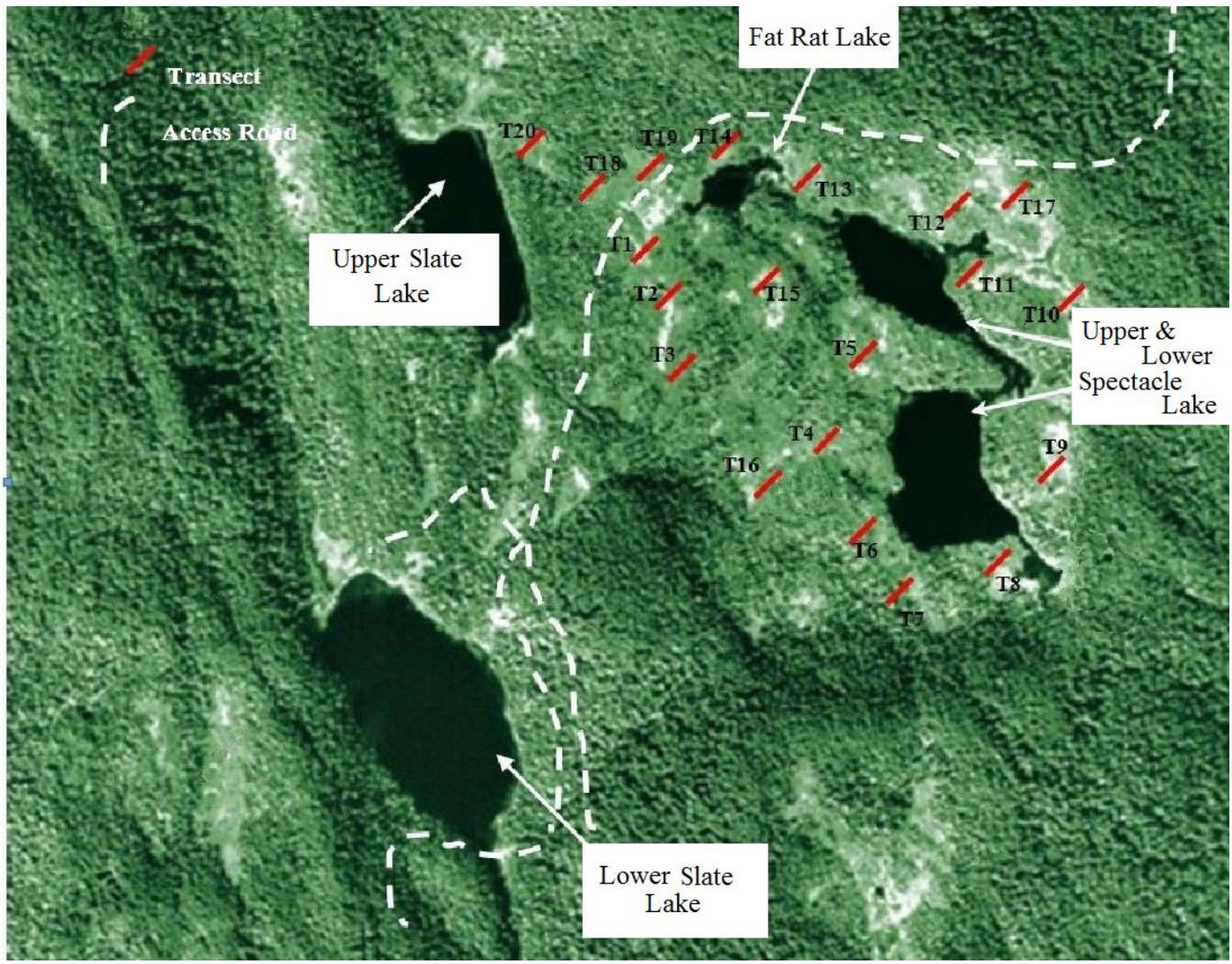


CHART 4: 2015 WILDLIFE MONITORING COMPARISON OF PRIMARY SPECIES OF THE SLATE LAKES BASIN



APPENDIX A: SITE MAP WITH TRANSECTS



APPENDIX B: TRANSECT GPS COORDINATES

(All North End Coordinates)

T1 N 58.81712N/135.03537W
T2 N 58.81631N/135.03036W
T3 N 58.81509N/135.03416W
T4 N 58.81410N/135.03032W
T5 N 58.81537N/135.02911W
T6 N 58.81288N/135.02849W
T7 N 58.81182N/135.02705W
T8 N 58.81250N/135.02471W
T9 N 58.81377N/135.02370W
T10 N 58.81657N/135.02342W
T11 N 58.81678N/135.02596W
T12 N 58.81765N/135.02682W
T13 N 58.81788N/135.03061W
T14 N 58.81834N/135.03325W
T15 N 58.81660N/135.03181W
T16 N 58.81410N/135.03157W
T17 N 58.81782N/135.02492W
T18 N 58.81820N/135.03523W
T19 N 58.81812N/135.03630W
T20 N 58.81844N/135.03839W

APPENDIX C: 2015 DATA SHEETS

Transect Data

Transect: T1-T20
Personnel: SIERRA LAMMERS, RYAN BAILEY
Date: 5/13/2015
Weather: SUN, Ø WIND, 65°F - 70°F
Time: START: 1330 END: 1515

Location	L/R	Sign Type (Track, Scat, etc)	Species	Photo (Y/N)	Sample (Y/N)	Notes
T13		Ø				
T12		Ø				
T17		Ø				
T10 46	LCR	T	MOOSE	N	N	
T11		Ø				
T9		Ø				
T8		Ø				
T7		Ø				
T6 35	LCR	T	MOOSE			
37	LCR	T	MOOSE	N	N	
T16		Ø				
T4		Ø				
T15		Ø				HEARD OLIVE-SIDED FLYCATCHER(S)
T5		Ø				
T3		Ø				
T2 33	R	T	MOOSE	N	N	
T1		Ø				
T14 40	L	S	BEAR	N	N	
T18		Ø				
T19		Ø				
T20 17	LCR	T	MOOSE	N	N	
32	LCR	T	MOOSE	N	N	

Transect Data

Transect: ALL
Personnel: S.LAMMERS
K.ASPLUND

Date: 5/20/2015
Weather: SUN, CALM, 65-70°F

Time: START: 1335
END: 1530

Location	L/R	Sign Type (Track, Scat, etc)	Species	Photo (Y/N)	Sample (Y/N)	Notes
T13		Ø				
						HEARD OLIVE-SIDED FLY CATCHER
T12		Ø				
T17		Ø				
T11 32	R	D	B			
T10 20	L	T	GROUSE	YES		
T9		Ø				
T8		Ø				
T7		Ø				
T6 15	L	T	M			
18	L	T	M			
T16 30-50	L&R	T	M			
T4		Ø				
T5 43	L	D	B			
T15		Ø				
T3		Ø				

T1 Ø
T2 Ø

T18-T20 Ø

Transect Data

Transect:

Personnel: Kristi Asplund/ Brian Riggins

Date: 5/29/2015

Weather: SUNNY 67° F

Time: START 1:30 FINISH 2:45

Location	L/R	Sign Type (Track, Scat, etc)	Species	Photo (Y/N)	Sample (Y/N)	Notes
13 —						
12 —						
17 —						
11 —						
10 —						
9	UC/R	T	M			
8 —						
7 —						
6 —						
4 —						
16 —		BORED				
5 —						
15 —						
3 —						
2 —						
1 —						
14 —						
~~18~~ 19 —						
18 —						
20 —						

Transect Data

Transect: ALL T1-T20 Date: 6/4/2015 Time: START: 1300

Personnel: S. LAMMERS, R. MURNANE Weather: RAIN, CALM, 45°F END: 1445

Location		L/R	Sign Type (Track, Scat, etc)	Species	Photo (Y/N)	Sample (Y/N)	Notes
T13	23	R	T	MOOSE			
T12	Ø						
T17	Ø						
T11	Ø						
T10	Ø						
T9	3	L	T	MOOSE			
T8	Ø						
T7	Ø						Common Merganser flying
T16	20	L	S	BEAR			
T4	Ø						
T5	Ø						
T15	Ø						
T3	Ø						
T2	Ø						
T1	Ø						
T14	50	RC	T	MOOSE			
	45	R	S	BEAR			
T18	Ø						
T19	Ø						
T20	Ø						
T6	Ø						

Transect Data

Transect: ALL T1-T20
Personnel: SIERRA CARRUTHERS, RILEY MURNANE
Date: JUNE 12, 2015
Weather: CLOUDY, LIGHT BREEZE
Time: START: 1330 END: 1515

Location	L/R	Sign Type (Track, Scat, etc)	Species	Photo (Y/N)	Sample (Y/N)	Notes
T13 Ø						
T12 26	L	D	B			
T17 Ø						
T11 Ø						
T10 Ø						Female SOGR
T9 Ø						flushed, Ø chicks
T8 Ø						observed
T7 Ø						
T6 Ø						Yellowlegs T10 to T9
T16 Ø						
T4 Ø						Olive Sided Flycatcher
T5 Ø						
T15 Ø						
T3 Ø						VERY DEFENSIVE
T2 Ø						
T1 Ø						
T14 48	LCR	T	M			
T18 30	LCR	T	M			
T19 Ø						
T20 50	LCR	T	M			

Transect Data

Transect: All
Date: 6-19-2015
Time: 13:45 - 15:00
Personnel: Ryan Bailey
Weather: P. Cloudy 62°

Location	L/R	Sign Type (Track, Scat, etc)	Species	Photo (Y/N)	Sample (Y/N)	Notes
T 13		Dive bombing	Bird w/ long legs + beak			
X @ 27m	R	T	M			
T-12	–	–	–			
T-17	–	–	–			
T-11						
@ 3m	R	Dig	Bear			
@ 35m	R	Scat	Bear			
T-10						
X @ 49m	C	Track	Bird			
@ 25m	R	Dig	Bear			
T-9						
@ 0	L	Track	Moose			
T-8	–	–	–			
T-7						
@ 25m	R	Track	Moose			
T-6						
@ 12m	L	Dig	Bear			
@ 2m	R	Dig	Bear			
(T) = T-16	NO	GO Due to Cin. Bear in area				

Transect Data

Transect: All
Personnel: Ryan Bailey

Date: 6-19-2015 (Cont.)
Weather: P. Cloudy 62°

Time: 13:45 - 1500

Location	L/R	Sign Type (Track, Scat, etc)	Species	Photo (Y/N)	Sample (Y/N)	Notes
T-4						
@ 34	LBR	Track	Moose			
@ 18	C	Scat	Marten			
@ 17.5	R	Scat	Goose			
T-5						
@ 48	R	Track	Deer			
(other) X @ 28	L	~~Dragonfly~~ Sex	Dragonfly			
T-15						
@ 29	LCR	Tracks	Moose			
T-3	—	—	—			
T-2	—	—	—			
T-1						
@ 28	CR	Tracks	Moose			
T-14						
@ 48	LCR	Tracks	Moose			
T-18		Dive Bombing, sharp beaked, large Talon Bird				
@ 31	L	Tracks	Moose			
(other) T-19						
@ 32	C	Tracks	Deer			
T-20 ~~@21m~~	~~LCR~~	~~Tracks~~	~~Moose~~			
@21m	LCR	Tracks	Mooser			

Transect Data

Transect: ALL
Personnel: S. LAMMERS, R. MURNANE

Date: JUNE 24, 2015
Weather: MOSTLY CLOUDY, WINDY

Time: START: 1500
END: 1630

Location		L/R	Sign Type (Track, Scat, etc)	Species	Photo (Y/N)	Sample (Y/N)	Notes
T13	—	—	Black Bear on transect - did not survey area —				Noisy Yellowlegs ↓
goose poop between T13 & T12							
T12	27	C	D	B			
T17	25	R	D	B			
T11	Ø						
T10	40	R	D	B			
T9	24	C	SCAT	B			
T8	Ø						
T7	Ø						18-20 geese on lake
T6	Ø						
T16	35	LCR	~~g~~ scat	goose			tree swallow @ T16
	45	C	scat	B			
T4	5-20	LCR	scat	goose			
	15	L	dig	B			
T5	30 ~~[illegible]~~ 35	LCR	goose scat + tracks	goose			
	2 ~~[illegible]~~	L	~~scat~~ dig	bear			
T15	Ø						

Plugging for next survey

Transect Data

Transect: _____ Date: JUNE 24 (CONT) Time: END: 1630

Personnel: _____ Weather: _____

Location		L/R	Sign Type (Track, Scat, etc)	Species	Photo (Y/N)	Sample (Y/N)	Notes
T3	Ø						
T2	45	R	D	B			
T1	27	R	T	M			
T4	Ø						
T8	Ø						
T9	22	L	D	B			
	27	R	D	B			
T10	Ø						

Transect Data

Transect: ALL T1-T20
Personnel: SIERRA LAMMERS, RILEY MURNANE

Date: JULY 1, 2015
Weather: OVERCAST, RAIN, CALM, 50°F

Time: START: 1320
END: 1515

Location		L/R	Sign Type (Track, Scat, etc)	Species	Photo (Y/N)	Sample (Y/N)	Notes
T18	Ø						
T19	25-40	L/R	SCAT	GOOSE			
T20	Ø						
T13	10	L	DIG	B			
	12	C	DIG	B			
	20	R	DIG	B			
	40	R	DIG	B			
	45	L/R	DIG	B			
T12	25	L	DIG	B			TREE SWALLOWS - BLUE
T17	40	R	SCAT	GOOSE			
T11	10	C	DIG	BEAR			15-20 CAGD ON LAKE
	32	L	DIG	BEAR			
	~~40~~	L	DIG	BEAR			
T10	12	R	DIG x3	B			
	26	L/R	TRACKS IN MUD	GOOSE			AGGRESSIVE YELLOWLEGS
T9	1	L	DIG	B			
	15	R	DIG	B			
T8	5	R	D	B			2 FLEDGLING V. THRUSHES FLUSHED
T7	Ø						

Transect Data

Transect: ________

Personnel: ________

Date: JULY 1, 2015 CONT.

Weather: ________

Time: 1430 → 1515

Location		L/R	Sign Type (Track, Scat, etc)	Species	Photo (Y/N)	Sample (Y/N)	Notes
T6	17	L	(D) x2	B			Finch(?) ground nest (4-5 eggs → song sparrow?
T16	9	L	D	B			
	45	R	SCAT	B			
T4	46	C	SCAT	B			
	15	CR	SCAT	GOOSE			
	14	R	D	B			
T5	5	L	D	B			
T15	Ø						
T3	Ø						
T2	55	R	D	B			
	15	L	S	B			
T1	45	R	D	B			
T14	30	C	& FEATHERS	GOOSE			

Transect Data

Transect: ALL T1-T20
Personnel: S. LAMMERS, R. BAILEY
Date: 7/7/2015
Weather: SUNNY, LIGHT BREEZE, 70°F
Time: START: 1350, END: 1515

Location		L/R	Sign Type (Track, Scat, etc)	Species	Photo (Y/N)	Sample (Y/N)	Notes
T13	20	L	DIG	BEAR			YELLOW LEGS ALREADY ALARM CALLING
T12	2	R	DIG	BEAR			
T17	Ø						
T11	38	R	DIG	BEAR			
T10	Ø						
T9	Ø						20-30 geese on lake
T8	25	R	FEATHERS	GOOSE			
		R	SCAT	GOOSE			
		R	SCAT	BEAR			
T7	Ø						
T6	Ø						NEST @ 20 ABOUT ON T6 SONG SPARROW?
T16	Ø						
T4	26	L	DIG	BEAR			
T5	5	L	DIG	BEAR			
	13	C	DIG	BEAR			
	19	R	TRACK	BEAR			
	20	L	DIG	BEAR			

Transect Data

Transect: _____ Date: 7/7/2015 CONT Time: 1415-1515

Personnel: _____ Weather: _____

Location		L/R	Sign Type (Track, Scat, etc)	Species	Photo (Y/N)	Sample (Y/N)	Notes
T15	38	R	DIG	BEAR			
	44	R	DIG	BEAR			
T2	45	R	DIG	~~BEAR~~			
	42	C	DIG	~~BEAR~~			
T1	Ø						
T3	Ø						
T14	Ø						Merganser on Fat Rat W/ ~~one~~ chicks two
T18	Ø						
T19	Ø						
T20	26	L	DIG	BEAR			

Transect Data

Transect: ALL T1-T20
Personnel: S. LAMMERS, R. MURNANE
Date: JULY 17, 2015
Weather: RAIN, BREEZY, 55°F
Time: START: 1500 END: 1700

Location		L/R	Sign Type (Track, Scat, etc)	Species	Photo (Y/N)	Sample (Y/N)	Notes
T18	26	R	DIG	BEAR			
	45	L	FEATHER	GOOSE			
	50	R	DIG	BEAR			
T19	Ø						
T20	Ø						WOLF ON TRAIL CAM!
T13	BEARS			BEAR			BEAR AT T13 SOW W/ TWO TINY CUBS
T12	Ø						
T17	25	R	SANDPIPER				RAPTOR GOING FOR DUCKS ON UPPER SPECTACLE LAKE LOON?
T11	23	L	DIGS	BEAR			
T10	26	L	DIG	BEAR			
T9	1	L	DIG	BEAR			
	10	C	TRACK	MOOSE			
	12	R	DIG	BEAR			
T8	Ø						
T7	Ø						
T6	Ø						

Transect Data

Transect: ALL
Personnel: _____

Date: JULY 17 CONT
Weather: _____

Time: START: 1635
END: 1700

Location		L/R	Sign Type (Track, Scat, etc)	Species	Photo (Y/N)	Sample (Y/N)	Notes
T16	Ø		GOOSE POOP THROUGHOUT TRANSECT				
T4							
T5	7	L/R	SCAT & FEATHERS	GOOSE			
	1	R	SCAT	BEAR			
T15	Ø						
T3	Ø						
T2	5	R	DIG	BEAR			
	45	L	DIG	BEAR			
T1	Ø						
T14	10	C	FEATHER	GOOSE			

Transect Data

Transect: A&I Date: 7-22-2015 Time: 1330 → 1515

Personnel: Ryan Bailey/Riley Murnane Weather: P. Cloudy 60°F

Location	L/R	Sign Type (Track, Scat, etc)	Species	Photo (Y/N)	Sample (Y/N)	Notes
T-13 @ 12	R	Dig	Bear			
@ 32	R	Dig	Bear			
T-12 @ 46	R	Dig	Bear			
T-17	—	—	—			
T-11	—	—	—			
T-10 @ 27	L	Dig	Bear			
T-9 @ 25	R	Scat	Bear			
T-8	—	—	—			
T-7	—	—	—			
T-6 @ 35	R	Track	Moose			
T-4	—	—	—			
T-16	—	—	—			
T-5 @ 30	L	Dig	Bear			
T-15	—	—	—			

Transect Data

Transect: All
Date: 7-22-15
Time: 1330→1515
Personnel: R.B + R.M.
Weather: P. Cloudy 60° F

Location	L/R	Sign Type (Track, Scat, etc)	Species	Photo (Y/N)	Sample (Y/N)	Notes
T-3 @ 12m	C	Dig	Bear			
T-2	—	—	—			
T-1	—	—	—			
T-14	L	Dig	Bear			
T-18	—	—	—			
T-19	—	—	—			
T-20	—	—	—			

Transect Data

Transect: T1-T20 ALL
Personnel: S.LAMMERS, K.ASPLUND
Date: July 30, 2015
Weather: OVERCAST, CALM, 55°F
Time: START: 1340
END:

Location		L/R	Sign Type (Track, Scat, etc)	Species	Photo (Y/N)	Sample (Y/N)	Notes
T18	5	L	SCAT	BEAR			
	30	CL	TRACK	BEAR			
T19	Ø						
T20	Ø						
T13	Ø						
T12	45	C	DIG	BEAR			
T17	Ø						
T11	Ø						
T10	Ø						
T9	20	R	DIG	BEAR			
T8	Ø						
T7	Ø						
T6	Ø						
T16	Ø						
T4	38	R	DIG	BEAR			

Transect Data

Transect: _____
Personnel: _____

Date: July 30, 2015 cont.
Weather: SUN CAME OUT

Time: START 1430
END

Location	L/R	Sign Type (Track, Scat, etc)	Species	Photo (Y/N)	Sample (Y/N)	Notes
T5 30	LRC	TRACK	MOOSE			
33	R	DIG	BEAR			
T15 43	L	DIG	BEAR			
T3						
T2 47	C	DIG	BEAR			
T1 Ø						
T14 Ø						

Transect Data

Transect: ALL T1-T20
Personnel: SIERRA LAMMERS, R. MURNANE

Date: AUG 7, 2015
Weather: SUNSHINE, BREEZY, 65-60°F

Time: START: 1430
END: 1600

Location	L/R	Sign Type (Track, Scat, etc)	Species	Photo (Y/N)	Sample (Y/N)	Notes
T18 Ø						Redtail Hawk noted
T19 Ø						in transect area
T20 Ø						around 1130 AM
T13 Ø						
T12 Ø						
T17 29	R	SCAT	GOOSE			NO YELLOWLEGS
45	LCR	SCAT	GOOSE			SEEN OR HEARD
T10 10	C	SCAT	GOOSE			
T9 Ø						~30 CAGO ON
T8 Ø						LAKE (LOWER
T7 Ø						SPEC)
T6 Ø						
T16 Ø						T8 END STAKE
T4 Ø						MISSING!
T5 45	LCR	SCAT	GOOSE			
|	|	TRACK	GOOSE			
15						
T15 Ø						
T3 Ø						
T2 Ø						
T1 Ø						
T14 26	LCR	SCAT	GOOSE			
|	|	[illegible]				
40						

Transect Data

Transect: All T1-T20
Personnel: S. LAMMERS, K. ASPLUND

Date: 9/2/2015
Weather: CLEAR, WINDY

Time: START 1415, END 1530

Location	L/R	Sign Type (Track, Scat, etc)	Species	Photo (Y/N)	Sample (Y/N)	Notes
T18 Ø						
T19 Ø						
T20 Ø						
T13 Ø						STAKE MISSING
T17 Ø						
T12 Ø						
T11 Ø						
T10 Ø						
T9 Ø						
T8 Ø						
T7 Ø						
T6 Ø						
[illegible]						
T16 Ø						
T4 Ø						
T5 Ø						
T15 Ø						
T3 Ø						
T2						
T1 Ø						
T14 Ø						

Transect Data

Transect: T1-T20 ALL
Date: 9/9/2015
Time: START: 1500
END: 1620

Personnel: SIERRA LAMMERS
RYAN BAILEY

Weather: CLOUDY, LIGHT BREEZE
45-60°F

Location	L/R	Sign Type (Track, Scat, etc)	Species	Photo (Y/N)	Sample (Y/N)	Notes
T13 Ø						
T12 Ø						
T17 40	L	DIG	BEAR			
T11 30	L	TRACK	MOOSE			SAW MOOSE AT T9!
42	L	SCAT	MOOSE			
T10 6	R	DIG	BEAR			
T9 Ø						
T8 Ø						
T7 28	L	TRACK	BEAR			
32	L&R	TRACK	MOOSE			
T6 Ø						
T4 Ø						
T16 22	L	TRACK	MOOSE			
		~~DIG~~	~~BEAR~~			
T15 Ø						
T3 13	L&R	TRACK	MOOSE			
T2 18	L	DIG	BEAR			
44	↓	DIG	BEAR			
47	↓	DIG	BEAR			
T1 44	L	DIG	BEAR			
40	L	DIG	BEAR			
T14 Ø						
T18 Ø						
T19 Ø						
T20 15	R	SCAT	GOOSE			
T5 45	L&R	DIG	BEAR			

Transect Data

Transect: ALL T1-T20 Date: 9/30/2015 Time: START @ ~~[illegible]~~ 1415 END @ 1530

Personnel: SIERRA LAMMERS, RYAN BAILEY Weather: RAIN, CLOUDY CHANGING TO SUNNY, COOL, BREEZEY

Location	L/R	Sign Type (Track, Scat, etc)	Species	Photo (Y/N)	Sample (Y/N)	Notes
~~T19~~ T20 24	LRC	TRACK	M MOOSE			
T19 21	R	TRACK	~~MOOSE~~ WOLF			
T18 20	LRC	TRACK	M MOOSE			
T13 8	LCR	TRACK	M			
T12 Ø						
T17 2	L	DIG	B			
T11 Ø						
T10 5	R	DIG	B			
40	R	SCAT	B			
T9 Ø						
T8 25	R	SCAT	B			
26	C	SCAT	GOOSE			
T7 28	LCR	TRACK	M			
24	LCR	TRACK	DEER			
15	LCR	TRACK	M			
T6 40	LCR	TRACK	M			
T16 19	LCR	TRACK	M			
T4 5	LCR	TRACK	M			
T5 10	C	SCAT	GOOSE			
T15 12	L	TRACK	DEER			
41	L	DIG(S)	B			
~~[illegible]~~ T2 Ø						
T1 40	LCR	TRACK	M			
7	LCR	TRACK	M			
T14 Ø						
T3 14	LCR	~~MOOSE~~ TRACK	M ~~B~~			
24	LCR	~~BE~~ TRACK	B			

MOUNTAIN AP?

Transect Data

Transect: T1-T20 ALL
Personnel: SIERRA LAMMERS
K. ASPLUND

Date: 10.7.2015
Weather: OVERCAST, 45°F, CALM

Time: START: 1445
END: 1605

Location		L/R	Sign Type (Track, Scat, etc)	Species	Photo (Y/N)	Sample (Y/N)	Notes
T18	2	L/R	T	MOOSE			
	6	"	T	MOOSE			
	25	"	T	MOOSE			
T19	0						
T20	30	R	T	MOOSE			
	35	L/R	T	MOOSE			FIX STAKES
	39	L/R	T	MOOSE			T8- NEW PAINT
	25	L/R	T	MOOSE			
							T7 - NEW STAKES (POUNDED IN)
T13	20	L/R	T	MOOSE			
T12	15	L/R	T	MOOSE			
T17	0						
T11	0						
T10	0						
T9	0						
T8	0						
T7	30	L/R	T	MOOSE			
	18	L/R	T	MOOSE			
T6	0						
T16	10	L	DIG	BEAR			
T4	15	L/R	T	MOOSE			
T5	0						
T15	0						
T2	0						
T1	5	L/R	T	MOOSE			
T14	0						
T3	0						

Transect Data

Transect: ALL
Personnel: K ASPLUND

Date: 10/25/2015
Weather: SUNNY

Time: 13:25 START

Location	L/R	Sign Type (Track, Scat, etc)	Species	Photo (Y/N)	Sample (Y/N)	Notes
T13 18	L/R/C	MT	M			
T12 —						
T17 —						
T11 —						
T10 27	R	T	M			
47	L/C/R	T	M			
T9 40	L	D	B			
T8 —						
T7 16	L/R/C	T	M			
T6 2/3	L/R/C	T	M			
T4 13-25	L	T	M			
4	L/R/C	T	M			
T16 12	L	D	B			
T5 3	L/R/C	T	M			
17	C/L	T	M			
T15 29	L/R/C	T	M			
T3 —						
T2 5	R	D	B			
T1 8	L	D	B			
42	C/R	T	M			
45	C	T	M			
47	L	T	M			
T14 26	R	T	M			
T19 —						
T18 —						
T20 14	L/C/R	T	M			

Transect Data

Transect: ALL
Personnel: S.LAMMERS, P. STROW

Date: 10/29/2015
Weather: RAIN, COOL, 40°F

Time: START: 1400
END: 1530

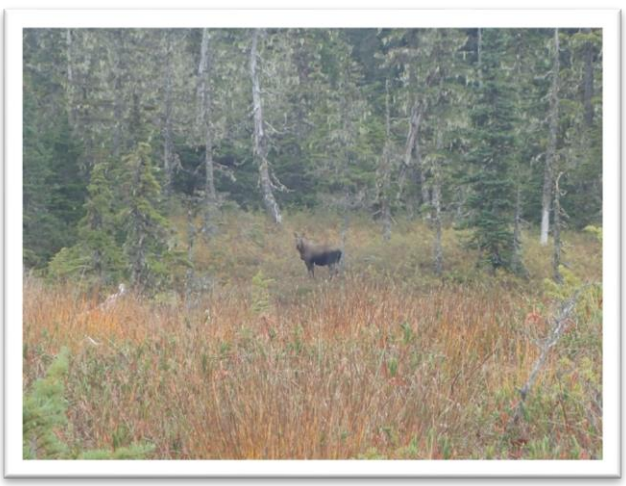
Location		L/R	Sign Type (Track, Scat, etc)	Species	Photo (Y/N)	Sample (Y/N)	Notes
T18	3	LCR	T	M			
	7	LCR	T	M			
T19	Ø						
T20	49	LCR	T	M			
T13	5	LCR	T	M			
T12	5	LCR	T	M			
T17	Ø						
T11	Ø						
T10	Ø						
T9	Ø						
T8	Ø						
T7	28	LCR	T	M			
T6	Ø						
T16	10	R	T	M			
T4	Ø						
T5	Ø						
T15	Ø						
T3	Ø						
T2	15	LCR	T	M			
	40	LCR	T	M			
T1							
T14							

APPENDIX D: COEUR KENSINGTON WILDLIFE MONITORING PHOTO LOG

Black bear print on transect

Brown bear spotted in survey area (July 19th)

Grouse prints in survey area (May 21st)

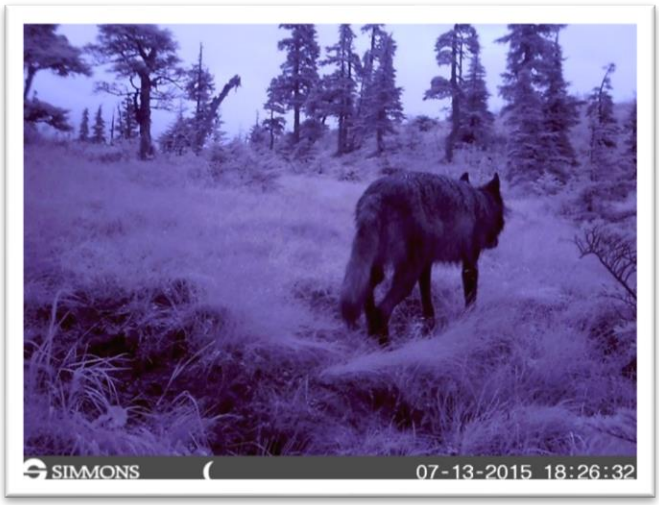


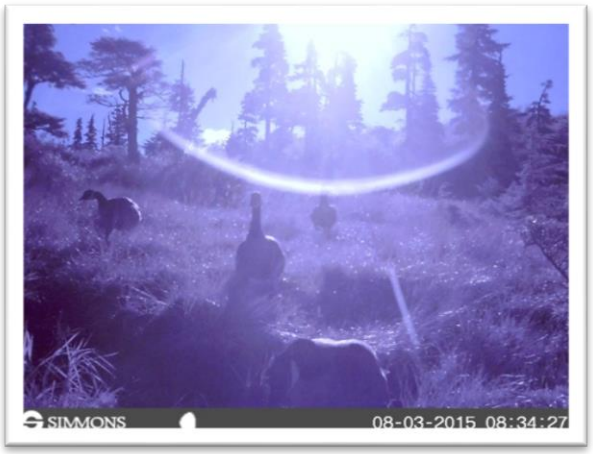
Moose sighted near T9 (September 9th)

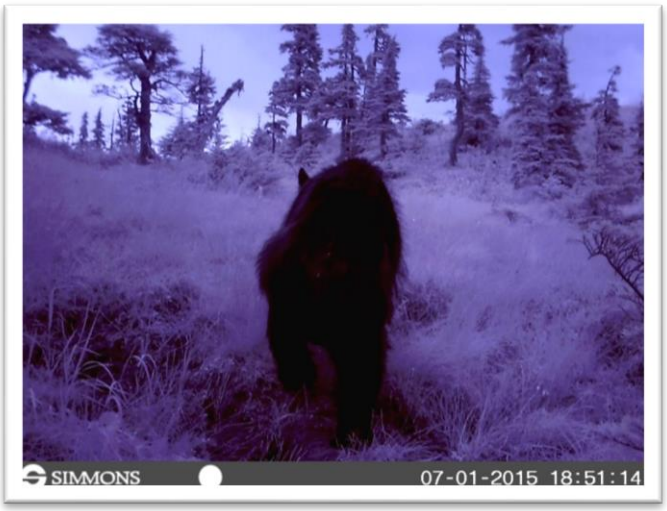
Song Sparrow ground nest with two eggs (July 1st)

Yellowlegs (July 17)

PHOTO LOG CONTINUED: TRAIL CAMERA PHOTOS







APPENDIX E: AVIAN SPECIES LIST

Waterfowl
American Wigeon *(Anas Americana)*
Blue-winged Teal (*Anas discors)*
Canada Goose (*Branta canadensis*) **S, Common**
Common Goldeneye (*Bucephala clangula*) **S**
Common Merganser *(Mergus merganser)* **S**
Greater Scaup (*Aytha marila*)
Hooded Merganser (*Lophodytes cucullatus*)
Mallard (*Anas platyrhynchos*) **S, Common**
Red-throated Loon (*Gavia stellata*)
Ring-necked Duck (*Aythya collaris*)
White-winged Scoter (*Melanitta fusca*)

Raptors
Bald Eagle (*Haliaeetus leucocephalus*) **S, Common**
Northern Harrier *(Circus cyaneus)*
Northern Pygmy Owl (*Glaucidium gnoma*)
Red-tailed Hawk (*Buteo jamaicensis*) **S**
Sharp-shinned Hawk (*Accipiter striatus*)

Other
Belted Kingfisher (*Ceryle alcyon*) **S, Common**
Bohemian Waxwing (*Bombycilla garrulous*)
Cedar Waxwing (*Bombycilla cedrorum*)
Chestnut-backed Chickadee (*Poecile rufescens*) **S, Common**
Common Raven (*Corvus corax*) **S, Common**
Dark-eyed Junco (*Junco hyemalis*) **S, Common**
Great Blue Heron *(Ardea herodias)* **S**
Hermit Thrush (*Catharus guttatus*) **S**
Least Sandpiper (*Calidris minutilla*)
Lesser Yellowlegs (*Tringa flavipes*) **S**
Northwestern Crow (*Corvus caurinus*)
Olive-sided Flycatcher (*Contopus borea*lis) **S, C**
Orange-crowned Warbler (*Vermivora celata*)
Pine Grosbeak (*Pinicola enucleator*)
Red-breasted Sapsucker (*Sphyrapicus rubber*) **C**
Ruby-crowned Kinglet (*Regulus calendula*)
Rufous Hummingbird (*Selasphorus rufus*) **S**
Savannah Sparrow (*Passerculus sandwichesis*)
Solitary Sandpiper (*Tringa solitaria*)
Song Sparrow *(Melospiza melodia*) **S**
Sooty Grouse (Dendragapus fuliginosus) **S, Common**
Steller's Jay (*Cyanocitta stelleri*) **S, Common**
Tree Swallow (*Tachycineta bicolor*) **S, Common**
Varied Thrush (*Ixoreus naevius*) **S, Common**
White-crowned Sparrow (*Zonotrichia albicollis*)
Wilson's Warbler (*Wilsonia canadensis*)
Pacific Wren (*Troglodytes troglodytes*) **S, Common**

Common = multiple sightings throughout season

S = identified through sighting

C = identified through call or song

Attachment 3

Mountain Goat Population Monitoring near Kensington Mine, Alaska – February, 2015

Mountain goat population monitoring and movement patterns near the Kensington Mine, Alaska

Kevin S. White, Neil L. Barten, Ryan Scott and Anthony Crupi

February 2015

Alaska Department of Fish and Game Division of Wildlife Conservation

Cover Photo: An adult male mountain goat (LG-172) seen during an aerial survey south of Mt. Sinclair, September 2014 ©2014 ADF&G/photo by Kevin White.

Mountain goat population monitoring and movement patterns near the Kensington Mine, Alaska

Kevin S. White[1], Neil L. Barten, Ryan Scott, and Anthony Crupi

Alaska Department of Fish and Game, Division of Wildlife Conservation
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February 2015

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Contents

INTRODUCTION

This report was prepared to meet the annual reporting requirements for Coeur Alaska, Inc.. Funding for this project was made available in September 2005 and this report summarizes activities completed by December 30, 2014.

Background

In 2005, Coeur Alaska, Inc. re-initiated development activities at the Kensington mine site, located a short distance northwest of Berners Bay. In addition, the Alaska Department of Transportation and Public Facilities (ADOT/PF) proposed construction an all-season highway between Echo Cove and the Katzehin River. In the context of these proposed industrial development activities, mountain goats were identified as an important wildlife species likely to be affected by mine development and road construction activities.

A small-scale study of mountain goats conducted in the vicinity of the Kensington mine by Robus and Carney (1995) showed that goats moved seasonally from high alpine elevations in the summer and fall to low, timbered elevations during winter months. One of the main objectives of the Robus and Carney (1995) study was to assess the impacts of the mine development activities on habitat use, movement patterns and, ultimately, productivity of mountain goats. However, the mine never became operational, thus these objectives could not be achieved, and by 1995 goat monitoring in the area wound down and eventually ended. In 2005, when the mine development activities were re-initiated, the Alaska Department of Fish and Game (ADFG) maintained that many of the same concerns that prompted the Robus and Carney (1995) study were still valid and needed to be addressed. In addition, large-scale plans for development of the Juneau Access road raised new and potentially more substantial concerns regarding not only the enlarged "footprint" of industrial development activities in eastern Lynn Canal, but also the cumulative impacts of both development projects on wildlife resources.

The potential effects of mining and road development activities on local mountain goat populations in the vicinity of the Kensington mine and eastern Lynn Canal have potentially important ramifications for management and conservation of the species in the area. Studies conducted elsewhere indicate that mountain goats can be negatively impacted by industrial development activities. Such effects include temporary range abandonment, alteration of foraging behavior and population decline (Chadwick 1973, Foster and Rahs 1983, Joslin 1986, Cote and Festa-Bianchet 2003, Cote et al. 2013). Consequently, information about the distribution of mountain goats proximate to the mine and road development corridor is critical for determining the extent to which populations may be affected by associated industrial activities. Information collected by Robus and Carney (1995), in the vicinity of Kensington mine, as well as Schoen and Kirchhoff (1982) near Echo Cove, suggest that spatial overlap between mountain goats and the proposed industrial activity will be most pronounced when goats are over-wintering in low-elevation habitats.

In response to the above concerns, ADFG, with operational funding provided by ADOT/PF, Federal Highway Administration (FHWA) and Coeur Alaska, Inc., initiated monitoring and assessment activities to determine possible impacts of road construction and mine development on mountain goats and identify potential mitigation measures, to the extent needed. Assessment and monitoring work included collection of vital rate, habitat use and movement data from a sample of radio-marked mountain goats, in addition to conducting annual aerial population abundance and productivity surveys. These efforts are aimed at providing the ADFG with information necessary to appropriately manage mountain goats in the proposed areas of development.

Implementation of field objectives were initiated in 2005 and consisted of a 5-year monitoring program (2005-2011) jointly funded by ADOT/PF, FHWA, Coeur Alaska, Inc. and ADFG. Beginning in 2007, the ADFG committed additional annual funding for a complementary aerial survey technique development project within and adjacent to the project area. In 2009, the USDA-Forest Service (Tongass National Forest) also began contributing funding to further support aerial survey technique development data collection efforts. And, in 2010, Coeur Alaska, Inc. resumed funding of mountain goat monitoring near the Kensington Mine and adjacent areas (as per the Kensington Plan of Operations, USFS 2005). In 2012, the project components funded by ADOT/PF and associated with the Juneau Access project were completed (see White et al. 2012). Currently, mountain goat monitoring activities are focused on the area surrounding the Kensington mine and north to the Katzehin river, an area considerably smaller than the original Juneau Access/Kensington joint study area.

STUDY OBJECTIVES

Research efforts were designed to investigate the spatial relationships, vital rates, and abundance of mountain goats in the Berners Bay and upper Lynn Canal area. The research objectives were to:

1) determine seasonal movement patterns of mountain goats;

2) characterize mountain goat habitat selection patterns;

3) estimate reproductive success and survival of mountain goats; and

4) estimate mountain goat population abundance and composition.

STUDY AREA

Mountain goats were studied in a ca. 1077 km^2 area located in a mainland coastal mountain range east of Lynn Canal, a post-glacial fiord located near Haines in southeastern Alaska (Figure 1). The study area encompassed the Kakuhan Range and was oriented along a north-south axis and bordered in the south by Berners Bay (58.76N, 135.00W) and the Katzehin River (59.29N, 135. 35W) in the north (Figure 2).

Elevation within the study areas range from sea level to 6300 feet. This area is an active glacial terrain underlain by late cretaceous-paleocene granodiorite and tonalite geologic formations (Gehrels 2000). Specifically, it is a geologically young, dynamic and unstable landscape that harbors a matrix of perennial snowfields and small glaciers at high elevations (i.e. above 4000 feet) and rugged, broken terrain that descends to a rocky, tidewater coastline. The northern part of the area is bisected by the Katzehin River, a moderate volume (ca. 1500 cfs; USGS, unpublished data) glacial river system that is fed by the Meade Glacier, a branch of the Juneau Icefield.

The maritime climate in this area is characterized by cool, wet summers and relatively warm snowy winters. Annual precipitation at sea-level averages 55 inches and winter temperatures are rarely less than 5º F and average 30º F (Haines, AK; National Weather Service, Juneau, AK, unpublished data). Elevations at 2600 feet typically receive ca. 250 inches of snowfall, annually (Eaglecrest Ski Area, Juneau, AK, unpublished data). Predominant vegetative communities occurring at low-moderate elevations (<1500 feet) include Sitka spruce (*Picea sitchensis*)-western hemlock (*Tsuga heterophylla*) coniferous forest, mixed-conifer muskeg and deciduous riparian forests. Mountain hemlock (*Tsuga mertensiana*) dominated 'krummholtz' forest comprises a subalpine, timberline band occupying elevations between 1500-2500 feet. Alpine plant communities are composed of a mosaic of relatively dry ericaceous heathlands, moist meadows dominated by sedges and forbs and wet fens. Avalanche chutes are common in the study area, bisect all plant community types and often terminate at sea-level.

METHODS

Mountain Goat Capture

Mountain goats were captured using standard helicopter darting techniques and immobilized by injecting 3.0 - 2.4 mg of carfentanil citrate, depending on sex and time of

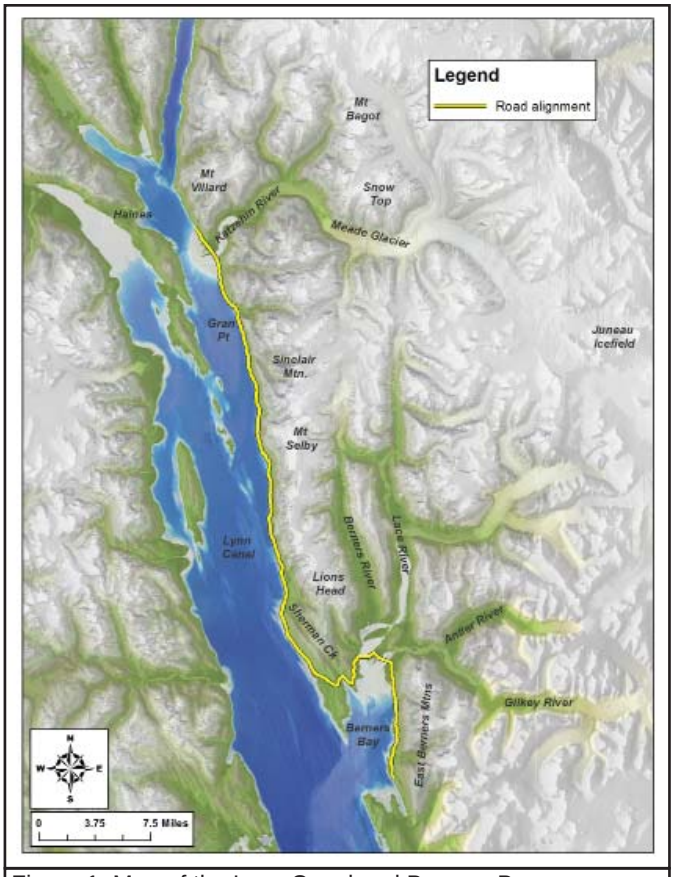

Figure 1: Map of the Lynn Canal and Berners Bay area. Local place names referenced in this report are identified. Mountain goats were studied in this area during 2005-2014.

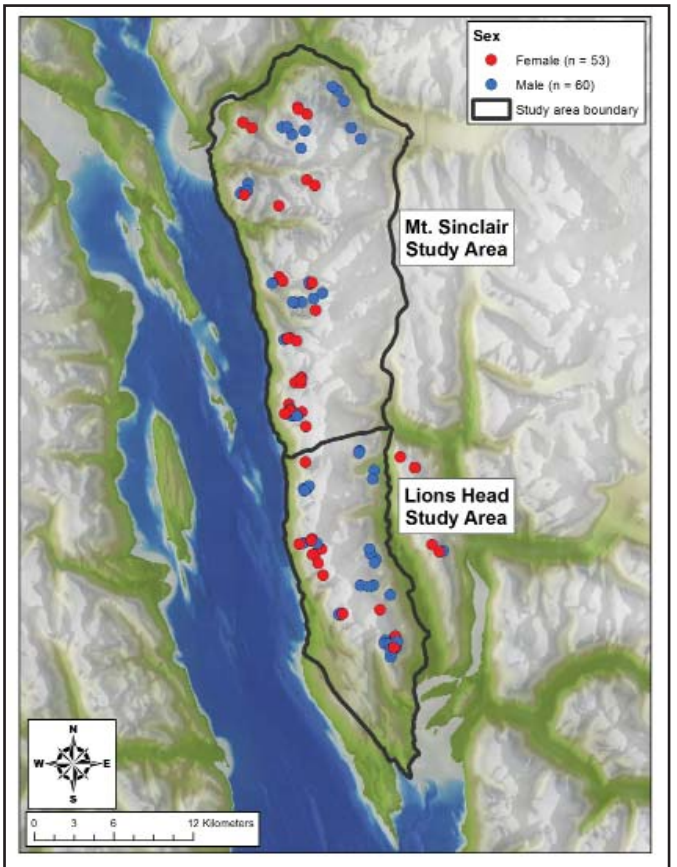

Figure 2: Locations of mountain goats captured and subsequently monitored in the Lynn Canal study area, 2005-2014.

year (Taylor 2000), via projectile syringe fired from a Palmer dart gun (Cap-Chur, Douglasville, GA). During handling, all animals were carefully examined and monitored following standard veterinary procedures (Taylor 2000) and routine biological samples and morphological data collected (Figure 3). Following handling procedures, the effects of the immobilizing agent was reversed with 100mg of naltrexone hydrochloride per 1mg of carfentanil citrate (Taylor 2000). All capture procedures were approved by the State of Alaska Animal Care and Use Committee.

GPS Location Data

Telonics TGW-3590 or TGW-4590 GPS radio-collars (Telonics, Inc., Mesa, AZ) were deployed on most animals captured. Telonics MOD-500 VHF radio-collars were been deployed on a subset (n = 23) of animals to enable longer-term monitoring opportunities. During 2009-2012, animals were simultaneously marked with GPS and lightweight (Telonics MOD-410) VHF radio-collars (370g). Double-collaring animals was conducted to extend the period of time individual animals could be monitored (lifespan, GPS: 3 years, VHF: 6 years), thereby increasing the long-term opportunity to gather mountain goat survival and reproduction data and reducing the frequency that mountain goats must be captured. The combined weight of radio-collars attached to animals comprise 1.2% of average male body weight and 2.0% of average female body weight and is well within the ethical standards for instrument deployment on free-ranging wildlife.

GPS radio-collars were programmed to collect location data at 6-hour intervals (collar lifetime: 2-3 years). During each location attempt, ancillary data about collar activity (i.e. percent of 1-second switch transitions calculated over a 15 minute period following each GPS fix attempt) and temperature (degrees C) were simultaneously collected. Complete data-sets for each individual were remotely downloaded (via fixed-wing aircraft) at 8-week intervals. Location data were post-processed and filtered for "impossible" points and 2D locations with PDOP (i.e. position dilution of precision) values greater than 10, following D'Eon et al. (2002) and D'Eon and Delparte (2005).

Movement Patterns and Habitat Selection

Diet Composition.—Fresh fecal pellets were collected from live-captured animals during the summer-fall period (late-July to mid-October). Fecal pellet samples were also collected opportunistically during winter reconnaissance and snow surveys. Samples were sent to Washington State University (Wildlife Habitat Analysis Lab, Pullman, WA) for dietary analyses. Specifically, microhistological analyses of plant cell fragments in pellet samples were conducted to provide an estimate of diet composition for individual mountain goats and a composite winter sample.

Figure 3: ADFG wildlife biologist, Kevin White, collecting a blood sample from an immobilized male mountain goat (LG-170) captured in Lynn Canal, near Mt. Selby, August 2014.

Activity, Movement Patterns and Resource Selection.—Analyses of mountain goat GPS location data (i.e. data collected during 2005-2011) to characterize activity, movement and resource selection patterns were summarized in White (2006), Shafer et al. (2012) and White et al. (2012). Additional analyses will be conducted in the future to update previous analyses as new data are collected.

Snow and Winter Severity Monitoring.—Winter distribution of mountain goats is strongly influenced by snow depth and distribution. Since patterns of snow accumulation vary at both small and large spatial scales it is often necessary to collect site-specific field data in order to accurately characterize these relationships within focal areas. Unfortunately, standardized snow depth monitoring information is extremely limited within the study area and additional information is needed in order to properly characterize spatial patterns of snow accumulation and, ultimately, mountain goat winter distribution. Consequently, in 2006 we initiated field efforts designed to create a snow depth database in order to generate spatially explicit snow depth models within the study area.

Standardized field surveys were conducted in order to estimate patterns of snow depth as it related to habitat type (i.e. forested/non-forested), altitude, and slope aspect. These efforts focused on four sites located in different mountain goat winter ranges in 2007 but consistent annual monitoring was conducted at only one site located on Echo Ridge, near Davies Creek. During surveys snow depth was

measured at geo-referenced locations along an altitudinal gradient (beginning at sea level). Snow measurements were replicated at each sampling location (n = 5) and associated covariate information was collected. Sampling locations were spaced at regular (100-200m) intervals, depending upon terrain complexity. Steep (>35 degrees), exposed slopes were, generally, not sampled due to safety considerations. In addition, daily climate information for reference weather stations was acquired from the National Weather Service (Haines COOP Weather Station).

Reproduction and Survival

Kidding rates and subsequent survival were estimated by monitoring individual study animals during monthly surveys using fixed-wing aircraft (usually a Piper PA-18 Super Cub) equipped for radio-telemetry tracking or via ground-based observations. During surveys, radio-collared adult female mountain goats were observed (typically using 14X image stabilizing binoculars) to determine whether they gave birth to kids and, if so, how long individual kids survived. Monitoring kid production and survival was only possible during the non-winter months when animals could be reliably observed in open habitats. We assumed that kids did not survive winter if they were not seen with their mothers the following spring. Cases in which kid status assessments were equivocal were filtered from the data set and not used for subsequent estimates of kid survival.

Mortality of individual radio-collared mountain goats was determined by detecting radio-frequency pulse rate changes during monthly monitoring surveys. In cases where mortality pulse rates were detected, efforts were made to investigate sites as soon as possible via helicopter or boat. To the extent possible, all mortalities were thoroughly investigated to ascertain the cause of death and relevant biological samples collected (Figure 4). We determined date of mortalities via examination of activity sensor data logged on GPS radio-collars. Annual survival of radio-collared animals was estimated using the Kaplan-Meier procedure (Pollock et al. 1989). This procedure allows for staggered entry and exit of newly captured or deceased animals, respectively.

Population Abundance and Composition Estimation

Aerial Surveys.—Population abundance and composition surveys were conducted using fixed-wing aircraft (Heliocourier and PA-18 Super Cub) and helicopter (Hughes 500) during August-October, 2005-2011. Aerial surveys were typically conducted when conditions met the following requirements: 1) flight ceiling above 5000 feet ASL, 2) wind speed less than 20 knots, 3) sea-level temperature less than 65 degrees F. Surveys were typically flown along

Figure 4: ADFG biologist Ben Williams rapelling down an escarpment to access an adult female mountain goat (LG-155) mortality, June 2014.

established flight paths between 2500-3500 feet ASL and followed geographic contours. Flight speeds varied between 60-70 knots. During surveys, the pilot and experienced observers enumerated and classified all mountain goats seen as either adults (includes adults and sub-adults) or kids. In addition, each mountain group observed was checked (via 14X image stabilizing binoculars) to determine whether radio-collared animals were present.

Population estimation.—The number of mountain goats in each study area was estimated using Bayesian procedures that involved statistically integrating survey-specific mark-resight estimates and modeled covariate-based survey-level estimates (White and Pendleton 2011). Briefly, logistic models were fit to predict average sighting probability for all goats in an area during a given survey as a function of survey level covariates that included: survey date, time of day, aircraft type, temperature, sky conditions, wind (median and maximum), and the number of observers (≤2 vs. 3); models were fit using Bayesian procedures with the program OpenBUGS. Bayesian models allowed for including results from each survey along with covariate-based sighting functions produced across many surveys to improve the precision of the population estimates (relative to Lincoln-Petersen type estimates) and provide estimates

when no marked goats were seen or when there were no marked goats in the area (with certain assumptions). These models also accounted for observed goats whose collar status could not be determined (i.e. cases where the view was insufficient to determine whether a goat was collared or not).

Sightability Data Collection.-During aerial surveys, data were simultaneously collected to evaluate individual- and survey-level "sightability". For accomplishing survey-level objectives, we enumerated the number of radio-collared animals seen during surveys and compared this value to the total number of radio-collared animals present in the area surveyed. To gather individual-based "sightability" data, we characterized behavioral, environmental and climatic conditions for each radio-collared animal seen and not seen (i.e. missed) during surveys. In cases where radio-collared animals were missed, it was necessary to back-track and use radio-telemetry techniques to locate animals and gather associated covariate information. Since observers had general knowledge of where specific individual radio-collared animals were likely to be found (i.e. ridge systems, canyon complexes, etc.), it was typically possible to locate missed animals within 5-15 minutes after an area was originally surveyed. In most cases, it was possible to completely characterize behavioral and site conditions with minimal apparent bias, however in some cases this was not possible (i.e. animals not seen in forested habitats, steep ravines, turbulent canyons) and incomplete covariate information was collected resulting in missing data.

RESULTS AND DISCUSSION

Mountain Goat Capture and Handling

Capture Activities.—During August 2014, 7 animals were captured in the Lions Head-Mt. Sinclair areas. All animals were simultaneously marked with GPS (TGW-4590) and lightweight VHF (Telonics MOD-410) radio-collars. Since 2005, 112 mountain goats have been radio-marked in the Lions Head and Sinclair Mountain study areas. Currently, 20 animals are marked in these two areas; all other previously deployed collars have either remotely released or animals have died. Annual capture activities are important for maintaining adequate sample sizes and compensating for natural or scheduled collar losses.

Helicopter captures were attempted during periods when mountain goats were distributed at high elevations and weather conditions were favorable (i.e. high flight ceiling and moderate wind speed). Additionally, captures were scheduled to avoid periods within 8 weeks of parturition in order to avoid unnecessary disturbance of adult females and associated neonates. Captures were attempted in areas where mountain goat access to dangerously steep terrain could be reasonably contained. As a result of these constraints, opportunities to capture mountain goats were fairly limited. Nevertheless, given the fairly large area of study and decent summer weather conditions, it was typically possible to capture approximately six mountain goats per day of effort.

Biological Sample Collection.—During handling procedures, standard biological specimens were collected and morphological measures recorded. Specific biological samples collected from study animals included: whole blood (4 mL), blood serum (8 mL), red blood cells (8mL), ear tissue, hair and fecal pellets. Whole blood, serum, red blood cells and fecal pellet sub-samples were either sent to Dr. Kimberlee Beckmen (ADFG, Fairbanks, AK) for disease and trace mineral screening or archived at ADFG facilities in Douglas, AK. During 2010, nasal and pharyngeal swab samples were collected from 5 animals to index prevalence of respiratory bacteria.

Genetic Analyses.—Tissue samples from all mountain goats captured between 2005-2011 have been genotyped by Aaron Shafer (University of Alberta, Edmonton, AB). (Sample collected during 2012-2014 have been archived for future analyses). These data have been analyzed and included in continent-wide analyses of mountain goat population genetics (Shafer et al. 2010). Shafer et al. (2010) indicated that substantial genetic structuring exists among mountain goats in southeastern Alaska (and across the western North American range of the species). More recent analyses indicated that three genetically distinct mountain goat populations occur in our study area [east Berners mountains, Kakuhan range (including Lions Head and Sinclair Mountain), and Mt. Villard]; population boundaries generally coincide with our specific study area boundaries (Shafer et al. 2012). These findings indicate that gene flow between our study areas (with the exception of the Lion Head and Sinclair study areas, which are genetically indistinct) is limited. Additional analyses examined the extent to which mountain goat habitat selection characteristics and landscape configuration are linked to genetic relatedness across the study area (Shafer et al. 2012). Results from this analyses indicated that small- (i.e. distance to cliffs, heat load) and large-scale (i.e. river valleys and marine waterways) landscape features are key determinants of mountain goat gene flow across our study area (Shafer et al. 2012).

Disease Surveillance.—In 2010, a subset of captured animals (n = 5) were tested (Washington Animal Disease Diagnostic Laboratory, Pullman, WA) for prevalence of respiratory bacteria associated with incidence of pneumonia (specifically *Pasteurella trehalosi* and *Mycoplasma ovipneumonia*). Results of these analyses were summa-

rized in White et al. (2012).

During 2005-2013, blood serum samples collected from captured animals have been tested each year for a suite of 15 different diseases relevant to ungulates (Appendix 1). Of particular interest was contagious ecthyma (CE), a viral disease previously documented among mountain goats in Juneau, Haines and other areas of southeastern Alaska. Common symptoms of CE include presence of grotesque lesions on the face, ears, and nose which can lead to death of animals, primarily those in young or old age classes; healthy adults commonly survive the disease. Of the 54 animals successfully tested for CE in the Lions Head and Mt Sinclair areas, three animals (6%) tested positive for CE-specific antibodies; a level of prevalence comparable to other southeastern Alaska populations tested.

Trace Mineral Testing.—In 2010-2013, whole blood and serum samples were analyzed to determine trace mineral concentration for 24 mountain goats in order to examine whether mineral deficiencies were prevalent in our study population (Appendix 2a). While experimental data is limited to assess deficiency threshold values for Selenium, a trace mineral that can influence pregnancy, values less than 0.10 ppm are generally considered low. In the Lion Head/Sinclair study areas 38% of animals had blood Selenium values below this threshold (Appendix 2b); a high proportion of deficiencies relative to other mountain goat research study areas in southeastern Alaska. Presumably, deficiencies are related to site productivity and geologic substrate and can provide some level of insight relative to inherent productivity of mountain goat summer range in this area.

GPS Location Data

GPS System Performance.—The performance of GPS radio-collars (Telonics TGW-3590) was evaluated for 124 collars deployed since the beginning of the study (see White et al. 2012). In general, the remote GPS data collection system used in this study worked as expected. Specifically, we did not encounter any significant problems with GPS collar performance, nor did any notable problems occur with remote data download attempts. This high level of success was achieved despite occasionally poor weather conditions and, in some cases, substantial download distances between aircraft and mountain goats (i.e. up to 3 miles). However, several pre-programmed bi-monthly GPS data download periods were missed due to weather conditions. Nevertheless, it was always possible to download missed GPS data on subsequent surveys.

Winter Severity and Snow Modeling

Snow Surveys.—Field-based snow surveys were conducted within 5 days of April 1 during 2007-2008, 2010-2014 on Echo Ridge. Analyses of these data quantified the degree to which snow depth differs with increasing elevation between forested and non-forested sites (White et al. 2012). Overall, these data quantify the extent to which snow depth varied relative to elevation and habitat type (i.e. open vs. forest). Specifically, snow depth was 30-40 inches deeper in open relative to forested habitats, on average. Further, snow depth increased 2.3-2.7 inches per 100 foot gain in elevation, on average (White et al. 2012). Importantly, these data provide quantitative information about winter severity in areas representative of where mountain goats in our study area are wintering. Such data will be able to be used as covariates in future analyses of survival, reproduction and resource selection.

Climate Data.—Daily climate data were archived from the National Weather Service database to characterize

Table 1: Proportion of radio-marked adult female mountain goats observed with kids at heel during parturition in the Lynn Canal study area, 2005-2014. Data are also presented from other study areas, for comparative purposes.

Area	Year	Kids	AdF	Prop	SE
Baranof					
	2010	4	4	1.00	0.00
	2011	5	6	0.83	0.15
	2012	3	5	0.60	0.22
	2013	5	10	0.50	0.16
	2014	9	12	0.75	0.13
	Total	26	37	0.70	0.08
Haines-Skagway					
	2010	5	10	0.50	0.16
	2011	8	10	0.80	0.13
	2012	8	11	0.73	0.13
	2013	10	12	0.83	0.11
	2014	10	17	0.59	0.12
	Total	41	60	0.68	0.06
Lynn Canal					
	2005	8	12	0.67	0.14
	2006	16	25	0.64	0.10
	2007	20	32	0.63	0.09
	2008	19	33	0.58	0.09
	2009	15	25	0.60	0.10
	2010	18	26	0.69	0.09
	2011	18	27	0.67	0.09
	2012	9	15	0.60	0.13
	2013	9	13	0.69	0.13
	2014	8	14	0.57	0.13
	Total	140	222	0.63	0.03

Table 2: Estimates of mountain goat survival for different sex classes during 2005-2014, Lynn Canal, AK. Data are also presented from other study areas, for comparative purposes.

	Males				Females				Total			
	At Risk	Died	Ŝ	SE	At Risk	Died	Ŝ	SE	At Risk	Died	Ŝ	SE
Baranof Island												
2010/2011	6.0	1	0.88	0.11	3.0	0	1.00	0.00	9.0	1	0.92	0.08
2011/2012	10.8	0	1.00	0.00	5.5	0	1.00	0.00	16.3	0	1.00	0.00
2012/2013	15.0	3	0.82	0.09	6.0	0	1.00	0.00	21.0	3	0.87	0.07
2013/2014	16.0	2	0.88	0.08	9.3	0	1.00	0.00	25.3	2	0.92	0.05
All years	47.8	6	0.88	0.04	23.8	0	1.00	0.00	71.6	6	0.92	0.03
Cleveland Pen.												
2009/2010	5.0	0	1.00	0.00	2.0	0	1.00	0.00	7.0	0	1.00	0.00
2010/2011	5.8	2	0.67	0.16	5.0	0	1.00	0.00	10.8	2	0.83	0.10
2011/2012	4.0	2	0.50	0.18	6.0	0	1.00	0.00	10.0	2	0.80	0.11
2012/2013	1.6	1	0.50	0.35	6.0	0	1.00	0.00	7.6	1	0.88	0.12
2013/2014	1.0	0	1.00	0.00	5.5	1	0.83	0.15	6.5	1	0.86	0.13
All years	16.1	5	0.72	0.09	24.0	1	0.96	0.04	40.1	6	0.86	0.10
Haines-Skagway												
2010/2011	11.6	4	0.69	0.13	9.2	3	0.70	0.14	20.8	7	0.70	0.10
2011/2012	13.2	2	0.87	0.09	9.0	1	0.90	0.09	22.2	3	0.88	0.06
2012/2013	16.3	2	0.89	0.07	10.3	1	0.91	0.08	26.6	3	0.90	0.06
2013/2014	20.2	2	0.91	0.06	10.9	1	0.92	0.08	31.1	3	0.91	0.05
All years	59.3	10	0.85	0.04	37.9	6	0.86	0.05	97.2	16	0.86	0.03
Lynn Canal												
2005/2006	9.6	2	0.79	0.13	10.0	1	0.90	0.09	19.6	3	0.85	0.08
2006/2007	25.4	11	0.57	0.10	22.1	4	0.82	0.08	47.5	15	0.68	0.07
2007/2008	26.5	6	0.79	0.07	20.8	3	0.88	0.07	47.3	9	0.83	0.05
2008/2009	24.2	10	0.66	0.09	21.4	6	0.73	0.09	45.6	16	0.69	0.06
2009/2010	25.1	4	0.86	0.07	22.3	4	0.85	0.07	47.4	8	0.85	0.05
2010/2011	24.3	3	0.88	0.06	23.2	2	0.91	0.06	47.5	5	0.90	0.04
2011/2012	17.9	6	0.72	0.10	15.3	3	0.85	0.08	33.2	9	0.77	0.07
2012/2013	16.8	8	0.59	0.10	13.6	7	0.60	0.11	30.4	15	0.59	0.07
2013/2014	11.3	3	0.75	0.13	10.9	2	0.83	0.11	22.3	5	0.79	0.08
All years	178.8	54	0.73	0.03	157.0	33	0.81	0.03	335.8	87	0.77	0.02

At Risk = average number of animals monitored per month (per time period)

broader scale climate patterns. Mean daily snow depth and snowfall data were summarized from data collected at the National Weather Service station in Haines, AK (Appendix 3). Mean snowfall in Haines during the study period (2005-2014) was 132% of the long-term normal (i.e. 1950-2014). Overall, snowfall in Haines during 6 of the 9 winters of the study was above normal (including 5 of the 10 highest snowfall winters on record; 39 years of data). The winter of 2012/2013 was 84% of normal.

Reproduction and Survival

Kid Recruitment.—Kid recruitment of radio-marked female mountain goats was estimated by determining the percentage of radio-marked females seen with kids during May-June aerial telemetry surveys (Table 1). Since each radio-marked female was not observed daily during the kidding period, it was not possible to determine if kids were born and subsequently died prior to, or between, surveys. As such, estimates of kid production reported here are presumably lower than the actual percentage of females that gave birth. Nevertheless, our estimates of kid production were similar to estimates of kidding rates reported elsewhere (Festa-Bianchet and Cote 2007).

Annual estimates of kid production in Lynn Canal ranged from 57-69% between 2005-2014 (Table 1). During 2014, 57% of radio-marked females (n = 14) had a kid at heel; the lowest estimate for the population but not statistically different from most previous years or from other southeastern Alaska populations studied (Table 1).

Survival.—Mountain goats were monitored monthly during fixed-wing aerial telemetry flights and/or via GPS-telemetry. During 2013/2014 biological year, 5 radio-marked animals died. One animal likely died in an avalanches and the remaining four animals died of unknown causes. Overall, 79±8% of animals survived during 2013/2014. Winter snowfall amounts during 2013/2014 was average, relative to the long term mean (see Winter Severity and Snow Modeling section above). The observed survival rate was average, relative to the long-term mean for the study area but likely too low to result in demographic growth of the population.

Population Abundance and Composition

Aerial Surveys.—During September 2013, we conducted three aerial surveys in the Lions Head and Sinclair Mountain study areas and the Berners-Lace ridge area (Appendix 4). The Berners-Lace ridge was surveyed because seasonal movement (albeit limited) by male mountain goats has been documented from the Lions Head study area to this site in past years. Other nearby areas were also surveyed (i.e. East Berners mountains and Mt. Villard) as part of a separate research project. Overall, data from all these survey areas are presented (Appendix 4) for comparative purposes.

Table 3: Population-level aerial survey sighting probabilities, based on surveys conducted between 2010-2014 in Lynn Canal and other areas in southeastern Alaska.

Area	Seen	Total	Prop. seen	SE
Baranof				
2010	--	--	--	--
2011	12	18	0.67	0.11
2012	11	21	0.52	0.11
2013	16	22	0.73	0.09
2014	18	25	0.72	0.09
Total	57	86	0.66	0.05
Cleveland Pen				
2010	--	--	--	--
2011	--	--	--	--
2012	3	16	0.19	0.10
2013	10	21	0.48	0.11
2014	2	5	0.40	0.22
Total	15	42	0.36	0.07
Haines-Skagway				
2010	14	20	0.70	0.10
2011	20	32	0.63	0.09
2012	9	19	0.47	0.11
2013	24	31	0.77	0.08
2014	23	34	0.68	0.08
Total	90	136	0.66	0.04
Lynn Canal				
2010	39	73	0.53	0.06
2011	19	28	0.68	0.09
2012	21	32	0.66	0.08
2013	13	22	0.59	0.10
2014	15	26	0.58	0.10
Total	107	181	0.59	0.04
Overall total	269	445	0.60	0.02

Sightability Modeling and Population Estimates.-During all surveys, data were collected for purposes of developing individual-based and population-level sighting probability models (exceptions occurred when surveys were conducted prior to marking). In addition, complementary aerial surveys were conducted in areas outside of the study area (Haines, Baranof Island) where mountain goats were marked as part of independent studies. Collection of data in other areas enabled acquisition of additional sightability data resulting in opportunity to more accurately parameterize sightability models; however, a majority of the data used to develop models was collected in the Lynn Canal/ Berners Bay study areas.

During 2014, we collected individual-based sightability modeling data from 26 radio-marked animals in the Lynn

Canal study areas. In addition we collected population-level data during 3 surveys. Preliminary estimates indicate that we observed 58% of animals during aerial surveys in the Lynn Canal areas during 2014 (Table 3). Overall, the sightability estimate for 2014 was moderate and statistically comparable to surveys conducted in previous years and areas (Table 3).

Estimation of population sizes for each study area and year is a computationally intensive process (White et al. 2012). In White et al. (2012), population estimates for 2005-2011 were provided for each study area. Computer programming efforts to automate estimation procedures are ongoing (White and Pendleton 2012) and in the future population estimates are expected to be conducted annually. In the interim, population estimates will be provided at multi-year intervals.

FUTURE WORK

The mountain goat population monitoring and assessment work in the vicinity of the Kensington Mine is planned to continue during the operational phase on mining operations (the current funding agreement between ADFG and Coeur Alaska, Inc. continues through 2016 but is expected to be renewed by Coeur Alaska, Inc. thereafter). The project area for ongoing mine-related monitoring work encompasses the area between Slate cove and the Katzehin River (i.e. the "Lions Head" and "Sinclair" study areas). In this area study animals (2014, n = 20) will continue to be monitored monthly to assess reproductive status and survival. Additionally, at 8-week intervals GPS data will be downloaded from each animal during aerial surveys. These data will be post-processed and integrated with the existing GPS location database. During late-summer 6-8 mountain goats will be captured to ensure scientifically defensible sample sizes are maintained. Three replicate aerial surveys will be conducted in early-fall 2014, weather permitting, in order to estimate mountain goat sightability, population abundance and composition. During winter 2015/2016 data analyses will be conducted to examine spatial patterns in population trends throughout the study area. In addition, analyses will be conducted to examine the extent to which mountain goat winter range in the direct vicinity of the mine is occupied relative to what is expected based on resource selection function models developed in White et al. (2012). These analyses are intended to provide insight relative to effects of mine activities on the local mountain goat population. Results of these efforts will be summarized and submitted to Coeur Alaska, Inc. and associated stakeholders as an annual research project report in spring 2016.

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Appendix 1: Incidence of disease prevalence of mountain goats in the Lions Head, Sinclair, Villard and East Berners study areas, 2010-2013. Results are also provided for three other populations in southeastern Alaska in 2010-2013, for comparison. (Kakuhan includes the Lions Head and Sinclair study areas combined).

	Baranof			Cleveland			Haines			Berners			Kakuhan			Villard			Total		
Disease	n	Pos.	Prop	n	Pos.	Prop	n	Pos.	Prop	n	Pos.	Prop	n	Pos.	Prop	n	Pos.	Prop	n	Pos.	Prop
Contagious Ecthyma	30	1	0.03	10	1	0.10	32	3	0.09	20	1	0.05	54	3	0.06	24	0	0.00	170	9	0.05
Chlamydia	11	1	0.09	12	1	0.08	22	0	0.00	27	2	0.07	29	1	0.03	30	0	0.00	131	5	0.04
Q Fever	26	0	0.00	11	0	0.00	40	0	0.00	29	0	0.00	55	3	0.05	32	1	0.03	193	4	0.02
Bluetongue	17	0	0.00	10	0	0.00	20	0	0.00	20	0	0.00	17	0	0.00	18	0	0.00	102	0	0.00
Bovine respiratory synctial virus (BRSV)	17	0	0.00	10	0	0.00	20	0	0.00	21	0	0.00	17	0	0.00	16	0	0.00	101	0	0.00
Infectious bovine rhinotrachetis (IBR)	17	0	0.00	10	0	0.00	20	0	0.00	21	0	0.00	17	0	0.00	17	0	0.00	102	0	0.00
Parainfluenza-3 (PI-3)	17	0	0.00	10	0	0.00	20	0	0.00	21	0	0.00	17	0	0.00	17	0	0.00	102	0	0.00
Epizootic hemorrhagic disease (EHD)	17	0	0.00	9	0	0.00	20	0	0.00	21	0	0.00	17	0	0.00	17	0	0.00	101	0	0.00
Caprinae arthritis encephalitis (CAE)	17	0	0.00	9	0	0.00	20	0	0.00	21	0	0.00	17	0	0.00	16	0	0.00	100	0	0.00
Malignant cataharral fever-ovine (MCF)	17	0	0.00	9	0	0.00	20	0	0.00	21	0	0.00	17	0	0.00	16	0	0.00	100	0	0.00
Leptospirosis cannicola	17	0	0.00	9	0	0.00	20	0	0.00	21	0	0.00	17	0	0.00	17	0	0.00	101	0	0.00
Leptospirosis grippo	17	0	0.00	9	0	0.00	20	1	0.05	21	0	0.00	17	1	0.06	17	1	0.06	101	3	0.03
Leptospirosis hardjo	17	0	0.00	9	0	0.00	20	0	0.00	21	0	0.00	17	0	0.00	17	0	0.00	101	0	0.00
Leptospirosis ictero	17	0	0.00	9	0	0.00	20	3	0.15	21	2	0.10	17	3	0.18	17	3	0.18	101	11	0.11
Leptospirosis pomona	17	0	0.00	9	0	0.00	20	0	0.00	21	0	0.00	17	0	0.00	17	0	0.00	101	0	0.00

Positive titers: PI3>1:120, IBR> 1:64, BRSV >1:32, Leptospirosis sp.>1:100

Appendix 2a: Trace mineral concentration documented for mountain goats in the Lions Head and Sinclair study areas, 2010-2013. Results are also provided for three other populations in southeastern Alaska in 2010-2013, for comparison. (Kakuhan includes the Lions Head and Sinclair study areas combined).

	Se			Mo			Mn			Fe			Cu			Zn		
Area	mean	SE	n	mean	SE	n	mean	SE	n	mean	SE	n	mean	SE	n	mean	SE	n
Baranof	0.31	0.01	31	0.05	0.00	31	0.01	0.00	31	1.67	0.08	31	1.08	0.03	31	0.80	0.03	31
Cleveland	0.26	0.01	5	0.05	0.00	5	0.01	0.00	5	1.71	0.09	5	0.81	0.03	5	0.70	0.04	5
Kakuhan	0.16	0.02	24	0.05	0.00	24	0.01	0.00	24	1.70	0.10	24	0.96	0.04	24	0.81	0.04	24
Haines	0.24	0.02	46	0.05	0.00	45	0.01	0.00	45	1.88	0.07	45	1.07	0.03	45	0.82	0.03	45
Average	0.24	0.01	108	0.05	0.00	107	0.01	0.00	107	1.79	0.05	107	1.03	0.02	107	0.81	0.02	107

Appendix 2b: Selenium concentration for mountain goats in the Lions Head and Sinclair study areas, 2010-2013. Results are also provided for three other populations in southeastern Alaska in 2010-2013, for comparison. (Kakuhan includes the Lions Head and Sinclair study areas combined).

Selenium (ppm)

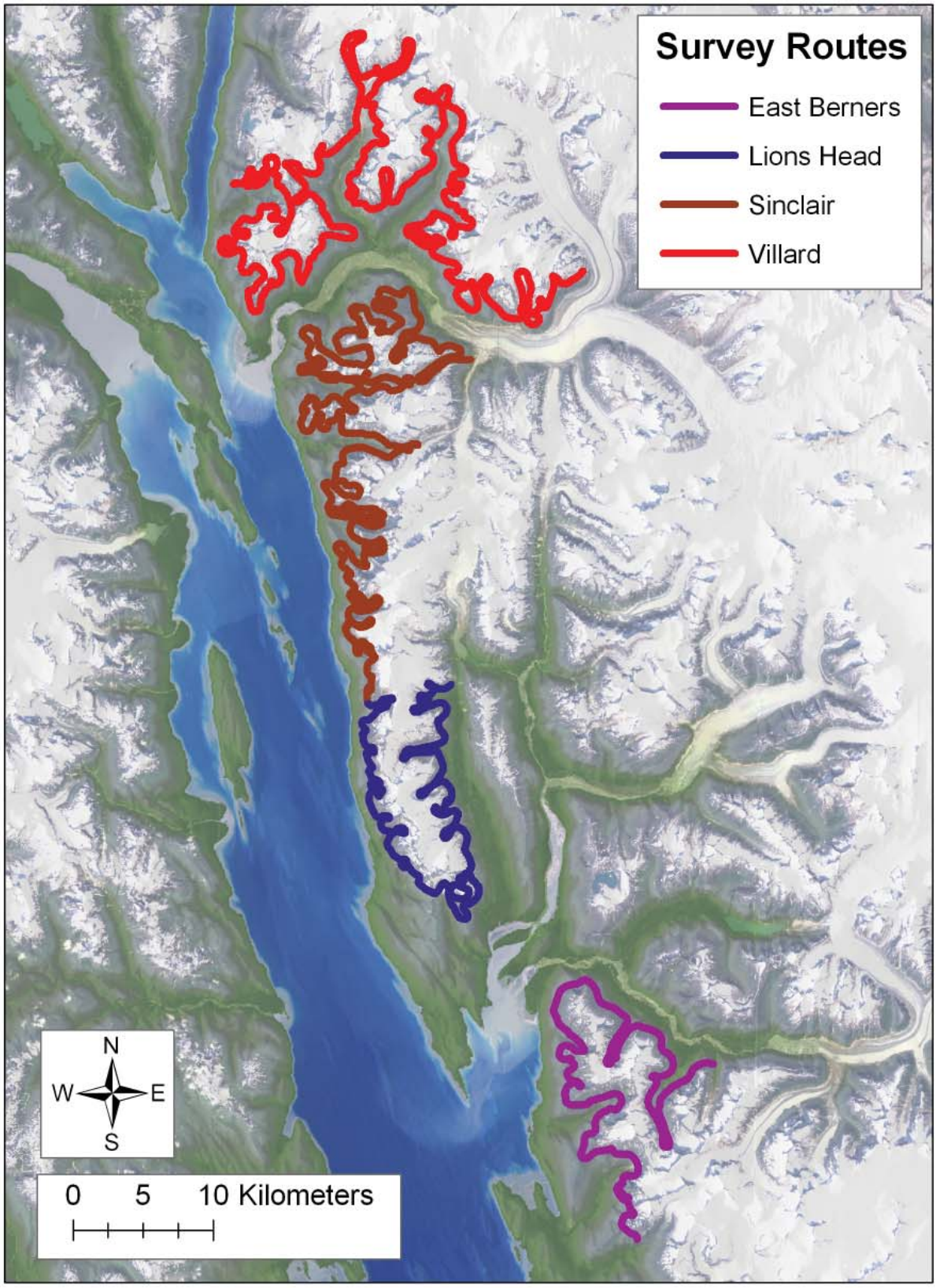
Area	mean	SE	n	Min	Max	# < 0.10	Prop < 0.10
Baranof	0.31	0.01	31	0.19	0.41	0	0.00
Cleveland	0.26	0.01	5	0.22	0.29	0	0.00
Haines	0.24	0.02	46	0.03	0.73	9	0.20
Berners	--	--	--	--	--	--	--
Villard	--	--	--	--	--	--	--
Kakuhan	0.16	0.02	24	0.05	0.37	9	0.38
Average	0.24	0.01	108	0.03	0.73	18	0.17

Appendix 3: Monthly snowfall (in.) recorded at the NWS weather station in Haines, AK between 2005-2014.

Year	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Total	% of normal
2005/2006	0	30	9	40	22	16	0	0	118	74%
2006/2007	0	42	78	81	28	78	3	0	309	195%
2007/2008	0	6	56	78	41	31	3	0	214	135%
2008/2009	22	24	56	62	45	43	9	0	261	165%
2009/2010	0	48	19	68	8	59	0	0	202	128%
2010/2011	0	24	25	19	20	3	3	0	93	59%
2011/2012	0	126	40	121	20	56	0	0	363	230%
2012/2013	4	20	41	21	23	10	14	1	133	84%
2013/2014	0	20	92	22	23	35	1	0	192	121%
Average, Study period	3	40	40	61	26	37	4	0	209	132%
Average, Long-term[1]	3	23	38	40	29	20	4	0	158	100%

[1]Haines Airport (1950-1955, 1973-1998) and Haines COOP NWS Station (1999-2014)

Appendix 4a: Mountain goat aerial survey routes in the Lynn Canal study area. Each area was surveyed by fixed- and/or rotor-wing aircraft during August-October, 2005-2014.



Appendix 4b: Summary of mountain goat population composition and minimum abundance data collected during aerial surveys on the East Berners Mountains survey route, 2006-2014. These data do not account for differences in mountain goat sighting probabilities that occur between surveys. As a result, the number of mountain goats recorded represent the minimum number of animals on the survey route during a given survey.

Study area	Year	Date	Adults	Kids	Total	% Kids	Temp (F)	Weather	Median wind speed (knots)	Aircraft	# Observers	Complete survey?
East Berners	2006	8/28/06	86	42	128	32.8	40-50	Mostly Clear	5	Heliocourier	3	N
East Berners	2006	9/3/06	83	21	104	20.2	51	Partly Cloudy	5	Heliocourier	2	Y
East Berners	2006	10/3/06	70	22	92	23.9	35-40	High Overcast	10	Heliocourier	3	Y
East Berners	2007	9/2/07	105	28	133	21.1	44	Clear	3	Heliocourier	2	Y
East Berners	2007	9/22/07	97	28	125	22.4	35-40	High Overcast	5	Cub	2	Y
East Berners	2007	10/4/07	97	22	119	18.5	26-34	High Overcast	5	Cub	2	Y
East Berners	2008	9/25/08	125	38	163	23.3	40	Mostly Clear	5	Hughes 500	3	Y
East Berners	2009	8/10/09	85	28	113	24.8	46	Cloudy	8	Cub	2	N
East Berners	2009	8/20/09	23	6	29	20.7	52	Cloudy	5	Cub	2	N
East Berners	2009	10/2/09	74	26	100	26.0	37-42	High Overcast	8	Cub	2	Y
East Berners	2010	9/11/10	72	14	86	16.3	51	Clear	0	Cub	2	Y
East Berners	2010	9/22/10	67	15	82	18.3	42	Mostly Clear	5	Cub	2	Y
East Berners	2011	9/27/11	116	31	147	21.1	35	High Overcast	5	Cub	2	Y
East Berners	2012	9/19/12	141	37	178	20.8	42-43	High Overcast	3	Cub	2	Y
East Berners	2013	9/25/13	78	17	95	17.9	37	High Overcast	8	Cub	2	Y
East Berners	2014	9/10/14	121	33	154	21.4	42-47	High Overcast	3	Cub	2	Y

Appendix 4c: Summary of mountain goat population composition and minimum abundance data collected during aerial surveys on the Lions Head survey route, 2005-2014. These data do not account for differences in mountain goat sighting probabilities that occur between surveys. As a result, the number of mountain goats recorded represent the minimum number of animals on the survey route during a given survey.

Study area	Year	Date	Adults	Kids	Total	% Kids	Temp (F)	Weather	Median wind speed (knots)	Aircraft	# Observers	Complete survey?
Lions Head	2005	8/11/05	35	5	40	12.5	70	Clear	5	Cub	2	Y
Lions Head	2005	10/3/05	55	8	65	12.3	45	Clear	5	Heliocouirer	3	Y
Lions Head	2006	8/28/06	49	9	58	15.5	40-50	Mostly Clear	5	Heliocourier	3	Y
Lions Head	2006	9/3/06	54	11	65	16.9	51	Partly Cloudy	5	Heliocourier	2	Y
Lions Head	2006	10/2/06	92	13	105	12.4	26-31	Mostly Cloudy	10	Heliocourier	3	Y
Lions Head	2006	10/16/06	91	23	114	20.2	35-42	Mostly Clear	18	Hughes 500	3	Y
Lions Head	2007	8/10/07	18	2	20	10.0	51-57	Clear	5	Heliocourier	3	Y
Lions Head	2007	8/27/07	43	3	46	6.5	44-50	High Overcast	3	Heliocourier	3	Y
Lions Head	2007	9/13/07	46	5	51	9.8	~45-55	High Overcast/ Low Fog	3	Cub	2	Y
Lions Head	2007	9/28/07	78	15	93	16.1	35-40	Mostly Clear	5	Hughes 500	3	Y
Lions Head	2007	10/4/07	78	8	86	9.3	26-34	High Overcast	8	Cub	2	Y
Lions Head	2008	9/25/08	62	18	80	22.5	40	Mostly Clear	5	Hughes 500	3	Y
Lions Head	2008	10/7/08	63	13	76	17.1	31	Clear/High Overcast	8	Cub	2	Y
Lions Head	2009	8/12/09	76	18	94	19.1	43-46	Ptly/Mostly Cloudy	5	Cub	2	N
Lions Head	2009	10/3/09	51	16	67	23.9	40	High Overcast	13	Cub	2	Y
Lions Head	2010	9/6/10	49	14	63	22.2	44-48	Mostly Clear	15	Cub	2	Y
Lions Head	2010	9/21/10	58	23	81	28.4	36-42	Clear	3	Cub	2	Y
Lions Head	2011	9/18/11	89	30	119	25.2	39-42	High Overcast	5	Cub	2	Y
Lions Head	2012	9/19/12	76	15	91	16.5	40-44	High Overcast	5	Cub	2	Y
Lions Head	2013	9/23/13	66	18	84	21.4	37	Partly Cloudy	5	Cub	2	Y
Lions Head	2014	9/10/14	48	10	58	17.2	43-47	High Overcast	8	Cub	2	Y

Appendix 4d: Summary of mountain goat population composition and minimum abundance data collected during aerial surveys on the Mt. Sinclair survey route, 2005-2014. These data do not account for differences in mountain goat sighting probabilities that occur between surveys. As a result, the number of mountain goats recorded represent the minimum number of animals on the survey route during a given survey.

Study area	Year	Date	Adults	Kids	Total	% Kids	Temp (F)	Weather	Median wind speed (knots)	Aircraft	# Observers	Complete survey?
Sinclair Mtn.	2005	8/11/05	77	17	94	18.1	70	Clear	5	Cub	2	Y
Sinclair Mtn.	2005	10/3/05	159	30	189	15.9	45	Clear	5	Heliocouirer	3	Y
Sinclair Mtn.	2006	8/28/06	86	21	107	19.6	40-50	Mostly Clear	5	Heliocourier	3	N
Sinclair Mtn.	2006	9/2/06	128	31	159	19.5	50-56	High Overcast	5	Heliocourier	4	Y
Sinclair Mtn.	2006	9/23/06	153	22	182	12.1	40-42	High Overcast	5	Heliocourier	3	Y
Sinclair Mtn.	2006	10/16/06	227	41	268	15.3	35-42	Mostly Clear	18	Hughes 500	3	Y
Sinclair Mtn.	2007	8/27/07	57	4	61	6.6	44-50	High Overcast	3	Heliocourier	3	Y
Sinclair Mtn.	2007	9/13/07	75	13	88	14.8	45-55	High Overcast/ Low Fog	3	Cub	2	Y
Sinclair Mtn.	2007	9/28/07	173	38	211	18.0	35-40	High Overcast	5	Hughes 500	3	Y
Sinclair Mtn.	2008	9/25/08	127	27	154	17.5	40	Mostly Clear	5	Hughes 500	3	Y
Sinclair Mtn.	2008	10/7/08	123	26	149	17.4	31	Clear/High Overcast	8	Cub	2	Y
Sinclair Mtn.	2010	9/6/10	62	18	80	22.5	44-48	Mostly Clear	15	Cub	2	Y
Sinclair Mtn.	2010	9/21/10	59	19	78	24.4	36-42	Clear	3	Cub	2	Y
Sinclair Mtn.	2011	9/18/11	127	33	160	20.6	39-42	High Overcast	5	Cub	2	Y
Sinclair Mtn.	2012	9/19/12	107	15	122	12.3	40-44	High Overcast	5	Cub	2	Y
Sinclair Mtn.	2013	9/23/13	67	14	81	17.3	37	High Overcast	5	Cub	2	Y
Sinclair Mtn.	2014	9/10/14	76	24	100	24.0	43-47	High Overcast	8	Cub	2	Y

Appendix 4e: Summary of mountain goat population composition and minimum abundance data collected during aerial surveys on the Mt. Villard survey route, 2005-2014. These data do not account for differences in mountain goat sighting probabilities that occur between surveys. As a result, the number of mountain goats recorded represent the minimum number of animals on the survey route during a given survey.

Study area	Year	Date	Adults	Kids	Total	% Kids	Temp (F)	Weather	Med wind speed (knots)	Aircraft	# Observers	Complete survey?
Mt. Villard	2005	8/12/05	23	4	27	14.8	68	Clear	5	Cub	2	Y
Mt. Villard	2006	9/2/06	102	23	125	18.4	50-56	High Overcast	5	Heliocourier	4	Y
Mt. Villard	2006	9/23/06	90	12	102	11.8	40-42	High Overcast	5	Heliocourier	3	N
Mt. Villard	2006	10/1/06	41	12	53	22.6	31	Mostly Cloudy	10	Heliocourier	3	N
Mt. Villard	2006	10/2/06	165	28	193	14.5	26-31	Mostly Cloudy	10	Heliocourier	3	Y
Mt. Villard	2006	10/17/06	145	29	174	16.7	35-31	High Overcast	5	Hughes 500	3	N
Mt. Villard	2007	9/3/07	88	23	111	20.7	47-54	Clear	5	Heliocourier	3	Y
Mt. Villard	2007	9/14/07	74	23	97	23.7	44	Overcast/Fog	14	Heliocourier	3	Y
Mt. Villard	2007	9/22/07	132	22	154	14.3	35-40	Overcast/Lt Snow/Fog	8	Cub	2	Y
Mt. Villard	2008	9/6/08	52	10	62	16.1	45-55	Partly Cloudy/High Overcast	5	Cub	2	N
Mt. Villard	2008	9/25/08	164	30	194	15.5	40	Mostly Clear	5	Hughes 500	3	Y
Mt. Villard	2009	10/3/09	56	16	72	22.2	32	High Overcast	15	Cub	2	Y
Mt. Villard	2010	9/12/10	62	19	81	23.5	41-48	Clear	20	Cub	2	Y
Mt. Villard	2011	9/18/11	156	35	191	18.3	39-42	High Overcast	5	Cub	2	Y
Mt. Villard	2012	9/21/12	104	17	121	14.0	49-51	High Overcast	3	Cub	2	Y
Mt. Villard	2013	9/23/13	57	10	67	14.9	39-40	High Overcast	18	Cub	2	Y
Mt. Villard	2014	9/10/14	112	31	143	21.7	32	High Overcast	5	Cub	2	Y

Appendix 4f: Summary of mountain goat population composition and minimum abundance data collected during aerial surveys on the Berners-Lace Ridge survey route, 2007-2014. These data do not account for differences in mountain goat sighting probabilities that occur between surveys. As a result, the number of mountain goats recorded represent the minimum number of animals on the survey route during a given survey.

Study area	Year	Date	Adults	Kids	Total	% Kids	Temp (F)	Weather	Median wind speed (knots)	Aircraft	# Observers	Complete survey?
B-L Ridge	2007	9/2/07	25	4	29	13.8	51.5	Clear	3	Helio	2	Y
B-L Ridge	2008	9/25/08	19	3	22	13.6	40	Clear	0	HD500	3	Y
B-L Ridge	2010	9/6/10	17	4	21	19.0	48-52	Mostly Clear	10	Cub	2	Y
B-L Ridge	2011	9/26/11	26	9	35	25.7	42	Clear	15	Cub	2	Y
B-L Ridge	2012	9/19/12	24	3	27	11.1	43	High Overcast	3	Cub	2	Y
B-L Ridge	2013	9/23/13	13	2	15	13.3	37	Clear	3	Cub	2	Y
B-L Ridge	2014	9/10/14	16	3	19	15.8	43-47	High Overcast	8	Cub	2	Y

Attachment 4

2015 Re-vegetation Test Plot Monitoring Results

SURFACE STABILITY EVALUATION

Date 5/14/15 Data Collector(s) P. STROH

Site Data

Location Name: PLOT #3 (SOUTH)		Photographs taken: (Y) N (circle one)
Aspect:	Slope (degree):	Photograph notes:
Comments:		

Site Stabilization Data

EROSION FEATURE	POTENTIALLY PRESENT (Yes or No)	IDENTIFIED FACTORS	POSSIBLE FACTOR
Soil Movement	Y	3	14
Surface Litter	Y	3	14
Surface Rock Fragments	Y	5	14
Pedestals	Y	3	14
Flow Patterns	Y	6	15
Rills	Y	0	14
Gullies	Y	0	15
TOTAL		20	100

Procedure: (refer to Erosion Condition Classification System publication if needed)

1) Observe the total sample area and determine the average condition.
2) Determine if each item is potentially present. Only the potentially present items will be considered in the total calculation (cross out pre-entered possible factor # if it is not potentially present).
3) For items potentially present, review the Erosion Condition Class (Soil Surface Factor) sheet and assign a numerical value to each erosion feature.
4) Total both the weighted values and the possible values.
5) Calculate the Total percent SSF: (identified factors / possible factors) x 100
6) Write the total percent and corresponding condition class in the box below.

SSF Range	Class
1-20%	Stable
21-40%	Slight
41-60%	Moderate
61-80%	Critical
81-100%	Severe

SSF % and Class: 20 STABLE

Comments (when applicable, include information on width, depth, uniformity, number per m^2 or height):

1ST INSP. FOR 2016

KC HARVEY ENVIRONMENTAL, LLC

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Qualitative Monitoring

Site Name: B PLOT #3 (SOUTH) Date: 5/14/15

Data Collector(s): P. STROH Slope(%)/Aspect: /

Vegetation

	Reclamation Trial					Reference Site				
	Total Foliar Cover	Species 1/ % Cover	Species 2/ % Cover	Species 3/ % Cover	Species 4/ % Cover	Total Foliar Cover	Species 1/ % Cover	Species 2/ % Cover	Species 3/ % Cover	Species 4/ % Cover
Grass	5									
Forb	0									
Shrub	0									
Total	5	—	—	—	—		—	—	—	—
Weed	0									
Cover Crop	0	—	—	—	—	—	—	—	—	—
Rock	60	—	—	—	—		—	—	—	—
Litter	2	—	—	—	—		—	—	—	—
Bare Ground	33	—	—	—	—		—	—	—	—

Reclamation Trial	Reference Site
Other Species: Grass	Other Species: Grass
Forb	Forb
Shrub	Shrub
Weed	Weed

Relative % Cover _____ (Disturbed Total (Grass+Forb+Shrub))/(Undisturbed Total (Grass+Forb+Shrub))

Additional Monitoring Methods

Seedling Count ☐Yes ☑No

Canopy Cover ☐Yes ☐No

Mulch
☑None
☐ Fiber

Grazing
☐ Wildlife
☐ Livestock
☐ Both

Severity
☐ None 0-5%
☐ Low 5-40%
☐ Moderate 40-60%
☐ Heavy 60-100%

KC HARVEY
ENVIRONMENTAL, LLC

Qualitative Monitoring

Site Name: ~~Plot~~ PLOT #2 (MIDDLE) Date: ~~5~~ 5/14/15

Data Collector(s): D. STROW Slope(%)/Aspect: / 1

Vegetation

	Reclamation Trial					Reference Site				
	Total Foliar Cover	Species 1/ % Cover	Species 2/ % Cover	Species 3/ % Cover	Species 4/ % Cover	Total Foliar Cover	Species 1/ % Cover	Species 2/ % Cover	Species 3/ % Cover	Species 4/ % Cover
Grass	5									
Forb	0									
Shrub	0									
Total	5	—	—	—	—		—	—	—	—
Weed	0									
Cover Crop	0	—	—	—	—	—	—	—	—	—
Rock	50	—	—	—	—		—	—	—	—
Litter	5	—	—	—	—		—	—	—	—
Bare Ground	40	—	—	—	—		—	—	—	—

	Reclamation Trial	Reference Site
Other Species: Grass		
Forb		
Shrub		
Weed		

Relative % Cover _____ (Disturbed Total (Grass+Forb+Shrub))/(Undisturbed Total (Grass+Forb+Shrub))

Additional Monitoring Methods

Seedling Count ☐Yes ☑~~No~~

Canopy Cover ☐Yes ☑No

Mulch
☑~~None~~
☐ Fiber

Grazing
☐ Wildlife
☐ Livestock
☐ Both

Severity
☐ None 0-5%
☐ Low 5-40%
☐ Moderate 40-60%
☐ Heavy 60-100%

SURFACE STABILITY EVALUATION

Date 5/14/15 Data Collector(s) P. STROH

Site Data

Location Name: PLOT #2 (MIDDLE)		Photographs taken: (Y) N (circle one)
Aspect:	Slope (degree):	Photograph notes:
Comments:		

Site Stabilization Data

EROSION FEATURE	POTENTIALLY PRESENT (Yes or No)	IDENTIFIED FACTORS	POSSIBLE FACTOR
Soil Movement	5	y	14
Surface Litter	3	y	14
Surface Rock Fragments	2	y	14
Pedestals	~~0~~	y	14
Flow Patterns	6	y	15
Rills	3	y	14
Gullies	6	y	15
TOTAL	25	~~y~~	100

Procedure: (refer to Erosion Condition Classification System publication if needed)

1) Observe the total sample area and determine the average condition.
2) Determine if each item is potentially present. Only the potentially present items will be considered in the total calculation (cross out pre-entered possible factor # if it is not potentially present).
3) For items potentially present, review the Erosion Condition Class (Soil Surface Factor) sheet and assign a numerical value to each erosion feature.
4) Total both the weighted values and the possible values.
5) Calculate the Total percent SSF: (identified factors / possible factors) x 100
6) Write the total percent and corresponding condition class in the box below.

SSF Range	Class
1-20%	Stable
21-40%	Slight
41-60%	Moderate
61-80%	Critical
81-100%	Severe

SSF % and Class: 25% SLIGHT

Comments (when applicable, include information on width, depth, uniformity, number per m^2 or height):

1ST INSP. OF 2015

KC HARVEY ENVIRONMENTAL, LLC

SURFACE STABILITY EVALUATION

Date 5/14/15 Data Collector(s) P.STROW

Site Data

Location Name: ROT #1 (NORTH)		Photographs taken: (Y) N (circle one)
Aspect:	Slope (degree):	Photograph notes:
Comments:		

Site Stabilization Data

EROSION FEATURE	POTENTIALLY PRESENT (Yes or No)	IDENTIFIED FACTORS	POSSIBLE FACTOR
Soil Movement	3	y	14
Surface Litter	0	y	14
Surface Rock Fragments	2	y	14
Pedestals	0	y	14
Flow Patterns	3	y	15
Rills	0	y	14
Gullies	0	y	15
TOTAL	8		100

Procedure: (refer to Erosion Condition Classification System publication if needed)

1) Observe the total sample area and determine the average condition.
2) Determine if each item is potentially present. Only the potentially present items will be considered in the total calculation (cross out pre-entered possible factor # if it is not potentially present).
3) For items potentially present, review the Erosion Condition Class (Soil Surface Factor) sheet and assign a numerical value to each erosion feature.
4) Total both the weighted values and the possible values.
5) Calculate the Total percent SSF: (identified factors / possible factors) x 100
6) Write the total percent and corresponding condition class in the box below.

SSF Range	Class
1-20%	Stable
21-40%	Slight
41-60%	Moderate
61-80%	Critical
81-100%	Severe

SSF % and Class: 8 % STABLE

Comments (when applicable, include information on width, depth, uniformity, number per m^2 or height):

KC HARVEY ENVIRONMENTAL, LLC

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Qualitative Monitoring

Site Name: PLOT #1 NORTH Date: 5/14/15

Data Collector(s): P. STROW Slope(%)/Aspect: /

Vegetation

	Reclamation Trial					Reference Site				
	Total Foliar Cover	Species 1/ % Cover	Species 2/ % Cover	Species 3/ % Cover	Species 4/ % Cover	Total Foliar Cover	Species 1/ % Cover	Species 2/ % Cover	Species 3/ % Cover	Species 4/ % Cover
Grass	20									
Forb	0									
Shrub	0									
Total		—	—	—	—		—	—	—	—
Weed	0									
Cover Crop	0	—	—	—	—	—	—	—	—	—
Rock	50	—	—	—	—		—	—	—	—
Litter	2	—	—	—	—		—	—	—	—
Bare Ground	28	—	—	—	—		—	—	—	—

Other Species: Grass	Other Species: Grass
Forb	Forb
Shrub	Shrub
Weed	Weed

Relative % Cover _____ (Disturbed Total (Grass+Forb+Shrub))/(Undisturbed Total (Grass+Forb+Shrub))

MORE GRASS @ NORTH END OF PLOT

Additional Monitoring Methods

Seedling Count ☐Yes ☑No

Canopy Cover ☐Yes ☑No

Mulch
☐ None
☑ Fiber

Grazing
☐ Wildlife
☐ Livestock
☐ Both

Severity
☐ None 0-5%
☐ Low 5-40%
☐ Moderate 40-60%
☐ Heavy 60-100%

SURFACE STABILITY EVALUATION

Date 6/29/15 Data Collector(s) P.STROW

Site Data

Location Name: PLOT 3 (SOUTH)		Photographs taken: (Y) N (circle one)
Aspect:	Slope (degree):	Photograph notes:
Comments:		

Site Stabilization Data

EROSION FEATURE	POTENTIALLY PRESENT (Yes or No)	IDENTIFIED FACTORS	POSSIBLE FACTOR
Soil Movement	Y	3	14
Surface Litter	Y	3	14
Surface Rock Fragments	Y	2	14
Pedestals	Y	0	14
Flow Patterns	Y	3	15
Rills	Y	0	14
Gullies	Y	0	15
TOTAL		11	

Procedure: (refer to Erosion Condition Classification System publication if needed)

1) Observe the total sample area and determine the average condition.
2) Determine if each item is potentially present. Only the potentially present items will be considered in the total calculation (cross out pre-entered possible factor # if it is not potentially present).
3) For items potentially present, review the Erosion Condition Class (Soil Surface Factor) sheet and assign a numerical value to each erosion feature.
4) Total both the weighted values and the possible values.
5) Calculate the Total percent SSF: (identified factors / possible factors) x 100
6) Write the total percent and corresponding condition class in the box below.

SSF Range	Class
1-20%	Stable
21-40%	Slight
41-60%	Moderate
61-80%	Critical
81-100%	Severe

SSF % and Class: 11% STABLE

Comments (when applicable, include information on width, depth, uniformity, number per m^2 or height):

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Qualitative Monitoring

Site Name: Plot 3 South Date: 6/29/15

Data Collector(s): A. Straw Slope(%)/Aspect: /

Vegetation

	Reclamation Trial					Reference Site				
	Total Foliar Cover	Species 1/ % Cover	Species 2/ % Cover	Species 3/ % Cover	Species 4/ % Cover	Total Foliar Cover	Species 1/ % Cover	Species 2/ % Cover	Species 3/ % Cover	Species 4/ % Cover
Grass	15									
Forb	—									
Shrub	—									
Total	15	—	—	—	—		—	—	—	—
Weed										
Cover Crop		—	—	—	—	—	—	—	—	—
Rock	50	—	—	—	—		—	—	—	—
Litter	~	—	—	—	—		—	—	—	—
Bare Ground	35	—	—	—	—		—	—	—	—

Other Species: Grass	Other Species: Grass
Forb	Forb
Shrub	Shrub
Weed	Weed

Relative % Cover _____ (Disturbed Total (Grass+Forb+Shrub))/(Undisturbed Total (Grass+Forb+Shrub))

Additional Monitoring Methods

Seedling Count ☐Yes ☑No

Canopy Cover ☐Yes ☐No

Mulch
☑ None
☐ Fiber

Grazing
☐ Wildlife
☐ Livestock
☐ Both

Severity
☐ None 0-5%
☐ Low 5-40%
☐ Moderate 40-60%
☐ Heavy 60-100%

SURFACE STABILITY EVALUATION

Date 6/29/15 Data Collector(s) P. STOLL

Location Name: PLOT 2 (MIDDLE)		Photographs taken: (Y) N (circle one)
Aspect:	Slope (degree):	Photograph notes:
Comments:		

EROSION FEATURE	POTENTIALLY PRESENT (Yes or No)	IDENTIFIED FACTORS	POSSIBLE FACTOR
Soil Movement	Y	3	14
Surface Litter	Y	3	14
Surface Rock Fragments	Y	2	14
Pedestals	Y	0	14
Flow Patterns	Y	3	15
Rills	Y	0	14
Gullies	Y	0	15
TOTAL		11	100

Procedure: (refer to Erosion Condition Classification System publication if needed)

1) Observe the total sample area and determine the average condition.
2) Determine if each item is potentially present. Only the potentially present items will be considered in the total calculation (cross out pre-entered possible factor # if it is not potentially present).
3) For items potentially present, review the Erosion Condition Class (Soil Surface Factor) sheet and assign a numerical value to each erosion feature.
4) Total both the weighted values and the possible values.
5) Calculate the Total percent SSF: (identified factors / possible factors) x 100
6) Write the total percent and corresponding condition class in the box below.

SSF Range	Class
1-20%	Stable
21-40%	Slight
41-60%	Moderate
61-80%	Critical
81-100%	Severe

SSF % and Class: 11 % STABLE

Comments (when applicable, include information on width, depth, uniformity, number per m^2 or height):

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Qualitative Monitoring

Site Name: PLOT 2 (MIDDLE Date: 6/29/15

Data Collector(s): P. STROW Slope(%)/Aspect: ____ / ____

Vegetation

	Reclamation Trial					Reference Site				
	Total Foliar Cover	Species 1/ % Cover	Species 2/ % Cover	Species 3/ % Cover	Species 4/ % Cover	Total Foliar Cover	Species 1/ % Cover	Species 2/ % Cover	Species 3/ % Cover	Species 4/ % Cover
Grass	15									
Forb	—									
Shrub	—									
Total	15	—	—	—	—		—	—	—	—
Weed	—									
Cover Crop	—	—	—	—	—	—	—	—	—	—
Rock	45	—	—	—	—		—	—	—	—
Litter		—	—	—	—		—	—	—	—
Bare Ground	40	—	—	—	—		—	—	—	—

Other Species: Grass	Other Species: Grass
Forb	Forb
Shrub	Shrub
Weed	Weed

Relative % Cover _____ (Disturbed Total (Grass+Forb+Shrub))/(Undisturbed Total (Grass+Forb+Shrub))

Additional Monitoring Methods

Seedling Count ☐Yes ☒No

Canopy Cover ☐Yes ☒No

Mulch
☒None
☐ Fiber

Grazing
☐ Wildlife
☐ Livestock
☐ Both

Severity
☐ None 0-5%
☐ Low 5-40%
☐ Moderate 40-60%
☐ Heavy 60-100%

SURFACE STABILITY EVALUATION

Date 6/29/15 Data Collector(s) P. STROH

Location Name: PLOT 3 (NORTH)	Photographs taken: (Y) N (circle one)	
Aspect:	Slope (degree):	Photograph notes:
Comments:		

EROSION FEATURE	POTENTIALLY PRESENT (Yes or No)	IDENTIFIED FACTORS	POSSIBLE FACTOR
Soil Movement	Y	3	14
Surface Litter	Y	2	14
Surface Rock Fragments	Y	0	14
Pedestals	Y	0	14
Flow Patterns	Y	3	15
Rills	Y	0	14
Gullies	Y	0	15
TOTAL		8	100

Procedure: (refer to Erosion Condition Classification System publication if needed)

1) Observe the total sample area and determine the average condition.
2) Determine if each item is potentially present. Only the potentially present items will be considered in the total calculation (cross out pre-entered possible factor # if it is not potentially present).
3) For items potentially present, review the Erosion Condition Class (Soil Surface Factor) sheet and assign a numerical value to each erosion feature.
4) Total both the weighted values and the possible values.
5) Calculate the Total percent SSF: (identified factors / possible factors) x 100
6) Write the total percent and corresponding condition class in the box below.

SSF Range	Class
1-20%	Stable
21-40%	Slight
41-60%	Moderate
61-80%	Critical
81-100%	Severe

SSF % and Class: 8% STABLE

Comments (when applicable, include information on width, depth, uniformity, number per m^2 or height):

KC HARVEY ENVIRONMENTAL, LLC

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Qualitative Monitoring

Site Name: PLOT 3 (NORTH) Date: 6/29/15

Data Collector(s): P. STROH Slope(%)/Aspect: ____ / ____

Vegetation

	Reclamation Trial					Reference Site				
	Total Foliar Cover	Species 1/ % Cover	Species 2/ % Cover	Species 3/ % Cover	Species 4/ % Cover	Total Foliar Cover	Species 1/ % Cover	Species 2/ % Cover	Species 3/ % Cover	Species 4/ % Cover
Grass	40									
Forb	/									
Shrub	/									
Total	/	—	—	—	—		—	—	—	—
Weed	40									
Cover Crop	/	—	—	—	—	—	—	—	—	—
Rock	40	—	—	—	—		—	—	—	—
Litter		—	—	—	—		—	—	—	—
Bare Ground	20	—	—	—	—		—	—	—	—
	Other Species: Grass					Other Species: Grass				
	Forb					Forb				
	Shrub					Shrub				
	Weed					Weed				

Additional Monitoring Methods

Seedling Count ☐Yes ☑No

Canopy Cover ☐Yes ☑No

Mulch
☐ None
☑ Fiber

Grazing
☐ Wildlife
☐ Livestock
☐ Both

Severity
☐ None 0-5%
☐ Low 5-40%
☐ Moderate 40-60%
☐ Heavy 60-100%

Relative % Cover _____ (Disturbed Total (Grass+Forb+Shrub))/(Undisturbed Total (Grass+Forb+Shrub))

SURFACE STABILITY EVALUATION

Date 7/29/15 Data Collector(s) SIERRA LAMMERS

Location Name: PLOT 3 (SOUTH)		Photographs taken: (Y) N (circle one)
Aspect:	Slope (degree):	Photograph notes:
Comments:		

EROSION FEATURE	POTENTIALLY PRESENT (Yes or No)	IDENTIFIED FACTORS	POSSIBLE FACTOR
Soil Movement	Y	2	14
Surface Litter		2	14
Surface Rock Fragments		3	14
Pedestals		0	14
Flow Patterns		3	15
Rills		0	14
Gullies		0	15
TOTAL		10	100

Procedure: (refer to Erosion Condition Classification System publication if needed)

1) Observe the total sample area and determine the average condition.
2) Determine if each item is potentially present. Only the potentially present items will be considered in the total calculation (cross out pre-entered possible factor # if it is not potentially present).
3) For items potentially present, review the Erosion Condition Class (Soil Surface Factor) sheet and assign a numerical value to each erosion feature.
4) Total both the weighted values and the possible values.
5) Calculate the Total percent SSF: (identified factors / possible factors) x 100
6) Write the total percent and corresponding condition class in the box below.

SSF Range	Class
1-20%	Stable
21-40%	Slight
41-60%	Moderate
61-80%	Critical
81-100%	Severe

SSF % and Class: 10% Stable

Comments (when applicable, include information on width, depth, uniformity, number per m^2 or height):

Some Grass going to seed.

KC HARVEY ENVIRONMENTAL, LLC

KC HARVEY
ENVIRONMENTAL, LLC

Qualitative Monitoring

Site Name: PLOT 3 (SOUTH) Date: 7/29/15

Data Collector(s): SIERRA LAMMERS Slope(%)/Aspect: ____ / ____

Vegetation

	Reclamation Trial					Reference Site				
	Total Foliar Cover	Species 1/ % Cover	Species 2/ % Cover	Species 3/ % Cover	Species 4/ % Cover	Total Foliar Cover	Species 1/ % Cover	Species 2/ % Cover	Species 3/ % Cover	Species 4/ % Cover
Grass	20									
Forb	/									
Shrub	/									
Total	20	—	—	—	—		—	—	—	—
Weed	/									
Cover Crop	/	—	—	—	—	—	—	—	—	—
Rock	50	—	—	—	—		—	—	—	—
Litter	/	—	—	—	—		—	—	—	—
Bare Ground	30	—	—	—	—		—	—	—	—

Other Species:	
Grass	Grass
Forb	Forb
Shrub	Shrub
Weed	Weed

Relative % Cover _____ (Disturbed Total (Grass+Forb+Shrub))/(Undisturbed Total (Grass+Forb+Shrub))

Additional Monitoring Methods

Seedling Count ☐Yes ☒No

Canopy Cover ☐Yes ☒No

Mulch
☐ None
☒ Fiber

Grazing
☐ Wildlife
☐ Livestock
☐ Both

Severity
☐ None 0-5%
☐ Low 5-40%
☐ Moderate 40-60%
☐ Heavy 60-100%

SURFACE STABILITY EVALUATION

Date 7/29/15 Data Collector(s) SIERRA LAMMERS

Location Name: PLOT 2 (MIDDLE)		Photographs taken: (Y) N (circle one)
Aspect:	Slope (degree):	Photograph notes:
Comments:		

EROSION FEATURE	POTENTIALLY PRESENT (Yes or No)	IDENTIFIED FACTORS	POSSIBLE FACTOR
Soil Movement	Y	2	14
Surface Litter		3	14
Surface Rock Fragments		3	14
Pedestals		0	14
Flow Patterns		2	15
Rills		0	14
Gullies		0	15
TOTAL		10	100

Procedure: (refer to Erosion Condition Classification System publication if needed)

1) Observe the total sample area and determine the average condition.
2) Determine if each item is potentially present. Only the potentially present items will be considered in the total calculation (cross out pre-entered possible factor # if it is not potentially present).
3) For items potentially present, review the Erosion Condition Class (Soil Surface Factor) sheet and assign a numerical value to each erosion feature.
4) Total both the weighted values and the possible values.
5) Calculate the Total percent SSF: (identified factors / possible factors) x 100
6) Write the total percent and corresponding condition class in the box below.

SSF Range	Class
1-20%	Stable
21-40%	Slight
41-60%	Moderate
61-80%	Critical
81-100%	Severe

SSF % and Class: 10% Stable

Comments (when applicable, include information on width, depth, uniformity, number per m^2 or height):

Some grass going to seed.

KC HARVEY ENVIRONMENTAL, LLC

KC HARVEY
ENVIRONMENTAL, LLC

Qualitative Monitoring

Site Name: PLOT 2 (MIDDLE) Date: 7/29/15

Data Collector(s): SIERRA LAMMERS Slope(%)/Aspect: ____ / ____

Vegetation

	Reclamation Trial					Reference Site				
	Total Foliar Cover	Species 1/ % Cover	Species 2/ % Cover	Species 3/ % Cover	Species 4/ % Cover	Total Foliar Cover	Species 1/ % Cover	Species 2/ % Cover	Species 3/ % Cover	Species 4/ % Cover
Grass	45									
Forb	/									
Shrub	/									
Total	45	—	—	—	—		—	—	—	—
Weed	/									
Cover Crop	/	—	—	—	—	—	—	—	—	—
Rock	30	—	—	—	—		—	—	—	—
Litter	5	—	—	—	—		—	—	—	—
Bare Ground	20	—	—	—	—		—	—	—	—

	Reclamation Trial	Reference Site
Other Species: Grass		
Forb		
Shrub		
Weed		

Additional Monitoring Methods

Seedling Count ☐Yes ☒No

Canopy Cover ☐Yes ☒No

Mulch
☐ None
☒ Fiber

Grazing
☐ Wildlife
☐ Livestock
☐ Both

Severity
☐ None 0-5%
☐ Low 5-40%
☐ Moderate 40-60%
☐ Heavy 60-100%

Relative % Cover _____ (Disturbed Total (Grass+Forb+Shrub))/(Undisturbed Total (Grass+Forb+Shrub))

SURFACE STABILITY EVALUATION

Date 7/29/15 Data Collector(s) SIERRA LAMMERS

Location Name: PLOT 1 (NORTH)		Photographs taken: (Y) N (circle one)
Aspect:	Slope (degree):	Photograph notes:
Comments:		

EROSION FEATURE	POTENTIALLY PRESENT (Yes or No)	IDENTIFIED FACTORS	POSSIBLE FACTOR
Soil Movement	Y	1	14
Surface Litter		6	14
Surface Rock Fragments		2	14
Pedestals		0	14
Flow Patterns		1	15
Rills		0	14
Gullies		0	15
TOTAL		4	100

Procedure: (refer to Erosion Condition Classification System publication if needed)

1) Observe the total sample area and determine the average condition.
2) Determine if each item is potentially present. Only the potentially present items will be considered in the total calculation (cross out pre-entered possible factor # if it is not potentially present).
3) For items potentially present, review the Erosion Condition Class (Soil Surface Factor) sheet and assign a numerical value to each erosion feature.
4) Total both the weighted values and the possible values.
5) Calculate the Total percent SSF: (identified factors / possible factors) x 100
6) Write the total percent and corresponding condition class in the box below.

SSF Range	Class
1-20%	Stable
21-40%	Slight
41-60%	Moderate
61-80%	Critical
81-100%	Severe

SSF % and Class: 4% Stable

Comments (when applicable, include information on width, depth, uniformity, number per m^2 or height):

Some grass going to seed. Shrub growing top corner

KC HARVEY ENVIRONMENTAL, LLC

KC HARVEY
ENVIRONMENTAL, LLC

Qualitative Monitoring

Site Name: PLOT 1 (NORTH) Date: 7/29/15

Data Collector(s): SIERRA LAMMERS Slope(%)/Aspect: ____ / ____

Vegetation

	Reclamation Trial					Reference Site				
	Total Foliar Cover	Species 1/ % Cover	Species 2/ % Cover	Species 3/ % Cover	Species 4/ % Cover	Total Foliar Cover	Species 1/ % Cover	Species 2/ % Cover	Species 3/ % Cover	Species 4/ % Cover
Grass	60									
Forb	/									
Shrub	/									
Total	60	—	—	—	—		—	—	—	—
Weed	/									
Cover Crop	/	—	—	—	—	—	—	—	—	—
Rock	20	—	—	—	—		—	—	—	—
Litter	/	—	—	—	—		—	—	—	—
Bare Ground	20	—	—	—	—		—	—	—	—
	Other Species: Grass					Other Species: Grass				
	Forb					Forb				
	Shrub					Shrub				
	Weed					Weed				

Relative % Cover _____ (Disturbed Total (Grass+Forb+Shrub))/(Undisturbed Total (Grass+Forb+Shrub))

Additional Monitoring Methods

Seedling Count ☐Yes ☒No

Canopy Cover ☐Yes ☒No

Mulch
☐ None
☒ Fiber

Grazing
☐ Wildlife
☐ Livestock
☐ Both

Severity
☐ None 0-5%
☐ Low 5-40%
☐ Moderate 40-60%
☐ Heavy 60-100%

SURFACE STABILITY EVALUATION

Date 9/3/15 Data Collector(s) PS, SL

Location Name: PLOT #3		Photographs taken: (Y) N (circle one)
Aspect:	Slope (degree):	Photograph notes:
Comments:		

EROSION FEATURE	POTENTIALLY PRESENT (Yes or No)	IDENTIFIED FACTORS	POSSIBLE FACTOR
Soil Movement	0	YES	14
Surface Litter	0	YES	14
Surface Rock Fragments	0	YES	14
Pedestals	0	YES	14
Flow Patterns	3	YES	15
Rills	0	YES	14
Gullies	0	YES	15
TOTAL	3		

Procedure: (refer to Erosion Condition Classification System publication if needed)

1) Observe the total sample area and determine the average condition.
2) Determine if each item is potentially present. Only the potentially present items will be considered in the total calculation (cross out pre-entered possible factor # if it is not potentially present).
3) For items potentially present, review the Erosion Condition Class (Soil Surface Factor) sheet and assign a numerical value to each erosion feature.
4) Total both the weighted values and the possible values.
5) Calculate the Total percent SSF: (identified factors / possible factors) x 100
6) Write the total percent and corresponding condition class in the box below.

SSF Range	Class
1-20%	Stable
21-40%	Slight
41-60%	Moderate
61-80%	Critical
81-100%	Severe

SSF % and Class:

3% STABLE

Comments (when applicable, include information on width, depth, uniformity, number per m^2 or height):

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Qualitative Monitoring

Site Name: PLOT #3 Date: 9/3/15

Data Collector(s): PS, SL Slope(%)/Aspect: /

Vegetation

	Reclamation Trial					Reference Site				
	Total Foliar Cover	Species 1/ % Cover	Species 2/ % Cover	Species 3/ % Cover	Species 4/ % Cover	Total Foliar Cover	Species 1/ % Cover	Species 2/ % Cover	Species 3/ % Cover	Species 4/ % Cover
Grass	20									
Forb	5									
Shrub	—									
Total	25	—	—	—	—		—	—	—	—
Weed	—									
Cover Crop		—	—	—	—	—	—	—	—	—
Rock	60	—	—	—	—		—	—	—	—
Litter	1	—	—	—	—		—	—	—	—
Bare Ground	14	—	—	—	—		—	—	—	—

Other Species: Grass	Other Species: Grass
Forb	Forb
Shrub	Shrub
Weed	Weed

Relative % Cover _____ (Disturbed Total (Grass+Forb+Shrub))/(Undisturbed Total (Grass+Forb+Shrub))

Additional Monitoring Methods

Seedling Count ☐Yes ☑No

Canopy Cover ☐Yes ☐No

Mulch
☑ None
☐ Fiber

Grazing
☐ Wildlife
☐ Livestock
☐ Both

Severity
☐ None 0-5%
☐ Low 5-40%
☐ Moderate 40-60%
☐ Heavy 60-100%

SURFACE STABILITY EVALUATION

Date 9/3/15 Data Collector(s) PS, SL

Location Name: PLOT # 2		Photographs taken: (Y) N (circle one)
Aspect:	Slope (degree):	Photograph notes:
Comments:		

EROSION FEATURE	POTENTIALLY PRESENT (Yes or No)	IDENTIFIED FACTORS	POSSIBLE FACTOR
Soil Movement	3	YES	14
Surface Litter	3	YES	14
Surface Rock Fragments	5	YES	14
Pedestals	0	YES	14
Flow Patterns	3	YES	15
Rills	0	YES	14
Gullies	0	YS	15
TOTAL	14		100

Procedure: (refer to Erosion Condition Classification System publication if needed)

1) Observe the total sample area and determine the average condition.
2) Determine if each item is potentially present. Only the potentially present items will be considered in the total calculation (cross out pre-entered possible factor # if it is not potentially present).
3) For items potentially present, review the Erosion Condition Class (Soil Surface Factor) sheet and assign a numerical value to each erosion feature.
4) Total both the weighted values and the possible values.
5) Calculate the Total percent SSF: (identified factors / possible factors) x 100
6) Write the total percent and corresponding condition class in the box below.

SSF Range	Class
1-20%	Stable
21-40%	Slight
41-60%	Moderate
61-80%	Critical
81-100%	Severe

SSF % and Class: 14 % STABLE

Comments (when applicable, include information on width, depth, uniformity, number per m^2 or height):

KC HARVEY ENVIRONMENTAL, LLC

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ENVIRONMENTAL, LLC

Qualitative Monitoring

Site Name: PLOT #2 Date: 9/3/15

Data Collector(s): PS, SL Slope(%)/Aspect: /

Vegetation

	Reclamation Trial					Reference Site				
	Total Foliar Cover	Species 1/ % Cover	Species 2/ % Cover	Species 3/ % Cover	Species 4/ % Cover	Total Foliar Cover	Species 1/ % Cover	Species 2/ % Cover	Species 3/ % Cover	Species 4/ % Cover
Grass	15									
Forb	0									
Shrub	0									
Total	15	—	—	—	—		—	—	—	—
Weed	0									
Cover Crop	0	—	—	—	—	—	—	—	—	—
Rock	60	—	—	—	—		—	—	—	—
Litter	3	—	—	—	—		—	—	—	—
Bare Ground	22	—	—	—	—		—	—	—	—

Other Species:	Other Species:
Grass	Grass
Forb	Forb
Shrub	Shrub
Weed	Weed

Relative % Cover _____ (Disturbed Total (Grass+Forb+Shrub))/(Undisturbed Total (Grass+Forb+Shrub))

Additional Monitoring Methods

Seedling Count ☐Yes ☑No

Canopy Cover ☐Yes ☑No

Mulch
☑None
☐ Fiber

Grazing
☐ Wildlife
☐ Livestock
☐ Both

Severity
☐ None 0-5%
☐ Low 5-40%
☐ Moderate 40-60%
☐ Heavy 60-100%

SURFACE STABILITY EVALUATION

Date 9/3/15 Data Collector(s) PS, SL

Location Name: PLOT #1		Photographs taken: (Y) N (circle one)
Aspect:	Slope (degree):	Photograph notes:
Comments:		

EROSION FEATURE	POTENTIALLY PRESENT (Yes or No)	IDENTIFIED FACTORS	POSSIBLE FACTOR
Soil Movement	YES	3	14
Surface Litter	YES	0	14
Surface Rock Fragments	YES	2	14
Pedestals	YES	0	14
Flow Patterns	YES	0	15
Rills	YES	0	14
Gullies	YES	0	15
TOTAL		5	5 /100

Procedure: (refer to Erosion Condition Classification System publication if needed)

1) Observe the total sample area and determine the average condition.
2) Determine if each item is potentially present. Only the potentially present items will be considered in the total calculation (cross out pre-entered possible factor # if it is not potentially present).
3) For items potentially present, review the Erosion Condition Class (Soil Surface Factor) sheet and assign a numerical value to each erosion feature.
4) Total both the weighted values and the possible values.
5) Calculate the Total percent SSF: (identified factors / possible factors) x 100
6) Write the total percent and corresponding condition class in the box below.

SSF Range	Class
1-20%	Stable
21-40%	Slight
41-60%	Moderate
61-80%	Critical
81-100%	Severe

SSF % and Class: 5%

Comments (when applicable, include information on width, depth, uniformity, number per m^2 or height):

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Qualitative Monitoring

Site Name: PLOT #1 Date: 9/3/15

Data Collector(s): PS, SL Slope(%)/Aspect: /

Vegetation

	Reclamation Trial					Reference Site				
	Total Foliar Cover	Species 1/ % Cover	Species 2/ % Cover	Species 3/ % Cover	Species 4/ % Cover	Total Foliar Cover	Species 1/ % Cover	Species 2/ % Cover	Species 3/ % Cover	Species 4/ % Cover
Grass	12									
Forb	—									
Shrub	1									
Total	12	—	—	—	—		—	—	—	—
Weed	—									
Cover Crop		—	—	—	—	—	—	—	—	—
Rock	70	—	—	—	—		—	—	—	—
Litter		—	—	—	—		—	—	—	—
Bare Ground	5	—	—	—	—		—	—	—	—

Other Species: Grass	Other Species: Grass
Forb	Forb
Shrub	Shrub
Weed	Weed

Relative % Cover _____ (Disturbed Total (Grass+Forb+Shrub))/(Undisturbed Total (Grass+Forb+Shrub))

Additional Monitoring Methods

Seedling Count ☐Yes ☐No

Canopy Cover ☐Yes ☐No

Mulch
☐ None
☐ Fiber

Grazing
☐ Wildlife
☐ Livestock
☐ Both

Severity
☐ None 0-5%
☐ Low 5-40%
☐ Moderate 40-60%
☐ Heavy 60-100%

SURFACE STABILITY EVALUATION

Date 10/29/15 Data Collector(s) P. STROH

Location Name: PLOT #3 (SOUTH)		Photographs taken: (Y) N (circle one)
Aspect:	Slope (degree):	Photograph notes:
Comments:		

EROSION FEATURE	POTENTIALLY PRESENT (Yes or No)	IDENTIFIED FACTORS	POSSIBLE FACTOR
Soil Movement	Y	3	14
Surface Litter	Y	3	14
Surface Rock Fragments	Y	2	14
Pedestals	Y	3	14
Flow Patterns	Y	3	15
Rills	Y	3	14
Gullies	Y	3	15
TOTAL		20	100

Procedure: (refer to Erosion Condition Classification System publication if needed)

1) Observe the total sample area and determine the average condition.
2) Determine if each item is potentially present. Only the potentially present items will be considered in the total calculation (cross out pre-entered possible factor # if it is not potentially present).
3) For items potentially present, review the Erosion Condition Class (Soil Surface Factor) sheet and assign a numerical value to each erosion feature.
4) Total both the weighted values and the possible values.
5) Calculate the Total percent SSF: (identified factors / possible factors) x 100
6) Write the total percent and corresponding condition class in the box below.

SSF Range	Class
1-20%	Stable
21-40%	Slight
41-60%	Moderate
61-80%	Critical
81-100%	Severe

SSF % and Class: 20% STABLE

Comments (when applicable, include information on width, depth, uniformity, number per m^2 or height):

KC HARVEY ENVIRONMENTAL, LLC

KC HARVEY
ENVIRONMENTAL, LLC

Qualitative Monitoring

Site Name: PLOT #3 (SOUTH) Date: 10/25/15

Data Collector(s): P. STROW Slope(%)/Aspect: /

Vegetation

	Reclamation Trial					Reference Site				
	Total Foliar Cover	Species 1/ % Cover	Species 2/ % Cover	Species 3/ % Cover	Species 4/ % Cover	Total Foliar Cover	Species 1/ % Cover	Species 2/ % Cover	Species 3/ % Cover	Species 4/ % Cover
Grass	12									
Forb	—									
Shrub	—									
Total	12	—	—	—	—		—	—	—	—
Weed	—									
Cover Crop	—	—	—	—	—	—	—	—	—	—
Rock	50	—	—	—	—		—	—	—	—
Litter	1	—	—	—	—		—	—	—	—
Bare Ground	37	—	—	—	—		—	—	—	—

Other Species: Grass	Other Species: Grass
Forb	Forb
Shrub	Shrub
Weed	Weed

Relative % Cover _____ (Disturbed Total (Grass+Forb+Shrub))/(Undisturbed Total (Grass+Forb+Shrub))

Additional Monitoring Methods

Seedling Count ☐Yes ☑~~No~~

Canopy Cover ☐Yes ☑~~No~~

Mulch
☑~~None~~
☐ Fiber

Grazing
☐ Wildlife
☐ Livestock
☐ Both

Severity
☐ None 0-5%
☐ Low 5-40%
☐ Moderate 40-60%
☐ Heavy 60-100%

SURFACE STABILITY EVALUATION

Date 10/27/15 Data Collector(s) A. STROZ

Location Name: PLOT #2 (MIDDLE)		Photographs taken: (Y) N (circle one)
Aspect:	Slope (degree):	Photograph notes:
Comments:		

EROSION FEATURE	POTENTIALLY PRESENT (Yes or No)	IDENTIFIED FACTORS	POSSIBLE FACTOR
Soil Movement	Y	3	14
Surface Litter	Y	3	14
Surface Rock Fragments	Y	2	14
Pedestals	Y	3	14
Flow Patterns	Y	6	15
Rills	Y	3	14
Gullies	Y	3	15
TOTAL		23	100

Procedure: (refer to Erosion Condition Classification System publication if needed)

1) Observe the total sample area and determine the average condition.
2) Determine if each item is potentially present. Only the potentially present items will be considered in the total calculation (cross out pre-entered possible factor # if it is not potentially present).
3) For items potentially present, review the Erosion Condition Class (Soil Surface Factor) sheet and assign a numerical value to each erosion feature.
4) Total both the weighted values and the possible values.
5) Calculate the Total percent SSF: (identified factors / possible factors) x 100
6) Write the total percent and corresponding condition class in the box below.

SSF Range	Class
1-20%	Stable
21-40%	Slight
41-60%	Moderate
61-80%	Critical
81-100%	Severe

SSF % and Class: 23% SLIGHT

Comments (when applicable, include information on width, depth, uniformity, number per m^2 or height):

KC HARVEY ENVIRONMENTAL, LLC

KC HARVEY
ENVIRONMENTAL, LLC

Qualitative Monitoring

Site Name: PLOT #2 (MIDDLE) Date: 10/27/15

Data Collector(s): P. SLOAN Slope(%)/Aspect: /

Vegetation

	Reclamation Trial					Reference Site				
	Total Foliar Cover	Species 1/ % Cover	Species 2/ % Cover	Species 3/ % Cover	Species 4/ % Cover	Total Foliar Cover	Species 1/ % Cover	Species 2/ % Cover	Species 3/ % Cover	Species 4/ % Cover
Grass	5									
Forb	—									
Shrub	—									
Total	5	—	—	—	—		—	—	—	—
Weed	—									
Cover Crop	—	—	—	—	—	—	—	—	—	—
Rock	60	—	—	—	—		—	—	—	—
Litter	2	—	—	—	—		—	—	—	—
Bare Ground	28	—	—	—	—		—	—	—	—

Other Species: Grass	Other Species: Grass
Forb	Forb
Shrub	Shrub
Weed	Weed

Relative % Cover _____ (Disturbed Total (Grass+Forb+Shrub))/(Undisturbed Total (Grass+Forb+Shrub))

Additional Monitoring Methods

Seedling Count ☐Yes ☑No

Canopy Cover ☐Yes ☑No

Mulch
☑None
☐ Fiber

Grazing
☐ Wildlife
☐ Livestock
☐ Both

Severity
☐ None 0-5%
☐ Low 5-40%
☐ Moderate 40-60%
☐ Heavy 60-100%

SURFACE STABILITY EVALUATION

Date 10/27/15 Data Collector(s) P. STOR

Location Name: PLOT # 1 (NORTH)		Photographs taken: (Y) N (circle one)
Aspect:	Slope (degree):	Photograph notes:
Comments:		

EROSION FEATURE	POTENTIALLY PRESENT (Yes or No)	IDENTIFIED FACTORS	POSSIBLE FACTOR
Soil Movement	Y	0	14
Surface Litter	Y	0	14
Surface Rock Fragments	Y	2	14
Pedestals	Y	2	14
Flow Patterns	Y	0	15
Rills	Y	0	14
Gullies	Y	0	15
TOTAL		4	

Procedure: (refer to Erosion Condition Classification System publication if needed)

1) Observe the total sample area and determine the average condition.
2) Determine if each item is potentially present. Only the potentially present items will be considered in the total calculation (cross out pre-entered possible factor # if it is not potentially present).
3) For items potentially present, review the Erosion Condition Class (Soil Surface Factor) sheet and assign a numerical value to each erosion feature.
4) Total both the weighted values and the possible values.
5) Calculate the Total percent SSF: (identified factors / possible factors) x 100
6) Write the total percent and corresponding condition class in the box below.

SSF Range	Class
1-20%	Stable
21-40%	Slight
41-60%	Moderate
61-80%	Critical
81-100%	Severe

SSF % and Class:
4% STABLE

Comments (when applicable, include information on width, depth, uniformity, number per m^2 or height):

KC HARVEY ENVIRONMENTAL, LLC

KC HARVEY
ENVIRONMENTAL, LLC

Qualitative Monitoring

Site Name: PLOT # 1 (NORTH) Date: 10/27/15

Data Collector(s): P. STRAW Slope(%)/Aspect: /

Vegetation

	Reclamation Trial					Reference Site				
	Total Foliar Cover	Species 1/ % Cover	Species 2/ % Cover	Species 3/ % Cover	Species 4/ % Cover	Total Foliar Cover	Species 1/ % Cover	Species 2/ % Cover	Species 3/ % Cover	Species 4/ % Cover
Grass	15									
Forb	—									
Shrub	—									
Total	15	—	—	—	—		—	—	—	—
Weed	—									
Cover Crop	—	—	—	—	—	—	—	—	—	—
Rock	73	—	—	—	—		—	—	—	—
Litter	2	—	—	—	—		—	—	—	—
Bare Ground	10	—	—	—	—		—	—	—	—

Other Species: Grass	Other Species: Grass
Forb	Forb
Shrub	Shrub
Weed	Weed

Relative % Cover _____ (Disturbed Total (Grass+Forb+Shrub))/(Undisturbed Total (Grass+Forb+Shrub))

Additional Monitoring Methods

Seedling Count ☐Yes ☐No

Canopy Cover ☐Yes ☐No

Mulch
☐ None
☑ Fiber

Grazing
☐ Wildlife
☐ Livestock
☐ Both

Severity
☐ None 0-5%
☐ Low 5-40%
☐ Moderate 40-60%
☐ Heavy 60-100%