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Natural Resource Stewardship and Science

Bird Surveys at Klondike Gold Rush NHP

2016 Summary

Natural Resource Report NPS/KLGO/NRR—2018/1590

ON THE COVER
Photograph of adult Arctic Terns sitting on scrape at nesting colony in Skagway, Alaska on June 20th, 2016.
Photograph courtesy of the Skagway Bird Club/ A. Beierly. Used with permission.

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Natural Resource Report NPS/KLGO/NRR—2018/1590

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Abstract

Coastal Waterbird Surveys (loons, grebes, cormorants, herons, ducks, and geese, plovers and sandpipers, gulls, alcids, and kingfishers) were conducted at Klondike Gold Rush National Historic Park in 2016. The surveys serve to document coastal waterbird distribution and abundance throughout the park. Seventeen surveys were conducted from April 27th to September 28th and 48 waterbird species were detected. The North American Breeding Bird Survey (BBS) and Alaska Landbird Monitoring Survey (ALMS) were conducted as part of a continuous monitoring program to document the diversity and abundance of avian species breeding in the area. Conducted in mid-June, BBS surveyors detected 42 species and ALMS surveyors detected 31 species. Bald eagle nest monitoring continued at five historically active nests, none of which were observed to successfully produce a fledgling.

In addition to the results of systematic surveys, this report documents opportunistic bird nest and brood sightings from Klondike Gold Rush National Historical Park.

Photo 1. Mew Gull in flight (left) - Photo courtesy of Cameron Eckert; Northern Shovelers and Blue-winged Teals (center) - Photo courtesy of Andrew Beierly; Scope and tripod in Census Unit 2 (right) - Photo courtesy of Shelby Surdyk.

Acknowledgments

The fieldwork conducted this year would not have been possible without the support of many dedicated volunteers: Mike Konsler, Autumn Roseberry, Carole Murphy, Cameron Eckert, Alicia Beverage, Nicole Kovacs, Colten Jared, Judy Fairbanks, Maxwell Lemke, Mary and Ed Roach, Betsy Albecker, and others. Special thanks go to Skagway Bird Club president, C.E. Furbish, for conducting Coastal Waterbird Surveys early this season, as well as for her guidance, training, and great company! Additional thanks go to C.E. Furbish for her essential involvement with the Arctic Tern Nesting Colony and Municipality of Skagway Migratory Bird Working Group, as well as the Arctic tern citizen science project. Lastly, thanks to Jami Belt, our Natural Resource Program Manager, for her endless support in the office and in the field.

We would also like to acknowledge all of the former wildlife technicians who initiated, expanded, and improved the bird monitoring program at Klondike Gold Rush NHP and whose research and data are reflected in this report.

Introduction

Klondike Gold Rush National Historical Park (KLGO) is located at the northern terminus of Alaska's Inside Passage. KLGO was established in 1976 to preserve the historic structures and trails associated with the Klondike Gold Rush of 1898-99. The Park also contains dynamic and diverse natural resources. The Park is relatively small by Alaska standards with scattered landholdings in three separate units totaling 53 km^2 (13,191 acres). Despite its size, the Park's unique geographic setting and climate make it one of the most biologically diverse areas in Alaska (Pojar and MacKinnon 1994, MacDonald and Cook 1999).

Although KLGO is located within the Northern Pacific Rainforest Bird Conservation Region (BCR), it also borders the Northwestern Interior Forest BCR, placing the park in a transition zone between two ecologically divergent geographic regions with distinct associations of avifauna (NABCI 2000). The Northern Pacific Rainforest BCR is characterized by a temperate maritime climate and extensive coniferous forests dominated by western hemlock (*Tsuga heterophylla*) and Sitka spruce (*Picea sitchensis*). The predominantly steep, rocky coastline is periodically interrupted by river valleys and estuarine and freshwater wetlands that provide critically important breeding, migration, and wintering habitat for populations of both waterbirds and landbirds (NABCI 2000). The Northwestern Interior Forest BCR is an ecologically diverse region with an array of habitats, including boreal forests dominated by black spruce (*Picea mariana*), white spruce (*Picea glauca),* paper birch (*Betula papyrifera*), and poplars (*Populus* spp.). There are also extensive areas of non-forest including tall shrub, alpine dwarf scrub, and shrub-graminoid communities. This BCR supports internationally significant populations of breeding shorebirds, waterfowl, and passerines (NABCI 2000). The portion of the Northwestern Interior Forest BCR bordering KLGO is characterized by high-elevation, mountainous terrain and alpine plant communities. These areas provide breeding habitat for several landbird species that rarely breed in the cool, wet, coastal rainforests of Southeast Alaska.

Long-term monitoring and baseline inventories help managers to make decisions that meet the National Park Service goal to maintain intact ecosystems in their natural state (Hahr and Trapp 2004). Base funding from KLGO was used to conduct Coastal Waterbird Surveys (CWS), targeting loons (*Gaviidae*), grebes (*Podicipedidae*), cormorants (*Phalacrocoracidae*), herons (*Ardeidae*), ducks and geese (*Anatidae*), plovers (*Charadriidae*), sandpipers (*Scolopacidae*), gulls (*Laridae*) and alcids (*Alcidae*) along the coastline from Skagway to Dyea, covering the Skagway and Taiya River mouths and Nahku Bay. Additional species were documented as opportunistic sightings when observed by NPS biologists and other knowledgeable birders.

The North American Breeding Bird Survey (BBS) route and two Alaska Landbird Monitoring Survey (ALMS) routes were sampled as part of state and nation-wide efforts to collect annual data of breeding bird abundance during the peak of the breeding season.

Lastly, the monitoring of five previously documented Bald Eagle nests in the Dyea and lower Chilkoot Trail areas continued this season. In order to enhance the data of future bald eagle nest monitoring, a Standard Operating Protocol continued to be developed during the 2016 field season.

Methods

Coastal Waterbird Survey

During the 2016 field season, eight survey areas, previously defined by Hahr and Trapp (2004), were assessed according to the Waterbird Monitoring Protocol for Klondike Gold Rush NHP (see SOP3: Conducting the Waterbird Survey Transect). Surveys were conducted once per week from April 27 to May 20, once every two weeks from June 6 to July 18, and again weekly from August 1 to September 28, with a total of 17 surveys. All waterbirds (detected by sight or sound within the survey area were recorded. Occasionally during previous years, Census Unit 1 (CU1) was only partially surveyed or dropped altogether. In 2016, the entire area of CU1 was surveyed completely during every CWS.

Counts of waterbirds were made by scanning each survey area with Zeiss 8x42 binoculars and a Bausch & Lomb 20-60 x 70 mm spotting scope until all waterbirds had been counted. Eagle Optics 8x42 binoculars and a Swarovski 25 x 60 mm scope were used for surveys after August 15, when park monitoring equipment was upgraded. All surveys were scheduled around a rising tide at Census Unit 7 such that the survey began two hours prior to high tide. This allowed for the maximum number of feeding shorebirds and waterfowl while keeping them relatively concentrated for identification and counting. Similarly, surveys were ideally conducted early in the morning when the wind was calm and there were not yet heat waves over the water. All data were recorded in a field notebook or field note pages, then transcribed to standardized data sheets adapted from Collins et al. (2001) back in the office. All data were entered into the Coastal Waterbird Microsoft Access database (T:\NRM\Birds\CoastalWaterbirdSurveys\Data\Coastal_Waterbird_Database). The methods are described in greater detail by Hahr and Trapp (2004).

North American Breeding Bird Survey & Alaska Landbird Monitoring Survey

The North American Breeding Bird Survey (BBS) was conducted on June 16, 2016. The standard BBS route is approximately 25 miles long with stops at half mile intervals (Appendix A. BBS Route Map). As per the SOP, a three minute point count was conducted at each of the 50 designated survey points and all birds seen and heard within a quarter mile radius were recorded. The survey began ½ hour before sunrise. Additional information on the standardized methods for conducting this survey can be found at http://www.pwrc.usgs.gov/BBS. The completed datasheets from 2016 are digitally archived on the KLGO network at T:\Museum Curator\Archives\Processed_Archives\ BREEDING_BIRD_SURVEY_2016.PDF.

There are two Alaska Landbird Monitoring Survey (ALMS), also called the Off-Road Breeding Bird Survey (ORBBS), routes in and around the Park. In 2016, they were surveyed on June 14 and 15. Each survey consisted of 12 stops located at least 250 m apart. Each point was surveyed for ten minutes (divided into three, five, eight, and ten minute time intervals) and all species detected were recorded. The survey began ½ hour before sunrise. See *SOP1: Conducting Surveys and Data Management* for additional information on the standardized methods. The completed datasheets from this 2016 are digitally archived on the KLGO network at T:\Museum Curator\Archives\Processed_Archives.

Bald Eagle Nest Monitoring

No standardized protocol had been established for monitoring bald eagle nests in the Park. Five historically known nests (CT01, DY01, DY02, TR02, TR03) were located again (Appendix A. Maps: Bald Eagle Nests) and observed in 2016. Each nest was observed for up to 10 minutes per visit. The number and age of visible birds and any behavioral observations were recorded in a field notebook.. The data were then entered into a Microsoft Access Database (T:\NRM\Birds\Eagles\Eagle_Nests).

A newly recorded bald eagle nest was located on the eastern hillside at the south end of the railroad dock, but observations were not made of this nest during the 2016 season due to inaccessibility when cruise ships were in port. The nest appeared old, though was not monitored or mapped by KLGO prior to 2016.

Results

Coastal Waterbird Surveys

A total of 17 surveys were conducted from April 27 to September 28, 2016. A total of 16,615 waterbirds, comprising 48 species from ten families, were documented (Table 1). The peak spring waterbird migration (greatest abundance and species richness) occurred between April 29 and May 9, 2016. While fewer species were documented in 2016 than in 2015, a species new to the park (Black Turnstone) was observed on the Dyea Flats on Aug 8, 2016. Additionally, 11 species of non-waterbirds were detected during surveys.

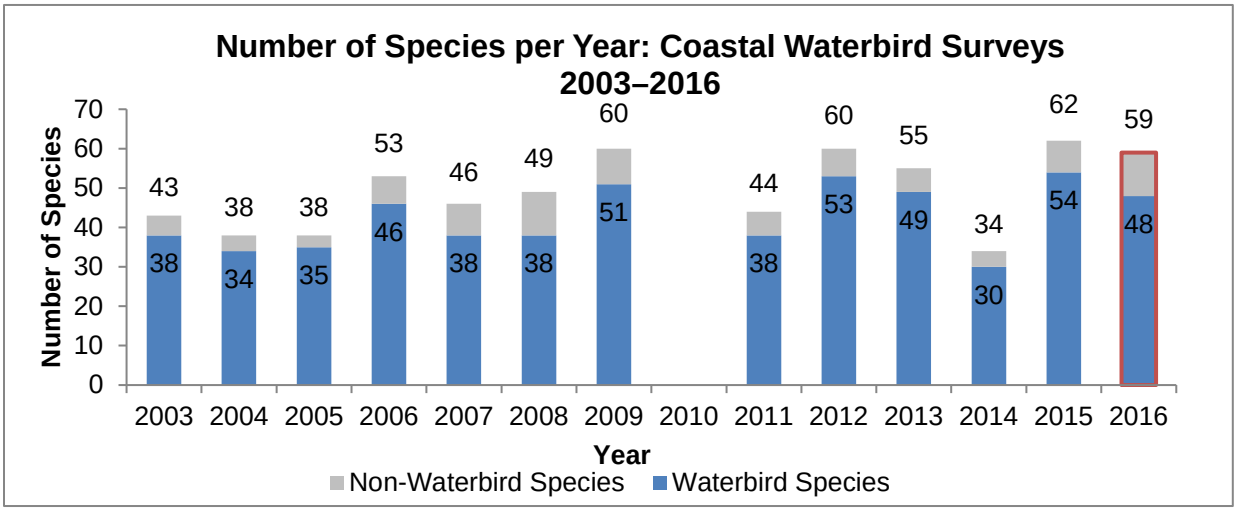

Figure 1. Number of waterbird species identified per year (blue with white labels), number of non-waterbird species identified per year (gray), and total number of species identified per year (black labels). The data from 2010 is omitted from this graph because there was no technician on staff that season responsible for the Coastal Waterbird Survey, and thus surveys were only conducted sporadically.

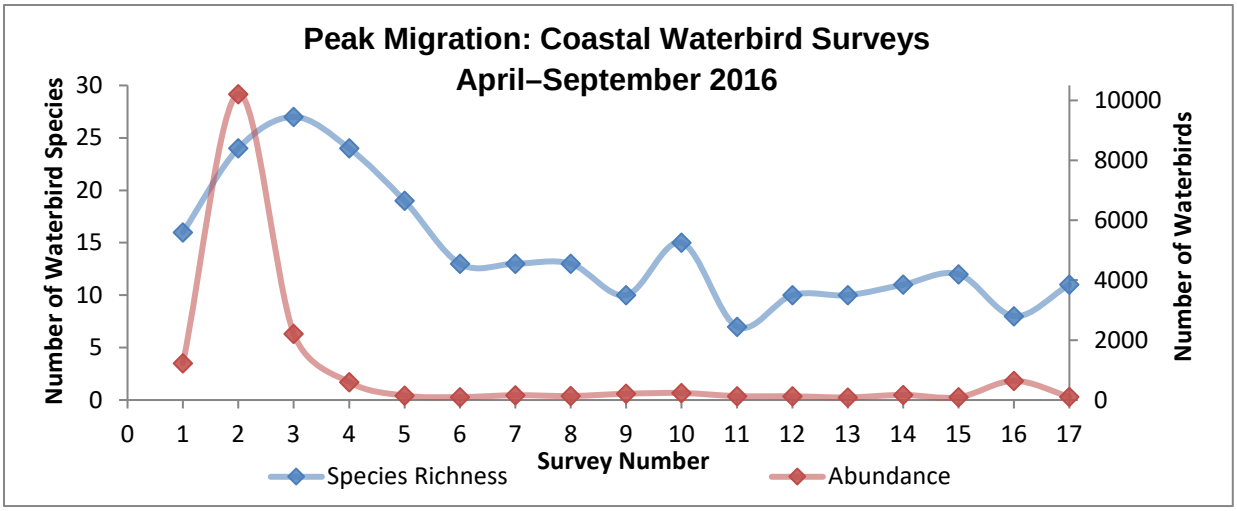

Figure 2. Number of waterbird species identified per survey (blue) and number of individual waterbirds counted per survey (red) during the 2016 monitoring season: Survey1 = 27 April, Survey17 = 28 Sept.

The Natural Resource Condition Assessment prepared for KLGO by Bernatz et al. (2011) provides a summary analysis of various observer bias that may influence trends in CWS data from 2003-2009. Linear regression of CWS data from 2003-2016 (prepared by the authors of this report) showed no significant association between species richness and year of survey (Figure 3). However, when 2014 data was excluded from the analysis (surveys began one month later than usual that year) we see a positive trend, R-squared value = 0.54 (Figure 3).

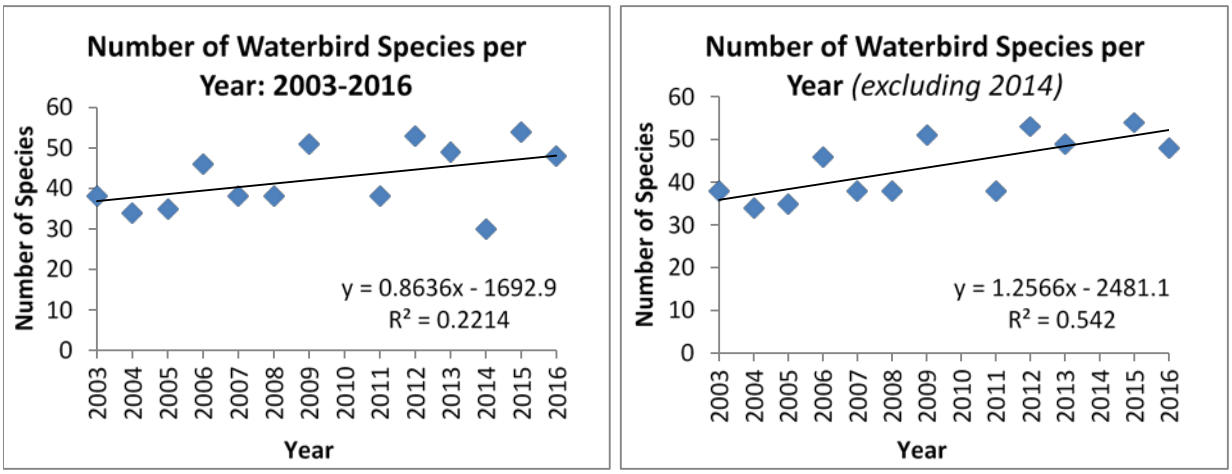

Figure 3. Number of waterbird species detected during each year of KLGO's CWS 2003-2016 (left), and the same graph excluding 2014 (right).

Table 1. Waterbird species observed during the 2016 Upper Taiya Inlet Coastal Waterbird Surveys.

Order	Family	Subfamily	Scientific Name	Common Name	Individuals Observed	Max. Number	Date of Max.	First Obs.	Last Obs.	# Surveys Detected
Anseriformes	Anatidae	Anserinae	*Anser caerulescens*	Snow Goose	7	7	4 May	4 May	4 May	1
	Anatidae	Anserinae	*Cygnus buccinator*	Trumpeter Swan	2	2	11 May	11 May	11 May	1
	Anatidae	Anatinae	*Spatula discors*	Blue-winged Teal	3	3	6 Jun	6 June	6 June	1
	Anatidae	Anatinae	*Spatula clypeata*	Northern Shoveler	127	58	11 May	27 April	20 May	4
	Anatidae	Anatinae	*Mareca penelope*	Eurasian Wigeon	1	1	27 April	27 April	27 April	1
	Anatidae	Anatinae	*Mareca americana*	American Wigeon	163	76	27 April	27 April	28 Sep	7
	Anatidae	Anatinae	*Anas platyrhynchos*	Mallard	626	228	27 April	27 April	28 Sep	17
	Anatidae	Anatinae	*Anas acuta*	Northern Pintail	18	10	4 May	27 April	11 May	3
	Anatidae	Anatinae	*Anas crecca*	Green-winged Teal	174	61	4 May	27 April	15 Sep	11
	Anatidae	Anatinae	*Aythya collaris*	Ring-necked Duck	5	5	20 May	20 May	20 May	1
	Anatidae	Anatinae	*Aythya marila*	Greater Scaup	2	2	11 May	11 May	11 May	1
	Anatidae	Anatinae	*Aythya affinis*	Lesser Scaup	34	16	4 May	4 May	8 Sep	4
	Anatidae	Anatinae	*Histrionicus histrionicus*	Harlequin Duck	106	33	20 May	4 May	28 Sep	8
	Anatidae	Anatinae	*Melanitta perspicillata*	Surf Scoter	4096	2452	4 May	27 April	19 Sep	11
	Anatidae	Anatinae	*Melanitta fusca*	White-winged Scoter	17	11	11 May	11 May	20 May	2
	Anatidae	Anatinae	*Melanitta nigra*	Black Scoter	1	1	6 June	6 June	6 June	1
	Anatidae	Anatinae	*Clangula hyemalis*	Long-tailed Duck	2	1	20 May	20 May	20 June	2
	Anatidae	Anatinae	*Bucephala albeola*	Bufflehead	144	59	4 May	27 April	8 Sep	5
	Anatidae	Anatinae	*Bucephala clangula*	Common Goldeneye	1	1	4 May	4 May	4 May	1

* Species listed in Table 1 have been organized in taxonomic sequence according to the 2017 American Ornithological Society's Checklist Supplement.

Table 1 (continued). Waterbird species observed during the 2016 Upper Taiya Inlet Coastal Waterbird Surveys.

Order	Family	Subfamily	Scientific Name	Common Name	Individuals Observed	Max. Number	Date of Max.	First Obs.	Last Obs.	# Surveys Detected
Anseriformes (continued)	Anatidae	Anatinae	*Bucephala islandica*	Barrow's Goldeneye	113	103	4 May	27 April	11 May	3
	Anatidae	Anatinae	*Lophodytes cucullatus*	Hooded Merganser	2	1	15, 28 Sep	15 Sep	28 Sep	1
	Anatidae	Anatinae	*Mergus merganser*	Common Merganser	155	45	20 May	27 April	28 Sep	15
	Anatidae	Anatinae	*Mergus serrator*	Red-breasted Merganser	249	103	4 May	27 April	19 Sep	9
Podicipediformes	Podicipedidae	-	*Podiceps auritus*	Horned Grebe	5	3	6 Jun	11 May	6 June	2
	Podicipedidae	-	*Podiceps grisegena*	Red-necked Grebe	1	1	6 Jun	6 June	6 June	1
Charadriiformes	Charadriidae	Charadriinae	*Charadrius semipalmatus*	Semipalmated Plover	4	4	29 Aug	29 Aug	29 Aug	1
	Scolopacidae	Arenariinae	*Arenaria melanocephala*	Black Turnstone	1	1	8 Aug	8 Aug	8 Aug	1
	Scolopacidae	Arenariinae	*Calidris minutilla*	Least Sandpiper	2	2	4 May	4 May	4 May	1
	Scolopacidae	Arenariinae	*Calidris pusilla*	Semipalmated Sandpiper	114	110	4 May	4 May	18 July	2
	Scolopacidae	Tringinae	*Actitis macularius*	Spotted Sandpiper	15	7	6 Jul	6 June	29 Aug	7
	Scolopacidae	Tringinae	*Tringa incana*	Wandering Tattler	6	5	20 May	20 May	1 Aug	2
	Scolopacidae	Tringinae	*Tringa flavipes*	Lesser Yellowlegs	9	5	1 Aug	11 May	1 Aug	3
	Scolopacidae	Tringinae	*Tringa melanoleuca*	Greater Yellowlegs	6	2	18 Jul	27 April	18 July	2
	Alcidae	-	*Brachyramphus marmoratus*	Marbled Murrelet	140	63	20 May	4 May	28 Sep	12
	Alcidae	-	*Cepphus columba*	Pigeon Guillemot	1	1	6 Jun	6 June	6 June	1
	Laridae	Larinae	*Chroicocephalus philadelphia*	Bonaparte's Gull	1100	656	4 May	27 April	28 Sep	15

* Species listed in Table 1 have been organized in taxonomic sequence according to the 2017 American Ornithological Society's Checklist Supplement.

Table 1 (continued). Waterbird species observed during the 2016 Upper Taiya Inlet Coastal Waterbird Surveys.

Order	Family	Subfamily	Scientific Name	Common Name	Individuals Observed	Max. Number	Date of Max.	First Obs.	Last Obs.	# Surveys Detected
Charadriiformes (continued)	Laridae	Larinae	*Larus canus*	Mew Gull	3540	2351	4 May	27 April	28 Sep	17
	Laridae	Larinae	*Larus argentatus*	Herring Gull	1008	803	4 May	27 April	15 Sep	14
	Laridae	Larinae	*Larus glaucoides thayeri*	Thayer's Gull	2093	2080	4 May	4 May	20 May	3
	Laridae	Larinae	*Larus glaucescens*	Glaucous-winged Gull	565	532	4 May	4 May	28 Sep	7
	Laridae	Larinae	*Larus hyperboreas*	Glaucous Gull	8	3	8 Sep	27 April	19 Sep	4
	Laridae	Sterninae	*Sterna paradisaea*	Arctic Tern	224	62	6 July	4 May	18 July	7
Gaviiformes	Gaviidae	-	*Gavia immer*	Common Loon	1	1	6 Jul	6 July	6 July	1
	Gaviidae	-	*Gavia pacifica*	Pacific Loon	2	2	4 May	4 May	4 May	1
	Gaviidae	-	*Gavia stellata*	Red-throated Loon	6	4	6 Jul	6 June	9 Sep	3
Pelicaniformes	Ardeidae	-	*Ardea herodias*	Great Blue Heron	49	11	11 May	11 May	8 Aug	8
Coraciiformes	Alcedinidae	-	*Megaceryle alcyon*	Belted Kingfisher	11	2	20 May, 24 Aug	11 May	15 Sep	9

* Species listed in Table 1 have been organized in taxonomic sequence according to the 2017 American Ornithological Society's Checklist Supplement.

North American Breeding Bird Survey & Alaska Landbird Monitoring Survey

The North American Breeding Bird Survey (BBS) documented the presence of 42 species (Table 2) and the Alaska Landbird Monitoring Survey (ALMS) documented the presence of 31 species (Table 3). A total of 46 species were documented between the two surveys.

Table 2. Species detected during the Breeding Bird Survey conducted on June 16, 2016.

Scientific Name	Common Name
Setophaga ruticilla	American Redstart
Turdus migratorius	American Robin
Spizella arborea	American Tree Sparrow
Sterna Paradisaea	Arctic Tern
Haliaeetus leucocephalus	Bald Eagle
Hirundo rustica	Barn Swallow
Ceryle alcyon	Belted Kingfisher
Poecile rufescens	Chestnut-backed Chickadee
Corvus corax	Common Raven
Geothlypis trichas	Common Yellowthroat
Junco hyemalis	Dark-eyed Junco (Oregon)
Passerella iliaca	Fox Sparrow
Larus glaucescens	Glaucous-winged Gull
Regulus satrapa	Golden-crowned Kinglet
Ardea Herodias	Great Blue Heron
Empidonax hammondii	Hammond’s Flycatcher
Catharus guttatus	Hermit Thrush
Larus argentatus	Herring Gull
Melospiza lincolnii	Lincoln's Sparrow
Falco columbarius	Merlin
Corvus caurinus	Northwestern Crow
Oreothlypis celata	Orange-crowned Warbler
Troglodytes pacificus	Pacific Wren
Empidonax difficilis	Pacific-slope Flycatcher
Spinus pinus	Pine Siskin
Loxia curvirostra	Red Crossbill
Sphyrapicus ruber	Red-breasted Sapsucker
Regulus calendula	Ruby-crowned Kinglet
Selasphorus rufus	Rufous Hummingbird
Passerculus sandwichensis	Savannah Sparrow
Dendragapus fuliginosus	Sooty Grouse

Table 2 (continued). Species detected during the Breeding Bird Survey conducted on June 16, 2016.

Scientific Name	Common Name
Actitis macularius	Spotted Sandpiper
Cyanocitta stelleri	Steller's Jay
Catharus ustulatus	Swainson's Thrush
Setophaga townsendi	Townsend's Warbler
Tachycineta bicolor	Tree Swallow
Ixoreus naevius	Varied Thrush
Tachycineta thalassina	Violet-green Swallow
Vireo gilvus	Warbling Vireo
Piranga ludoviciana	Western Tanager
Cardellina pusilla	Wilson's Warbler
Setophaga coronata	Yellow-rumped Warbler

Table 3. Species detected during the Alaska Landbird Monitoring Survey (ALMS) conducted on June 14 and 15, 2016.

Scientific Name	Common Name
Empidonax alnorum	Alder Flycatcher
Setophaga ruticilla	American Redstart
Turdus migratorius	American Robin
Poecile rufescens	Chestnut-backed Chickadee
Spizella passerina	Chipping Sparrow
Corvus corax	Common Raven
Geothlypis trichas	Common Yellowthroat
Junco hyemalis	Dark-eyed Junco (Oregon)
Passerella iliaca	Fox Sparrow
Regulus satrapa	Golden-crowned Kinglet
Empidonax hammondii	Hammond's Flycatcher
Catharus guttatus	Hermit Thrush
Melospiza lincolnii	Lincoln's Sparrow
Parkesia noveboracensis	Northern Waterthrush
Corvus caurinus	Northwestern Crow
Troglodytes pacificus	Pacific Wren
Empidonax difficilis	Pacific-slope Flycatcher
Spinus pinus	Pine Siskin
Sphyrapicus ruber	Red-breasted Sapsucker
Regulus calendula	Ruby-crowned Kinglet

Table 3 (continued). Species detected during the Alaska Landbird Monitoring Survey (ALMS) conducted on June 14 and 15, 2016.

Scientific Name	Common Name
Passerculus sandwichensis	Savannah Sparrow
Dendragapus fuliginosus	Sooty Grouse
Cyanocitta stelleri	Steller's Jay
Catharus ustulatus	Swainson's Thrush
Setophaga townsendi	Townsend's Warbler
Ixoreus naevius	Varied Thrush
Tachycineta thalassina	Violet-green Swallow
Vireo gilvus	Warbling Vireo
Piranga ludoviciana	Western Tanager
Cardellina pusilla	Wilson's Warbler
Setophaga coronata	Yellow-rumped Warbler

Bald Eagle Nest Monitoring

In 2016, observations were made of five historically active Bald Eagle nests (CT01, DY01, DY02, TR02, and TR03) periodically between May 19th and August 8th, 2016, for a total of 29 observations. One additional observation was made on September 28th, 2016. Breeding activity was observed at two nests, TR02 and DY01, but neither was observed to have successfully produced offspring. A map of Bald Eagle Nests, and description of nest sites are in Appendix A and Appendix B, respectively.

In 2015, TR01 and TR02 were suspected to be the same nest, just viewed from two different observation points. Today there is only one nest in the vicinity, so TR01 was not monitored in 2016 and should be removed from the Bald Eagle nest map.

TR02

Nine observations were made of TR02 between May 19th and September 28th, 2016. Only one observation point from the Taiya River Bridge was used to view the nest in 2016, although one attempt was made to get a better view on the east bank of the Taiya River. On May 19th, one adult was observed sitting low on the nest, with only its head visible. The nest was half obscured by cottonwood leaves and the adult was able to lower its head until it was no longer visible. No other Bald Eagle was seen in the area on that day. No Bald Eagles were observed on the nest after May 19th, but an adult was observed north of the bridge on June 20th. Two adults with two juveniles were later observed feeding and flying on the river bank just south of the bridge on September 29th, but it is unclear whether they originated from TR02.

DY01

Ten observations were made of DY01 between May 19th and August 8th, 2016. Two observation points were used to view the nest in 2016; one from Yakutania Point, and the other from Kalen's

Landing road overlook (CWS Census Unit 5, Observation Point 1). An adult Bald Eagle was first observed perched on the nest tree on May 19th. An adult was later seen on the nest during a CWS survey on June 6th. On June 20th and July 6th, an adult was observed perched on the nest tree. No Bald Eagles were detected in the surrounding area on July 11th, but two adults were perched together just below and south of DY01 on July 18th. No Bald Eagles were detected near DY01 when checked for the last time on August 8th.

Reily Lovejoy, security officer at the cruise ship docks, reported seeing a pair of adult Bald Eagles on a nest on the east hillside at the south end of the railroad docks on April 23rd. One of the KLGO avian technicians was shown the nest by Colten Jared (welder for White Pass) in early June, and at that time saw no Bald Eagles on the nest or in the area. When asked in late July, Reily reports having not seen an adult Bald Eagle on the railroad dock nest since April. This nest should be mapped and added to the Park database.

Discussion

Coastal Waterbird Surveys

The Coastal Waterbird Survey (CWS) has been conducted every year at KLGO from 2003 to the present. However, there has been variation in the number of surveys and length of monitoring season between years. In 2009, surveys were conducted during every month of the year, as opposed to only April through September for most other years. In 2010, surveys were only conducted sporadically, because there was no seasonal technician on staff whose duty was to conduct the surveys. In 2014, the first surveys did not occur until May 22nd (about one month later than usual) and thus the diversity and abundance of the spring migration was not captured in the data. These examples demonstrate ways in which the date of earliest survey, length of monitoring season, frequency of surveys, and other measures of observer "effort" have varied between years, making comparative analysis of the waterbird data difficult. The high turnover rate of observers and variation in level of experience identifying birds further complicate multi-year analyses. Species detection tends to increase as observers gain knowledge of local species and their habitat use. All of these factors may have influenced the 2016 results.

Since the CWS began in 2003, it has been suspected that peak spring waterbird migration occurs in tandem with the spring eulachon *(Thaleichthys pacificus)* run (Hahr and Trapp, 2004). This year, the spring eulachon run in the Skagway and Taiya Rivers, which started on approximately April 21, corresponded with the peak abundance of waterbirds recorded on May 4th. Species richness was also second highest on May 4th, and peaked on May 11th. A new monitoring program will be implemented in the Taiya River in 2017 to develop a baseline population estimate for eulachon. The new program, combined with additional wildlife surveys during the run, may help researchers to better understand the relationship between waterbird migration and spring eulachon runs.

Large numbers of Thayer's Gulls were observed feeding on eulachon this spring. Throughout the season, 2,093 individuals were documented. Prior to 2016, Thayer's Gulls were only documented in 2004, 2010, and 2015, with a total of 200 individuals. Because these gulls are easily confused with other species, it is likely that this dramatic increase is due to misidentification, rather than an influx of individuals.

Photo 2. Gulls feeding on eulachon in the Taiya River (left) - Photo courtesy of Cameron Eckert; Thayer's Gull in flight (right) - Photo courtesy of Cameron Eckert.

North American Breeding Bird Survey & Alaska Landbird Monitoring Survey

This year the BBS and ALMS were conducted by Deb Rudis, a retired biologist (previously with the US Fish and Wildlife Service, USFWS, in Juneau), with assistance from KLGO Natural Resource Program Manager, Jami Belt. Deb has been the primary observer for both surveys for most years that they have taken place. A notable exception is 2014, when Matt Klostermann, another biologist and former US Fish and Wildlife Service employee from Juneau, conducted them instead. While it is valuable that the annual surveys continued without interruption, observer variation should be taken into consideration when comparing data across seasons. USFWS has created an accessible database that will allow contributing parks and agencies to access their long-term data, enabling further analysis in future years.

Arctic Tern Nesting Colony and Municipality of Skagway Migratory Bird Working Group (Ad Hoc Committee)

In August 2015, the Municipality of Skagway (MOS) established a Migratory Bird Working Group (MBWG) in response to local concerns about the failure of an Artic Tern nesting colony near the mouth of the Skagway River. While the cause of colony failure was not known with certainty, the site was heavily disturbed by heavy machinery and staged gravel piles, and no longer appeared to be suitable nesting habitat at the time that the MBWG was formed. Coastal Waterbird Survey data collected by KLGO were shared with the Skagway Bird Club (SBC), which published a detailed account of Artic Tern observations and disturbances to the nesting colony in 2015, and is available on the SBC website at: https://sites.google.com/site/skagwaybirdclub/home-1/bird-monitoring-activities/local-histories/arctic-tern.

Over the winter, the NPS continued to play a role in providing technical assistance to the MBWG as they developed recommendations for the MOS regarding best practices for minimizing disturbance to migratory birds. Three accomplishments of the MBWG were:

1) Ensuring that the Municipality notified all lessees of the Migratory Bird Treaty Act and the USFWS recommendations for compliance.

2) Ensuring that staged gravel be removed from nesting habitat prior to the return of Arctic Terns in the spring of 2016.

3) Supporting SBC efforts to run a citizen-science monitoring program of the Arctic Tern nesting colony in 2016 (more information at: https://sites.google.com/site/skagwaybirdclub/home-1/bird-monitoring-activities/arctic-tern-colony-monitoring).

4) Directly contacting TEMSCO, a Helicopter company that sub-leases part of the property used by the Arctic Tern colony as nesting habitat, to notify them of nest locations and request permission to set cones near vulnerable nests.

Arctic Terns returned to the nesting colony location in April, and the MBWG was officially disbanded by the Mayor in June 2016. All minutes from MBWG meeting are available at: http://www.skagway.org/index.asp?SEC=35CCD68B-4ADB-4C73-B439-

56161C05176C&Type=B_BASIC. The final report of the SBC citizen-science project will be made available on the SBC website.

Raptor Sightings

The abundance, density, and richness of predatory avian species are often used to assess the health of avian prey populations, which include waterfowl and passerines. While the focus of the CWS is to track distribution and abundance of waterbird species, an inventory of raptor species may help managers to monitor ecosystem change over time. For this reason, a list of raptor species observed during the 2016 CWS was compiled. Raptors were documented during the survey, as well as opportunistically throughout the census unit.

Table 4. Five bird of prey species were documented during the Coastal Waterbird Surveys between April-Sept. 2016.

AOU Common Name	#Observations	Date	Locations
Bald Eagle	73	21 April-29 Sep	All census units
Northern Harrier	6	27 April-19 Sep	Dyea
Osprey	1	6 June	Yakutania Point
Red-tailed Hawk	1	6 July	Nahku Bay
Sharp-shinned Hawk	7	8 Aug-28 Sep	Dyea

Raptor sightings throughout KLGO were also documented by the Skagway Bird Club and on eBird. These data may contribute to a greater understanding of raptor presence in the park. To access these data, visit the Skagway Bird Club list-serve at https://groups.google.com/forum/#!forum/skagway-bird-club, and eBird at http://ebird.org/ebird/explore.

Additional Bird Nest and Brood Sightings

On July 14, 2016, Jami Belt observed a female Harlequin Duck with two chicks on the Taiya River. They were seen north of Canyon City, on the Chilkoot Trail.

On July 6, 2016, Shelby Surdyk observed two Spotted Sandpiper chicks on the south end of the Dyea Flats, near the pilings. Two adult Spotted Sandpipers were present as well.

Invasive Species

Eurasian Collared Doves were reported during a Coastal Waterbird Survey and on the Skagway Bird Club list-serve. On June 3, 2016, two doves were spotted in a Skagway resident's backyard in town. On August 3, 2016, Mike Konsler saw two doves on a powerline near the train. A single dove was seen by Shelby Surdyk on a telephone pole near the Ore Terminal on August 1, 2016.

Conclusions & Recommendations

Coastal Waterbird Surveys should continue for further baseline data on the occurrence, distribution, abundance, and habitat association of species. Surveys should be conducted weekly from April 15 to May 15 and from August 10 to September 30 to best document the spring and fall migrations. If a technician is not available late season, surveys can discontinue in mid-September. We also recommend that a future technician and the Natural Resource Program Manager review the protocol for assigning "Breeding Status" for birds counted during CWS. There are inconsistencies over the years, particularly when assigning the status of "possible" (O) or "probable" (X). See page 32 for reference to this that needs correction.

In previous reports, inconsistencies and difficulties in gull identification have been cited as a problem for the CWS. In 2016, we adopted two strategies for identifying gulls. First, during the spring migration, when "mega-flocks" of thousands of gulls were present in Dyea and Skagway, we adopted a strategy of estimating entire flock sizeand recording proportions of unidentified "large adult *Larus* gulls," "small adult *Larus* gulls," "large immature gulls," and "small immature gulls." Outside of the spring migration mega-flocks, gulls were only identified to species when in close range for a long enough time to achieve a confident look at key features (size, head shape, wing tips, legs, beak, and eyes), otherwise they were recorded as ULGU (unidentified *Larus* gull), such as in the case of fly-overs or when too far away. We recommend that this strategy continue to be employed in the future. Furthermore, prior to conducting surveys, participants in the CWS should become familiar with all gull species that are observed in the park. This is especially true for Thayer's gulls, which may have been misidentified in the past.

Currently there is no protocol established for recording passerine species detected at Coastal Waterbird Survey points. In past years, it has been recommended that if observers are reliably experienced, they could conduct brief point-count surveys in conjunction with the CWS to begin establishing baseline passerine data across the entire season for the Skagway area. We recommend that future technicians review this idea with the Natural Resource Program Manager. Before implementing a new passerine monitoring effort, the following questions should be considered: How much of a time commitment would it add to field work (including the time spent reviewing reference materials for unsure identifications) and office work (data entry, management, reporting)?; Where would the data be stored (a new access database?) and how would it be shared or reported?; Would the turnover rate of seasonal technicians allow for meaningful analysis of the data in the long-term?

In 2015, the preparation of a draft protocol for Bald Eagle monitoring was initiated. Ideally, this protocol would contain 6 parts:

SOP 1. Field Methods and Routine Spot Checks
SOP 2. Bald Eagle Nest Locations and Observation Points
SOP 3. Field Preparation
SOP 4. Data Entry, Verification, and Editing
SOP 5. Database Management
SOP 6. Data Analysis and Reporting.

In addition to finishing the remaining SOPs, it is recommended that a future technician populate the nest characteristic fields in the Nest ID table in the database (Eagle_Nest.mdb). Further, a regional Bald Eagle biologist with USFWS should be contacted to review the draft SOPs and establish a plan for sharing data/results of Bald Eagle monitoring efforts in KLGO.

It is probable that there are undocumented Bald Eagle nests in the Skagway/Dyea area. In 2015, a local river guide from Skagway Float Tours reported that he had seen Bald Eagles carrying nesting material (branches) into the trees on the hill south of the raft take-out in Dyea on three separate occasions, and he suspects that there is a nest somewhere near there. If searches for new Bald Eagle nests are conducted in the future, the hillsides around Nahku Bay, Sturgill's Landing, and the Dyea road might be good places to start.

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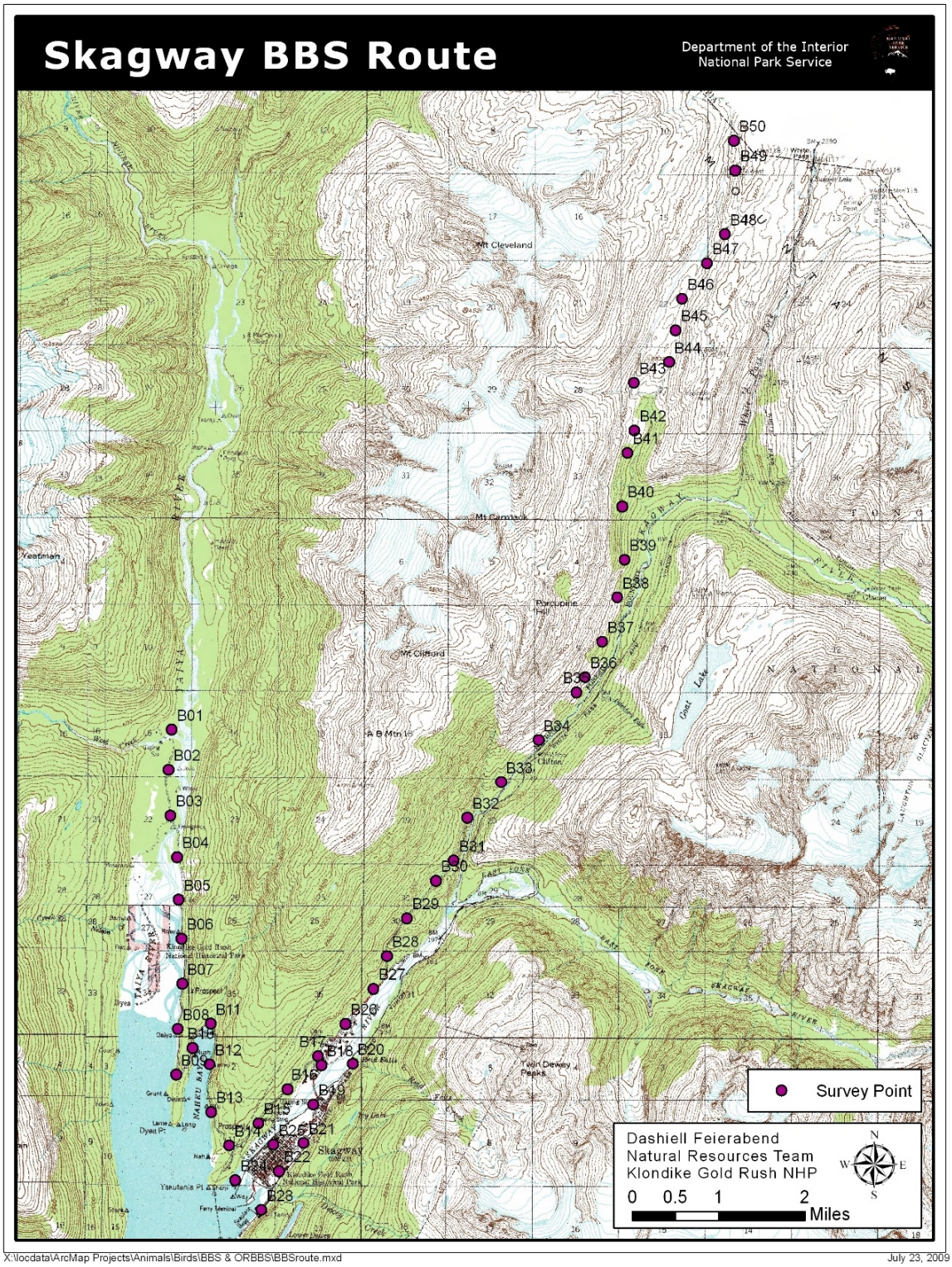
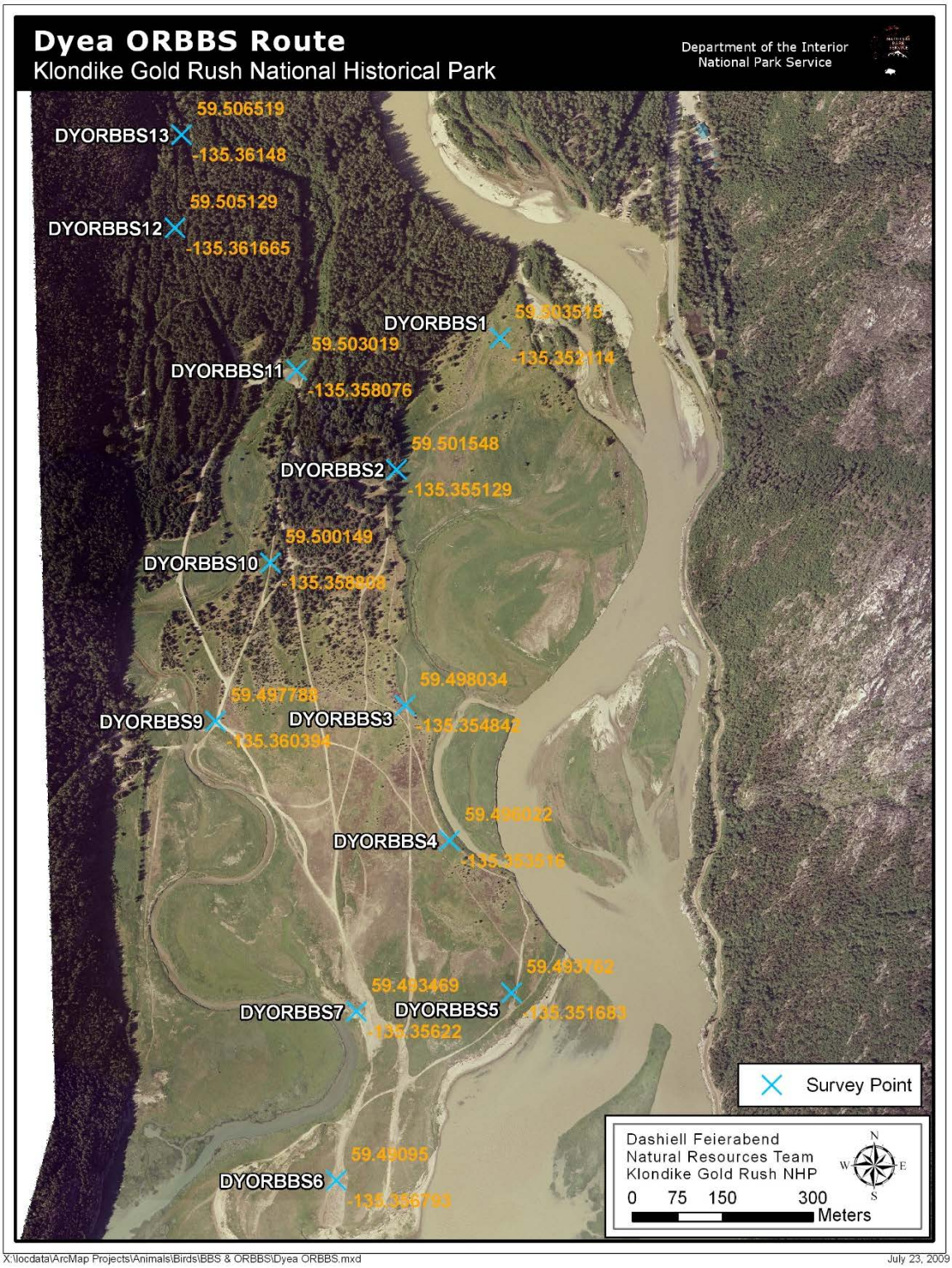
Appendix A. Maps

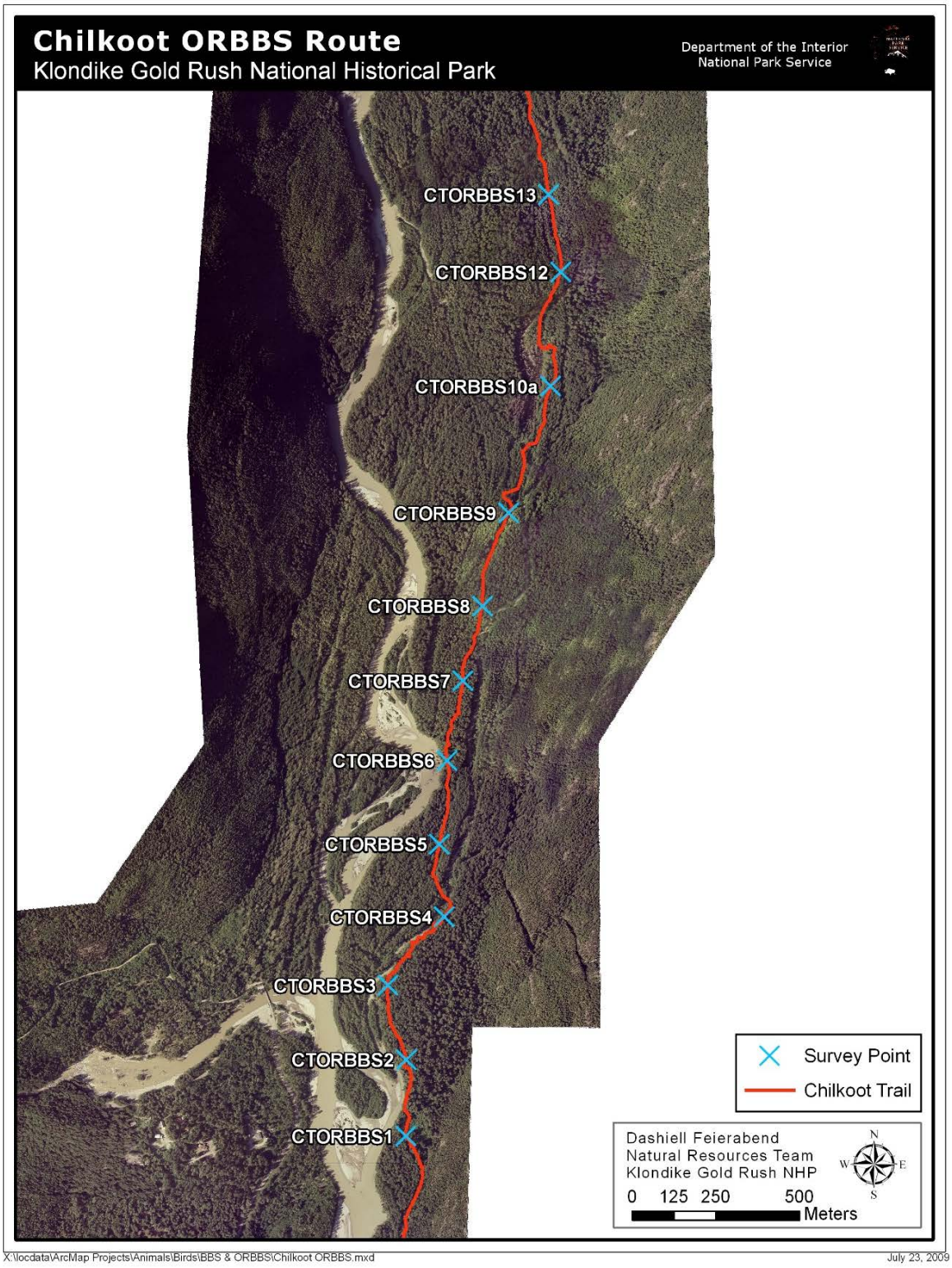
BBS Route Map



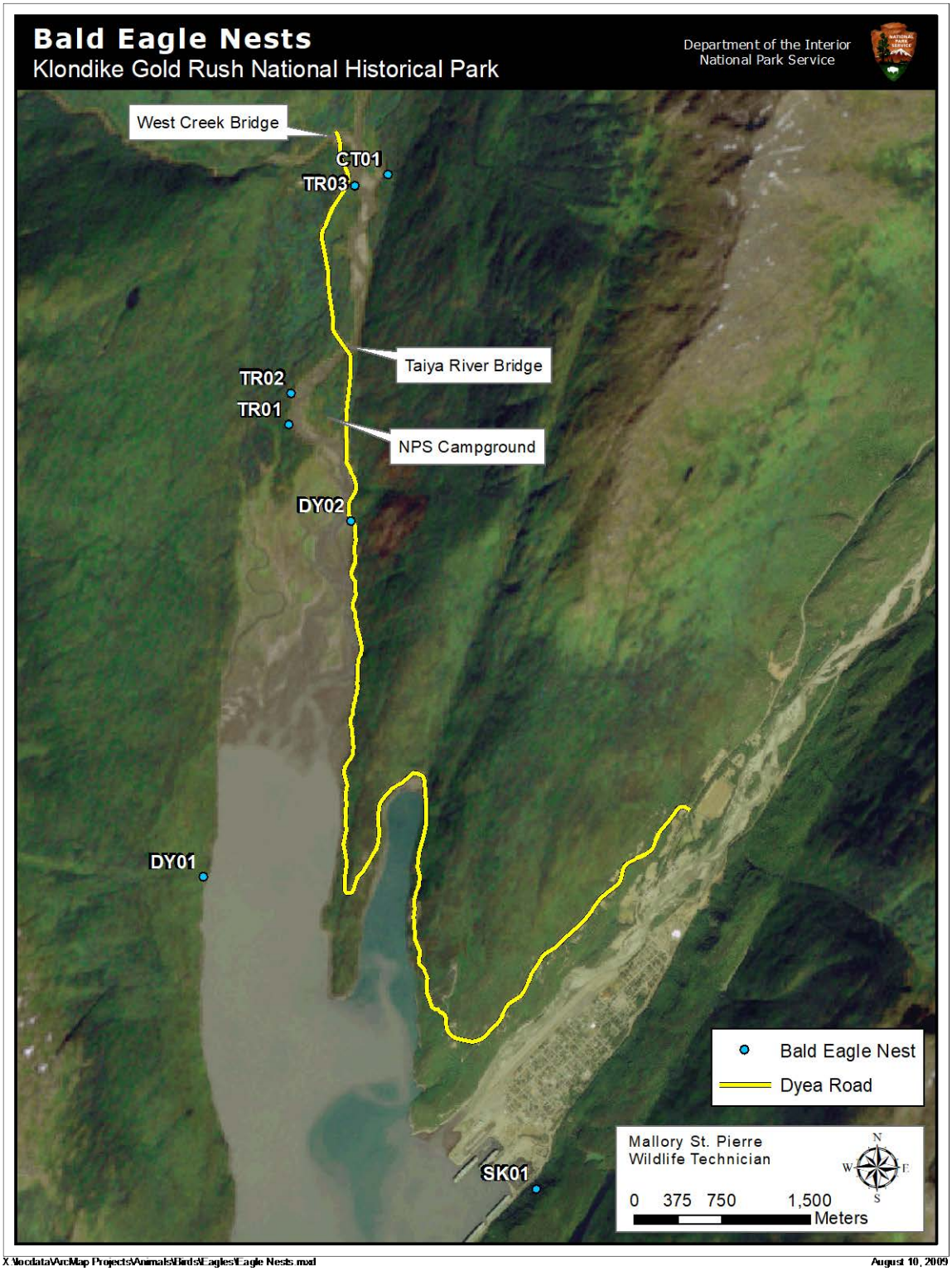
ALMS Dyea Route Map



ALMS Chilkoot Route Map



Bald Eagle Nest Map



Appendix B. Historic Bald Eagle Nest Site Descriptions

CT01 – The nest is located in a cottonwood tree on the east side of the Chilkoot Trail, approximately 1.5 miles from the trailhead. It is very difficult to see and is best sighted before the leaves come out on the vegetation. Walk just north of the second wooden bridge on the trail, then look east-southeast to find it. It may not be observable later in the summer because of the thick vegetation.

DY01 – The nest was mapped almost directly across the Taiya Inlet from the coastal waterbird census unit 5 observation point. It could not be located in 2009 or 2011.

DY02- Newly constructed in 2014, this nest is located just north of Hackett Hill, on the East side of the Dyea road.

SK01 – The nest was mapped east of the Skagway small boat harbor but could not be located in 2009 or 2011. This nest is no longer monitored.

TR01 – The nest is located near the top of a cottonwood tree approximately 30 m above ground level on the west bank of the Taiya River, across from the NPS Dyea Campground. The nest is approximately 4 ft in diameter (widest point at outer rim) and 3 ft deep (external base to top or rim). It can be viewed without disturbance from the east at the TR01 boreal toad monitoring site adjacent to the Taiya River. It can also be viewed at a greater distance from the river bank west of the Dyea Road, just south of the NPS Dyea Campground turnoff. Larger nestlings can be seen from these viewing points, but eggs are too low in the nest to be seen. TR01 could not be located in 2011, and appears that the nest or nest tree is no longer standing.

TR02 – The nest is located in a cottonwood tree on the west bank of the Taiya River, just north of the NPS Dyea Campground. It can be viewed from east on the Taiya River Bridge. Nestlings can probably be seen from this viewing point, although eggs are too low in the nest to be seen.

TR03 – The nest is located in a cottonwood tree approximately 20 m above the ground on the west bank of the Taiya River, south of the West Creek confluence and north of the Kalvick House. The nest is approximately 6 ft in diameter and 4 ft deep. It can be viewed from the north on the west bank of the Taiya River, which is approached through the gravel quarry on the east side of the Dyea Road just south of the West Creek Bridge. Nestlings can probably be seen from this viewing point, although eggs are likely too low in the nest to be seen.

SOP3 Conducting the Waterbird Survey Transect

Waterbird Monitoring Protocol for Klondike Gold Rush National Historical Park, Skagway, Alaska
Standard Operating Procedure (SOP) # 3
Conducting the Waterbird Survey Transect
Version 1.00 (April 9, 2009)

Revision History Log:

Previous Version #	Revision Date	Author	Changes Made	Reason for Change	New Version #

This SOP gives step-by-step instructions for conducting waterbird surveys by census unit at Klondike Gold Rush NHP, including data collection and completion of the data form "KLGO Coastal Waterbird Survey Data Form" (Form 1).

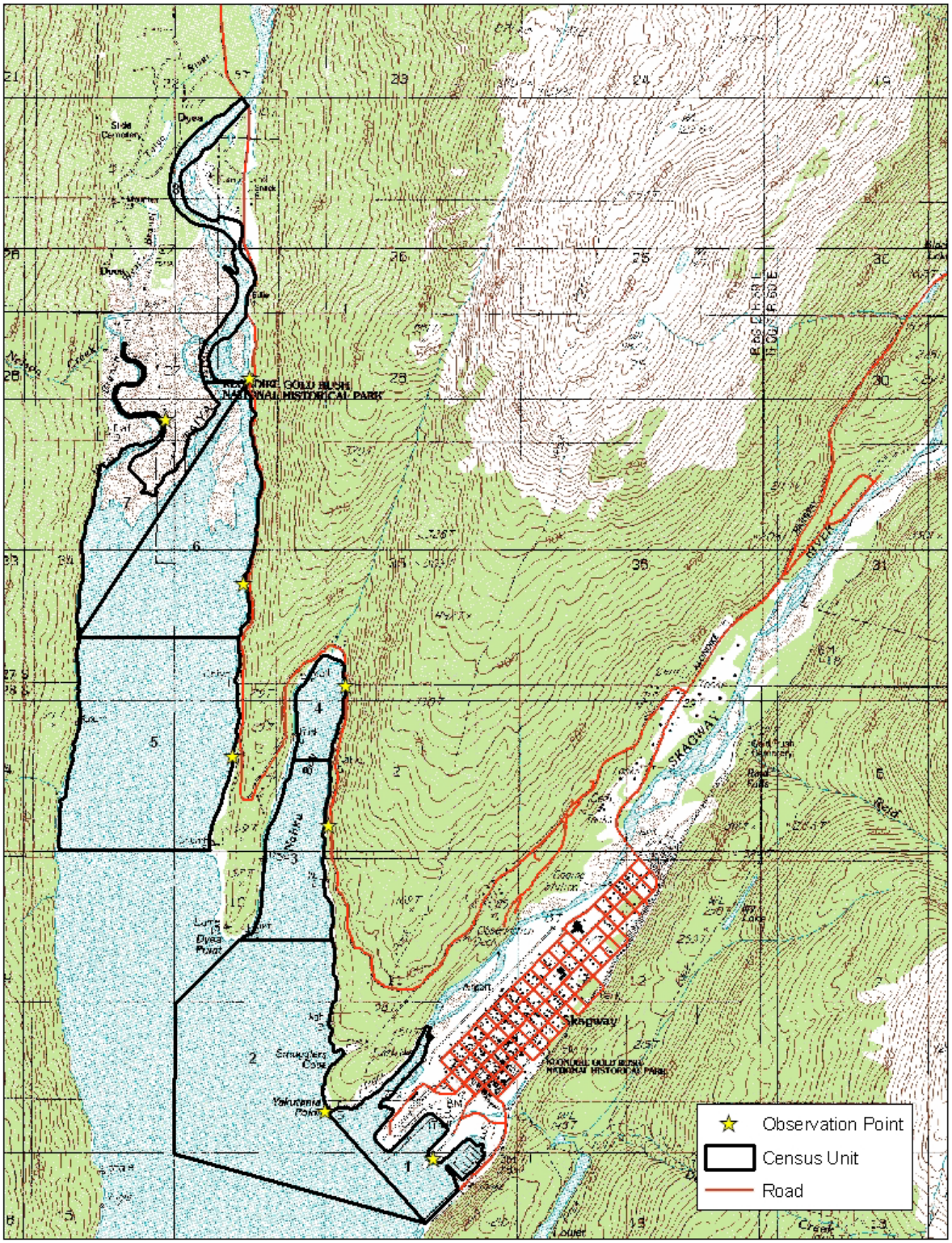
Procedures:

1. Prior to the day of the survey, determine the times of high and low tides as well as the weather forecast. Wind is the most problematic weather variable in Skagway. Because it is typically lightest in the morning, and because convection heat waves over water increase through the day, surveys are best conducted as early as daylight and tide will allow.
2. Sampling should be scheduled around a high tide in Dyea such that the survey of Census Unit #7 begins approximately two hours before high tide. The tidal flats in Dyea can be very expansive during low tide, inhibiting the ability of the surveyor to accurately count all shorebirds in the area. By conducting the survey on a rising mid-tide, the surveyor gains the advantage of having the greatest number of shorebirds using the tidal habitat in a more concentrated area for counting. This scheduling also means that Census Unit 1 is conducted during low tide, which allows for the most expansive, yet manageable, intertidal foraging area at the Skagway River mouth.
3. Avoid conducting surveys in high winds or heavy precipitation. These conditions inhibit bird activity and impair your ability to see and hear birds. In general, counts should not be conducted if wind strength on the Beaufort Scale is a sustained 5 or greater (see Table 5.01.1), or if it is raining hard or snowing (rain code $\geq$6 in Table 5.01.2). If you encounter these conditions, wait until the weather improves or else cancel the sampling for the day and try again on another day. If conditions do not improve during the week of scheduled surveys,

it may be necessary to endure such weather, especially during migration periods when the possibility of identifying rare species outweighs the cost of relatively inaccurate counts.

4. Begin the census at either CU1 (CU2 if CU1 is not being surveyed due to cruise ship interference) in Skagway or CU7 in Dyea, navigating to the starting point using the survey map (Figure 4.01.1). The order of units surveyed then is 1, 2, 3, 4, 5, 6, 8, 7, or the inverse. CU8 is surveyed between CU6 and CU7 because of its proximity to the Dyea road. It is important that the surveys take place in this sequence in order to minimize double counting by reducing travel time between units. Take into account the tides and drive time when choosing the starting census unit.

Figure 3.01.1 KLGO Waterbird Census Units



5. Once you arrive at the starting observation point, begin the count as soon as possible. You can fill in the following location, event, and weather conditions information at the top of the form at the beginning or end of the census unit.

Observers: Record the first and last names of primary and secondary observers.

Census Unit: Record the number of the census unit being surveyed.

Tide State: Record the tide state (High/Mid/Low; Rising/Falling) at the start of the census unit survey. High and low tide are separated by approximately six hours. The high tide category extends from two hours before to two hours after high tide. Similarly, the low tide category extends from two hours before to two hours after low tide. Mid tide consists of the two hours between the high and low tide categories. A rising tide begins at the exact time of low tide and ends at the apex of high tide. A falling tide begins at the exact time of high tide and ends at the nadir of low tide. You may temporarily record "Unknown" in the field, but tides should be referenced and the appropriate categories reentered on the data sheet upon returning to the office.

Temperature: Record the temperature at the starting point of the census unit, rounded to the nearest degree Celsius.

Date (MM/DD/YY): Record the date of the survey in the form Month/Day/Year.

Start Time (24 hour HH/MM): Record the time at start of the census unit survey in 24 hour format using four digits (e.g. 9:00 AM is recorded as 09:00, and 1:00 PM is recorded as 13:00).

End Time (24 hour HH/MM): Record the time at end of the census unit survey in 24 hour format using four digits.

Cloud (0-3): Record the cloud code (0 through 3) from the following Table 4.01.1 as it applies to the cloud cover at the start of the census unit survey. If there is a considerable change in conditions (e.g. greater than two codes), describe the change in the Event Notes section.

Table 3.01.1. Codes used to record cloud cover during bird counts.

Cloud Code	Explanation
0	*Clear*, less than 10 percent cloud cover
1	*Scattered*, 10-50 percent cloud cover
2	*Broke*n, 50-90 percent cloud cover
3	*Overcast*, more than 90 percent cloud cover oven entire sky

Precipitation (0-10): Record the precipitation code (0 through 10) from the following Table 4.01.2 as it applies to conditions during the census unit survey. If there is a considerable change in conditions (e.g. greater than two codes), describe the change in the Event Notes section.

Table 3.01.2. Codes used to record precipitation codes during bird counts.

Precipitation Code	Explanation
0	None
1	Fog
2	Drizzle
3	Showers (intermittent rain)
4	Light rain
5	Moderate (steady) rain
6	Heavy rain
7	Sleet
8	Light snow
9	Moderate snow
10	Heavy snow

Wind Speed (0-5): Record the wind code (0 through 5) from the following Table 4.01.3 as it applies to the strength of the wind during the census unit survey. Record the average wind condition during the survey, not the maximum condition (do not worry about gusts).

Table 3.01.3. Codes (Beaufort scale) used to record wind strength during bird counts.

Wind Code	Wind Speed (miles/hour)	Explanation
0	Less than 1	Air calm; smoke rises vertically
1	1 to 3	Direction of wind shown by smoke drift
2	4 to 7	Wind felt on face; leaves rustle; wind vanes moved by wind
3	8 to 12	Leaves and small twigs in constant motion; wind extends light flag
4	13 to 18	Raises dust, loose paper; small branches are moved
5	19 to 24	Small trees in leaf begin to sway; crested wavelets form on inland waters

Wind Direction: Record the direction from which the wind is coming during the census unit survey in degrees, to the nearest 5 degrees (e.g. 353 degrees should be recorded at 355 degrees, and 352 degrees should be recorded as 350 degrees). For an exact north wind, use 0 degrees instead of 360 degrees.

Wave Height (0-5): Record the wave height code (0 through 5) from the following Table 4.01.4 that applies to the conditions during the census unit survey.

Table 3.01.4. Codes used to record wave height during bird counts.

Wave Height	Explanation
0	*Calm*, sea surface smooth and mirror-like
1	*0.1 m*, scaly ripples, no foam crests
2	*0.1-0.5 m*, small wavelets, crests glassy, no breaking
3	*0.5-1.0 m*, large wavelets, crests begin to break, scattered whitecaps
4	*1.0-1.5 m*, small waves, becoming longer, numerous whitecaps
5	*1.5-2.0 m*, moderate waves, taking longer form, many whitecaps, some spray

Event Notes: Record any significant notes about the census unit survey, such as a considerable change in weather, visibility impediments, breaks in the survey, or cancellation of the survey.

Both binoculars and spotting scope should be used. It is often best to do an initial scan with binoculars in order to quickly note the positions of birds before any movement occurs. If possible, scan continuously from one end of the census unit to the other before doubling back to check unsure identifications. The spotting scope is necessary for viewing the far sides of all census units, so it should be carried in all census units. Make sure to listen for bird calls and frequently scan your surroundings with a naked eye, as flyovers are often missed when using only magnified lenses. Waterbirds that are only aurally detected should be recorded as such if identifiable.

For each bird heard or seen, record the following information on the "KLGO Coastal Waterbird Survey Data Form":

Species: Record the four letter AOU common name code of the species detected (e.g. BAEA for Bald Eagle). A full list of AOU codes can be found at T:\NRM\Birds\Misc\Alpha Codes. Several individuals of a single species can be recorded on more than one line if needed.

Number: Record the number of individuals counted for each species detected.

Age: Record the age category (Adult, Immature, Juvenile, Mixed, Unknown) of the individuals counted. “Immature” is used for species with multi-year maturation periods such as gulls and eagles, as well as male ducks in 1st winter plumage. If the year of immaturity is known, record in the notes for that individual (e.g. 1st; 2nd; 3rd; 1st winter). “Mixed” should be used only when multiple age groups are present and individual identification is not possible, such as large feeding groups of diving ducks.

Composition (Sex): Record the sex (Male, Female, Female/Juvenile, Mixed, Unknown) of the individuals counted. “Female/Juvenile” can be used for species with juvenile males so close in appearance to adult females that distinguishing between the two is not possible. “Mixed” should be

used only when multiple age groups are present and individual identification is not possible, such as large feeding groups of scoters.

Breeding Status: Record the breeding criteria code for the individuals counted. If multiple pairs are discernible within a larger group of individuals, note the number of pairs separate from the other individuals.

Observations: Record any noteworthy behavioral observations, identifying features, or general comments that seem appropriate and that might help someone interpret and analyze the data correctly.

If an unidentified species was seen in the field and characteristics were recorded for later identification, that process should take place in the office immediately following the survey using reference materials.

Example for filling in the field data form

KLGO Coastal Waterbird Survey Data Form

Observer(s) Dashiell Feierabend

Census Unit # 7 Tide State: HIGH-TIDE (MID-TIDE) LOW-TIDE R (F) U

Date: Month 0 4 / Day 0 8 / Year 0 9 Start Time 0 9 1 5 (24 hours) End Time 1 0 2 0 (24 hours) Temp 0 4 °C

Wind: 0 (1) 2 3 4 5 Cloud: 0 1 (2) 3 Precip: (0) 1 2 3 4 5 6 7 8 9 10

WDir 1 9 0 ° Wave Height: 0 (1) 2 3 4 5 Event Notes: Numerous boats traveling through census unit during survey

Species	Number	Age & Composition	Breeding Status	Observations
MALL	2	1 Ad M; 1 Ad F	P	Pair with Juvenile.
MALL	1	1 Juv Unk	O	Juvenile with Pair.
BAEA	1	Imm Unk	O	2nd year plumage in southwest corner of Dyea flats.
CORA	1	Unk	O	Auditory only. East side of flats.

In the example above, five birds were detected. In the first record, two adult Mallards (MALL) – a male and a female – were seen together along with a juvenile of unknown sex. Next, an immature Bald Eagle (BAEA) was observed in southwest Dyea flats. It was determined to have 2nd year plumage, and was described as such in the Observations field. Because it was an immature bird, it was given the breeding status O (observed) despite the fact that it was in appropriate breeding habitat during the breeding season. Finally, a Common Raven (CORA) was heard but not visually seen in the east side of the flats, and the observation notes describe that.

KLGO Coastal Waterbird Survey Data Form

Observer(s) _____

Census Unit # [ ] Tide State: HIGH-TIDE MID-TIDE LOW-TIDE R F U

Date Month [ ][ ] / Day [ ][ ] / Year [ ][ ] Start Time [ ][ ][ ][ ] (24 hours) End Time [ ][ ][ ][ ] (24 hours) Temp [ ][ ] °C

Wind: 0 1 2 3 4 5 Cloud: 0 1 2 3 Precip: 0 1 2 3 4 5 6 7 8 9 10

WDir [ ][ ][ ] ° Wave Height: 0 1 2 3 4 5 Event Notes:

Species	Number	Age & Composition	Breeding Status	Observations

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WIND SPEED CODES: (Enter Beaufort numbers, not m.p.h.)

Beaufort Number	Wind Speed (miles/hr)	Indicators of Wind Speed
0	Less than 1	Air calm; smoke rises vertically.
1	1 to 3	Direction of wind shown by smoke drift but not by wind vanes.
2	4 to 7	Wind felt on face; leaves rustle; wind vanes moved by wind.
3	8 to 12	Leaves and small twigs in constant motion; wind extends light flag.
4	13 to 18	Raises dust, loose paper; small branches are moved.
5	19 to 24	Small trees in leaf begin to sway; crested wavelets form on inland waters.

TIDE STATE:

R	*Rising*
F	*Falling*
U	*Unknown*

CLOUD COVER CODES:

0	*Clear*, less than 10 percent cloud cover.
1	*Scattered*, 10-50 percent cloud cover.
2	*Broken*, 50-90 percent cloud cover.
3	*Overcast*, more than 90 percent cloud cover over entire sky.

PRECIPITATION CODES:

0	*None.*
1	*Fog.*
2	*Drizzle.*
3	*Showers* (intermittent rain).
4	*Light rain.*
5	*Moderate (steady) rain.*
6	*Heavy rain.*
7	*Sleet.*
8	*Light snow.*
9	*Moderate snow.*
10	*Heavy snow.*

WAVE/SWELL HEIGHT CODES:

0	*Calm*, sea surface smooth and mirror-like.
1	*0.1 m*, scaly ripples, no foam crests.
2	*0.1-0.5 m*, small wavelets, crests glassy, no breaking.
3	*0.5-1.0 m*, large wavelets, crests begin to break, scattered whitecaps.
4	*1.0-1.5 m*, small waves, becoming longer, numerous whitecaps.
5	*1.5-2.0 m*, moderate waves, taking longer form, many whitecaps, some spray.

BREEDING CRITERIA CODES:

Code[1] — **Evidence**

OBSERVED:

O—Species (male or female) **observed** in a block during its breeding season, but no evidence of breeding. Not in suitable nesting habitat. Includes wide ranging species such as vultures or raptors, or a colonial nesting species not at the nesting colony.

POSSIBLE:

X—Species (male or female) observed in suitable nesting habitat during its breeding season.

XS—Singing/drumming/booming male present in suitable nesting habitat during its breeding season.

XT—Multiple singing males of a species, evenly spaced in suitable nesting habitat during their breeding season.

PROBABLE:

P—**Pair** observed in suitable habitat during its breeding season.

S—Permanent territory presumed through **song** at same location on at least two occasions 7 days or more apart.

T—Permanent **territory** presumed through defense of territory (chasing individuals of the same species).

C—**Courtship** behavior or **copulation**.

N—Visiting probable **nest-site**.

A—**Agitated** behavior or anxiety calls from adult.

B—Nest **building** by wrens or excavation of holes by woodpeckers.

CONFIRMED:

CN—**Carrying nesting** material, such as sticks or other material. Please submit full details including location within the block of the observation.

NB—**Nest building** at the actual nest-site.

PE—**Physiological evidence** of breeding (e.g. highly vascularized, edematous incubation [brood] patch or egg in oviduct based on bird in hand. To be used by experienced bird banders on local birds during the nesting season).

DD—**Distraction display** or injury feigning.

UN—**Used nests** or eggshells found. Caution: these must be carefully identified, if they are to be accepted.

PY—**Precocial young**. Flightless young of precocial species restricted to the natal area by dependence on adults or limited ability.

FL—Recently **fledged** young (either precocial or altricial) incapable of sustained flight, restricted to natal area by dependence on adults or limited mobility.

ON—**Occupied nest**: adults entering or leaving a nest site in circumstances indicating occupied nest. To be used for nests which are too high (eg the tops of trees) or enclosed (eg chimneys) for the contents to be seen.

CF—**Carrying food**: adult carrying food for the young.

FY—Adult feeding recently **fledged** young.

FS—Adult carrying fecal **sac**.

NE—**Nest** with **egg(s)**.[2]

NY—**Nest** with young seen or heard.[2]

Notes:

1. The **letter code** is entered by the field workers in the appropriate space on the field report form. **Possible** and **Probable** categories are represented by single letters or a symbol. **Confirmed** by double letters. Letters have been selected as a mnemonic aid, keyed to bolded words in criteria definitions.

2. Presence of cowbird eggs or young is confirmation of both cowbird and host species.

WIND SPEED CODES: (Enter Beaufort numbers, not m.p.h.)

Beaufort Number	Wind Speed (miles/hr)	Indicators of Wind Speed
0	Less than 1	Air calm; smoke rises vertically.
1	1 to 3	Direction of wind shown by smoke drift but not by wind vanes.
2	4 to 7	Wind felt on face; leaves rustle; wind vanes moved by wind.
3	8 to 12	Leaves and small twigs in constant motion; wind extends light flag.
4	13 to 18	Raises dust, loose paper; small branches are moved.
5	19 to 24	Small trees in leaf begin to sway; crested wavelets form on inland waters.

TIDE STATE:

R	*Rising*
F	*Falling*
U	*Unknown*

CLOUD COVER CODES:

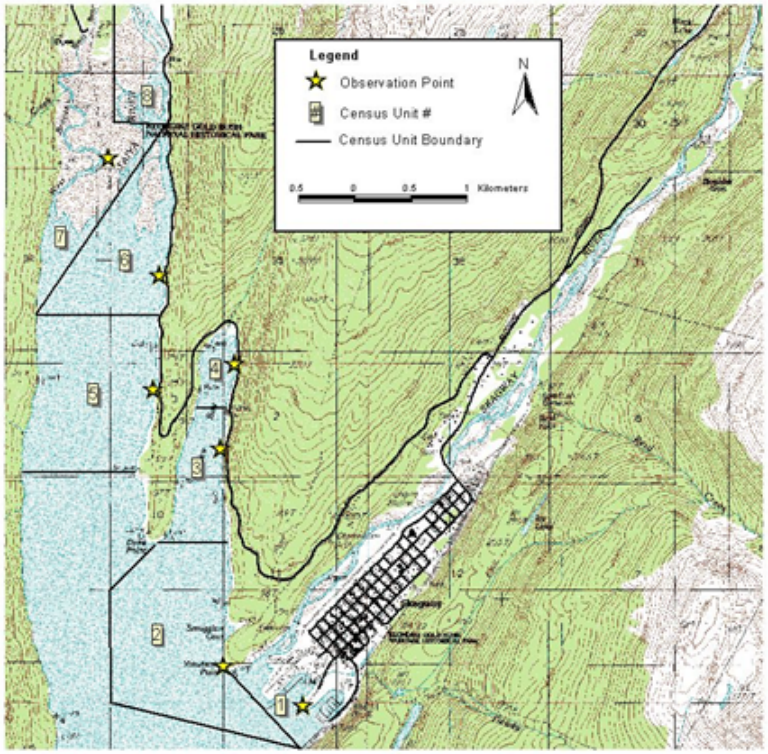
0	*Clear*, less than 10 percent cloud cover.
1	*Scattered*, 10-50 percent cloud cover.
2	*Broken*, 50-90 percent cloud cover.
3	*Overcast*, more than 90 percent cloud cover over entire sky.

PRECIPITATION CODES:

0	*None.*	**6**	*Heavy rain.*
1	*Fog.*	**7**	*Sleet.*
2	*Drizzle.*	**8**	*Light snow.*
3	*Showers* (intermittent rain).	**9**	*Moderate snow.*
4	*Light rain.*	**10**	*Heavy snow.*
5	*Moderate (steady) rain.*		

WAVE/SWELL HEIGHT CODES:

0	*Calm*, sea surface smooth and mirror-like.
1	*0.1 m*, scaly ripples, no foam crests.
2	*0.1-0.5 m*, small wavelets, crests glassy, no breaking.
3	*0.5-1.0 m*, large wavelets, crests begin to break, scattered whitecaps.
4	*1.0-1.5 m*, small waves, becoming longer, numerous whitecaps.
5	*1.5-2.0 m*, moderate waves, taking longer form, many whitecaps, some spray.



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KLGO COASTAL WATERBIRD SURVEY

Census Unit Descriptions

CENSUS UNIT #1

Skagway Harbor Area and River Mouth.--Start the survey by walking from the Harbor Master's office down the small boat harbor access ramp south to the docks. Continue walking along the east dock to the end looking down each slip sequentially (make sure to look for gulls on the tops of poles). Turn right and continue to the end of the south dock to the small boat harbor entrance. From there, turn around and walk back up the south ramp and out onto the harbor breakwall to near the end. Scan the outer harbor area to just beyond the east ship dock where the shoreline curves inward and disappears from view (make sure to look for waterfowl beneath the dock amongst the pilings).

When finished, walk back along Congress Way around the small boat harbor to the State Ferry Terminal parking lot. From there, walk around the north end of the ship harbor scanning beneath the pilings and then back along the west sidewalk south to the northwest corner of the Ferry Terminal. Scan the rest of the outer harbor area out parallel to Yakutania Point. Then, take a quick walk around the Terminal out onto the Ferry dock.

Next, walk back up Broadway and take the sidewalk along the railroad tracks northwest to the Skagway River foot bridge that goes to Yakutania Point. Survey up river to the end of the airport runway and downstream to the river mouth (look for shorebirds on the east side of the river below Temsco Helicopters where there is a small tidal wetland area). Continue walking across the foot bridge and down the foot path toward Yakutania Point. Where the path turns right to go to Yakutania Point, continue straight ahead out onto the rocky point on the west side of the river. This gives a good view of the river mouth and the small beach area to the north. This completes this section of the survey.

Survey Tips

- Surveying from the south side of the weather station beyond the airport terminal parking lot provides a wide view of the river mouth.
- Watch for shorebirds (spotted sandpipers, solitary sandpipers, and wandering tattlers) in the rocks at the river mouth. They can be difficult to see.
- Look carefully for mergansers upriver from the foot bridge. They are often resting on gravel bars or eddies.

CENSUS UNIT #2

Yakutania Point.--Walk out onto the end of Yakutania Point and survey the area in a line out to just beyond the end of the east ship dock where the shoreline curves inward and is not visible from the harbor area in a triangle approximately 1.6 km southwest of Yakutania Point. Continue scanning out 1.6 km west of the point in an arc to Dyea Point and across the mouth of Nahku Bay.

After surveying this section, walk across the gravel beach immediately to the north of Yakutania Point and up onto the large rock outcrop. From the top of the rock outcrop, survey the rest of the shoreline and small cove not visible from the point. This completes this section of the survey.

Survey Tips

- Survey from as far out on the rocky point as possible in order to maximize your field of vision.
- Scoters, scaup, and red-necked grebes are often along the west shore of Taiya Inlet at the limit of visibility with the spotting scope.
- Arctic terns and gulls frequently fly overhead across the point, so be aware of your immediate surroundings.
- Spotted sandpipers are sometimes on the rocks in the small cove north of the point proper.
- Marbled murrelets are usually scattered throughout the entire census unit and are difficult to see if significant waves are present.

CENSUS UNIT #3

Outer Nahku Bay.--The observation point for this section is at the northern end of the large pullout at Mile 5 of the Dyea Road. There is a rock promontory on the other side of the guard rail that provides a good overlook. Survey the outer two-thirds of the bay beginning at the entrance to the bay demarcated by Dyea Point to the large rock outcrop on the west shore directly below the black house on the ridge above. Survey the outer bay to the point where the outcrop breaks the small bench along the shore.

Survey Tips

- Marbled murrelets are usually near the mouth of the bay and can be difficult to see.
- Harlequin ducks are sometimes resting on the west shore of the bay.
- Spotted sandpipers are sometimes feeding along the west shore of the bay – it is important to scan the entire west shoreline for these and other birds.
- Bald eagles are often perched higher up in the trees on the west slope above the bay.

CENSUS UNIT #4

Inner Nahku Bay.--The observation point for this section is at the last little pullout on the west side of the road (actually just a small widening of the road) before the beach. Survey the inner one-third of

the bay beginning at the large rock outcrop on the west shore directly below the black house on the ridge above.

Survey Tips

- Spotted sandpipers are sometimes feeding along the west shore of the bay, and shorebirds are often on the beach at the end of the bay – it is important to scan the entire shoreline.

CENSUS UNIT #5

Upper Taiya Inlet.--This section is best surveyed when the water is calm and glassy as many waterbirds prefer the west shore. It is also best to survey this section at low tide when the birds are concentrated.

Begin by parking at the small pullout next to a rock promontory on the west side of the Dyea Road at Mile 7. Walk south along the road approximately 30 m to the side road on the west. Walk down the side road a short distance to a gate and then walk west to the edge of the ridge along the Inlet. Follow the ridge south about 20 m to a large open rock outcrop with the remains of a large old wooden tripod probably used as a boom or hoist of some kind. This is the primary observation point for this section. Begin the survey from an east-west line directly across from the southernmost visible point on the east shore (i.e., the next point north of Dyea Point). Survey the upper Inlet to an east-west line directly across from the derelict trespass cabin. This point is roughly demarcated by a rock outcrop on the west shore where a section of rock has fallen away revealing reddish-toned rock beneath.

Survey the east shore that is not visible from the tripod for this section from the rock promontory at the parking pullout. This completes this section of the survey.

Survey Tips

- There are typically large numbers of marbled murrelets in this census unit. They can be difficult to see if significant waves are present.
- Look for red-necked grebes, horned grebes, loons, and other divers along the very west side of the inlet at the limit of visibility with the spotting scope.
- Look for spotted sandpipers, mergansers, harlequin ducks, and other birds on the rocks along the east shore, south of the observation point.

CENSUS UNIT #6

Taiya River Mouth.--Just north of the derelict trespass cabin there is a large pullout on the east side of the road at a utility pole. Directly kiddy-corner from this pullout there is a small pullout (actually just a small widening of the road) on the west side of the road approximately 30m north. Park here and walk down a fairly steep embankment to the shoreline. There is a large flat rock exposed during low tide just to the south that provides a good vantage point of the upper Inlet. The observer may also pick another suitable vantage point if the rock slab is not accessible. Survey the triangle formed by a northeast line beginning on the west shore directly across from the trespass cabin demarcated by a rock outcrop on the west shore where a section of rock has fallen away revealing reddish-toned rock beneath to the southwest corner of the Taiya River mouth. This observation point gives a good view of the head of the Inlet.

Drive north along the Inlet from the pullout, looking for birds along the shoreline below that was not visible from the last observation point. Continue past a large pullout on the west side of the road above the mouth of the river to several small pullouts (actually just small widenings of the road) on the west past the last shrubs that block the view. Survey the mouth of the river from here. The determination of the mouth of the river will depend on the tide.

The end of this section is upstream to the point where the river starts to curve to the west in a large S-curve and a vegetated cut-bank begins on the west bank. Toward the end of the S-curve, a higher-benched cut-bank begins.

Survey Tips

- Another route to the first observation point is to park at the large pullout on the east side of the road as it begins to turn left at the beginning of the S-curve. Walk 20 m south to the west side of the road where there is a culvert. Descend the road bank just north of the culvert and make your way through the trees to the shoreline where there is a relatively flat rock that serves as the first observation point.
- Another suggested observation point is from the north end of the pullout with an interpretive sign, on the west side of the road just before the descent to the river. This is a great place to count the gulls that gather in large groups on the southern spits of sand and gravel.
- It is also suggested that the surveyor use the small knoll at the south end of Hackett Hill as the final observation point for this census unit (and as the first observation point for CU8). Use the first pullout on the west side of the road after beginning the ascent up Hackett Hill.
- During lower tides, take care not to accidentally count birds that in fact are in CU7. Avoid this by drawing an imaginary line between the reddish rock face and the south end of Hackett Hill.
- Look for bald eagles perched in the trees on the east side of the inlet along the roadway.
- Look for spotted sandpipers, solitary sandpipers, and other shorebirds along the shorelines at the mouth of the river.

CENSUS UNIT #8

Taiya River.--Survey from where a large S-curve begins as described above in the section Taiya River Mouth. This section ends at the farthest point upstream visible from the Chilkoot Trailhead at the Taiya River Bridge. Note birds as being either below or above the bridge.

Survey Tips

- While at first glance this may seem like a rather empty census unit, the seasoned surveyor will usually find a good number of birds by thoroughly searching the banks of the river.
- Suggested observation points include the last point in CU6; the last pullout on the west side of the road before reaching the bottom of Hackett Hill on the north side; the east bank around the rafter's pullout; the Chilkoot Trail trailhead; and the Taiya River bridge, facing south.
- Look for mallards resting on the river banks at the south end of the census unit.
- Look for spotted sandpipers, solitary sandpipers, and yellowlegs along the east rockwall at the south end of the census unit, in the wetlands in the same area, and along all shorelines north to the Dyea campground area.
- Look for teal and other dabblers in the wetlands mentioned above.
- Look for mergansers north of the rafter's pullout and north of the Taiya River bridge.
- Look for bald eagles in and around the two nests west of the Dyea campground area on the west side of the river.
- Look for belted kingfishers just north of the Taiya River bridge.

CENSUS UNIT #7

Nelson Creek Mouth and Taiya Flats.--Drive along the dirt road out onto the flats and park at the point where the road goes alongside Nelson Creek, at a bend in the creek just before a sharp dip in the road. From here, walk along the east side of the creek to its mouth, surveying the creek as well as the flats. Survey the triangle at the head of the Inlet formed by a line beginning at a rock outcrop on the west shore where a section of rock has fallen away revealing reddish-toned rock beneath, directly across from the derelict trespass cabin on the eastern shore, to the southwest corner of the Taiya River mouth. If the upper Inlet was surveyed at low tide, most birds except dabblers near the creek mouth will have been counted.

Continue walking the shoreline east of the creek mouth along the beach dunes in a wide circle back to the parking area. Dabbling ducks in this section will be flighty, so it is best to get counts from a distance before birds are flushed. This completes this section.

Survey Tips

- Look for spotted sandpipers, solitary sandpipers, yellowlegs, and least sandpipers along the edge of the creek near the start of the census unit. Also look well ahead for mallards, teal, and other dabblers before accidentally flushing them.

- Look for belted kingfishers near the waterfall in the southwest corner of the flats.

- Look for bald eagles in the trees above the southwest flats.

- Look for plovers, least sandpipers, and rare shorebirds along the south and southeast shores of the flats. Many uncommon sightings were in this area.

- Walk along the shore at water's edge in the southeast flats to flush any peeps and snipes that are not readily visible.

Survey Notes.--The Skagway harbor and River mouth, and Yakutania Point can be surveyed in 3-4 hours. It is best to survey this area very early in the morning before cruise ship passenger, boat, and helicopter traffic picks up. Currently, the harbor area from the railroad dock to the ore dock in Census Unit 1 should not be surveyed while cruise ships are present. However, the Skagway River and river mouth should continue to be surveyed as usual, noted as such on the data sheets.

Nahku Bay, upper Taiya Inlet, Taiya River, Nelson Creek, and Taiya Flats can be surveyed in 5-8 hours depending on the number of birds present. While it is less than desirable to complete the census over the course of two days, it is absolutely essential that the upper Inlet, Taiya River, Nelson Creek, and Taiya Flats be surveyed on the same day. It is best to start surveying the upper Inlet on a rising mid tide when tidal habitat is abundant but birds are concentrated. The ideal time would be two hours before high tide.

These surveys are best conducted on sunny, calm days when visibility is excellent. However, Skagway is hardly known for having agreeable weather, and winds tend to pick up mid- to late morning. Therefore, it is best to start as early as possible, taking into consideration the tide and daylight, and avoiding the convection waves that form over the water in the heat of the day. It is easy to see and count birds, especially small species such as the marbled murrelet, or distant birds, when the water is glassy. It is equally easy to miss these birds when the waves have picked up and the wind is shaking the spotting scope.

SOP1 Conducting Surveys and Data Management

Off Road Breeding Bird Survey Protocol for Klondike Gold Rush National Historical Park, Skagway, Alaska
Standard Operating Procedure (SOP) # 1
Conducting Surveys and Data Management
Version 1.00 (April 9, 2009)

Revision History Log:

Previous Version #	Revision Date	Author	Changes Made	Reason for Change	New Version #

This SOP gives step-by-step instructions for conducting the ORBBS at Klondike Gold Rush NHP, including data collection, completion of the data form (Form 1), and data management.

Conducting the Survey

There are two ORBBS routes for Klondike Gold Rush National Historical Park: one in the Dyea townsite area, and one at the south end of the Chilkoot Trail. Both are surveyed annually with the assistance of a USFWS biologist. Each survey consists of 12 plots located at least 250 m apart. Each plot is surveyed for ten minutes (divided into three, five, eight, and ten minute time periods) and all species detected by sight and sound are recorded. The survey start time is ½ hour before official sunrise. Surveys are typically conducted in mid to late June, beginning around 4:00AM.

Data forms can be found on the Resources drive at
T:\NRM\Birds\ORBBS&ALMS\Alms_forms_2004.pdf

The full ORBBS protocol can be found on the Resources drive at
T:\NRM\Birds\ORBBS&ALMS\ALMSprotocol_2004.pdf

Survey route descriptions and maps can be found below.

Data Management

After completing the surveys, a copy of all data forms should be made and archived at the park with the help of the museum curator. The originals should be sent to the Colleen Handel, USGS Wildlife Biologist, at the following address:

Colleen M. Handel

Research Wildlife Biologist
USGS Alaska Science Center
4210 University Drive
Anchorage, AK 99508
Tel: 907-786-7181
Fax: 907-786-7021
Email: cmhandel@usgs.gov

An electronic version of the data should be acquired from Colleen Handel when available.

Off-Road Breeding Bird Survey Route
Dyea, AK (Route #818)
Updated June 2009

Route distance: ~5 km. Drive time from Skagway: ~25 minutes. Take Dyea Rd. from Skagway to Dyea. After crossing the Taiya River Bridge, make immediate left turn at Y intersection. Follow road 1.1 miles to parking area at the West Branch Taiya River (Nelson) slough. A portion of route is in the intertidal zone so rubber boots are recommended. It is a 5 minute walk from parking area to the first point, which should be conducted by 4 AM. Each point name is followed by the (UTM UPS) coordinates (Garmin).

Station 1: (0480067/6596174) Head east from parking area on roadway over slough and follow main trail south. In about 250 feet bear left at the intersection (toward historic warehouse exhibit.) Walk 200 feet west, past warehouse remains on your right. Just before road bends to the right, next to the false front sign, turn left down a small sandy footpath. Drop down from bench (leaving the forest) and walk along this footpath (NE) about 1000 feet. Station is where trail makes a sharp right turn. There is a large piece of milled timber driftwood on left side. Station is at log.

Station 2: (0479895/6595956) Back track 1000 feet from Station 1. Station 2 is on your left in a wide disturbed area at crest of rise as footpath climbs back up on bench (5m north of NPS wood barricade).

Station 3: (0479909/6595564) Return to warehouse road, take a left, follow it as it bends right. Follow the cut bank on the left until the roadway dips into the intertidal zone for 150 feet and then climbs back up. Station is at top of rise out of wet area. Flagging is at base of a 12’ tall Birch on right.

Station 4: (04799831/6595340) Continue on same road south from station 3 (stay left). At 150’ second road comes in from right and soon forks again. Take left branch along slough for 600’. Station is 50’ before twin 14’ spruce on left side of trail. There is a 3’ driftwood limb hidden in grass to the right of trail on the ground near 7’ spruce.

Station 5: (0480085/6595087) Walk 1000 feet from Station 4, continuing east along same roadway and then south when it bends to the right. Pass vehicular traffic boundary sign on left. Just before a road comes in from the left there are 3 driftwood root balls on the right, marking the station.

Station 6: (0479794/6594776) Intertidal zone—From Station 5 follow track to SW. Go straight at first intersection, bear left at second intersection. Walk 215 steps south to muddy turnaround area 230 feet north of stormberm.

Station 7: (0479828/6595056) Follow main roadway north about 900 feet from Station 6. Look for a group of rootballs on the left (200’ before vehicular traffic boundary sign) and then a large disturbed area used for parking. Station is west of the rootballs on Nelson Creek side. Station flagging is on backside of largest rootball.

Station 9: (0479595/6595538) From Station 7, head north on main roadway. At 250 feet road forks. Take left fork. Follow track northwest until it intersects larger roadway. (Left fork goes west to ford across West Branch Taiya River (Nelson Creek) to private cabin. Right fork goes northeast toward starting point.) Station is in intersection. Flagging is in 20' tall birch on the left. This station should be conducted before 6:15 AM to avoid noise from the dog camp.

Station 10: (0479686/6595801) From Station 9 continue north and bear right at the next intersection. Station is 900 feet north of station 9. Bear left at the next fork (600 feet) that is partially blocked by rocks. Station is 65m north of intersection. Walk past a driftwood root ball on the right. Station is at the 25' tall twin spruce on right edge of road. There is a clump of cottonwood on the opposite side of the road.

Station 11: (0479728/6596120) From Station 10, follow track to intersection. Continue straight, walking north until you reach the slough crossing where you are parked. The station is the (far) east end of the footbridge and faces north.

Station 12: (0479527/6596356) From station 11, return to vehicle and drive to last two points. Follow road from parking lot heading north past first road on left. Station is the junction where a lesser side track angles off to the left.

Station 13: (0479538/6596511) From station 11, follow main road until the lesser side track rejoins road. 100 feet ahead there is a footpath on the right side of road with a log (now very decomposed) blocking access for cars. There is a pullout on the east side of the road just south of the footpath. Take the trail east until it drops down to small creek (West Branch Taiya River.) Station is on W side of creek.

Off-Road Breeding Bird Survey Route
Chilkoot Trail (Route #817)
Updated June 2009

Take Dyea Road from Skagway to Chilkoot Trail Trailhead (30 minutes driving time). Hike Chilkoot Trail over Saintly Hill to reach start of route. Allow 30 minutes to hike to Station 1. All points are a minimum of 250 m apart.

Station 1: 147 steps past 1st bridge. Hike from trailhead 0.9 miles to first bridge along trail. Follow trail 147 steps just past a large cottonwood tree on the right. Trail makes a double bend to the right. Station is in the second bend along stream channel before the second bridge. Station is a south edge of forest opening near downed log on right with spruce tree.

> 59.52502, 135.34124 (59º 31' 30.067", 135º 20' 28.459") (Estimate from GIS. Original coordinates are bad: *59.64767, 135.27759*)

Station 2: 280 steps north of Station 1. At 243 steps, you will pass the second 30" diameter cottonwood deadfall cut on each side of the trail. Continue 37 steps. The station is just past the 3rd cut log. Blue/white flagging on spruce on right side of trail, ~12 feet high.

> 59.52707, 135.34108 ± 44 ft (59º 31' 37.452", 135º 20' 27.888")

Station 3: 30 feet before river cutbank. (285 steps)To find station, follow trail about 300 steps to point where it comes out of the trees and hits cutbank where river is eroding trail. Turn around and walk back 30 feet. Station is marked with blue and white flagging on the right (left as you face south) at the base of an alder.

> 59.52906, 135.34218 ± 29 ft (59º 31' 44.616", 135º 20' 31.848")

Station 4: 150' before Steel Brige. Station is 285 steps north of Station 3. Follow trail to Steel bridge. You will pass station on the right at 285 steps; at the short side path that leads to stream bank and cottonwood log and several cut rounds. If you miss it, continue on to red steel bridge and back track 150 feet. Blue and white flagging is wrapped around small hemlock on right.

> 59.53091, 135.33900 ± 30 ft (59º 31' 51.2754", 135º 20' 20.3994")

Station 5: 310 feet north of 1.6 mile intersection sign. Follow trail north, across bridge, and right at the 1.6 mile intersection. Trail follows old roadway so it is straight and hard surfaced. Station is half way along straight stretch among an alder grove at a slight high spot. 3' tall spruce on L edge of trail. Small dead spruce (5') with multiple tops on R side of trail. Root growing across trail on diagonal.

> 59.53286, 135.33975 ± 37 ft (59º 31' 58.2954", 135º 20' 23.1")

Station 6: 70 feet north of the 32” diameter windfall, at the south edge of devil’s club field opening. Station 6 is 285 steps north of Station 5. Blue/white flagging in spruce on Right side of trail. At newer bank erosion.

59.53925, 135.33946 ± 17 ft (59º 32’ 6.3594”, 135º 20’ 22.056”)

Station 7: 12 steps past root ball of 60’ long deadfall (rootball on L side) running along north side of trail. Station is 300 steps north of Station 6. 8’ hemlock w/ b/w flagging on R. 2 mature cottonwood trees on L side of trail. Tree closest to trail has broken top 12’ high (and cut blaze 3’ up).

59.53724, 135.33858 ± 23 ft (59º 32’ 14.0634”, 135º 20’ 18.888”) (Closest known point)

Station 8: 150 steps north of blowout where river is eroding trail. Blue/white flag is on small hemlock on right, ~5 feet high.

59.53925, 135.33736 ± 30 ft (59º 32’ 21.3”, 135º 20’ 14.4954”)

Station 9: 350 steps after Station 8. Before the main trail turns left and leaves the road bed (330 feet south of Bridge #4). The old road (short side trail) fords the river. Blue/white flagging is in dead alder on right. Large, barkless dead cottonwood ~60 feet to right of trail.

59.54175, 135.33591 ± 26 ft (59º 32’ 30.3”, 135º 20’ 9.276”)

Station 10A: Between two small plank bridges south of beaver pond. Cross two major bridges. Station is behind large spruce on R, between two small plank bridges near the beaver pond. Flagging is on small hemlock on the right.

59.54516, 135.33400 ± 31 ft (59º 32’ 42.576”, 135º 20’ 2.4”)

Station 12: Trail follows boardwalk through beaver pond. The station is on the last left curve before the end of the boardwalk (60 steps) Blue/white flagging is in small dogwood on right, before dead hemlock on right.

59.54832, 135.33350 ± 29 ft (59º 32’ 53.9514”, 135º 20’ 0.5994”)

Station 13: Truck door panel (#1206) Trail follows old roadway. Continue walking until you see door panel from WW2 vintage truck on the right with #1206 stenciled on. Station is 45 steps north of the door, marked with orange and white flagging on dead spruce on the right. Station 13 is 290 paces north of Station 12.

59.55030, 135.33415 ± 31 ft (59º 33’ 1.08”, 135º 20’ 2.9394”)

*GPS coordinates are in NAD83 and were collected in 2007

The Department of the Interior protects and manages the nation's natural resources and cultural heritage; provides scientific and other information about those resources; and honors its special responsibilities to American Indians, Alaska Natives, and affiliated Island Communities.

NPS 461/142496, February 2018

Natural Resource Stewardship and Science
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