INVESTIGATOR'S ANNUAL REPORT

United States Department of the Interior

National Park Service

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OMB # (1024-0236)
Exp. Date (11/30/2010)
Form No. (10-226)

Reporting Year:	Park:	Select the type of permit this report addresses:
2009	Glacier Bay NP & PRES	Scientific Study

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Study Title (maximum 300 characters):
Development of a monitoring protocol for Kittlitz's Murrelets

Park-assigned Study or Activity #:	Park-assigned Permit #:	Permit Start Date:	Permit Expiration Date:
GLBA-00142	GLBA-2009-SCI-0010	Jul 01, 2009	Dec 31, 2013

Scientific Study Starting Date: Jul 01, 2009	**Estimated Scientific Study Ending Date:** Dec 31, 2013

For either a Scientific Study or a Science Education Activity, the status is:
Continuing

For a Scientific Study that is completed, please check each of the following that applies:

___ A final report has been provided to the park or will be provided to the park within the next two years

___ Copies of field notes, data files, photos, or other study records, as agreed, have been provided to the park

___ All collected and retained specimens have been cataloged into the NPS catalog system and NPS has processed loan agreements as needed

Activity Type:
Monitoring

Subject/Discipline:
Birds / Ornithology

Purpose of Scientific Study or Science Education Activity during the reporting year (maximum 4000 characters):
Under a cooperative (CESU) agreement with the University of Alaska-Fairbanks, we will be conducting a field test of critical components of designs for long-term monitoring of density/abundance/trend of Kittlitz's murrelets in Glacier Bay. The field work will feed back into the office-based protocol development process. We expect that a draft monitoring protocol will be completed in the fall of 2009.

Findings and status of Scientific Study or accomplishments of Science Education Activity during the reporting year (maximum 4000 characters):
INTRODUCTION
Our first year of monitoring protocol development had the following objectives: (1) evaluate logistics required to implement a long-term, annual monitoring project; (2) test the critical assumption of line transect sampling that probability of detection of birds on the transect line = 1.0; (3) test the efficacy of using 1 or 2 observers. The results of the 2009 field season will be used to inform the

development of a draft monitoring protocol that will be applied in the 2010 field season and further refined based on what we observe and learn over the next several years. The text provided here has been excerpted from a draft of a formal report that will be completed in 2010.

METHODS
We used standard distance sampling methods to sample line transects (Buckland et al. 2001, Buckland et al. 2004). We surveyed transects by boat, with a crew of 1-3 observer(s), 1 data recorder, and a boat captain. We conducted surveys between 0800 and 1700 hours from 8-15 July 2009, because densities of Kittlitz's in the Bay are believed to peak in mid-July (Kirchhoff). We conducted 2 experiments to assess the performance of observers. First, when sufficient personnel were available, we used an additional observer (hereafter "independent observer") to estimate the proportion of groups near the center line that were detected by the primary observer(s). In the second experiment, we assessed how the number of primary observers influenced performance by randomly assigning either 1 or 2 to each transect.

RESULTS: Survey Effort
We surveyed 53 transects totaling 219.0 km between 8-15 July, 2009, 47 in the Capelin and 6 in the Boomer. One transect in the upper west arm of Glacier Bay was dropped because of proximity to a tidewater glacier. Three observers detected a total of 1,235 murrelet groups, of which 167 groups (14%) were flying. Among the 1,064 groups detected on the water, 151 (14%) and 348 (33%) groups were identified as Kittlitz's and marbled murrelets. Conditions during surveys were generally clear and relatively still (Table 3), and visibility was always >500 m. Most observations (>65%) were recorded between 1000 and 1400 hours.

RESULTS: Independent Observer Experiment
An independent observer was included on 23 transects across 4 days of surveys (8, 13-15 July). The primary observer located 90 focal groups prior to detection by the primary observer(s), and 2 primary observers were present for 50% of these trials. Climatic conditions were conducive to high detection probabilities during observations: Beaufort sea state was either 0 (47%) or 1 (53%), and the weather code was either 0 (79%) or 1 (21%). The independent observer typically located focal groups far ahead of the boat ($x \pm SD$; 279 ± 87 m), and most focal groups (86%) were estimated to have a perpendicular distance of <30m from the transect center line (Fig. 5). Mean size of focal groups was 1.9 individuals, with 86% consisting of 1 or 2 individuals. Eighty two of 90 focal groups (91%) were detected by the primary observer(s).

RESULTS: 1 Versus 2 Observer Experiment
We randomly assigned 1 or 2 primary observers to 35 transects, where observers detected 399 groups. Twenty two transects were in the low density stratum (5 with 1 observer and 17 with 2 observers), and 13 were in the high density stratum (6 with 1 observer and 7 with 2 observers). We removed 1 extreme outlier from analyses (2 observer transect with = 33). Including this transect reinforced observed patterns, but likely decreased accuracy of predicted encounter rates. Estimated encounter rates with 2 observers were >50% higher than with 1 observer in both. Although samples were small, we found evidence that encounter rates for the study area were substantially higher for 2 (3.62/km) versus 1 (2.32/km) observer.

Specific recommendations for the 2010 season and the long-term protocol are included in a draft report on file with the Southeast Alaska Network.

For Scientific Studies (not Science Education Activities), were any specimens collected and removed from the park but not destroyed during analysis?
No

Funding specifically used in this park this reporting year that was provided by NPS (enter dollar amount):	**Funding specifically used in this park this reporting year that was provided by all other sources (enter dollar amount):**
$75,000.00	$0.00

List any other U.S. Government Agencies supporting this study or activity and the funding each provided this reporting year:

For Scientific Studies (not Science Education Activities), were any specimens collected and removed from the park but not destroyed during analysis?
No

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