

**FEDERAL AID  
FINAL PERFORMANCE REPORT**

ALASKA DEPARTMENT OF FISH AND GAME  
DIVISION OF WILDLIFE CONSERVATION  
PO Box 115526  
Juneau, AK 99811-5526

**Alaska Department of Fish and Game  
State Wildlife Grant**

**Grant Number:** T-1 **Segment Number:** 6  
**Project Number:** 14  
**Project Title:** Current population and decadal trends of Kittlitz's and marbled murrelets in Kachemak Bay, Alaska  
**Project Duration:** July 1, 2004 – June 30, 2007  
**Report Period:** July 1, 2006 – June 30, 2007  
**Report Due Date:** September 30, 2007  
**Partner:** U. S. Fish & Wildlife Service

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**Project Objectives**

1. Obtain population estimates for Kittlitz's and marbled murrelets in Kachemak Bay.
2. Determine decadal trends of Kittlitz's and marbled murrelets in Kachemak Bay.
3. Track annual and seasonal patterns of abundance and distribution of adult and juvenile Kittlitz's and marbled murrelets in Kachemak Bay.
4. Identify critical habitats for Kittlitz's and marbled murrelets within Kachemak Bay.

**Summary of Project Accomplishments for entire project**

**Objective 1:** We obtained current population estimates during mid June and late July for Kittlitz's and marbled murrelets in Kachemak Bay. The June survey (conducted in 2005 and 2006) repeated randomly selected transects that had been surveyed in 1993 by USFWS. The July surveys (2005 and 2006) used a systematic design to provide comprehensive coverage of all habitats. We received funding from USFWS to conduct late July surveys in 2007, and this data will be incorporated into the final report. Population estimates will also be available for other marine species encountered during our surveys.

**Objective 2:** To determine decadal trends we replicated survey track lines that had been surveyed between 1988 and 1996. The two survey periods were mid June (re-surveyed during this project in 2005 and 2006) and from late July to late August (2004, 2005, 2006). We will incorporate the late July 2007 surveys which were funded by USFWS.

**Objective 3:** Our surveys will provide data on inter-annual variation in abundance and distribution of murrelets for 2004-2007. Seasonal patterns will be examined for the entire breeding period (June – August) for 2005 and 2006. Adult and juvenile abundance during the fledging and post breeding period (August) will be examined for 2004, 2005, and 2006. August surveys provide data on the timing of juvenile fledging, and juvenile densities and juvenile:adult ratios during the post-fledging period, as an index of productivity.

**Objective 4:** We have identified critical habitats for Kittlitz's and marbled murrelets in Kachemak Bay by combining at sea surveys with GIS coverages and concurrent CTD sampling of the water column. Areas of high murrelet density will be mapped for the final

report, and a multivariate analyses will describe water column characteristics associated with murrelets. We also have data on distribution of other marine species, of which maps for selected species will be included in the report. A complete data set will be available via the North Pacific Pelagic Seabird Database.

**Project Accomplishments during last segment period only (July 1, 2006 – June 30, 2007)**

**Objectives 1-3:**

1. At-sea surveys were conducted from 18 to 24 July 2006 for a comprehensive survey of Kachemak Bay. This survey repeated the 2005 July survey, and provided complete coverage of the bay during a period of peak murrelet at-sea attendance (mid to late July). Transects (total 188 km) were systematically spaced, 4 km apart. Preliminary population estimates were 8754 ( $\pm$  5450 95% CI) marbled murrelets and 2592 ( $\pm$  2470) Kittlitz's murrelets.
2. We conducted at-sea surveys from 1 to 17 August 2006. These surveys repeated historic transects (1988 - 1996) during the murrelet fledging period, and were also surveyed in 2004 and 2005. For both murrelet species, juvenile densities and ratios were higher in 2006 than in 2005, and comparable to 2004 results.
3. All June and July survey data were prepared and formatted for entry into the North Pacific Pelagic Seabird Database. To complete this task, we contracted with a programmer familiar with the DLOG data entry program.

**Objective 4:**

1. Environmental variables were collected at the start of each transect, including sea surface temperature and salinity, water clarity (with sechi disk), wind speed and direction, air temperature, and sea state. Continuous plotting by GPS provided track lines and location data for every recorded observation.
2. In addition to the surface conditions sampled (above), we used a CTD (Conductivity-Temperature-Depth) probe (Seabird Electronics Inc., SBE 19 SEACAT), fitted with an additional sensor to measure turbidity, to determine the vertical profile of the water column. Thirty-two CTD sites were sampled 24-26 July 2006. These will provide information on water column characteristics (temperature, salinity, density), which will be used to describe marine habitats used by each murrelet species. We will be assisted in analysis of the CTD data by Dr. Scott Pegau, of the Kachemak Bay Research Reserve. The CTD (a \$10,000 instrument) was donated by Auke Bay Laboratory, Juneau, Alaska, which was not in the original proposal as part of the federal contribution.

**Significant Deviations:** none

**Project Leader:** Kathy Kuletz