Protocol: Kittlitz's murrelets

Parks Where Protocol will be Implemented: GLBA

Justification/Issues being addressed:

The Kittlitz's murrelet (*Brachyramphus brevirostris*), hereafter KIMU, is a small rare seabird (family Alcidae) that ranges across coastal areas of Alaska and parts of Russia (Day et al. 1999). During the summer breeding season KIMU forage on pelagic schooling fish or invertebrates near the outflows of tidewater glaciers or glacial streams (Day and Nigro 2000). Nesting behavior is likewise affiliated with glacial habitats, with the few nests ever found located in areas with little vegetation due to recent deglaciation (Day 1996). Because of their strong association with glacial habitats, KIMU are intricately linked to several national parks in Alaska. In fact, the National Park Service serves as a steward to the global population of KIMU: best estimates place over 20% of the world's population within Glacier Bay and Wrangell-St. Elias (Icy Bay) National Parks (van Vliet 1993). Yet, KIMU are a species of management concern due to declines across their range, including some areas where declines have exceeded 70% (USFWS 2006). The population in Glacier Bay National Park is estimated to be 20% of numbers found there in the early 1970's. In 2007, the USFWS upgraded KIMU to a Listing Priority 2 for listing under the Endangered Species Act due to the ubiquity of declines across their range. As KIMU are intricately linked to glacial habitats (both marine and terrestrial), their trends in abundance and productivity likely reflects the changes in marine productivity and glacial dynamics.

Specific Monitoring Questions and Objectives to be Addressed by the Protocol:

Questions:

- What are the long-term trends in spatial distribution and abundance of Kittlitz's murrelets within GLBA?

Objectives:

- Determine annual and long-term changes in the numbers of KIMU within GLBA proper by generating population estimates every summer using at-sea surveys using distance sampling from historical along-shore (shoreline) and pelagic line transects.
- Generate precise population estimates that achieve achieve 80% power at alpha=0.05 within the next 10 years
- Devise and implement a protocol that quantifies annual variation in spatial patterns of KIMU within the park.
- Adapt and implement the KIMU monitoring design developed in Icy Bay, WRST, (Kissling et al. 2007) for GLBA proper to achieve the monitoring and sampling objectives identified above.

Basic Approach:

KIMU are highly patchily distributed within their habitats, and thus it is important to develop a survey protocol that captures this variability. Sampling will involve a series of at-sea surveys conducted on several occasions during the summer months. Multiple surveys throughout the summer will help identify the peak in numbers of KIMU for timing of future surveys and ensure that surveys capture temporal variability of KIMU within the park. Surveys will consist of two types of transects to capture the spatial variability in distribution: Shoreline transects will be placed within 200 m parallel to shore for individuals distributed 'along shore'. Pelagic transects will be placed perpendicular to shore approximately 2 km apart, varied in length according to width of the bay or fjord, and ended at 200 m from shore (following Kissling et al. 2007). Surveys will be conducted during two one-week survey periods with transect direction and order changing among surveys; surveys will not occur if weather conditions are unacceptable (high

winds or sea state/Beaufort scale > 2. Surveys will occur between 0700 and 2100 using a vessel at least 6 m boat in length moving at a speed of about 10 km/hr using two observers and one boat driver. For both shoreline and pelagic surveys, observers will record all *Brachyramphus* murrelets within an unlimited distance on either side of the boat and 300 m ahead of the boat. For each observation, the following data will be recorded: group size, age category (see below), location (air or water), activity (e.g., flying, on water), and distance (m) to the group. Based on plumage characteristics, each murrelet will be categorized as definite AHY, probable AHY, unknown, probable HY, or definite HY (following Kuletz and Kendall 1998); it will also be noted if murrelets are holding fish in their bills. Depth (m), sea conditions (Beaufort scale), precipitation, ice cover (%), and swell height will be recorded every 30 minutes or as conditions changed. A voice-activated recording system that integrates geodata (from geographic-positioning system) will be used by recording observational data with location and time.

The data from the initial surveys will then be compared with historical surveys conducted within Glacier Bay proper and from other surveys in Icy Bay, WRST (Kissling et al., 2007) and utilized in a power analysis to estimate sampling design power under different conditions of sampling (detectability, transect length, size of population change, etc.).

Principal Investigators and NPS Lead:

- Scott Gende-NPS
- Michelle Kissling-USFWS
- Paul Lukacs-Colorado Division of Fish and Wildlife
- Matt Kirchhoff-ADF&G

Development Schedule, Budget, and Expected Interim Projects:

2008 NPS collaborate with USFWS, ADF&G, and CDFW to develop a survey protocol in GLBA using previous survey results conducted by USGS and ADF&G, and from surveys conducted in Icy Bay, WRST.

2008 Surveys in GLBA for protocol development ($ provided by USGS and USFWS); Analysis of pilot data, conduct power analysis, meet with partners to discuss survey design.

2009 Implement monitoring protocols ($ to be determined)

Literature Cited:

Day, R. H. 1996. Nesting phenology of Kittlitz's murrelets. Condor 98:433-437.

Day, R. H., K. J. Kuletz, and D. A. Nigro. 1999. Kittlitz's murrelet *Brachyramphus brevirostris*. The Birds of North America, No. 435.

Day, R. H., and D. A. Nigro. 2000. Feeding ecology of Kittlitz's and Marbled murrelets in Prince William Sound, Alaska. Waterbirds 23:1–14.

Kissling, M., Reid, M., Lukacs, P., Gende, S.M., and S.B. Lewis. 2007. Using spatial models to understand abundance patterns for a declining seabird: implications for monitoring. Ecological Applications XX:XXXXXXX.

Kuletz, K. J., and S. J. Kendall. 1998. A productivity index for marbled murrelets in Alaska based on surveys at sea. Journal of Wildlife Management 62:446-460.

U.S. Fish and Wildlife Service. 2006. Candidate and listing priority assignment form for Kittlitz's Murrelet. U.S. Fish and Wildlife Service, Migratory Bird Management, Anchorage, Alaska. 38pp.

Van Vliet, G. B. and M. McAllister. 1994. Kittlitz's murrelet: the species most impacted by direct mortality from the Exxon Valdez oil spill? Pacific Seabirds 21:5-6.