

Science

Many projects take place each year on the Refuge. Some are ongoing studies. Others are one-time efforts. Many are done in partnership with other entities. There are sometimes opportunities for employment or volunteering. Learn more about current plans and projects by calling our office: 907-246-3339.

Christmas Bird Count

Refuge staff cooperate with the National Audubon Society to host an annual Christmas Bird Count. The count area includes the road corridor from the Kvichak Bay beach at Naknek to Lake Camp at the mouth of Naknek Lake. The Christmas Bird Count has been conducted every year since 1986. The count must occur in the window of December 14 – January 5 each year. Participants find 9 to 18 species of winter birds, including: common and red-breasted merganser, common and Barrow's goldeneye, bald eagle, willow ptarmigan, glaucous-winged and mew gulls, gray jay, black-billed magpie, common raven, black-capped and boreal chickadee, northern shrike, snow bunting, pine grosbeak, and common redpoll.

North American Migration Count

To participate in International Migratory Bird Day, the Refuge has sponsored a North American Migration Count on the second Saturday in May since 1998. Local birders join Refuge staff to cover the area from Lake Camp at the mouth of Naknek Lake to the beach at Kvichak Bay in Naknek. Birds are counted by species and effort is tracked, similar to the Christmas Bird Count. In May, species diversity can be quite high as the waterfowl peak is waning, the shorebird peak is building, and many species of passerine and raptor have arrived and are displaying on territories. 57 to 77 species have been observed on one day, and counts range from 4,400 to 8,800 individual birds. In addition to the resident birds named under the Christmas Bird Count, we add breeding and migrating shorebirds, waterfowl, and the breeding raptors, waterbirds, and most of the passerines common to the Alaska Peninsula (see [Alaska Peninsula and Becharof bird checklist](#) (pdf)).

Assist Public with Injured Raptors

Fish and Wildlife Service permitted activities include assisting with care of injured birds. The main focus is raptors and threatened or endangered species. Especially with large birds that have a good chance of being treated successfully, Refuge staff act as intermediaries between the public and rehabilitation facilities. Refuge staff collect injured birds from the public and see that they are transported to the Bird Treatment and Learning Center in Anchorage or to other facilities. Visit our "Injured Wildlife" page to learn more.

Assist Public to Report Bird Bands

The public can report bird bands to the U.S. Geological Survey, Biological Resources Division Bird Banding Laboratory at <https://www.pwrc.usgs.gov/BBL/bblretrv/> or 1-800-327-2263. If people would like assistance, Refuge staff will collect the information and transmit it to the lab. Because we have had a comprehensive banding program at the Refuge, Refuge biologists are always interested in the fate of banded birds that are harvested, seen, or found by the public on the Alaska Peninsula.

Landbird Studies

Refuge biologists are active members in Boreal Partners in Flight, a working group that coordinates landbird conservation between government and private organizations. A new statewide monitoring scheme has been developed, called the Alaska Landbird Monitoring Survey. This survey features a biennial schedule of visits to randomly selected blocks where off-road point counts are conducted. Distance sampling will be employed at each point to try to estimate density for each species. Four point count blocks have been established on the Alaska Peninsula and Becharof National Wildlife Refuges.

Bald Eagle Monitoring

Bald eagles are the most common raptor observed on the Alaska Peninsula. Because of their high position on the food chain and the relative ease of monitoring them, they have frequently been monitored to track the health of their own population and as a general ecological indicator. In addition, bald eagle conservation is specifically named in the enabling legislation for the Alaska Peninsula NWR. Bald eagles have been monitored at the Alaska Peninsula and Becharof Refuges using two methods. In 1989, 1990, and 1995, sections of the Pacific Coast within the Refuge boundaries were surveyed from the air, and nest locations were mapped in late April; in late July additional surveys determined the success of nestlings. This survey method resulted in a map of nesting locations and an estimate of nest productivity within the Refuge boundaries. In 1983, 2000, 2005, and 2010 bald eagle populations along the Pacific Coast (from Cape Douglas to Unimak Island) were monitored in late April using sample plots surveyed from the air. Nest locations were mapped within these plots. This work was conducted in conjunction with USFWS Migratory Bird Management office in Juneau. The result was a population estimate for the entire Alaska Peninsula coastline with confidence intervals. The population index increased between 1983 and 2000, but stabilized between 2000 and 2005. Results from 2010 are still pending. Currently the Refuge, with Migratory Bird Management, plans to continue estimating population size every 5 years.

Seabird Monitoring

Although small compared with many of the seabird colonies on Alaska Maritime National Wildlife Refuge, the three murre colonies at and near Puale Bay are some of the largest colonies on the Alaska Peninsula. Seabird conservation and habitat protection are named in the enabling legislation for Becharof National Wildlife Refuge. Although seabirds spend most of their time away from land in the open ocean, their nests on cliff faces are relatively easy to observe and reproductive success can be monitored during their breeding season. In addition, because they are predators at the top of the marine fish and invertebrate food chain, they act as indicators of the ocean ecosystem's health.

Prior to 1989, seabirds drew little attention from the small and newly established staff at the Becharof National Wildlife Refuge. However, when the *Exxon Valdez* Oil Spill occurred and the oil spread to the Alaska Peninsula, it became imperative to learn as much about these three colonies as possible. Puale Bay was the most heavily oiled bay outside of Prince William Sound. From 1989 to 1992, land-based and sea-based population, reproductive chronology, and reproductive success of seabird populations was monitored at Puale Bay using standardized methods developing at the time and now well established by the Alaska Maritime National Wildlife Refuge. Sea-based population counts were also conducted at Oil Creek and Jute Peak.

The results of this work, and for other seabird colonies affected by the oil spill, are available in Dragoo et al. (1995). In short, murre reproduction virtually failed from 1989 to 1991 and was greatly depressed in 1992 at the Puale Bay colony.

Refuge biologists repeated the land-based monitoring work in 2001 through 2003, and in 2010 and the sea-based monitoring in 1999, 2001, 2002, and 2012 using the same established methods. Results from these years have been analyzed and indicate that reproductive success and reproductive chronology at Puale Bay have returned to levels similar to other colonies in the Gulf of Alaska that were not affected by the *Exxon Valdez* Oil Spill. Population data indicate marked improvement since the early 1990s at Puale Bay, but only modest increases at Oil Creek and Jute Peak. The Refuge plans to continue land-based monitoring the Puale Bay colony every three out of ten years, and sea-based monitoring of all colonies when a large boat capable of monitoring is available.

Shorebird Inventory and Monitoring

The bays and river estuaries on the Bristol Bay side of the Alaska Peninsula are well documented as important shorebird migration stopovers. All of the major bays have been nominated as Western Hemisphere Shorebird Reserve Network sites. In contrast, little documentation exists regarding the breeding distribution and habits of shorebirds of the Alaska Peninsula. In 1995, the Refuge assisted a graduate student with a study of the Alaska subspecies of Marbled Godwit in the Ugashik River drainage. In 2002 Refuge biologists joined with others in the Alaska Shorebird Group and with the Program for Regional and International Shorebird Monitoring (PRISM) to conduct some initial surveys of the Bristol Bay lowlands both on and off the Refuge. Refuge staff worked with US Geological Survey – Biological Resource Division (BRD) staff from the Forest and Range Ecosystem Science Center in Boise, Idaho, to design and implement this work following the PRISM protocols. Then from 2004 – 2007 the Refuge joined with US Geological Survey, BRD staff from the Alaska Science Center to design and implement a large scale shorebird inventory and monitoring program on the Bristol Bay Coastal Plain from the northern boundary of the Becharof drainage to Port Moller.

In 2002, six remote areas accessible by wheeled or float plane were chosen and random plots were selected around these access points. Five of the areas were in the Bristol Bay lowland area and one was an alpine area. We surveyed 49 plots (400 x 400 meter) from 15 May through 5 June, 2003. We focused on territorial males and nests. Ten species of shorebirds were found to be breeding on the surveyed plots. Five other shorebird species were noted on or off plots, but breeding status was not determined. The most common breeder was dunlin, followed by least sandpiper. Other moderately common species included Wilson's snipe, short-billed dowitcher, red-necked phalarope, and greater yellowlegs.

From 2004 – 2007 we visited 52 5 x 5 km randomly selected plots and used point counts to surveyed shorebirds, shorebird predators and other birds where we also measured distance and collected habitat parameters. We conducted 792 point counts and documented 74 species of birds during the point counts and another 21 species while we were visiting the plots but not counting. The most common species were dunlin, sandhill crane, Lapland longspur, savannah sparrow, Wilson's snipe, short-billed dowitcher, greater scaup, and American tree sparrow. The

data are currently being further modeled to determine habitat relationships and density estimates for the most common species.

Tundra Swan Monitoring

Tundra swans gained attention early on in the Refuge's wildlife inventory and monitoring program. The first monitoring plots were established in 1983 on the Alaska Peninsula coastal lowlands (both inside and outside Refuge boundaries). Tundra swans are highly visible on their nesting grounds, making them relatively easy to monitor from the air. Tundra swans are a key indicator species because their production trends are highly correlated with other waterfowl. The Bristol Bay population is of particular interest because suitable habitat for nesting is available earlier than in most other nest areas of Alaska. It is estimated that 13-20% of the western population of tundra swans breeds on the Alaska Peninsula.

Refuge biologists designed a sampling scheme and began monitoring swans in 1983. Since that time, swans have been monitored using the same plot boundaries and similar methods in 1984-1987, 1991, and 2003. In 2008, we surveyed the same plots as in 2003, but employed double sampling and distance sampling. A statistical analysis was also performed on the validity of our sampling design. Survey data through 2008 indicate the tundra swan population on the Northern Alaska Peninsula has been relatively stable. Ongoing statistical analysis indicates our methods may be slightly underestimating the population, so in 2013 the survey was redesigned and implemented to correct this problem. Results are currently pending for 2013. The Refuge plans to continue surveying tundra swans once every five years.

Willow Ptarmigan Monitoring

Land managers, sport and subsistence hunters, climate change scientists, and predators all have an interest in willow ptarmigan populations. In 2011, we embarked on a project to examine minimum, relative abundance of willow ptarmigan across the lowlands of the Alaska Peninsula from the Naknek River to Port Moller. Other landbird experts recommended methodological changes for 2012, so we conducted another pilot study completing 13 line transect surveys from the Naknek River drainage to Ugashik to test this method. In 2013 we implemented the line transect survey, but reduced our area of interest to the area from the Naknek River to the Upper Ugashik Lake area.

From 1 May through 1 June 2013, we conducted 18 line transect surveys from nine general locations. Survey areas were located at accessible airstrips south of King Salmon or along accessible roads. Eight surveys were located randomly while the others followed the path of surveys conducted in 2012 or were located to avoid large obstacles (e.g., uncrossable rivers, large lakes) in the field. Surveys began shortly after sunrise, unless fog prevented seeing ptarmigan. All surveys but one were approximately four km in length. Each ptarmigan sighting was recorded including distance from observer (visuals measured with a range finder, aural observations estimated within ranges), azimuth, number of birds, and several descriptors of behavior, habitat, detection criteria, and molt. Other species of birds were also tallied.

We obtained a density estimate of about one male ptarmigan per 9 acres. In 2012, our sample of 13 transects resulted in an estimate of about one male ptarmigan per 16 acres. Because we could not obtain a random sample in either year due to serious logistical challenges,

the 2013 estimate applies only to the areas around the nine accessible areas visited. Further analysis of ptarmigan use of land cover types and incidental species is ongoing.

The Refuge plans to incorporate the ptarmigan survey using this method into its Wildlife Inventory and Monitoring Plan, with surveys occurring every odd spring to avoid logistical conflicts with spring bear season. Lessons learned in 2013 will be applied also to try to increase the sample of transects to 20 – 24. The final results will be presented in a progress report available from the Refuge.

Small Mammal Surveys

Small mammals provide a prey base for many larger mammals and birds that inhabit the Alaska Peninsula. Very little is known about the small rodents and shrews (insectivores) of the Alaska Peninsula. Biologists are still confirming the presence and distribution of some species, and know little about population trends. To fill this void, Refuge biologists often conduct small mammal surveys in conjunction with other biological projects. Usually a grid of 100 live traps spaced 10 meters apart is used to trap an area for three 24-hour cycles or five nights. These grids may be run for three different months during the summer. To date, small mammal trapping projects have been conducted around Becharof Lake at Island Arm, Ruth Lake, and Gas Rocks, and on the Pacific coast at Puale Bay. We have confirmed the presence of masked shrew, dusky shrew, Northern red-backed vole, tundra vole, Northern collared lemming, and meadow jumping mouse.

Caribou Monitoring

Refuge staff and staff of the Alaska Department of Fish & Game (ADF&G) cooperate on two annual surveys that monitor the size and composition of the Northern Alaska Peninsula Caribou Herd (NAP). These are the post-calving herd count during June-July, and the composition estimate in October. These surveys provide critical data that the ADF&G uses to determine the harvestable surplus of caribou. These data have become of greater interest to constituents of the Refuge, such as local subsistence users, sport hunters, and commercial hunting guides, since the herd began declining in 1994. In 1999, the Alaska Board of Game closed hunting to non-resident hunters, and instituted a Tier II hunt with a limited number of permits for those Alaska residents who can document the longest history of subsistence use and greatest dependence on the NAP. Concurrently, the Federal Subsistence Board closed federal public lands to hunters who were not local residents.

During the post-calving count, Refuge and ADF&G staffs use small airplanes to search the count area on the upper Alaska Peninsula for caribou. Radio-telemetry assists them in locating aggregations of caribou by leading them to caribou that previously have been collared with radio transmitters. Aerial photography allows for better counts, especially of calves. During the October composition estimate, agency staffs use small airplanes and radio-telemetry to find groups of caribou. Airplane crews direct the crew of a small helicopter to these groups, and the helicopter crew determines the composition of each group as cows, calves, and bulls by age class.

The Refuge also has been monitoring the range and seasonal movements of the NAP. Service and University of British Columbia botanists have surveyed the floristic composition and

structure of plant communities, recorded lichen abundance, and classified plant communities in the upper Alaska Peninsula during 1998 through 2001. Refuge staff also established two fenced caribou exclosure plots on caribou winter range in Becharof Refuge. These exclosures will be monitored to document changes in vegetation composition and abundance in the absence of grazing by caribou.

Satellite telemetry has been used to document seasonal movements of caribou since 1998. Several caribou cows have been collared with transmitters that allow satellites to periodically locate them. This project has clarified the seasonal ranges and sub-groups of the NAP.

Moose Monitoring

Refuge staff and the ADF&G staff also cooperate on annual surveys that monitor the composition and trend of moose on the Alaska Peninsula. ADF&G established several moose composition survey areas in the 1960's; a few more have been established since. Observers in small airplanes intensively survey these areas in November–January when good snow cover exists in order to classify moose into the categories of cows, calves, and bulls by age class and count the total moose in each survey area. These composition data are important for determining seasons and harvest limits. The counts from these areas also provide an index to population trends when considered over several years.

Refuge staff initiated an effort to estimate moose density on the upper Alaska Peninsula in the winter of 2003-2004 after two winters with inadequate snow cover. Western EcoSystems Technology of Wyoming assisted the Refuge in this effort. The survey method is a distance sampling line transect, using a helicopter to fly the transects.

The Refuge has supported a graduate student project with the Alaska Fish and Wildlife Cooperative Research Unit at the University of Alaska, Fairbanks. The study area covered the drainage basin east of the Ugashik Lakes on the Alaska Peninsula Refuge. The objectives of the study were to document winter moose forage utilization and to describe the characteristics of preferred winter moose habitat. These characteristics of winter habitat will be used to develop a habitat map for the upper Alaska Peninsula, including the Becharof Refuge.

Current studies of moose are aimed at evaluating survival of adult and calf moose on the Northern Alaska Peninsula. Over 30 adult cow and yearling moose have been fitted with GPS radiocollars since 2010. These radiocollared moose allow biologists to find and observe individuals using aircraft throughout the year and closely monitor their movements and collect other information. GPS data also provide detailed information on movements and habitat use. During the calving season, radiocollared moose are closely monitored to determine calf production and timing of births, twinning rates, and calf survival during the first few months of life. Data from these projects are an important part of moose management and are used by wildlife managers to design suitable management strategies for moose on the Alaska Peninsula.