2005 Annual Summary of Landbird Projects for Boreal Partners in Flight

March 2006

No. 2

Compiled and lightly edited by Chris Harwood for Boreal Partners in Flight.
Dark-eyed Junco cover illustration by Robin Corcoran, U.S. Fish and Wildlife Service

***A brief note from the compiler*:** This is the second annual summary of landbird projects (e.g., field work, analyses, conservation initiatives, etc.) produced for *Boreal Partners in Flight* (BPIF). It represents a compilation of efforts from not only the BPIF membership, but also non-members who worked on northern breeding landbirds in 2005. My thanks especially to the latter for graciously furnishing their summaries.

This year's compilation represents a 23% increase in abstracts over last year. This increase was aided in no small part by the 11th Alaska Bird Conference (ABC) in February 2006. The ABC served as a forum that brought to light additional landbird work done in 2005. Willingness of ABC presenters to allow your humble (and pesty!) compiler to use their abstracts in this document (some even updated them!!) was near unanimous. My thanks to them all. [*Note: ABC paper and poster abstracts appearing in this document are noted by single and double asterisks, respectively*.]

The 38 projects summaries included represent these six general topics: broad-scale monitoring (5), local scale monitoring (4), inventories (4), species-specific studies/research (15), multi-species studies/research (6), and conservation (4). No fewer than 73 cooperators (individuals [70] and groups [3]) served as investigators. Colleen Handel (USGS-Alaska Science Center) wins this year's award (check's in the mail) for most times (6) listed as a project (co)investigator. (I could have had as many but I was too busy pestering procrastinators to turn in their summaries!!) The investigators represent the following entities:

- Governmental: Alaska Department of Fish and Game, Armed Forces Institute of Pathology, Bureau of Land Management, Canadian Wildlife Service, National Park Service, Smithsonian Migratory Bird Center, U.S. Fish and Wildlife Service, U.S. Forest Service, U.S. Geological Survey;

- Non-governmental Organizations (NGOs): Alaska Bird Observatory, Alaska Natural Heritage Program, Alaska Natural History Institutes, Albert Creek Banding Station (Yukon Territory), Audubon Alaska, Teslin Lake Banding Station (Yukon Territory), The Institute for Bird Populations, World Wildlife Fund;

- Academia: Alaska Pacific University, Boise State University, Idaho State University, Lund University (Sweden), Ohio State University, University of Alaska Anchorage, University of Alaska Fairbanks, Virginia Polytechnic Institute and State University;

- Private Sector: ABR Inc. Environmental Research and Services, Willson Ecological Consulting.

The project summaries are followed by an appendix containing citations of published and gray literature on northern breeding landbirds attributed to BPIF members and colleagues over the last two years.

As outgoing co-chair, this is likely my last time as compiler. It has indeed been a privilege being the first to read all these abstracts in one document. Many thanks to all who contributed in any fashion. Again, special thanks to Robin Corcoran (Innoko NWR) for her artwork (and to think she's a better ornithologist than an artist!). Please distribute this to appropriate colleagues who may not be BPIF members, especially those who contributed project summaries. We will aspire to add this to the BPIF web site as soon as possible.

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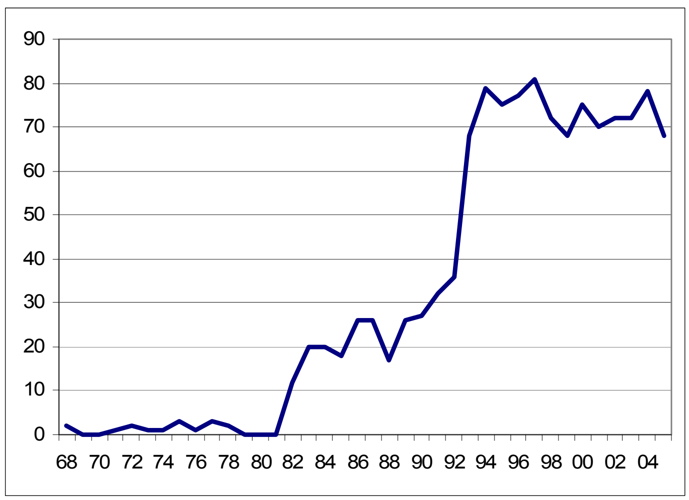
BROAD SCALE MONITORING

Project: 2005 update on the North American Breeding Bird Survey, Alaska

Investigators: Boreal Partners in Flight

In 2005, BBS surveys were conducted on 68 routes by 41 observers in Alaska. This was a decline in effort from the 78 routes run in 2003 and put us below the average state-wide effort since 1993 ($\bar{x} = 73.5$ routes, Fig. 1). However, the 2005 total for routes will likely still rise as the remaining data collected in 2005 are reported. Twenty-one people ran more than one route with large contributions by Buddy Johnson, Rob MacDonald (four routes each), Peter Bente, Jeanie Cole, and Robin Corcoran (three routes each). Swainson's Thrush (1,821 birds) and Dark-eyed Junco (1,760 birds) again topped this list of birds encountered. Species with more than 1,000 detections included Alder Flycatcher (1,170), American Robin (1,309), Varied Thrush (1,130), Orange-crowned Warbler (1,322), Wilson's Warbler (1,134), and White-crowned Sparrow (1,690).

Figure 1. BBS routes run annually in Alaska, 1968–2005.



Boreal Partners in Flight began supporting the BBS program in Alaska in 1992 after which participation in the program grew quickly to its current level (Fig. 1). Through the dedication of many observers the program has now run 100 routes for ≥5 years and 66 routes for ≥10 years. Trends in abundance in Alaska are now available for a wide diversity of 106 species on the web (Table 1 [end of document], Sauer et al. 2005). Notably, six species showed populations declines and 13 species population increases ($P \leq 0.15$, $n \geq 14$ routes) from 1980–2005 (Table 2 [end of document]). Declining birds include uncommon species with very steep declines (Rusty Blackbirds, -5.3 ± 0.05% per year), fairly common species with moderate declines (Blackpoll Warbler, -3.0 ± 0.02%), and still abundant species with smaller declines (White-crowned Sparrow, -1.7 ± 0.05%). The causes of such declines should be the focus of research or conservation, particularly for the former two cases where declines exceed 2% per year and mirror those observed at the continental level (Table 1, Rich et al. 2004). The list of increasing birds notably includes three species of corvids (Northwestern Crow, Gray Jay, and Black-billed Magpie), all of which are nest predators. Thus these population trends may be negatively influencing those of other bird species.

In 2006, we hope to continue widespread participation in the BBS in Alaska, run a minimum of 70 routes, and collect GPS locations for all count stops. The latter should be recorded in NAD27 and submitted to the national office along with the count data. We also we hope to fill route vacancies (http://www.pwrc.usgs.gov/bbs/results/routemaps/index.cfm) and implement the Alaska Landbird Monitoring Survey, an off-road complement to the BBS that will considerably increase the geographic scope of sampling and statistical power to monitor bird populations in Alaska.

Contact: Steven M. Matsuoka, U.S. Fish and Wildlife Service, Migratory Bird Management, 1011 E. Tudor Rd., ms 201, Anchorage, AK 99503, 907-786-3672, steve_matsuoka@fws.gov

Literature Cited

RICH, T.D., C.J. BEARDMORE, H. BERLANGA, P.J. BLANCHER, M.S.W. BRADSTREET, G.S. BUTCHER, D.W. DEMAREST, E.H. DUNN, W.C. HUNTER, E.E. IÑIGO-ELIAS, J.A. KENNEDY, A.M. MARTELL, A.O. PANJABI, D.N. PASHELY, K.V. ROSENBERG, C.M. RUSTAY, J.S. WENDT, AND T.C. WILL. 2004. Partners in Flight North American landbird conservation plan. Cornell Lab of Ornithology, Ithaca, NY.

SAUER, J. R., J. E. HINES, AND J. FALLON. 2005. The North American Breeding Bird Survey, Results and Analysis 1966–2003. Version 2004.1. USGS Patuxent Wildlife Research Center, Laurel, Maryland. Available at [http://www.mbr-pwrc.usgs.gov/bbs/bbs.html, September 2004].

Project: 2005 update of the Alaska Landbird Monitoring Survey (ALMS) and Alaska Off-road Breeding Bird Survey

Investigators: Colleen Handel and Melissa Cady, USGS–Alaska Science Center; Steve Matsuoka, U. S. Fish and Wildlife Service; BPIF collaborators

Boreal Partners in Flight (BPIF) established the Alaska Off-road Breeding Bird Survey (ORBBS) in 1992 to determine the status and trends of landbird populations and to document patterns of breeding distribution in relation to habitat. ORBBS was created to complement the existing road-based North American Breeding Bird Survey (BBS) by sampling areas away from the road system. Further modifications, including random stratified sampling, distance sampling, and detailed information on habitats at survey sites, were proposed at BPIF meetings and incorporated into a new program called the Alaska Landbird Monitoring Survey (ALMS). The most recent modification of the program involves stratifying the sampling universe into two strata based on accessibility: (1) more accessible (via foot, road, trail, boat, fixed-wing aircraft, etc.) and (2) less accessible (via helicopter). These strata were defined because of budget limitations and policy restrictions in many areas on use of helicopters. Information on the pilot program, protocols, data forms, and sampling areas can be found on the BPIF website:

http://www.absc.usgs.gov/research/bpif/Monitor/alms2.html

Summary of ALMS activities in 2005.—Four land management agencies participated in 2005: Chugach National Forest, Kanuti NWR, Kenai NWR, and Tongass National Forest. This season, cooperators surveyed 13 blocks, including 4 new blocks and 9 replicates of blocks first surveyed in 2003. They conducted bird surveys and collected habitat data at 226 points within these blocks. This was the third year of data collection for the ALMS program; Table 3 summarizes survey effort to date by land management unit. To date, participants have completed 811 10-minute point-transect surveys, recording more than 10,000 detections of 133 species of birds.

Table 3. Number of ALMS blocks surveyed to date.

	Number of blocks surveyed			
Land Unit	2003	2004	2005*	Total unique
Alaska Department of Fish & Game	0	1	0	1
Alaska Peninsula/Becharof NWR	0	7	0	7
Chugach NF	3	2	3*	6
Kanuti NWR	3	0	1*	3
Kenai NWR	1	0	1*	1
Tongass NF	5	7	8*	15
Yukon Delta NWR	3	0	0	3
TOTAL	**15**	**17**	**13***	**36**

*Includes some blocks replicated in both 2003 and 2005.

Summary of Alaska ORBBS activities in 2005; routes run using the old protocols.—Five cooperators replicated 19 of the original ORBBS routes in 2005, surveying a total of 241 points (Table 4). More than half of the surveys incorporated distance sampling to conform to the ALMS protocol; the others recorded bird detections inside and outside a fixed radius of 50 m. Survey routes on Tetlin NWR were selected randomly from within accessible strata, so they will be incorporated as is into the new ALMS sampling design. Surveys on islands of the Alaska Maritime NWR will also be incorporated into ALMS. Analyses of count data and habitat variables are currently underway. Figure 2 shows the number of surveys conducted each year under each protocol.

Table 4. Summary of Alaska ORBBS routes surveyed in 2005.

Land Unit	Route Number	Route Name	Distance/ Fixed radius	Number of Points
Alaska Maritime NWR	315	Buldir Island	Distance	12
Alaska Maritime NWR	316	Ugamak Island	Fixed	12
Alaska Maritime NWR	331	Kasatochi Island	Distance	12
Alaska Maritime NWR	355	Shemya	Distance	12
Chugach NF	632	Toboggan Glacier	Fixed	12
Chugach NF	633	Serpentine Cove	Fixed	12
Chugach NF	634	Doran Straits	Fixed	12
Innoko NWR	405	Cabin Lake Bog	Fixed	12
Innoko NWR	406	Halfway Hill	Fixed	12
Innoko NWR	451	River Lowland	Fixed	5*
Koyukuk NWR	526	Two Lakes Burn	Fixed	12
Koyukuk NWR	527	Caribou Woodland	Fixed	12
Tetlin NWR	429	Deeper Lake	Distance	12
Tetlin NWR	430	Ten Mile Hill	Distance	14
Tetlin NWR	431	Northway Road	Distance	28
Tetlin NWR	433	Fish Camp Lake	Distance	14
Tetlin NWR	434	Hidden Lake	Distance	12
Tetlin NWR	435	Chisana River	Distance	12
Tetlin NWR	518	Mt. Fairplay	Distance	12

*All 12 points not completed because of logistical difficulties.

Recommendations for 2006.—We encourage all collaborators to identify the accessible stratum within their land units so that we can select potential survey blocks for the ALMS program. Ongoing ALMS participants should continue to survey their blocks in the prescribed rotation. Collaborators from Tetlin NWR and Alaska Maritime NWR should continue to survey the routes previously established under ORBBS but with the new distance-sampling protocols. We have established an initial goal to monitor 50 blocks/routes each year, for a total of 100 every two years on a biennial rotation for replication (see Table 5). These have been allocated among Bird Conservation Regions (BCRs) to match the current effort of the roadside BBS, with which they will be analyzed jointly for regional population trends.

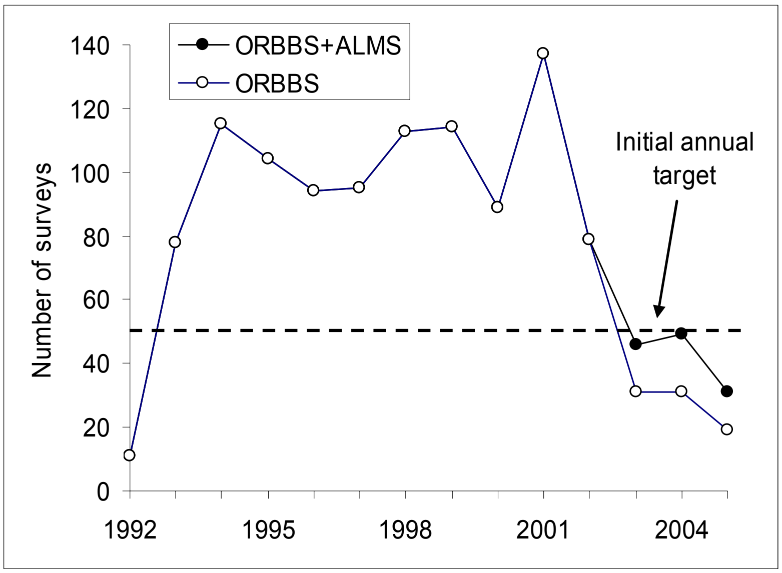


Figure 2. Number of surveys completed from 1992–2005 for the Off-road Breeding Bird Survey (ORBBS) and Alaska Landbird Monitoring Survey (ALMS). The initial monitoring goal is to replicate 100 ALMS surveys every two years, with 50 completed each year.

Table 5. Proposed allocation of ALMS surveys by Bird Conservation Region.

Bird Conservation Region (BCR)		Number of biennial surveys
1	Aleutian/Bering Sea Islands	7
2	Western Alaska	17
3	Arctic Plains and Mountains	6
4	Northwestern Interior Forest	45
5	Northern Pacific Rainforest	25
	Total	100

Contact: Colleen Handel, USGS–Alaska Science Center, 1011 E. Tudor Rd., Anchorage, AK 99503. Phone: 907-786-3418; e-mail: colleen_handel@usgs.gov.

Project: Migration monitoring activities in Alaska and the Yukon, 2005

Investigators: Bud Johnson, U.S. Fish and Wildlife Service; Tim Walker, Alaska Bird Observatory; Bruce Seppi, Bureau of Land Management; Ted Murphy-Kelly, Albert Creek Banding Station, Ben Schonewille, Teslin Lake Banding Station

Migration banding stations were operated at six locations in Alaska and the Yukon during 2005 *[see Bud Johnson's contact information below for obtaining banding tables]*. The Alaska Bird Observatory (ABO) Creamer's Field Migration Station in Fairbanks completed its 14th year of monitoring and captured 280 birds over 5,022 net-hours during spring and banded 4,342 birds in 11,460.4 net hours during fall. The Tetlin National Wildlife Refuge (NWR) has operated a migration station near Tok since 1993 and captured 2,312 birds over 6,673.5 net hours during fall migration. The Moose Creek Migration Station in Denali National Park and Preserve (Denali Institute) captured 2,439 birds during fall while the Campbell Tract station in Anchorage (Bureau of Land Management) captured 759 birds in 830 net hours. Two stations were operational in Southeast Yukon in 2006. The Albert Creek station in Southeast Yukon has been in operation since 2001 and captured 1,870 birds over 4,962.25 net hours during spring and 2,679 birds over 6,289.75 net hours in the fall. A new station was opened near Teslin Lake and recorded 1,142 captures over 3,413.75 net hours during spring migration. The six stations plan to be in operation in 2006; however, the effort at the Campbell Tract may be reduced because of staff and funding constraints.

A number of cooperative efforts were completed in 2005. Personnel from the University of Alaska collected approximately 1,000 fecal swabs from birds banded during fall at ABO's Creamer's Field as part of a larger effort to detect the avian influenza virus. In the Yukon, staff at the Teslin Lake and Albert Creek Migration stations banded Rusty Blackbirds with color bands as part of a cooperative effort with the Canadian Wildlife Service to learn more about this declining species.

The Migration Monitoring working group gathered prior to the BPIF annual meeting (December 2005) and discussed a number of topics including: 1) protocol issues, 2) permit issues, 3) Landbird Migration Monitoring Network, 4) habitat management on banding sites, 5) whether we need more stations in Alaska, 6) avian influenza , 7) statewide data analysis, and 8) training needs.

ABO continued analysis of banding data from Creamer's Field and Tetlin NWR and hope to have a draft report completed in 2006. ABO will also be analyzing data from the Denali Institute's Moose Creek Station. Data from the former Yakutat Migration Station was published in the Wilson Bulletin in 2005 in a paper entitled "Composition, abundance, and timing of post-breeding migrant landbirds at Yakutat, Alaska". Data from several stations in Alaska were analyzed for a paper entitled "Differential timing of Wilson's Warbler (*Wilsonia pusilla*) migration in Alaska" and should be published in the Wilson Bulletin in 2006.

In addition to collecting biological information, all migration stations operating in 2005 had active volunteer programs and provided interpretation regarding landbird conservation to thousands of visitors of all ages.

Contact: Bud Johnson, U.S. Fish and Wildlife Service, Tetlin National Wildlife Refuge, Mile Post 1314, Alaska Highway, PO Box 779, Tok, AK 99780; email: buddy_johnson@fws.gov.

Project: Summary of inventory and monitoring projects for nesting diurnal raptors in Alaska, 2005.

Compiled by: Carol McIntyre, National Park Service

Thanks to the many investigators who provided summaries. Please let me know if I overlooked any studies. Respective investigators should contact me if I assigned their study area to the wrong BCR. Results of research studies are reported elsewhere. Abbreviations used in this summary include ADFG (Alaska Department of Fish and Game, BLM (Bureau of Land Management), FWS (U.S. Fish and Wildlife Service), NPS (National Park Service), National Park and Preserve (NPP), and National Wildlife Refuge (NWR).

Most of the surveys conducted in 2005 are part of longer-term monitoring projects. Several surveys have been conducted for >15 years. New areas surveyed in 2005 included the north side of Iliamna Lake and the Minto Flats State Game Refuge.

BCR 2 - Western Alaska

Thanks to Peter Bente (ADFG), Rob MacDonald (FWS), Brian McCaffery (FWS), Bob Ritchie (ABR, Inc.), Susan Savage (FWS) and Denny Zwiefelhofer (FWS) for information in BCR 2.

FWS conducted two Bald Eagle surveys on ***Kodiak NWR*** using a Husky fixed-wing aircraft. One-hundred and thirteen nests were occupied, and 70 successful pairs produced 105 fledglings.

FWS conducted two Bald Eagle surveys on ***Togiak NWR*** using a SuperCub fixed-wing aircraft. Forty-two nests were occupied, and 32 successful pairs produced 58 fledglings.

FWS conducted surveys in the ***Ingakslugwhat Hills, Yukon-Delta NWR*** using helicopter, boat and foot surveys. Six pairs of Gyrfalcons produced 13 fledglings. Lone pairs of nesting Rough-legged Hawks and Golden Eagles were observed.

ADFG conducted one survey for cliff-nesting raptors on the ***southern Seward Peninsula*** using an R-44 helicopter in late June. Eighty-one pairs of Rough-legged Hawks, 21 pairs of Golden Eagles, 43 pairs of Gyrfalcons, and 7 pairs of Peregrine Falcons were documented.

ABR, Inc. conducted multiple surveys on the ***north side of Iliamna Lake*** using R-44 and Hughes 500 helicopters. Successful pairs included Osprey (5 pairs and 10 fledglings), Rough-legged Hawk (5 pairs and 8 fledglings), Golden Eagle (6 pairs and 10 fledglings), Bald Eagle (15 pairs and 24 fledglings), Peregrine Falcon (2 pairs and 5 fledglings), and Gyrfalcon (3 pairs and 8 fledglings). Surveys in this area may occur in 2006.

FWS conducted one Bald Eagle survey on the ***Alaska Peninsula NWR and Becharof NWR*** using a turbine Beaver fixed-wing aircraft. Survey personnel located 114 occupied nesting territories. This survey is conducted every 5 years.

BCR 3 - Arctic Plains and Mountains

Thanks to Debbie Nigro (BLM) and Dave Payer (FWS) for information in BCR 3.

FWS conducted two surveys on the ***Canning River, Arctic NWR*** using inflatable boats. Rough-legged Hawk occupied 5 territories and 2 successful pairs produced 4 fledglings. Golden Eagles occupied 4 territories and 2 successful pairs produced 4 fledglings. Gyrfalcons occupied one territory and produced 4 fledglings. Peregrine Falcons occupied 3 territories and 2 successful pairs produced 5 fledglings. A defensive pair of Merlins was seen on the second survey trip.

BLM and FWS conducted two surveys on the ***Colville River*** for Rough-legged Hawks, Peregrine Falcons, and Gyrfalcons using an inflatable motorized raft. No survey results were reported. This survey is conducted triennially.

BCR 4 - Northwestern Interior Forest

Thanks to John Burch (NPS), Tim Craig (BLM), Nikki Guldager (NPS), Buck Mangipane (NPS), Carol McIntyre (NPS), Dave Payer, (FWS), Judy Putera (NPS), Mason Reid (NPS), Hank Timm (FWS), and Jack Whitman (ADFG) for information in BCR 4.

FWS conducted one survey along the ***Porcupine River, Arctic NWR*** using an inflatable motorized raft and documented the first successful Golden Eagle nest on the Porcupine River since 2000. Peregrine Falcons occupied 32 territories and 25 successful pairs produced 58 fledglings.

BLM monitored 7 pairs of American Kestrel in nest boxes in the ***Coldfoot*** area. Six successful pairs produced 14 fledglings.

NPS conducted two Bald Eagle surveys in ***Lake Clark NPP*** from a SuperCub fixed-wing aircraft. Eighty-nine nesting territories were observed, and 26 successful pairs produced 32 fledglings.

NPS conducted two surveys in ***Denali NPP*** using an R-44 helicopter. Golden Eagles occupied 67 territories and 29 successful pairs produced 40 fledglings. Breeding success and productivity were higher than the last 4 years, apparently in response to higher numbers of snowshoe hares. Gyrfalcons occupied 4 territories and 4 pairs successfully raised 5 fledglings.

NPS conducted two surveys in ***Yukon-Charley Rivers National Preserve*** using a motor boat (Yukon River) and inflatable raft (Charley River). Peregrines occupied 48 territories and 31 successful pairs produced 70 fledglings on the Yukon River. Peregrines occupied 17 territories and 10 successful pairs produced at least 19 fledglings on the Charley River.

FWS conducted multiple surveys ***in and near Tetlin NWR***. Surveys were conducted using a SuperCub fixed-winged aircraft, an R-44 helicopter, on foot, and by boat. Ospreys occupied 24 territories and 15 successful pairs produced 27 fledglings. Bald Eagles occupied 34 territories and 17 successful pairs produced 18 fledglings. Peregrine Falcons occupied 14 territories and 9 successful pairs raised 22 fledglings.

ADFG conducted a baseline inventory ***in and near Minto Flats State Game Refuge*** from a SuperCub fixed-wing aircraft and an R-44 helicopter. Surveyors located occupied nests of Northern Goshawk (2), Red-tailed Hawk (7), Rough-legged Hawk (3), Bald Eagle (20), and Peregrine Falcon (3). (Sample sizes are in parentheses).

NPS conducted two Bald Eagle surveys along the ***Copper River, Wrangell-St. Elias NPP*** from a Husky fixed-wing aircraft. Fifty-one territories were occupied and 18 successful pairs produced 28 fledglings.

BLM conducted a Bald Eagle survey on the ***Gulkana River*** (K. Rogers, pers. comm.). No survey results were reported.

BCR 5 - Northwest Pacific Rainforest
Thanks to Mike Jacobson (FWS) for information in BCR 5.

FWS conducted two Bald Eagle surveys along ***Lynn Canal*** from a helicopter. Forty-five nesting territories were occupied and 22 successful pairs produced 29 fledglings.

Contact: Carol McIntyre, Denali National Park and Preserve, 201 1st. Ave., Fairbanks, AK 99701; Carol_McIntyre@nps.gov.

Project: Bald Eagle monitoring in Alaska.

Compiled by: Phil Schempf, U.S. Fish and Wildlife Service

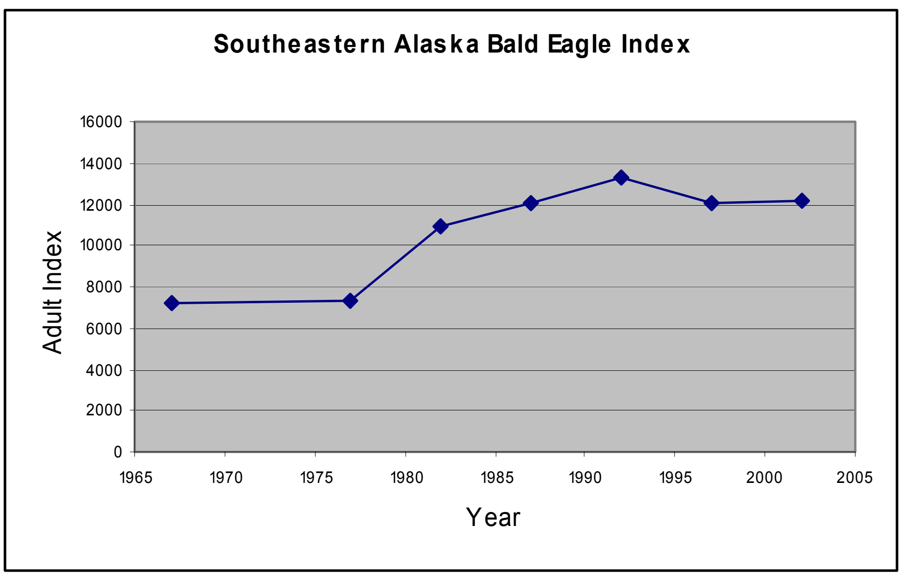
Bald Eagles are distributed throughout most of North America, from the northern edge of the boreal forest in Canada and Alaska, south into the northern edge of Mexico. In Alaska, the majority of the birds occur along the southern coast from Dixon Entrance at the southern tip of southeastern Alaska north and westward to Kiska Island in the Aleutians. Numbers become sparser as you move northward in the state with eagles occurring along most rivers and the shorelines of fish-bearing lakes north and west to the edge of the boreal forest. Few eagles occur north of the Yukon River or west of the boreal forest. The Alaska Bald Eagle population comprises more than 70% of the total population for the United States.

The Raptor Management Project of the USFWS Alaska Office of Migratory Bird Management proposes to monitor Bald Eagle populations statewide in Alaska using tested methods along the south coast from Dixon Entrance to Unimak Island and newly developed methods for the sparser populations of the Interior and the logistically difficult Aleutian Islands. Because of the magnitude of the task, the state will be divided into five regions: Southeastern Alaska, the North Gulf Coast, the Alaska Peninsula and Kodiak Island, the Aleutian Islands, and the Interior, with one of the regions surveyed each year over a 5-year period. Numbers of adult eagles change slowly over time and the precision of our estimates is such that we are unlikely to detect changes between years unless they are truly catastrophic. A 5-year survey interval allows sufficient time between surveys for detectable changes in numbers and keeps the survey task to manageable proportions.

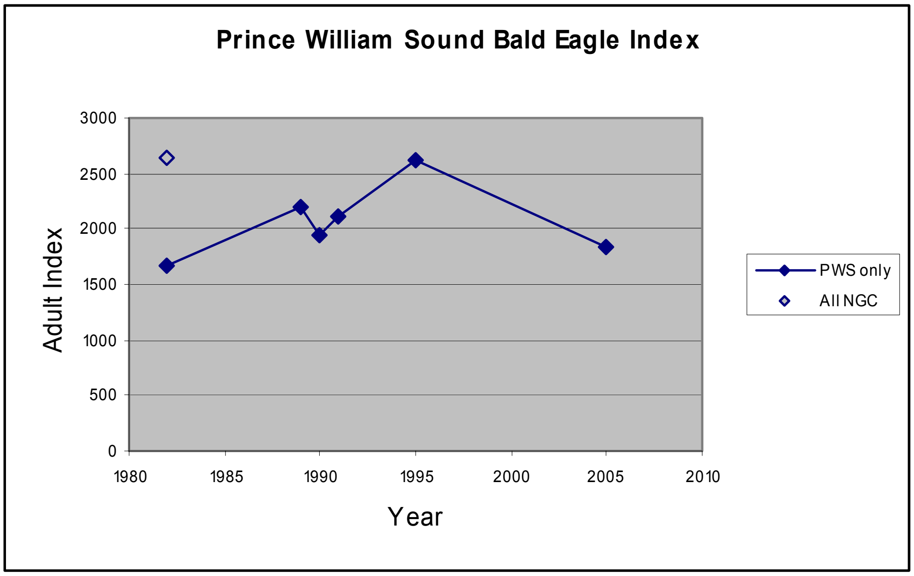
The first effort to survey a section of Alaska for Bald Eagle numbers was in 1967 (King et al. 1972). Thirty random plots were selected across southeast Alaska including all inshore saltwater shorelines and the outer coast south of Cape Spencer. This sample of 30 of 488 total plots was classified as having low, moderate, or high potential numbers of eagles, primarily based on the extent of shoreline in each plot. The shoreline in each plot was flown with fixed-wing aircraft and the eagles observed in each plot were classified as adult or immature and whether they were flying or perched. Eagles with predominately white heads were classified as adults. The estimate for the total survey area was obtained by expanding the plot estimate to the total number of plots. Immature birds are less visible than adults. Studies in Prince William Sound estimated that 79% of adults were detected during a population survey while only 51% of immatures were observed (Bowman and Schempf 1999). The number of immatures in the survey area is estimated by using the ratio of immatures to adults observed flying. We assume the flying immatures and flying adults are equally visible and that adults and immatures are equally likely to be flying at the time of the survey. In truth, immatures may be more likely to be observed flying with a substantial proportion of the adults confined to nest sites while incubating, but this assumption has not been adequately tested to date.

This method has been refined over the years and used to fly surveys from British Columbia along the south coast of Alaska to the end of the Alaska Peninsula (King et al. 1972, Hodges et al. 1979, Hodges et al. 1984, Bowman et al. 1997, Jacobson and Hodges 1999, USFWS unpubl. data). A comprehensive survey of the Interior or the Aleutian Islands has never been accomplished.

Southeastern Alaska has the longest survey history with seven complete surveys accomplished since the first in 1967. The survey area includes all saltwater shorelines in southeastern Alaska from Dixon Entrance on the south to Cape Spencer on the north. The initial surveys found approximately 7,300 adults. These numbers increased into the 1980s, but have stabilized at a population index of roughly 12,000 adult eagles with no statistically significant difference in the numbers observed over the last five surveys (Jacobson and Hodges 1999, USFWS, unpubl. data).

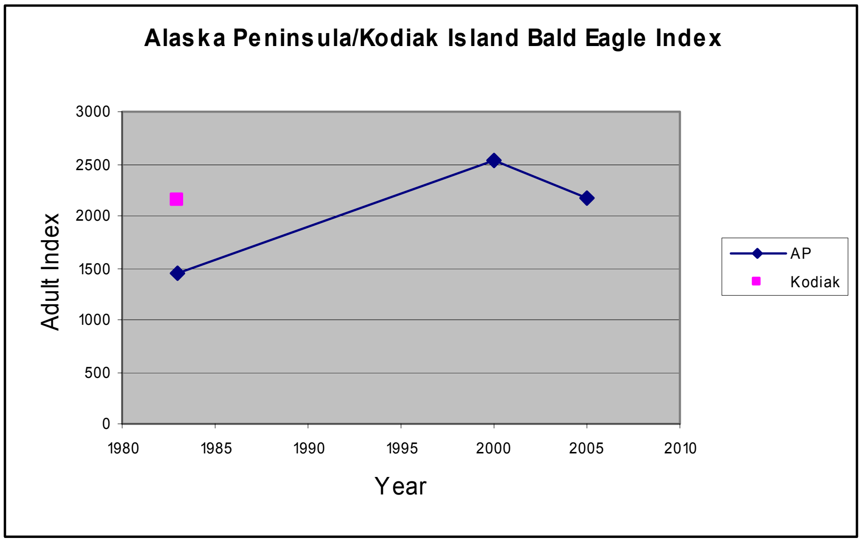


The North Gulf Coast (NGC) from Cape Spencer to Cape Elizabeth at the western end of the Kenai Peninsula was first surveyed in 1982 and not resurveyed until after the Exxon Valdez oil spill in 1989. Additional plots were added in 1989 to increase the precision of the estimate and a complete survey of the islands in Prince William Sound (PWS) was added. Subsequent surveys focused only on PWS which was resurveyed in 1990, 1991, and then not again until 1995 (Bowman et al. 1997). The last survey was conducted in 2005 (USFWS, unpubl. data).



In 1982, PWS comprised a little more than 60% of the adult index for the entire NGC region. The PWS population increased from 1982 to 1995 at an annual rate of 3.7%. The 1989 survey was too late to determine the pre-spill population, but by 1995 the population was thought to have fully recovered from any spill-related impacts and continuing to expand. There was no significant difference among the three surveys conducted immediately after the spill (1989-91). The 2005 survey, however found a population index 30% lower than the last estimate and nowhere near the 3,400 adults expected if the population had continued to follow the trajectory estimated in 1995. Additional analysis is needed to understand the implications of the observed decrease in the eagle index. Future surveys need to include those plots outside of PWS that have not been recently surveyed.

The Alaska Peninsula and Kodiak Island bald eagle populations were first surveyed in 1983. Since that original survey Kodiak has not been resurveyed, but the Peninsula has been surveyed in 2000 and 2005. Eagle numbers there have apparently increased since the early 1980s, but the data are too few to make conclusive statements on current trends. Numbers on Kodiak Island are believed to have increased substantially from the 2,145 adults estimated in 1983 (D. Zwiefelhofer, pers. comm.), possibly doubling in the more than 20 years since the last survey. Future surveys need to include the plots on Kodiak and determine the current status of that population.



The Interior and Aleutian Island are the major areas of the state without extensive surveys. Both areas will require modification of the survey technique that has been applied so successfully to the south coast of Alaska.

Bald Eagles in the Interior occur at low densities over vast areas along river systems and the shorelines of fish-bearing lakes. The breeding population of the Interior has been estimated at 525-725 pairs (Ritchie and Ambrose 1996), occurring primarily in the Susitna, Copper, and Tanana river drainages with lower numbers of eagles occupying habitats along the Kuskokwim and Yukon rivers. River drainages will be samples and augmented by plot surveys to estimate the number of birds using non-riverine habitats.

As with the Interior, there has been no extensive survey of the Aleutians, but Byrd and Williams (1991) projected that there was a minimum of 400 pairs of Bald Eagles based on their field experience and knowledge of nesting densities. They reported considerable variation in eagle nesting densities between individual islands, even within the same island group. The Aleutians are logistically more difficult to survey, geographically remote with adverse weather and limited facilities for aircraft, and have a less complex coastline, requiring a different methodological approach. The current thought is to break the Aleutian chain from Unimak Pass to Kiska Island into to north-south segments 20° of longitude in width. Shorelines of approximately a third of the strips would be surveyed with fixed-wing aircraft to estimate the total population of the island chain.

The proposed survey schedule for the next five years is:

2006 Pilot Interior Survey
2007 Southeastern Alaska Survey
2008 Pilot Aleutian Island Survey
2009 North Gulf Coast Survey
2010 Alaska Peninsula/Kodiak Island Survey

Throughout this report, I have described the data derived from the surveys as an index to the number of adults within the survey area. This is due to the fact that all adult eagles that are "resident" within the survey area are not detected during the survey. Some adults that are normally within the area surveyed are not there when the survey aircraft passes. They may be up soaring, off at a feeding site outside the survey area, perched on a distant ridge top or otherwise not available to be counted. Other adults are simply missed by the surveyors, an error to detect birds that are available to be counted. Reasons for detection errors are many, but include such things as cryptic perches, adverse lighting conditions, and observer fatigue. Studies in Prince William Sound illustrate these issues (Bowman and Schempf 1999). Using radio telemetry we estimated that 21% of adults were not available to be counted during the time of the population survey. In addition, using independent dual observers, we estimated that only 79% for the adults within the survey area were detected. Combining the two factors suggests only 62% of the adults associated with the surveyed habitat were found during the survey or that the index should be increase by a factor of 1.6 to obtain the true population estimate. Availability cannot be easily estimated without a substantial increase in time and cost, but detection can be estimated by adding a second observer. Estimation of detection rates will ameliorate concerns about comparability between surveys conducted with different observers of variable ability, under variable weather conditions or influence by other variables that are difficult to keep consistent between surveys. Future surveys should strive to estimate detectability whenever feasible.

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LOCAL-SCALE MONITORING

Project: Occupancy and Productivity of Nesting Bald Eagles, Togiak National Wildlife Refuge, Alaska, 2005.

Investigator: Rob MacDonald, U.S. Fish and Wildlife Service

One of the 10 inventory and monitoring projects listed in the Togiak National Wildlife Refuge (Togiak Refuge) Wildlife Inventory and Monitoring Plan is the Raptor Monitoring Project. This report presents Bald Eagle nest occupancy and productivity survey data collected on and adjacent to the Togiak Refuge in 2005 and compares to data collected from 1985-1989 and 1999-2004. A Bald Eagle nest occupancy survey was flown on 1-2 June to observe 74 known Bald Eagles nests. A nest productivity survey was flown on 25 and 27 July observing 58 Bald Eagle chicks in 32 bald eagle nests (1.81 chicks per successful nest). For comparison, brood sizes averaged 1.73 Bald Eagle chicks per successful nest in the period from 1985-1989 and 1.59 Bald Eagle chicks per successful nest in the period from 1999-2004. Rates of nest activity were lower in the period from 1985-1989 (average of 69%) than in the period from 1999-2005 (average of 76%).

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Project: Long-term monitoring of passerine birds in Denali National Park and Preserve, Alaska.

Investigator: Carol McIntyre, National Park Service

A long-term monitoring program for passerine birds was developed as part of the National Park Service's Vital Signs Monitoring Program in the Central Alaska Monitoring Network in Denali National Park and Preserve (Denali). A primary objective of the program is to assess the response of bird communities (composition, distribution, and abundance) to landscape-scale changes in their habitat. The same spatial sampling design (the minigrids) used in the passerine monitoring program is the same as Denali's vegetation monitoring program. The probabilistic sampling design, developed by Carl Roland (NPS), Karen Oakley (USGS) and Trent MacDonald (WEST) referred to as the minigrid design, contains 2.5 km x 2.5 km grids located 10 km or 20 km apart, with each grid containing 25 sampling points located 500-m apart.

In 2005, surveys were conducted on 11 minigrids in Denali. Four experienced bird surveyors, Tim Walker, Ryan Drum, Sally Andersen, and Peter Elstner, completed a two-week distance sampling training course at the Alaska Bird Observatory before the field season and conducted all the surveys. Sampling for birds followed the Alaska Land Bird Monitoring (ALMS) protocol. Sampling occurred at each accessible point using 10-minute point-transects with data grouped by distance and time interval. All birds detected during a 10-minute sampling period were separated into four time segments: 0-3 minutes, 3-5 minutes, 5-8 minutes, and 8-10 minutes. All detections were recorded at 10-m intervals up to 100 m, then at 25 m intervals to 150-m, and then >150-m. All surveys were conducted between 0300 and 0930 from 1 June to 28 June 2005.

The crew sampled 261 of 275 points (95%) on 11 minigrids. Sixty-four species were detected on the 10-minute point counts and 13 species were detected on minigrids but not during a 10-minute count. The crew detected 17 to 32 species per minigrid, 4.5 to 8.4 species per point, and had 10.4 to 22.9 detections per point. Species richness was greatest (28 to 32 species) on the three minigrids along Birch and Hult Creeks. Most detection (>70%) were occurred during the first 5 minutes of the count and most detections (>80%) were of singing or calling birds.

The crew detected ≥60 individuals of 17 species including White-crowned Sparrow (781), White-winged Crossbill (308), American Tree Sparrow (302), Swainson's Thrush (256), Fox Sparrow (254), Wilson's Warbler (253), Savannah Sparrow (238), Dark-eyed Junco (217), Redpoll spp. (205), Orange-crowned Warbler (189), Gray-cheeked Thrush (143), Arctic Warbler (107), American Robin (102), Varied Thrush (81), Yellow-rumped Warbler (74), Hermit Thrush (67), and Ruby-crowned Kinglet (60). (Number of detections).

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Project: Monitoring and modeling breeding landbird distributions on the Kenai National Wildlife Refuge, Alaska*

Investigators: John Morton and Todd Eskelin, U.S. Fish and Wildlife Service, and Dawn Magness, University of Alaska Fairbanks

Kenai National Wildlife Refuge (KENWR) has a legislative mandate "to conserve fish and wildlife populations and habitats in their natural diversity" on 2 million acres within the boreal forest biome. To improve our understanding of spatial and temporal variation at the landscape level, we are developing a Long Term Ecological Monitoring Program (LTEMP) that inventories and monitors biota on ~350 permanent points systematically distributed at 5-km intervals across KENWR. Through a formal agreement that recognizes LTEMP as an adjunct inventory to the USDA Forest Inventory & Analysis program (FIA), we sample fauna on FIA sites, share data and protocols, and together will resample 20% of sites every other year over a 10-year monitoring window. We initiated LTEMP in 2004 by sampling breeding landbirds (variable circular plot), vascular and nonvascular plants on nonforested sites (line intercept), insects (sweep net), and noise (sound meter) on every other point (n = 147). Despite this incomplete inventory, we encountered 80% of 96 landbird species known to occur on KENWR. Using logistic regression, we modeled the distributions of 13 landbird species across KENWR using a 200-m moving window analysis (FRAGSTATS). In the future, we will use frequency of occurrence to evaluate distributional changes and density estimates (PROGRAM DISTANCE) to evaluate changes in abundance. All sampling methods are passive, nondestructive (to habitat), relatively inexpensive, and require ≤ 2 visits to a plot in a given sampling year. Our approach provides a statistically-rigorous framework for landscape monitoring and modeling, yet maintains a great deal of design flexibility. Integration with the FIA ensures that LTEMP is cost effective, and the collocation of floral and faunal sampling permits additional species-habitat modeling. Furthermore, we used plot data to train a supervised classification of vegetation (ECognition) from LANDSAT imagery. We believe LTEMP can serve as a template for agencies that are developing long-term ecological monitoring programs at the landscape level.

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Project: Bald Eagle Survey of the Pacific Coast of the Alaska Peninsula, Alaska, Spring 2005.

Investigators: Susan Savage and Jack Hodges, U.S. Fish and Wildlife Service

As part of its Wildlife Inventory Plan program, in 2000 the Alaska Peninsula/Becharof NWR (Refuge) initiated a program to monitor adult Bald Eagle population levels along the Alaska Peninsula Gulf Coast. Survey methods followed procedures established by Migratory Bird Management (MBM) and sampling design initiated during a survey conducted in 1983. In 1983 MBM Pilot/Biologist Hodges surveyed 40 plots; in 2000 we surveyed these original 40 plots plus 10 more plots within the refuge boundary. From 17 to 24 April 2005 we surveyed the same 50 plots. The total population index from Cape Douglas to Unimak Island was 2,168 $\pm$ 530 (24%) adult eagles. The immature eagle population index was 435 $\pm$ 297 (68%) immature eagles. Although the adult population index decreased from 2000 and the immature population index increased from 2000, neither difference was statistically significant. The number of occupied nests also did not differ statistically between 2000 and 2005 (132 occupied nests in 2000 versus 114 occupied nests in 2005). In 2005, we used a new method to estimate detection rates for adult Bald Eagles. Detection rates have not been previously estimated for Bald Eagle surveys in open habitats such as those found on the Alaska Peninsula. Our method of estimating the detection rate used subjective estimates of the detection probabilities for each adult eagle to build a presumed detection probability distribution. The left-seat observer subjectively assigned a probability, to the nearest tenth, of detection to every eagle sighting. Assuming this distribution to be true led to a correction factor for increasing the Peterson estimate of eagles missed by both observers. Our total adult eagle population estimate should be increased by 28%to account for the eagles missed, yielding an adjusted index of 2,775 adult eagles. In addition to the Bald Eagle observations, we report on observations of other raptor, and large terrestrial and sea mammals made during the survey.

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INVENTORIES

Project: An inventory of landbirds for Kenai Fjords National Park

Investigators: Melissa Cady, U.S. Forest Service and Caroline Van Hemert, Colleen Handel, Lisa Pajot, and John Terenzi, U.S. Geological Survey

Alaska's coastal forests, stretching from Southeast Alaska to the Kenai Peninsula, support guilds of breeding landbirds that are uniquely adapted to maritime climatic conditions and rugged topography. Despite the importance of this ecosystem, however, no systematic inventory of the landbird resources had been conducted previously for Kenai Fjords National Park. In addition, only incidental records regarding landbird species distribution and habitat use, both of which are critical avian management tools, existed for this area.

U.S. Geological Survey Alaska Science Center and National Park Service biologists conducted landbird surveys in Kenai Fjords National Park (KFNP) during May-June 2005. Participants conducted 399 point counts across 50 routes, using protocols adapted from the Alaska Landbird Monitoring Survey. These surveys comprise the first systematic inventory of landbirds in KFNP. Resulting data will be used to certify the list of landbird species known to occur in the park, and data can also be used to establish habitat associations and estimate densities of selected species. During the survey period, observers identified 101 species of birds in KFNP, accumulating over 4,500 total detections. Highlights from this year's field work include observations of several relatively rare species, including Gyrfalcon (*Falco rusticolus*), Golden Eagle (*Aquila chrysaetos*), Western Screech-Owl *(Otus kennicottii)*, Rusty Blackbird *(Euphagus carolinus)*, and one species not previously recorded in the Park, Townsend's Solitaire (*Myadestes townsendi*).

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Project: Gates of the Arctic National Park and Preserve riparian bird inventory

Investigator: Nikki Guldager, National Park Service

The Park Flight Program (a partnership between the NPS, National Park Foundation, National Fish & Wildlife Foundation/USAID, American Airlines, and the University of Arizona) provided support for a riparian bird inventory within Gates of the Arctic National Park and Preserve (GAAR). The bird inventory was designed to document species distribution, diversity, density and habitat within GAAR's major riparian corridors. Variable circular plot methodology with unlimited distance estimation was used. In 2005 we sampled more than 150 points for landbirds along the Alatna and Itkillik Rivers, bringing the total number of survey points conducted in 2003 – 2005 to more than 800. Previously surveyed rivers include the Noatak, North Fork of the Koyukuk, John, Kobuk and Killik. Analyses to estimate species density, examine species habitat associations, and predict species distributions within the study area will be completed in 2006.

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Project: Inventory of montane-nesting birds in Katmai National Park and Preserve

Investigators: Dan Ruthrauff, Lee Tibbitts, and Robert Gill, U.S. Geological Survey

In 2005 we completed the second year of a three-year study to inventory montane-nesting birds within the National Park Service's Southwest Alaska Network (SWAN) of parks. We deployed three two-observer crews within Katmai National Park and Preserve from 11–25 May, and surveyed a total of 23 10-km X 10-km study plots distributed throughout the Park. In total, we conducted 382 15-minute point counts utilizing variable circular plot methodology, complementing 379 counts we conducted in Lake Clark National Park and Preserve in 2004.

Spring conditions were similar to those we experienced in 2004. Western sections of the Katmai region were mostly snow-free during our survey period, in contrast to eastern sections of the Park with delayed spring phenology typified by near complete snow cover and below-normal temperatures. Noteworthy observations included sightings of breeding Baird's Sandpipers (*Calidris bairdii*), Surfbirds (*Aphriza virgata*), and Wandering Tattlers (*Heteroscelus incanus*) at locations at or beyond the southern limit of their known breeding range, and unexpectedly high numbers of Whimbrel (*Numenius phaeopus*) and American Golden-Plovers (*Pluvialis dominica*) in the area surrounding Kukaklek Lake. Pacific Golden-Plovers (*Pluvialis fulva*), while known to be common in low-lying areas of the Alaska Peninsula, were detected at sites further inland than expected. In contrast to these intriguing shorebird observations, observers were struck by the relative dearth of high-montane passerines (e.g., Northern Wheatear (*Oenanthe oenanthe*) , Say's Phoebe (*Sayornis saya*), Gray-crowned Rosy-Finch (*Leucosticte tephrocotis*)), species which were detected in low numbers at Lake Clark in 2004.

In 2006, we will finish our inventory of Lake Clark and Katmai by surveying study sites in eastern sections of both Parks in early June, a time of year when snow cover will be less extensive, thus facilitating plot access. These data will be utilized to calculate park- and habitat-specific bird densities, and park-wide densities and distributions will be linked to a GIS database delineating sample area. These surveys serve not only as basic avifaunal inventories, but the repeatable nature of the methodology will also enable land managers to monitor population changes over time.

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Project: Inventory of raptor and Common Raven nests on Minto Flats State Game Refuge, Alaska

Investigators: Jackson S. Whitman and Jason R. Caikoski, Alaska Department of Fish and Game

Raptor populations occur at the apex of natural food webs. As such, monitoring their populations is often used as an indicator of diminished capacity of an area to support natural ecological systems. Management of Minto Flats State Game Refuge is a state responsibility, and recent interest in natural resource extraction has the potential to degrade existing habitats. Alaska State Statutes establishing the Refuge and the Refuge Management Plan mandate that the Department of Fish and Game manage the Refuge to protect and enhance fish and wildlife habitat and conserve fish and wildlife populations and diversity. However, only preliminary information exists on the extent of use of the area by raptors. This investigation is designed to establish baseline data on nesting raptors, and further, to document specific nesting locations. Future management of the area (locations of temporary facilities, road corridors, etc.) can be improved if baseline data exist.

During spring 2005 we surveyed 2,640 km^2 within and adjacent to Minto Flats State Game Refuge in interior Alaska. Initial survey efforts employed fixed-wing aircraft (PA18, SuperCubs) flown at approximately 100 m AGL at about 70 knots airspeed. One hundred twenty-nine nest structures of at least eight raptor species, as well as Common Ravens, were identified (Table 6). Global Positioning System (GPS) locations were recorded for all platforms and later mapped using Geographic Information System (GIS) software. All identified platforms were later visited using a helicopter (Robinson R44), and species occupancy data were collected. Although these data are useful as a baseline for species occurrence and distribution on the Refuge, they are inadequate for computing density of raptor nests. Further research is warranted to determine sightability and enhance our understanding of actual nest and raptor pair densities.

Because of the 2005 effort, we know that Minto Flats State Game Refuge provides nesting habitat for a variety of raptors. Depending on the extent of alteration of those habitats, raptor nesting may decline without adequate safeguards put in place by the managing agencies (State of Alaska, Departments of Fish and Game and Natural Resources). Additional data are needed to compute habitat affinities and actual nesting density of various raptor species that typically use large stick platforms.

During spring 2006, we will intensively sample subunits (approximately 7 min/$mile^2$) within the Refuge. With previously-identified platforms as the “marked” sample, we will gather information on nest sightability and ultimately be capable of computing an estimated nest density for at least the three most-commonly found raptor species. Attempts will be made to classify the nest structure (species of tree, approximate height and location of nest in the structure) and the surrounding habitat. Proximity to water and waterbody type will also be noted.

Following the March efforts to locate nesting structures, follow-up surveys will be conducted in June using a Robinson R44 helicopter. All nests noted from fixed-wing surveys will be re-visited to determine activity status and initial productivity. Attempts will be made to categorize alternate or supernumerary sites depending on proximity to occupied nests. An attempt will be made at this time to locate additional nest sites and mapping will ensue.

Table 6. Raptor and Common Raven nest platforms encountered on Minto Flats State Game Refuge, Alaska, spring 2005.

Species	**Active**	**Inactive**	**Unknown**[1]
Bald Eagle (*Haliaeetus leucocephalus*)	20	18	
Osprey (*Pandion haliaetus*)	0	0	
Great Gray Owl (*Strix nebulosa*)	11	2	
Great Horned Owl (*Bubo virginianus*)	3	1	
Northern Goshawk (*Accipiter gentilis*)	2	0	
Red-tailed Hawk (*Buteo jamaicensis*)	7	1	
Rough-legged Hawk (*Buteo lagopus*)	3	1	
Peregrine Falcon (*Falco peregrinus*)	3	1	
Common Raven (*Corvus corax*)	20	8	
unknown	2[a]	23[b]	3

[1]Nest structures that were not active when located during fixed-wing surveys and the species of builder could not be determined and the nest site could not be located using the helicopter to determine occupancy.
[a]Nest structure that showed evidence of being used but young had fledged prior to positive identification of a species.
[b]Nest structures that were positively classified as inactive but the species of nest builder could not be determined.

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SPECIES-SPECIFIC STUDIES/RESEARCH

Project: Black swift distribution in Alaska

Investigators: Gwen Baluss, Tongass National Forest and Bob Altman, American Bird Conservancy

The Black Swift (*Cypseloides niger*) is a priority species for bird conservation throughout its range in North America. In Alaska it is included on the Audubon Alaska WatchList and in the *Boreal Partners in Flight* Landbird Conservation Plan (as a species of concern), as well as being a species of interest for the Northern Pacific Rainforest Bird Conservation Region (BCR 5). Little is known about the species, and it is not adequately monitored by current monitoring schemes such as the Breeding Bird Survey.

In 2003 through 2005 we sought to learn more about the range of the Black Swift in Alaska and to survey likely nesting areas. It was hoped that monitoring efforts could then be initiated based on the species' tendency toward long-term fidelity to colonial nesting sites at waterfalls.

A database of all Black Swift sightings from both published and unpublished accounts by competent bird-watchers was compiled. Within the zone of highest occurrence of Black Swift observations, waterfalls that met the known criteria for nesting Black Swifts were surveyed according to protocol established the BCR 5 Black Swift effort.

Waterfalls were checked along the Stikine River, Hyder area, inland lakes in Misty Fjords National Monument, Tracy Arm - Ford's Terror Wilderness, and locations near Petersberg and Ketchikan. In 2005, waterfalls were surveyed in Walker Cove off the Behm Canal. A total of 12 waterfalls were surveyed at least once during the nesting season. No nests were found in Alaska. Adults were seen at five of the survey areas. Incidental to the survey, one likely nesting area was found near the border, outside of Stewart, B.C. in 2003.

No further surveys are planned. Gwen Baluss will continue to compile additional anecdotal observations, and encourage volunteer efforts for travelers to Misty Fjords, especially the inland reaches of the Chickamin and Unuk rivers, to check waterfalls for nests.

Although it would be helpful to document breeding in Alaska, we have concluded that due to the extreme difficulty of finding and accessing suitable waterfalls in the Tongass National Forest and the uncertainty that still surrounds their habits at the northern extent of their range, any practical monitoring effort for this species in Alaska would need to be based on observations of foragers. Prime areas for annual counts would be the Stikine River, Hyder, and possibly other interior river systems in the extreme southeast portion of the state. Ideally these could be coordinated with similar efforts in Northern British Columbia, Washington, and Oregon.

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***Project: Life history lessons from molted Gyrfalcon feathers on Yukon Delta NWR**.*

Investigators: Travis Booms, Kevin McCracken, and Falk Huettmann, University of Alaska Fairbanks; Brian McCaffery and Phil Schempf, U.S. Fish and Wildlife Service; Sandy Talbot, U.S. Geological Survey (Alaska Science Center); Mark Fuller, U.S. Geological Survey (Snake River Field Station) and Boise State University's Raptor Research Center

2005 was our third year of collecting intensive information on the breeding ecology of Gyrfalcons on the Yukon Delta NWR. Our research interests include: 1) determining inter-year nest site and mate fidelity, turn-over rates, and breeding dispersal of adults; 2) documenting intra- and inter-year movements of adults and young; 3) identifying diet, contaminant levels, and ptarmigan densities; and 4) estimating aerial survey detectability during the incubation period. Though Yukon Delta NWR staff has been monitoring three populations of nesting raptors, our work has concentrated on a unique assemblage of extinct volcano craters, the Ingakslugwat Hills, which support some of the highest Gyrfalcon nesting densities anywhere documented to date. Field crews of two to five people occupied a remote camp from April-July 2005 at the Ingakslugwat Hills while carrying out research duties.

In 2005, we deployed 11 transmitters on adult and fledgling Gyrfalcons, collected approximately 200 molted feathers from 16 territories for genetic analysis, banded and sampled for genetics and contaminants 25 nestlings in 11 nests, including four in the Kilbuck Mountains study area. We also conducted pre-incubation surveys of the Kilbuck Mountains via fixed-wing plane, an incubation survey via helicopter at the Ingakslugwat Hills, and a productivity survey via ground efforts at the Ingakslugwat Hills and via helicopter in the Kilbuck Mountains. We also initiated a line-transect survey for Willow Ptarmigan to document distribution and density of the Gyrfalcon's primary prey species. Preliminary results from microsatellite analysis of molted feathers suggest the population may have high turn-over rates and low site fidelity, an unexpected finding and one on which we will concentrate efforts in future years.

We plan to continue research efforts on a similar level for 2006 and 2007, depending on funding. Primary research topics for 2006 include estimating survey detectability via a repeated visits survey design, continuing with the molted feather microsatellite work, and deploying additional transmitters. The project is supported by the USFWS Yukon Delta NWR, USFWS Office of Migratory Birds, the National Science Foundation, and the Environmental Protection Agency. The project is the focus of Travis Booms' doctoral dissertation at the University of Alaska Fairbanks.

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Project: Phylogeography of south-central Alaskan rosy-finches

Investigators: Kathryn Brown and Sergei Drovetski, University of Alaska, Anchorage

Systematics of North American rosy-finches (*Leucosticte)* has been unstable. Currently, one species of rosy-finch (Gray-crowned Rosy-Finch; *Leucosticte tephrocotis*) is recognized in south-central Alaska. This species is further divided into three subspecies, a continental form (*L .t. littoralis*), an

Aleutian form (*L t. griseonucha*), and a Pribilof form (*L. t. umbrina*). Systematics varies between considering all North American rosy-finches conspecific with Asian Rosy-Finch (*L. arctoa*), to dividing North American populations into four species. According to the latter view, Aleutian (*griseonucha*) and Pribilof (*umbrina*) populations are a different species from the continental form (*littoralis*). We used the complete ND2 mitochondrial gene to test these different taxanomic hypotheses. Our results revealed that south-central Alaskan rosy-finches are distinct from Asian Rosy-Finches from the Kamchatka peninsula. None of the subspecies appear to be reciprocally monophyletic. On a population genetics level, both Bering Sea forms differed from the continental form. However, this distinction appears to be an artifact of the very low genetic diversity of Bering Sea populations compared to continental populations. Additionally, we found no significant differentiation between populations in the Aleutians and the Pribilofs. Due to the low genetic diversity of the Bering Sea populations, additional sampling from the Aleutians and Alaska Peninsula would be required to reconstruct the demographic and phylogenetic history of rosy-finches.

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Project: Distribution and habitat associations for Rusty Blackbird (Euphagus carolinus) in Alaska.

Investigators: Tracey Gotthardt and Jodi McClory, Alaska Natural Heritage Program; Colleen Handel, U.S. Geological Survey; Melissa Cady, U.S. Forest Service

The Rusty Blackbird (*Euphagus carolinus*) is of high conservation concern because of a severe long-term continental population decline. Little is known about the distribution, habitat requirements, or breeding biology of this boreal nesting passerine. To aid research and conservation efforts, we developed a statewide distribution map and observation database for Rusty Blackbirds by compiling survey information across Alaska. We analyzed habitat use at a coarse scale by comparing the distribution of observations to an AVHRR/NDVI vegetation map of Alaska. We analyzed habitat use at a fine scale using Off-road Breeding Bird Survey (ORBBS) data with habitats classified according to Viereck et al. (1992). A total of 754 blackbird observations were collected from researchers statewide. Additions to the known breeding range came from the Seward Peninsula and Kodiak Island. In both coarse- and fine-scale analyses, Rusty Blackbirds were most often associated with forest habitats, secondarily with shrub habitats. Fine-scale analyses indicated blackbirds were most often detected in needleleaf forests and woodlands, closed broadleaf forests and dwarf tree scrub habitats, but were also strongly associated with wet graminoid emergent herbaceous vegetation. Future analyses will incorporate specific vegetation subcomponents, wetland classifications, Viereck level IV classifications, and topographic variables from ORBBS data. Based on results of both coarse- and fine-scale habitat analyses, we aim to develop predictive models for Rusty Blackbird distribution to help guide field investigations and conservation actions.

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Project: International Rusty Blackbirds Technical Working Group (IRBTWG)

Investigators: Russ Greenberg, Smithsonian Institute, (chair, IRBTWG). [The group's members include many avian researchers and conservationists from the U.S. and Canada.]

In February 2005 the International Rusty Blackbird Technical Working Group was formed to develop a cross-seasonal and comprehensive research program to develop the information to understand the causes and ecological significance of the Rusty Blackbirds' decline. This information and the future information gathered by long-term monitoring programs are critical to developing on-the-ground conservation strategies and management programs to stem the rapid decline of this species.

Critical Needs

The research and monitoring program is designed to obtain critically-needed information in three different areas:

1. basic ecology and natural history
2. the effects of specific possible causes for declines
3. the most efficacious survey techniques and monitoring program

To address these areas we have developed a series of high priority research activities.

Short-term goals

- intensive studies of breeding and winter population biology and trophic ecology using marked and radio-tagged birds.
- establish the connectivity of breeding and wintering populations through feather isotope analysis.
- focal studies in the western portion of the breeding range to monitor the effects of wetlands drying and in the eastern portion to assess the impact of acidification and methyl mercury contamination.
- use existing data sets to relate local changes in abundance to climate and land use to develop hypotheses for what is causing the species' decline.
- develop survey techniques that can be used in a pilot and breeding and winter atlas projects.

Long-term goals

- synthesize demographic data gathered at multiple breeding and winter sites along with connectivity information to begin to build population models.
- develop recommendations to wildlife and land management agencies for the recovery of Rusty Blackbird populations.

For more information visit the Smithsonian Institute's web site on Rusty Blackbirds: http://nationalzoo.si.edu/ConservationAndScience/MigratoryBirds/Research/Rusty_Blackbird

Project: Bill deformities in Black-capped Chickadees and other birds in Alaska

Investigators: Colleen Handel, Lisa Pajot, John Terenzi, and Julie Stotts, USGS–Alaska Science Center; Steve Matsuoka and Kimberly Trust, U. S. Fish and Wildlife Service

We documented 2,153 reports of Black-capped Chickadees (*Poecile atricapillus*) with deformed bills observed in Alaska from 1991–2005; these represent an estimated minimum of 1,441 individuals. We also documented 282 individuals of 28 other species with bill deformities observed from 1979–2005 in Alaska, including 11 migrant species and 18 resident species, primarily corvids. Only 17 deformed Black-capped Chickadees have been documented to date outside of Alaska but reports of other species with bill deformities have been steadily increasing from other areas of North America, with a notable recent cluster in the Pacific Northwest. We estimate prevalence of bill deformities to be about 10% within the chickadee population in south-central Alaska, although rates vary seasonally. Higher concentrations of several organochlorine compounds have been linked to the presence of bill deformities among adult chickadees and to inviability of their eggs in this population. Chickadees with severe deformities can successfully raise young but have difficulties preening and foraging in winter. Although reproductive success has remained high, analysis of both the roadside Breeding Bird Survey and off-road surveys suggest that the population of Black-capped Chickadees in Alaska may have declined during the past decade.

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Project: Urban and rural Bald Eagles at Southeast Alaska*

Investigator: Michael Jacobson, U.S. Fish and Wildlife Service

The Bald Eagle population of Southeast Alaska appears to have stabilized during the last 20+ years, yet the number of eagles in the towns of Juneau, Sitka, Petersburg and Ketchikan has steadily increased. Growing numbers of eagles demonstrate surprising tolerance to human activity. Bald Eagles at Juneau show greater individual and population level productivity than at any wild habitat of Southeast Alaska where surveys have been conducted during various periods from 1981 to 2005. Eagles and people generally coexist favorably, but because the urban Bald Eagle population of Southeast Alaska is increasing, levels of eagle-human conflicts are increasing as well.

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Project: Extra-pair paternity among Black-capped Chickadees in south-central Alaska*

Investigators: Lisa M. Pajot, U.S. Geological Survey/Alaska Pacific University, Colleen M. Handel and Sandra L. Talbot, U.S. Geological Survey, and Roman Dial, Alaska Pacific University

Black-capped Chickadees (*Poecile atricapillus*) reside year-round in mixed and coniferous forests across Alaska. Chickadees are almost strictly socially monogamous and pair bonds often persist for several years. However, recent paternity studies of Black-capped Chickadees in north-eastern North America and of several closely related species of tits (*Parus* sp.) in Europe have suggested that mating may not always be genetically monogamous. During the past several years, a significant proportion of the population of Black-capped Chickadees residing in south-central Alaska has been afflicted with severe bill deformities. As part of a larger investigation of this problem, we collected genetic data from adults and young breeding in nest boxes in Anchorage and the Matanuska-Susitna Valley between 2000 and 2004. We present the frequencies of extra-pair paternity within this population and test whether the presence of a bill deformity in either breeding adult affects the probability of producing extra-pair young. Preliminary analyses suggest that almost 100% of the broods with a deformed parent contain extra-pair young whereas approximately 50% of the broods with normal parents have extra-pair young.

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Project: The Common Raven (Corvus corax) on Alaska's Coastal Plain in relation to oil and gas development: 2005 progress report

Investigators: Abby Powell and Stacia Backensto, University of Alaska Fairbanks

Populations of Common Ravens (*Corvus corax*) on the North Slope of Alaska appear to be increasing where anthropogenic resources are available. Ravens use infrastructure in the oil fields for nesting and forage on anthropogenic foods. In 2004 we trapped adult and juvenile ravens to investigate their role as predators of tundra-nesting birds and how they use infrastructure and human food in Kuparuk and Prudhoe Bay oil fields. In 2005 we continued to follow adults marked in 2004, monitor their breeding activities, document their foraging patterns, and capture and mark their young. We continued trapping adults in the oil fields and expanded our efforts at sites along the Colville River and Pt. Lonely. To further investigate seasonal movements, dispersal, and anthropogenic resource use we collected sightings reported by oil field personnel and the general public across Alaska from 2004-2005. Additionally, we interviewed personnel from across Kuparuk and Prudhoe Bay in 2005. Interviews were conducted to document the history of ravens in the oil fields and local perspectives on raven management in the oil fields.

Nest success varied both temporally and spatially at Kuparuk and Prudhoe Bay. In 2004, 100% of nests initiated in Prudhoe Bay and 57% of nests in Kuparuk fledged at least one young. Nest success at both sites was lower in 2005; 81% of nests in Prudhoe Bay and 33% of nests in Kuparuk fledged at least one young. Mean number of fledglings produced per nest for 2005 was 3.4 ± 1.6 (SD) at Prudhoe Bay and 3.6 ± 0.6 at Kuparuk, compared to 3.9 ± 1.3 in Prudhoe Bay and 2.6 ± 1.9 in Kuparuk in 2004. We captured and marked one breeding adult and 13 fledglings throughout Kuparuk and Prudhoe Bay. We discovered one resident pair at Pt. Lonely in early April 2005, but our attempts to capture one individual from this pair failed. We found six nests along the Colville

River; we were unable to capture any adult ravens but managed to trap one juvenile, which we fit with a satellite transmitter.

Our preliminary findings suggest that breeding adults in the oil fields return to the same nest site annually, and maintain 1-2 km territories around nest sites until late in the nestling stage. After fledgling, families make foraging movements > 3 km from natal territory. Juveniles remain with adults and siblings for a period of >5 weeks after fledging. Marked ravens have been and continue to be resighted across the oil fields year round. Additionally, sightings of marked ravens have been reported from other locations in Alaska including the Dalton highway north of the Brooks Range, Pt. Lay, Teshekpuk Lake, Beaver, Fairbanks, and even as far south as Anchorage. The community of oil field personnel provided a body of knowledge that complements our research and generated new ideas regarding raven behavior and population demographics. We emphasize the preliminary nature of these results; further analyses and additional data collection in the coming years is necessary to better understand the relationship between ravens and human activity on the North Slope. *A website describing this project can be found at: http://www.rap.uaf.edu/raven/index.cfm*

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Project: Spruce Grouse population assessment in southeast Alaska

Investigator: Dale Rabe, Alaska Department of Fish and Game

The first year of a multi-year study has been completed to assess the distribution and relative abundance of Spruce Grouse and other gallinaceous birds in Southeast Alaska. A voluntary wing-collection program and supplemental field surveys were the primary methods used to collect biological samples and obtain information on species, sex and age, and location of harvest. Through the wing-collection program, 165 samples were submitted by hunters, consisting of 146 Blue Grouse, 15 Spruce Grouse, and 4 ptarmigan. An additional 5 Spruce Grouse and 3 ptarmigan were collected during supplemental surveys on Zarembo, Prince of Wales, Admiralty, and Heceta islands. All Spruce Grouse samples thus far have come from Prince of Wales, Zarembo, and San Fernando islands. Collection programs will continue for at least two more years, with the goal of completing a genetic comparison of Spruce Grouse populations among islands within Southeast Alaska, and comparisons with other recognized subspecies of Spruce Grouse in British Columbia and interior Alaska.

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Project: Arctic Warbler breeding biology along the Denali Highway

Investigators: Richard Ring, Susan Sharbaugh, and Nancy DeWitt, Alaska Bird Observatory,

The Alaska Bird Observatory (ABO) initiated a three-year study in May 2004 to describe the breeding biology and habitat associations of Arctic Warblers (*Phylloscopus borealis kennecotti*) along the Denali Highway (Milepost 23-34) between Tangle Lakes and Maclaren Summit. The Arctic Warbler is a little-studied paleotropical migrant that has been named a Species of Concern by the U.S. Fish and Wildlife Service. The North American subspecies is endemic to Alaska. In this second field season, we continued to document basic breeding chronology and behavior, band and individually color-mark birds, describe habitat characteristics of nest sites, and find and monitor nests to document breeding success and productivity. One season of experience, two returning crewmembers, and the addition of a dedicated bander combined to produce a very successful summer. ABO has now amassed the largest dataset on Arctic Warblers in North America.

Arctic Warblers nested in varying densities on all four established study plots (10-ha each). We observed the first singing male on 7 June. A female was seen carrying moss to an incomplete nest on 17 June; the nest was finished on the following day. The first nest with eggs was found on 22 June. We monitored 41 nests; 18 within the plots (3, 1, 7, and 7 on Plots 1-4, respectively) and 23 near the plots. Four nests were found during nest building, 9 during incubation, and 28 at the nestling stage. Clutch size varied from 5 to 7 with a mean clutch size of 5.9. Date of first hatch was 6 July and the first fledging was observed on 19 July. We banded 149 nestlings from 38 nests. Thirty-eight of the 41 monitored nests fledged young; a nest success rate of 93%. All nests had produced fledglings or had failed by 30 July.

Forty-six adults (24 males, 20 females, and 2 of unknown sex) were captured in mist nests and color-banded. Adults arrived on the breeding grounds with little to no wear on their flight feathers, indicative of a protracted molt during spring migration. Ten of the 22 adults color-banded in 2004 were re-captured or re-sighted in 2005, providing a minimal survival and return rate of 45%.

The general pattern of Arctic Warbler distribution among the 4 study plots was the same in 2005 as in 2004. The density of Arctic Warbler territories and nests was much lower on Plots 1 and 2 ($n = 5$) than Plots 3 and 4 ($n = 14$). Plots 1 and 2 are at lower elevation and had a dense shrub layer dominated by tall dwarf birch (*Betula nana*) or tall willow (S*alix sp*.). Plots 3 and 4 had a more open shrub layer consisting of shorter willow and more openings dominated by graminoids and forbs. The dominant species of the shrub layer, its density, and the characteristics of the substrate beneath it all affect nest site preference by Arctic Warblers in our study area. Within the range of habitats along the Denali Highway, Arctic Warblers reached their highest densities in areas of 1 to 2 m-tall willow with meadow-like openings of lupine (*Lupinus arcticus*), burnet (*Sanguisorba* spp.) and the sedge (*Carex* spp.) and grass (primarily *Deschampsia caespitosa*) used to build nests (characteristic of Plots 3 and 4).

Our research on Arctic Warblers is yielding exciting results. We are rapidly expanding our understanding of the ecology of this species. All this information answers some of our original questions but also generates many new ones. Future research could include mist-netting efforts in August to examine female and juvenile molt, migration fattening patterns, and departure times, more behavioral observations to document polygyny, and additional vegetation surveys to fine-tune habitat associations.

These findings will provide guidance for future management plans for the Denali Highway district. The study area, while relatively pristine, is under increasing pressure from mining, infrastructure development, and off-road vehicle use. Increased resource development and road improvements slated for coming years may negatively affect Arctic Warblers and other species of concern in the study area.

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Project: Influence of late winter/spring climate variation on demographic rates of Wilson's Warblers in Denali National Park and Preserve

Investigators: James F. Saracco, M. Philip Nott, and David F. DeSante, The Institute for Bird Populations

Broad-scale climate variation can strongly influence annual variability in avian vital rates (survival and reproduction). For migratory landbirds that overwinter in the northern Neotropics, rainfall levels during the late dry season (January-May) can affect survival rates of birds during spring migration and their physical condition upon their arrival to the breeding grounds. Here we use banding data collected at seven Monitoring Avian Productivity and Survivorship (MAPS) stations in Denali National Park from 1992-2002 to explore relationships between late winter precipitation and vital rates of Wilson's Warblers (*Wilsonia pusilla*). We found strong support for a model of annual survival that included late winter values of the El Niño/Southern Oscillation precipitation index (ESPI) and models that included rainfall levels in western Mexico. An index of reproductive success (ratio of young birds to adults captured in mist-nets) was also positively correlated with late-winter rainfall in western Mexico. These findings suggest that the condition of foraging habitat (as influenced via rainfall) during the non-breeding season, and especially during migration, may be critical for influencing the population dynamics of migratory songbirds. Furthermore, the strong correspondence between climate patterns in western Mexico and vital rates in Denali suggest specific geographic links between breeding and wintering areas.

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Project: Dietary analysis of Northern Hawk Owls in interior Alaska*

Investigators: John E. Shook, ABR Inc. Environmental Research and Services and Marc J. Bechard, Boise State University

The breeding season diet of Northern Hawk Owls (*Surnia ulula*) is well-documented from studies in Fennoscandia where they are considered vole specialists, but few data exist from North America. We collected pellets from 17 nesting areas and performed observations of prey deliveries at seven, with the objective to assess the validity of pellet analysis and to quantify the diet of hawk owls. Because 96% of the diet of hawk owls consisted of microtine rodents and snowshoe hares (*Lepus americanus*) by both frequency and biomass, these major prey categories were used for comparisons. Results of observational data were not different than results of pellet analysis suggesting that the use of pellet analysis is an accurate measure of hawk owl diet. We detected no significant differences in percent frequency or percent biomass of microtines or hares among years, but percent frequency and percent biomass of microtines was different among forest types. Hawk owls ate more hares in areas with high hare densities, and microtine species in the diet of owls appeared to correspond with each species spatial distribution and habitat associations. This suggested that hawk owls in interior Alaska are not selective hunters, but rather hunted opportunistically, which is unlike hawk owls in Fennoscandia.

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Editor's note: John Shook's MS Thesis, from which the above paper was derived, may be found at: Shook, J.E. 2002. Breeding biology, nesting habitat, dietary analysis and breeding behaviors of northern hawk owls. MS-Raptor Biology Thesis, Boise State University, Boise, ID. 100 pp.

Project: Ecology of Boreal Owls (*Aegolius funereus*) in interior Alaska

Investigator: Jackson S. Whitman, Alaska Department of Fish and Game

Monitoring populations of nocturnal raptors using standard techniques (Christmas Bird Counts, FeederWatch, Breeding Bird Surveys, etc.) is inadequate. Several jurisdictions throughout North America have developed various protocols for nocturnal listening point counts to rectify this situation. I have developed and refined a standardized protocol in interior Alaska (BCR4) for conducting spring listening surveys, primarily designed for Boreal Owls, Great Horned Owls, and Great Gray Owls, and further, have gathered data during 2004-2005 for assessing the efficiency of these listening surveys.

Objectives of the research program have been to: 1) establish protocol and conduct spring listening surveys for Boreal Owls, Great Horned Owls, and Great Gray Owls in interior Alaska; 2) establish nest boxes along accessible transects to evaluate feasibility of spring listening surveys for determining annual owl nesting abundance; 3) assess annual productivity of nesting Boreal Owls throughout an array of habitat types; and 4) compare efficacy of monitoring annual Boreal Owl populations through listening surveys and nest box monitoring.

A protocol was developed in 2004 based on Canadian methodology for surveying boreal forest owls in interior Alaska. During spring 2005, seven survey routes were conducted a total of 27 times between 15 February and 15 April by 14 biologists and volunteers. Five hundred sixty-nine point counts were completed. Boreal Owls were detected a total of 109 times, while Great Horned Owls and Great Gray Owls were detected 189 and 4 times, respectively. Forty-two additional monitoring hours of a singing male Boreal Owls were completed in an effort to quantify environmental parameters that affect singing rates.

One hundred eighteen Boreal Owl nest boxes were monitored during 2005. Because of overwinter box attrition, 112 boxes were available for occupancy. Twenty-nine boxes were used by Boreal Owls (26% occupancy rate) and 7 by American Kestrels. A minimum of 125 Boreal Owls fledged from 25 successful boxes, as well as 30 kestrels from 6 successful boxes. Only 10 of 59 (17%)

listening stations within 1 km of occupied Boreal Owl nest boxes resulted in detections. This detection rate compares favorably with results from 2004 (14%). Further analysis of the efficacy of monitoring owls through listening surveys and/or nest box monitoring will occur during 2006.

Because of the availability of natural nesting cavities and the concurrent inability to detect nesting activity using hooting surveys for Boreal Owls, actual nesting density over large areas may not be feasible. High use of nest boxes during 2005 was thought to be a result of high populations of arvicolines (formerly, microtines). Analyses of prey items in nest boxes along one of four routes (Steese Highway) revealed the presence of 271 prey items of at least 15 taxa. Northern red-backed voles (*Clethrionomys rutilus*) made up the bulk of the prey (68%). Further analyses of Boreal Owl diet will continue. Results from standardized small mammal traplines indicated that arvicoline abundance was extremely high during 2005.

High use of nest boxes by Boreal Owls in 2005 should allow analyses of productivity by major habitat type. An additional year of productivity data should reveal productivity differences and habitat preferences. Analyses will continue in an effort to describe differences between productivity in four major overstory types (white spruce, black spruce, paper birch and aspen). Ninety-three 0.01-acre timber stand exams have been conducted at Boreal Owl nest boxes to assess preference or avoidance of any particular stand type. Analyses are ongoing.

In successive years, only 14 and 17% of known Boreal Owl nesting pairs were detected on listening surveys. Early analyses suggest that, over the long term, nest box monitoring is more effective and slightly less expensive than listening surveys.

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Project: Distribution and seasonal habitat use of American Dippers near Juneau*

Investigator: Mary F. Willson, Willson Ecological Consulting

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The five species of dippers (*Cinclus*) in the world can be used as indicator species because they accumulate environmental toxins and are sensitive to environmental pollution, which depresses their prey populations. Some dipper populations are seriously diminished as a result of habitat degradation. We determined stream occupancy for many streams in the Juneau area, but nest searched only streams accessible from the road and trail system. Nesting adults were banded with individual color combinations, permitting detection of known birds at different seasons. American Dippers (*C. mexicanus*) nest along many local streams, including some of glacial origin. Although the literature commonly states that populations are limited by nest-site availability, field evidence indicates a more complex situation. Nests are found in many different kinds of sites, including some human-made sites, but seldom on streams with seasonal low flow < 0.5 cfs even when suitable sites are available. Some territories used successfully for several years were vacant in 2005, suggesting that overwinter mortality may sometimes limit the number of nesting birds. Nest success is generally high (> 85%). Chicks are heavier and brood reduction is less on stream reaches that support spawning salmon than on those that do not. Banded adults often occupy the same territory, and often the same nest site, for more than one year. Some adults changed nesting territories between years, but all such cases were shifts within the same watershed. Apparent annual mortality was about 50% in 2005. In winter, many dippers move around the landscape extensively. Some appear to have habitual wintering areas, but others are clearly itinerant, often foraging in tiny (non-nesting) streams and estuaries. Amphipods are the common prey in estuaries -- a diet quite different from the usual benthic insects. Small fishes are a significant dietary component, as are salmon eggs in season.

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MULTI-SPECIES STUDIES/RESEARCH

Project: Migratory orientation of Savannah and White-crowned Sparrows at the Kanariarmiut Field Station, Yukon Delta National Wildlife Refuge

Investigators: Susanne Åkesson and Maja Tarka, Lund University, Sweden; Rachel Muheim, Virginia Polytechnic Institute and State University, USA

As part of the "Beringia 2005" expedition organized by the Swedish Polar Research Secretary, we studied the orientation of two nocturnally migrating passerines, Savannah Sparrow (*Passerculus sandwichensis)* and White-crowned Sparrow (*Zonotrichia leucophrys gambelii)*, at the Kanariarmiut field station in the Yukon Delta National Wildlife Refuge during fall 2005.

Migratory birds use different compass systems for orientation to determine their migratory direction: they use information from the sun, stars and the geomagnetic field. Orientation at high geographic latitudes poses a number of difficulties, like the unavailability of stars during the polar summer and early fall as well as large changes in magnetic declination and rapid longitudinal time-shifts experienced during long-distance flights. In earlier displacement experiments with White-crowned Sparrows in high arctic Canada the sparrows showed a dramatic shift in orientation after being exposed to the vertical magnetic field and/or zero-declination line at the north magnetic pole, in 1999 located at Ellef Ringnes Island. This led to the hypothesis that the magnetic pole itself might act as a regional signpost, indicating to the birds that they had migrated too far to the east. The rapid shift from positive declinations in the area west of the magnetic pole where the birds were captured to negative values in the eastern part was also discussed as a possible explanation for this change in orientation behavior.

There is ample evidence that migratory birds intercalibrate their different compass systems before and during migration, but there is a large debate over the relative importance of the different compasses during different stages of the migration. A recent review suggested that birds regularly recalibrate their magnetic compass using the skylight polarization pattern near the horizon at sunrise and sunset, independent of migratory stage and age.

Based on this background, our aim was to study (1) the question whether White-crowned Sparrows use the magnetic north pole as a navigational signpost, (2) the effect of exposure to an artificially deflected magnetic field at noon (i.e., whether White-crowned Sparrows recalibrated either their magnetic or celestial compass), and (3) the interrelationship of the magnetic compass and skylight polarization cues at sunrise and sunset in Savannah Sparrows.

These studies were in part financed by grants from the Swedish Research Council to S. Åkesson, and the Swedish Polar Research Secretariat.

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Project: Nesting ecology of bark- and cavity-nesting birds in southeast Alaska – pilot study

Investigator: Michelle Kissling, U.S. Fish and Wildlife Service, Juneau.

This project began in April 2004. The objectives were: (1) to review and determine the efficacy of existing habitat capability models developed for Red-breasted Sapsucker, Brown Creeper, and Hairy Woodpecker; (2) to develop a survey protocol(s) appropriate for primary cavity excavators and early-nesting terrestrial birds in southeast Alaska; and (3) to investigate the feasibility of monitoring woodpecker populations in response to management activities on the Tongass National Forest. Most objectives were addressed during 2004; however, there were insufficient data on Brown Creepers. Therefore, in 2005, efforts were focused on quantifying nest site characteristics of Brown Creepers in three study areas adjacent to the Juneau road system.

In 2005, we located nests of Brown Creeper (8 active nests; 9 inactive nests), Chestnut-backed Chickadee (n = 5), Hairy Woodpecker (n = 1), Red-breasted Sapsucker (n = 15), and American Three-toed Woodpecker (n = 1) in three study areas adjacent to the Juneau road system (Point Bridget, Windfall Lake, and Peterson Creek on North Douglas). Only Brown Creeper, Hairy Woodpecker, and Three-toed Woodpecker nests were monitored (BBIRD protocol) throughout the nesting season. Brown Creeper productivity was high (75%; six of eight nests fledged at least one young; one nest failed; one nest unknown). Nest initiation dates ranged from 28 April – 4 June, resulting in fledge dates starting 5 June through 19 June. The Hairy and Three-toed Woodpecker nests fledged at least one young. Nest initiation for Hairy Woodpecker was 18 April and young fledged on 1 June. The Three-toed Woodpecker nest was initiated on 10 May and fledged on 15 June. Nest tree characteristics were recorded for all nests (all species) found. Vegetation measurements were recorded using BBIRD protocol at Brown Creeper nests only. These data will be used to verify peak periods of detectability identified during the 2004 breeding season and to describe nest site characteristics to use in habitat modeling of Brown Creeper nesting habitat. A final report will be available by December 31, 2006.

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Project: Distribution, abundance, and ecology of forest owls in southeast Alaska

Investigators: Michelle Kissling, U.S. Fish and Wildlife Service and Stephen B. Lewis, Alaska Department of Fish and Game

This project was divided into three phases, each scheduled to last approximately one year. During 2005, we completed Phase 1. Objectives of Phase 1 were (a) to establish the Southeast Alaska Owl Network; and (b) to develop a survey protocol for forest owls in southeast Alaska.

Southeast Alaska Owl Network

We worked closely with Juneau Raptor Center to launch the Southeast Alaska Owl Network. We recruited 51 volunteers in 12 communities throughout Southeast Alaska to conduct monthly surveys in or near their communities. From January through December 2005, 444 points were surveyed, resulting in 59 detections of eight species of owls (including Short-eared Owls [*Asio flammeus*] and Snowy Owls [*Bubo scandiacus*]) and a detection rate of 13%. Because routes were surveyed monthly throughout the entire year, the points used to estimate the detection rate were not independent of one another. Volunteers detected Barred Owl (*Strix varia*; $n = 4$), Boreal Owl (*Aegolius funereus*; $n = 1$), Great Gray Owl (*Strix nebulosa*; $n = 4$), Great Horned Owl (*Bubo virginianus*; $n = 6$), Northern Pygmy-Owl (*Glaucidium gnoma*; $n = 3$), Northern Saw-whet Owl (*Aegolius acadicus*; $n = 23$), Western Screech-Owl (*Megascops kennicottii*; $n = 12$), and Short-eared Owl ($n = 2$) during systematic surveys. In addition to the eight species mentioned above, Northern Hawk Owl (*Surnia ulula*) and Snowy Owl were reported by volunteers as opportunistic observations ($n = 85$).

Point transect surveys

To determine singing behavior and factors affecting the detection of forest owls, we conducted point count surveys repeatedly throughout the suspected breeding season. Surveys commenced on 28 February 2005 and ended on 7 June 2005. The entire survey period was divided into 10 10-day intervals. Surveys were conducted along the Juneau and Mitkof Island road systems (for details see field study plan for Phase 1 of this project).

Over the entire survey period, 482 primary stops and 429 secondary stops were completed; five species of owls ($n = 192$) were recorded. Owl detections were not independent across survey intervals (i.e., time), but were independent across points within the same survey interval (i.e., space). The estimated detection rate (number of detections per points surveyed) over the entire survey period was 0.21. Northern Saw-whet Owl ($n = 87$) was the most common species recorded, followed by Barred Owl ($n = 51$), Western Screech-Owl ($n = 39$), Great Horned Owl ($n = 13$), and Northern Pygmy-Owl ($n = 2$). Approximately 50% of the detections were recorded between 9 April and 8 May, suggesting that this period was the peak period of detectability. During silent surveys, approximately 75% of detections were noted within the first 2 minutes of the count period. Broadcast surveys were effective, particularly for western screech-owls, with only three detections recorded during the silent period and 32 recorded during the broadcast period.

Radio-transmitters – a pilot study

We captured two Western Screech-Owls and two Northern Saw-whet Owls to test the feasibility of attaching radio transmitters and monitoring radio-tagged owls in this region. We attached radio-transmitters of appropriate size and weight (for details see field study plan for Phase 1 of this project) before releasing each bird. We relocated radio-tagged birds by walking in ($n_{screech} = 24$; $n_{saw\text{-}whet} = 4$) or by triangulation ($n_{screech} = 14$; $n_{saw\text{-}whet} = 24$). During walk-in relocations, we recorded roost site characteristics and examined the radio-transmitter on the bird using binoculars and/or spotting scopes. Generally, both radio-tagged Western Screech-Owls roosted close to their respective capture sites, choosing to roost in medium-sized, live trees ($\bar{\chi} \pm$ SD; 22.6 ± 16.5 m height; 37.7 ± 24.6 cm diameter-breast-height) that were dominant in the canopy. In contrast, both Northern Saw-whet Owls made large movements relative to their capture site and roosted in small live spruce trees (7.4 ± 4.0 m height; 13.6 ± 7.8 cm diameter-breast-height) which usually were located in clearcut stands less than 30 years old. Often these birds were located (using triangulation) in forested stands that were not conducive to walk-in locations. For these reasons, we will focus our telemetry efforts in 2006 on Western Screech-Owls only.

This project is scheduled to continue for two more years (2006 and 2007).

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Project: Evaluating the effects of timber harvest and subsequent forest management on bird and vegetation communities on Prince of Wales Island.

Investigators: Steve Matsuoka and Jim Johnson, U.S. Fish and Wildlife Service and Dominick DellaSala, World Wildlife Fund.

Timber harvest is by far the largest form of active land management in Alaska that threatens terrestrial bird populations, many of which are of conservation concern, particularly in southeast Alaska. In particular, harvest of the highest volume stands of old-growth conifers has reduced such stands by 70% in southeast Alaska. The area most heavily affected by this harvest strategy is Prince of Wales Island, Alaska. The island now has the dubious distinction of being the most highly fragmented forest system in the state. Left alone, more than 100 years are needed for harvested stands in southeast Alaska to recruit the vegetation and bird communities that were present prior to harvest. To hasten succession of harvested stands towards pre-harvest condition, the USDA Forest Service has invested considerable time and money in thinning strategies. However, the long-term efficacy of these silvicultural treatments in maintaining old-growth plant and wildlife communities in southeast Alaska has not been assessed.

From 1991-1993, Dominick DellaSala studied the effects of timber harvest and subsequent management of harvested stands on bird and plant communities on Prince of Wales Island. Specifically, bird communities, forest structure, and understory composition were compared among two types of young growth stands (non-modified and pre-commercially thinned) and virgin old growth (150 years). In 2005 and 2006 we are replicating the DellaSala study to assess the longer term effects of the harvest and post-harvest treatment on bird and vegetation communities on Prince of Wales Island. As these stands now approach the age for commercial thinning, this work will provide an important assessment of the efficacy of these silvicultural practices in meeting the long-term management goal of maintaining old-growth bird communities within harvested landscapes.

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Project: Prevalence and Diversity of Avian Influenza in Alaska

Investigators: Jonathan Runstadler[1], George Happ[1], Nancy Gundlach[1], Michael Petrula[2], Richard Slemons[3], Jeffrey Taubenberger[4], Sue Hills[1], and Tom Marr[1]. [[1]Institute of Arctic Biology, University of Alaska, Fairbanks; [2]Alaska Department of Fish & Game; [3]Ohio State University; [4]Armed Forces Institute of Pathology]

Migratory birds from six continents pass through Alaska, which provides prime environments for interspecies assemblages and the introduction and transfer of pathogens such as avian influenza between members of overlapping avian migration routes. Avian influenza is a particular concern because of perceived risk for introduction and emergence of high pathogenic strains of the virus. Few previous studies have examined avian influenza in Alaska. In 2005, we initiated the largest single year sampling undertaken in Alaska to describe the prevalence and diversity of avian influenza viruses across Alaska. We sampled over 30 species of birds from diverse groups including migratory waterfowl, but also over 1,000 birds from the fall migration banding in cooperation with the Alaska Bird Observatory in Fairbanks, AK. The total sample collection was made possible by collaboration from a wide range of individuals and agencies who handled birds in the summer of 2005. For all birds, cloacal swabs were preserved in ethanol for molecular screening and subtyping. Where samples were able to be maintained in a strict cold chain, matching swabs were taken into Viral Transport Media to be used in viral isolation and serological subtyping. Initial results from a sample of 528 ducks in Interior Alaska show 86 samples positive by molecular screening. Molecular screening reveals that no H5 subtypes are present in this sample which includes H3, H4, H6 and H12 subtypes. Positively screened samples that have been subtyped by both molecular and serologic methods correlate 100%. This study will use the 2005 data to refine and expand sampling in 2006.

This work was supported in part by NIH Grant 2 P20 RR016466.

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Project: Density and habitat use of landbird species in Alaska's Pacific Coast forests

Investigators: Caroline Van Hemert and Colleen Handel, U.S. Geological Survey, and Melissa Cady, U.S. Forest Service

Alaska's coastal forest bands comprise the largest extant temperate rainforest in the world and provide habitat for more than 100 of the 135 landbird species that occur in the state. Of these coastally-distributed species, 19 have been identified in the *Alaska Comprehensive Wildlife Conservation Plan* as species of concern due to global or statewide population declines. At least 10 additional species are also of conservation interest due to their high dependence on coastal forests during the breeding season. However, very little information about breeding densities or habitat use exists for individual landbird species or communities within the Bird Conservation Region (BCR) 5. This area encompasses a variety of coastal forests, ranging from Sitka spruce-dominated Kenai Fjords National Park (KEFJ) to the cedar and hemlock stands of the southern Tongass National Forest (TONG). In order to better understand the status of coastally-distributed landbird species and to address potential concerns about population declines, it is important to document patterns of habitat use throughout this region. With standardized point transect data collected in an inventory of KEFJ and for the Alaska Landbird Monitoring Survey (ALMS), we examined habitat associations and distribution for several landbird species that occur in the coastal forests of BCR 5.

For our analysis, we parsed by land unit—separating KEFJ, Chugach National Forest (CHUG), and TONG plots—to examine general patterns of habitat use relative to availability for birds detected within 50 m of survey points. We also ran the DISTANCE program in order to determine species-specific densities for each of these regions.

We found that plots sampled in TONG had the highest proportion of needleleaf forest, at nearly 80% coverage, with very little (5%) shrub cover. In comparison, KEFJ sample areas were comprised of approximately 30% needleleaf cover and 25% shrub cover. Finally, CHUG plots showed the highest shrub cover at more than 40% and needleleaf coverage similar to KEFJ. We looked at three species of shrub-nesting landbirds: Orange-crowned Warbler (*Vermivora celata*), Wilson's Warbler (*Wilsonia pusilla*), and Hermit Thrush (*Catharus guttatus*). For these species, densities were estimated to be highest in KEFJ and CHUG and detections occurred more frequently in shrub habitats relative to availability in these two areas. In TONG, we found no apparent habitat selection. In all sample areas, Wilson's Warblers were detected at higher densities in inland versus coastal habitats.

For forest species, including Pacific-slope Flycatcher (*Empidonax difficilis*), Chestnut-backed Chickadee (*Parus rufescens*), Winter Wren (*Troglodytes troglodytes*), Golden-crowned Kinglet (*Regulus satrapa*), Varied Thrush (*Ixoreus naevius*), and Red-breasted Sapsucker (*Sphyrapicus ruber*), we observed generally highest densities in TONG. This was true for all species except Varied Thrush, which was detected at similar densities across the three regions. There appeared to be selection for closed forests among several forest species: Chestnut-backed Chickadee, Winter Wren, Golden-crowned Kinglet, and two which occur only in Southeast Alaska, Pacific-slope Flycatcher and Red-breasted Sapsucker. Coastal distribution of Chestnut-backed Chickadees also suggested a possible association with the forest-coast interface for this species. For most species, forest type in which the birds were detected (primarily hemlock-dominant forests in TONG; and spruce-dominant forests in CHUG and KEFJ) did not differ significantly from the proportion of available habitat. These data therefore suggest a stronger association with canopy cover than forest type.

Although we have presented only preliminary results, they indicate that some species use habitats differently across BCR 5. This may account in part for differences in densities and distribution, which are important components for landbird conservation work. An obvious need exists for further research, including analysis of specific structural components of various habitat layers and species-specific studies of nesting habitat requirements relative to forest structure. Additional habitat analyses may allow for predictive models of distribution, which are useful for forest management decisions that affect the health of Alaska's landbird communities.

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CONSERVATION

***Project: Status review of landbirds included as featured species in the Alaska Department of Fish and Game's* Comprehensive Wildlife Conservation Strategy**

Investigator: Alaska Natural Heritage Program

The Alaska Natural Heritage Program (AKNHP) has been developing status reports and reviewing conservation status ranks for a number of landbird species that were highlighted as "*featured species*" within the Alaska Department of Fish and Game's *Comprehensive Wildlife Conservation Strategy*. During 2005, we updated status information on the Northern Harrier, Snowy Owl, Brown Creeper, Hermit Thrush, Violet-green Swallow, Cliff Swallow, Townsend's Warbler, Blackpoll Warbler, White-crowned Sparrow, and Rusty Blackbird. Landbird species reviewed the previous year included the Queen Charlotte Goshawk, Short-eared Owl, Olive-sided Flycatcher, Gray-cheeked Thrush, Smith's Longspur, and McKay's Bunting.

Within each status report we summarized information on individual species' life history traits, distribution, population abundance and trends, habitat needs, level of protection, threats, conservation status, and potential conservation and management actions at both state and global levels. Reports are largely based on published and unpublished literature and personal communication with experts. Each report also received expert and public review. Species reports are available on-line at: http://aknhp.uaa.alaska.edu/zoology/Zoology_ADFG.htm. Future steps include compilation and mapping of occurrence data for individual species to help identify data gaps.

For further information contact: Tracey Gotthardt, Alaska Natural Heritage Program, Environment and Natural Resources Institute, University of Alaska Anchorage, 707 A Street, Anchorage, AK 99501. Tel: 907-257-2782; Fax: 907-257-2789; E-mail: antg@uaa.alaska.edu.

Project: Identifying and cataloging the Important Bird Areas of Alaska

Investigator: Audubon Alaska

The Important Bird Area (IBA) concept was developed in Europe in the 1980s by BirdLife International, and IBAs are now recognized around the world as a valuable tool in bird conservation. The goal of the IBA project is two-fold: the first phase identifies areas essential to the survival of bird populations, while the second phase aims to enhance the protection of these areas through cooperative conservation measures.

For a site to qualify as an IBA it must meet one or more of a series of criteria - by supporting species of conservation concern, species with restricted ranges or unique habitat requirements, and/or species that congregate at high densities. Thus, IBA recognition is given to discrete sites that stand out from the surrounding landscape as having local, continental, or global significance for birds.

Currently, Audubon Alaska is carrying out a statewide IBA project aimed at the first phase - identification of sites. At present, ~130 IBAs have been identified in Alaska, mainly in the Bering Sea and Cook Inlet regions. Of 96 of these sites reviewed by the National IBA Technical Committee, 60 are recognized as having global significance and 5 of continental significance.

Anyone can nominate a site and, with the cooperation of local experts across the state, we expect to have an inventory of at least the globally and continentally significant IBAs in Alaska completed by the end of 2007.

To request an IBA nomination package, or for further information, contact: Dr. Iain J. Stenhouse, Audubon Alaska, 715 L Street, Suite 200, Anchorage, AK 99501. Tel: 907-276-7034; Fax: 907-276-5069; E-mail: istenhouse@audubon.org

Project: The Audubon Alaska WatchList: 2005

Investigator: Audubon Alaska

Attempting to recover species pushed to the brink of extinction is difficult, costly, and often controversial. The Audubon Alaska WatchList is intended to be an early-warning system specifically designed to focus attention on at-risk populations before they are in jeopardy of extinction. The foundation of the WatchList is built upon a national database created by *Partners in Flight*, which scores species on a range of biological factors, such as population trend, relative abundance, breeding distribution, area importance, etc. Data on bird populations in Alaska are often limited, however, so the development of the WatchList relies on the best existing information available supplemented by local expert opinion. The Alaska WatchList was first published in 2002, and updated in 2005. The original WatchList featured 37 species or subspecies. The update removed 2 species or subspecies and added 17 (including 3 federally listed species), thus, the new WatchList total is 52. This increased total appears to reflect a growing body of knowledge on the biology and population trends of northern breeding species, and improved information on a number of potential threats, rather than any single catastrophic change in the ecosystem. Not surprisingly, waterbirds make up the bulk of the species or subspecies listed, with 18 shorebirds (35%), 12 waterfowl (23%), and 6 seabirds (12%). The species or subspecies listed also show a broad geographic spread across Alaska, with the most strongly represented regions being Western Alaska (BCR 2) with 35 breeding species or subspecies (32%) and the Northern Pacific Rainforest (BCR 5) with 22 breeding species or subspecies (20%). Audubon Alaska plans to update the Alaska WatchList at regular intervals, and continues to seek new information on WatchList species as it becomes available.

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Editor's Note: The 2005 Audubon WatchList can be viewed online at: http://www.audubon.org/chapter/ak/ak/pdfs/WatchList2005.pdf

Project: The Queen Charlotte Goshawk listing decision: where we've been and where we're going*

Investigator: Steve Brockmann, U.S. Fish and Wildlife Service

In 1994, the U.S. Fish and Wildlife Service (FWS) was petitioned to list the "Queen Charlotte" Northern Goshawk (*Accipiter gentilis laingi*) as endangered. Logging in Southeast Alaska and coastal British Columbia, where the bird nests and forages, was the primary threat identified. The FWS concluded, in June 1995, that an updated management plan for the Tongass National Forest, due to be released in the foreseeable future, would adequately provide for the species, so listing was not warranted. In a series of subsequent lawsuits, courts ruled: (1) that the listing decision must be based on the management plan in effect at the time of the listing decision, (2) that the FWS was not required to conduct a study to determine the size of the bird's population, (3) that the FWS must determine if Vancouver Island is a significant portion of the subspecies' range and, if so, whether the bird is threatened or endangered there. To address item (3), the FWS is currently updating a 1997 status review for the bird. Notable additions to our knowledge since 1997 include more complete information on habitat selection, productivity, and food habits from both Alaska and Canada, better insight on genetic relationships across the species' range, and documentation of less robust populations within British Columbia than previously recognized. The FWS will use the updated status review to determine whether the subspecies should be listed across all or a portion of its range. This decision will be documented in a "Finding" that we anticipate will be published in the Federal Register during the summer of 2006.

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Table 1. Alaska and Continental population trends (% / year) from 1980–2004 for birds detected on the North American Breeding Bird Survey. Data are available on the web at [http://www.pwrc.usgs.gov/bbs, December 2005].

	Alaska					U.S./Canada[1]				
Species	Trend	*P*	*n*	Abund.[2]	Cred.[3]	Trend	*P*	*n*	Abund.	Cred.
Common Loon	1.0	0.65	27	0.27	3	2.2	<0.01	430	0.95	2
Horned Grebe	1.0	0.61	6	0.08	3	-5.2	<0.01	73	0.35	2
Red-necked Grebe	2.5	0.56	24	0.45	3	0.1	0.94	76	0.37	2
Pelagic Cormorant	7.4	0.28	4	0.42	3	-2.5	0.45	14	0.78	2
Great-blue Heron	-1.3	0.79	8	0.71	3	0.6	0.10	2329	0.83	2
Canada Goose	6.4	0.41	37	2.93	3	8.2	<0.01	1539	4.16	2
American Wigeon	1.4	0.42	42	5.49	3	0.1	0.92	281	0.86	3
Mallard	4.1	0.50	43	1.52	3	1.0	0.07	2193	5.16	2
Northern Shoveler	12.9	0.17	16	0.67	3	3.7	<0.01	309	1.17	1
Northern Pintail	0.1	0.99	23	1.73	3	-0.9	0.53	353	1.78	1
Green-winged Teal	7.1	0.08	37	2.46	3	-0.8	0.59	287	0.31	2
Ring-necked Duck	13.9	0.21	9	0.09	3	3.7	0.01	162	0.22	2
Lesser Scaup	7.9	0.31	15	0.48	3	-2.0	0.02	213	1.88	1
Bufflehead	4.8	0.51	16	0.59	3	7.2	0.01	86	0.26	2
Common Goldeneye	-5.2	0.35	15	0.56	3	1.7	0.47	83	0.18	2
Barrow's Goldeneye	8.9	0.32	9	0.60	3	2.6	0.07	48	0.30	2
Common Merganser	-7.6	0.22	22	0.28	3	1.9	0.04	357	0.24	3
Red-breasted Merganser	-0.5	0.86	18	4.32	3	-5.2	0.13	15	0.03	3
Bald Eagle	5.3	0.03	48	1.30	3	5.3	0.05	224	0.14	2
Northern Harrier	10.8	0.03	7	0.06	3	-1.1	0.02	929	0.45	2
Sharp-shinned Hawk	55.7	0.35	4	0.02	3	5.9	<0.01	274	0.02	3
Northern Goshawk	-6.3	0.20	4	0.02	3	1.2	0.48	61	0.02	3
Red-tailed Hawk	-5.9	0.12	18	0.11	3	1.8	<0.01	2877	1.07	2
Golden Eagle	6.3	0.52	6	0.06	3	3.0	0.04	306	0.21	2
American Kestrel	17.0	<0.01	4	0.04	3	-1.1	<0.01	2272	0.87	2
Merlin	2.0	0.63	10	0.09	3	7.6	<0.01	141	0.05	3
Ruffed Grouse	-1.1	0.87	7	0.15	3	-1.0	0.28	485	0.35	2
Blue Grouse	-3.2	0.83	11	2.36	3	-2.1	<0.01	88	0.36	2
Sandhill Crane	2.1	0.44	34	1.29	3	4.5	<0.01	360	1.15	1
Killdeer	6.7	0.62	2	0.03	3	-1.1	<0.01	3237	5.41	2
Greater Yellowlegs	2.1	0.21	38	1.54	3	12.0	0.23	18	0.21	3
Lesser Yellowlegs	-1.7	0.23	45	2.49	3	-17.1	<0.01	29	0.20	2
Solitary Sandpiper	-3.3	0.16	23	0.61	3	0.8	0.78	13	0.04	3
Spotted Sandpiper	-0.8	0.75	51	2.20	3	-1.3	0.03	832	0.43	2
Upland Sandpiper	-1.4	0.79	6	0.12	3	-1.2	0.02	552	2.34	2
Common Snipe	1.3	0.13	83	10.01	3	0.0	0.25	1098	2.33	2
Herring Gull	3.8	0.39	22	0.58	3	-3.3	<0.01	311	4.08	1
Glaucous-winged Gull	-1.7	0.67	35	9.89	3	-3.3	0.33	36	11.34	1
Rock Pigeon	6.3	0.33	4	2.52	3	-1.1	<0.01	2384	4.87	2
Great-horned Owl	19.1	0.29	15	0.14	3	-1.7	0.03	1148	0.19	2
Short-eared Owl	8.4	0.45	7	0.16	3	-5.0	<0.01	123	0.18	2
Rufous Hummingbird	3.7	0.37	17	4.37	3	-1.8	0.02	207	1.39	1
Belted Kingfisher	-1.6	0.48	35	0.44	3	-1.7	<0.01	1795	0.32	2
Red-breasted Sapsucker	7.1	0.01	17	9.55	3	n/a				
Downy Woodpecker	-0.1	0.97	17	0.06	3	-0.4	0.02	2471	1.16	1
Hairy Woodpecker	3.9	0.19	30	0.20	3	0.7	0.07	2026	0.50	2

	Alaska					U.S./Canada[1]				
Species	Trend	*P*	*n*	Abund.[2]	Cred.[3]	Trend	*P*	*n*	Abund.	Cred.
Am. Three-toed Woodpecker	1.6	0.77	16	0.10	3	9.3	0.04	37	0.05	3
Northern Flicker	0.0	0.96	36	0.33	3	n/a				
Olive-sided Flycatcher	-2.3	0.10	55	1.52	3	-3.5	<0.01	697	1.22	1
Western Wood-pewee	-2.7	0.60	23	0.45	3	-0.9	0.03	829	3.14	1
Yellow-bellied Flycatcher	53.7	0.48	3	0.06	3	1.7	0.14	183	1.10	2
Alder Flycatcher	-0.8	0.34	73	17.96	2	n/a				
Hammond's Flycatcher	-1.9	0.46	22	2.02	3	1.0	0.11	326	3.52	1
Pacific-slope Flycatcher	1.5	0.53	16	16.60	3	n/a				
Say's Phoebe	-12.1	0.01	8	0.11	3	1.3	0.16	592	0.94	2
Warbling Vireo	10.0	0.54	5	0.93	3	0.9	<0.01	1974	3.59	1
Gray Jay	2.1	<0.01	56	5.28	3	-0.3	0.69	364	0.95	2
Steller's Jay	1.0	0.43	23	3.74	3	0.5	0.14	466	3.24	1
Black-billed Magpie	2.1	0.14	29	0.92	3	0.8	0.04	762	6.59	2
Northwestern Crow	4.7	0.01	22	16.55	3	-0.5	0.51	32	12.84	2
Common Raven	3.2	0.21	94	3.81	1	1.9	<0.01	1642	5.48	1
Horned Lark	19.5	0.04	4	0.14	3	-2.7	<0.01	1821	24.62	2
Tree Swallow	1.2	0.45	61	4.18	1	-0.8	0.02	2019	4.47	2
Violet-green Swallow	-3.0	0.16	39	1.20	3	-0.3	0.71	623	4.30	1
Bank Swallow	3.6	0.06	40	10.08	3	-1.9	0.05	967	2.69	1
Cliff Swallow	-4.8	0.21	30	3.08	3	0.4	0.46	1880	17.45	2
Barn Swallow	-0.1	0.99	11	1.17	3	-2.0	<0.01	3306	12.60	2
Black-capped Chickadee	1.5	0.49	51	0.92	3	0.7	<0.01	1690	3.45	1
Chestnut-backed Chickadee	2.1	0.31	20	8.47	3	-0.7	0.28	181	4.34	1
Boreal Chickadee	2.0	0.35	44	0.81	3	-1.9	0.14	138	0.36	2
Red-breasted Nuthatch	0.4	0.87	17	0.08	3	1.2	<0.01	1080	2.36	1
Brown Creeper	21.6	0.16	14	0.51	3	-0.9	0.29	551	0.38	2
Winter Wren	-0.9	0.27	21	17.08	3	2.0	0.01	754	7.34	2
American Dipper	-35.5	0.07	4	0.02	3	-0.1	0.96	99	0.11	2
Golden-crowned Kinglet	-0.5	0.84	31	1.87	3	-1.7	0.01	649	2.39	2
Ruby-crowned Kinglet	-0.1	0.91	76	6.15	3	-0.1	0.79	656	6.71	2
Townsend's Solitaire	38.1	0.35	8	0.22	3	-1.9	0.09	322	0.67	2
Swainson's Thrush	-0.3	0.69	80	24.73	1	-0.8	<0.01	730	15.10	2
Hermit Thrush	-1.6	0.05	67	5.83	3	0.9	<0.01	1060	5.06	1
American Robin	1.5	0.07	96	20.02	1	0.4	<0.01	3300	27.16	1
Varied Thrush	-0.2	0.70	87	11.64	1	-1.1	0.03	188	6.09	2
European Starling	-9.6	0.54	4	0.76	3	-0.8	<0.01	3320	30.40	1
Orange-crowned Warbler	0.2	0.81	91	17.78	1	-1.4	<0.01	458	2.69	1
Yellow Warbler	-0.4	0.69	91	10.56	2	0.0	0.80	2380	4.34	1
Yellow-rumped Warbler	1.5	0.12	78	14.04	2	-0.2	0.56	1147	6.25	1
Townsend's Warbler	0.4	0.84	36	3.01	3	0.7	0.26	189	0.58	2
Blackpoll Warbler	-3.0	0.02	53	6.04	3	-9.5	<0.01	58	3.05	2
American Redstart	32.0	0.51	3	0.52	3	-0.5	0.09	1213	3.04	1
Northern Waterthrush	3.3	<0.01	69	13.63	3	-0.4	0.39	544	1.58	1
MacGillivray's Warbler	-11.0	0.34	5	1.24	3	-0.8	0.12	447	3.97	1
Common Yellowthroat	10.1	0.08	6	0.84	3	-0.8	<0.01	2805	7.40	2
Wilson's Warbler	1.0	0.32	86	15.21	3	-2.6	<0.01	473	1.54	1
Western Tanager	-9.4	0.40	5	0.31	3	1.4	<0.01	653	4.38	2
Chipping Sparrow	-8.3	0.42	13	0.30	3	-0.2	0.13	2775	7.92	2

	Alaska					U.S./Canada[1]				
Species	Trend	*P*	*n*	Abund.[2]	Cred.[3]	Trend	*P*	*n*	Abund.	Cred.
Savannah Sparrow	0.4	0.49	75	22.58	1	-0.9	<0.01	1583	8.26	2
Fox Sparrow	2.8	0.02	90	15.73	3	-0.3	0.72	217	2.13	1
Song Sparrow	-0.1	0.57	31	1.06	3	-0.3	0.02	2530	10.95	2
Lincoln's Sparrow	0.7	0.62	68	2.80	3	-0.7	0.25	455	2.45	2
White-crowned Sparrow	-1.7	0.05	75	28.50	1	-0.2	0.83	301	2.07	1
Dark-eyed Junco	-0.7	0.21	81	22.63	1	-2.0	<0.01	1070	7.61	1
Red-winged Blackbird	-0.9	0.92	8	0.11	3	-0.9	<0.01	3447	52.88	2
Rusty Blackbird	-5.2	0.05	27	0.87	3	-9.5	<0.01	60	0.27	2
Pine Grosbeak	3.9	0.29	37	0.41	3	-4.6	0.08	84	0.18	2
Red Crossbill	0.9	0.65	15	6.00	3	-2.5	<0.01	423	1.93	1
White-winged Crossbill	5.2	0.12	47	3.25	3	-1.9	0.67	116	1.93	2
Pine Siskin	10.9	0.18	42	2.70	3	-3.6	<0.01	807	5.11	1

[1] Survey-wide results for the U.S. & Canada are based on data from survey routes in the contiguous United States and southern Canada run from 1996–2004. Data from Alaska and northern Canada are not included because few northern routes encompass the long-term period.

[2] Abundance is measured as the number of individuals detected per route.

[3] Categories for the credibility of trend estimate are as follows:

3: The regional abundance is less than 0.1 birds/route (very low abundance), the sample is based on less than 5 routes for the long term, or is based on less than 3 routes (very small samples), or the results are so imprecise that a 5%/year change would not be detected over the long-term (very imprecise).

2: This category reflects data with a deficiency. In particular the regional abundance is less than 1.0 birds/route (low abundance), the sample is based on less than 14 routes (small sample size), the results are so imprecise that a 3%/year change would not be detected (quite imprecise), or the sub-interval (1966–1980, 1980–2001) trends are significantly different from each other (*P* less than 0.05, based on a z-test). This suggests inconsistency in trend over time).

1: This category reflects data with at least 14 samples in the long term, of moderate precision, and of moderate abundance on routes.

TABLE 2. Species with significant trends in abundance ($P \leq 0.15$) as measured by the BBS in Alaska 1980–2004. Only those species detected on ≥ 14 BBS routes (n = number of routes) are included. Species with an average of ≥ 1.0 bird detected per route in Alaska provide more credible estimates of trends than those species with lower numbers of birds per route (abundance).

Species	Trend	*P*	*n*	Abundance
Red-tailed Hawk	-5.9	0.12	18	0.11
Rusty Blackbird	-5.2	0.05	27	0.87
Blackpoll Warbler	-3.0	0.02	53	6.04
Olive-sided Flycatcher	-2.3	0.10	55	1.52
White-crowned Sparrow	-1.7	0.05	75	28.50
Hermit Thrush	-1.6	0.05	67	5.83
Common Snipe	1.3	0.13	83	10.01
Yellow-rumped Warbler	1.5	0.12	78	14.04
American Robin	1.5	0.07	96	20.02
Gray Jay	2.1	<0.01	56	5.28
Black-billed Magpie	2.1	0.14	29	0.92
Fox Sparrow	2.8	0.02	90	15.73
Northern Waterthrush	3.3	<0.01	69	13.63
Bank Swallow	3.6	0.06	40	10.08
Northwestern Crow	4.7	0.01	22	16.55
White-winged Crossbill	5.2	0.12	47	3.25
Bald Eagle	5.3	0.03	48	1.30
Green-winged Teal	7.1	0.08	37	2.46
Red-breasted Sapsucker	7.1	0.01	17	9.55

APPENDIX

List of landbird citations for 2005-2006 attributed to BPIF members and/or dealing with species or issues shared with BPIF.

2005

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