Landbird Conservation Plan for Alaska Biogeographic Regions

Version 1.0

Boreal Partners in Flight Working Group

October 1999

Address comments to:
Brad A. Andres, Chair
Boreal Partners in Flight
U. S. Fish and Wildlife Service
1011 East Tudor Road
Anchorage, Alaska 99503

907-786-3444

Brad_Andres@fws.gov

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Senior Author

_____

Regional Coordinator

_____

Regional Working Group Chair

_____

Boreal Partners in Flight Chair

Executive Summary

The size of Alaska (570,374 square-miles) dictates that conservation planning for landbirds generally be framed within a landscape context. To form a Bird Conservation Plan for the state, species, and their habitats, and management issues were considered within 5 Biogeographic Regions. These regions closely correspond to 5 Bird Conservation Regions in Alaska (based on the Commission for Environmental Cooperation's hierarchical framework of nested ecological units) that were recently developed. Identification of priority species, habitats, conservation actions were generated for each of the 5 Biogeographic Regions.

The Alaska landbird avifauna is represented by 39 families and is composed of 260 species; 135 landbird species breed in the state. About 50% of landbirds breeding in Alaska have some portion of their population that winters south of the U. S. - Mexico border. Alaska has a single endemic passerine -- the McKay's Bunting. Using the prioritization scheme, we identified 34 landbird species that were considered a priority for conservation in the state. The number of priority species varied from 5 to 20 species among Biogeographic Regions. Among all Biogeographic Regions in Alaska, the most important habitats for breeding landbirds were 1) coniferous and mixed coniferous/deciduous forests that occur at relatively low elevations, and 2) riparian, deciduous shrublands and forests. These habitats support numerous long-distance migrants and residents and are the most imperiled by human activities.

Although some landbird species are vulnerable to anthropogenic changes in the landscape, most landbird species or habitats are not immediately threatened with extirpation, or extinction, in Alaska. Therefore, the overall conservation goal for landbirds in Alaska is to keep species well-distributed across the landscape. Change in forest cover and condition, caused by timber harvest and insect outbreaks, will likely have a negative effect on the distribution of landbird population within certain regions; forest change is occurring most dramatically in Southeastern and Southcoastal Alaska. Human population growth in Cook Inlet will negatively effect forest bird populations. Within these areas, our knowledge is only rudimentary in understanding relationships between forest birds and the structural elements of their breeding habitats and the configuration of habitat patches within the landscape. More explicit conservation actions can be generated for landbirds as this knowledge becomes available.

Among other Biogeographic Regions, monitoring the persistence of populations is the primary conservation action. Implementation and evaluation of monitoring strategies should be done within a rigorous statistical framework. Because habitats in these regions are relatively undisturbed, an understanding of the ecological processes affecting landbirds along migration routes and on wintering areas is crucial to the conservation of Alaska-nesting species. Without this knowledge, even the most elementary conservation efforts undertaken in Alaska may be for naught.

The need to synthesize new information, as it becomes available, into a form useable to land managers and planners is paramount. Information on distribution and habitat requirements of

landbirds should be incorporated into land-use planning decisions; Boreal Partners in Flight will endeavor to provide reliable and timely information on to land-use planners.

Boreal Partners in Flight should also strive to transmit information about Alaska's landbirds to all publics. Creating an awareness in the general public about the complex natural history of Alaska's landbirds may be the greatest contribution Boreal Partners in Flight can make to the conservation of landbirds in the Western Hemisphere. Partnerships with groups interested in the conservation of migratory birds their annual cycle are critical for the future of Alaska's breeding landbirds.

Acknowledgments

Brad A. Andres, Chair of Boreal Partners in Flight, extends appreciation and thanks to all members who contributed their time and expertise to write this plan. Their hard work and dedication has made this very important endeavor possible. Thanks to all cooperating government agencies and non-governmental organizations that include the: Alaska Bird Observatory, Alaska Department of Fish and Game (ADF&G), Alaska Department of Natural Resources (ADNR), Bureau of Land Management (BLM), National Park Service (NPS), U. S. Air Force, U. S. Army, U. S. Fish and Wildlife Service (USFWS), U. S. Forest Service (USFS), and U. S. Geological Service - Biological Resources Division (USGS-BRD).

The following individuals contributed significantly to the development, writing and editing of this plan: Brad Andres (USFWS), Barbara Boyle (USFWS), Diana Brann (USFWS), Ellen Campbell (USFS), Paul Cotter (USFWS), Terry Doyle (USFWS), Colleen Handel (USGS-BRD), Buddy Johnson (USWFS), Steve Matsuoka (USGS-BRD), Brian McCaffery (USFWS), Carol McIntyre (NPS), Julie Melton (USFWS), Anne Morkill (BLM), Kristine Sowl (USFWS), Shelli Swanson (NPS), Matt Stotts (USFWS), Ted Swem (USFWS), John Wright (ADF&G), and Dave Yokel (BLM).

We also thank the following individuals for their participation in information assembly: Steve Albert (ADF&G), Steve Clautice (ADNR), Dan Gibson (Univ. of Alaska - Fairbanks), Brina Kessel (Univ. of Alaska - Fairbanks), Chris Maisch (Tanana Chiefs Council, Inc.), Carl Mitchell (NPS), Jim Peterson (ADNR), and Jim Roessler (BLM).

Comments on the plan were offered by: Carol Beardmore (PIF Western Regional Coordinator), Stan Senner (Alaska Audubon Society), Shelli Swanson (NPS), and Kent Wohl (USFWS).

Literature Citation

Literature citation of this document should read as follows:

Boreal Partners in Flight Working Group. 1999. Landbird Conservation Plan for Alaska Biogeographic Regions, Version 1.0. Unpubl. rep., U. S. Fish and Wildlife Service, Anchorage, Alas. 45pp.

Table of Contents

List of Tables

List of Figures

List of Appendices

Introduction

Continental and local declines in numerous bird populations has lead to concern for the future of migratory and resident bird species. The reasons for declines are complex and include: habitat alteration (at breeding, wintering, and stop-over sites), brood parasitism, predation, and contaminants. Scientists and the concerned public agreed that a coordinated, cooperative conservation initiative focusing on nongame landbirds was needed. In late 1990, the National Fish and Wildlife Foundation brought together federal agencies, state agencies, local governments, foundations, conservation groups, industry, and the academic community to form a program to address the problem. Thus, Partners in Flight (PIF) was conceived as a voluntary, international coalition of government agencies, conservation groups, academic institutions, private businesses, and citizens dedicated to "keeping common birds common" and reversing the downward trends of declining species.

Partners in Flight's primary goal is to direct resources, internationally, nationally and regionally, to the conservation of landbirds and their habitats through cooperative efforts in the areas of monitoring, research, management, education, and international cooperation (see Appendix 1).

The Boreal Partners in Flight Working Group (BPIF) was formed in March 1992 and functions under the umbrella of the Western Working Group of the U.S. PIF program. The main purpose of BPIF is to develop and coordinate a network of integrated research, monitoring, and educational programs specific to Neotropical migratory landbirds that breed in Alaska. Meetings, held once a year, have focused on the standardization of monitoring techniques and the identification of monitoring and public outreach needs. Despite having to travel long distances, 40-50 participants usually attended each meeting. This high level of participation demonstrates the strong commitment of Alaskans to the conservation of migratory landbirds (see Appendix 1).

Geographically-based conservation plans were identified as necessary for nongame land birds and were modeled after the North American Waterfowl Management Plan that directs efforts and prioritizes funding for waterfowl. "The Flight Plan" forms the strategy for coordinating, developing and writing Bird Conservation Plans (see Appendix 1).

Effective and efficient ecological management involves determining which species and habitats are most in need of conservation. This plan identifies priority species and habitats, establishes objectives for bird populations, and recommends conservation actions.

PIF bird conservation plans (BCPs) are intended to complement the successful North American Waterfowl Management Plan and the recently initiated National Shorebird Conservation Plan and North American Colonial Waterbird Conservation Plan. The most sensible way

to approach migratory bird conservation is to coordinate implementation among plans for all species groups.

BPIF recognizes that there are gaps in our knowledge of Alaska's birds. However, our intention is to assemble the best and most current scientific information into a format that land managers and landowners can use to put ideas into action. This plan provides the framework and background for conservation planning for landbirds in Alaska. As new information becomes available, either through monitoring recommended in this plan or from information overlooked, updates to the plan will be developed. Thus, we consider this a dynamic document in which adaptive management will play a large role; we hope to revisit the plan at 5-year intervals. Specific tasks to accomplish the plan's objectives need to drafted annually.

This conservation plan was developed by many people who offered input at planning meetings and as reviewers. Planning meetings, held by BPIF group, were open to anyone who had an interest in bird conservation. Meetings were designed to solicit information from participants that would form the core of the plan. An important result of planning meetings was to gain consensus on biological factors of migratory bird populations when substantial scientific information was lacking. All scientific and common names of birds used in plan follow the American Ornithologists' Union recent checklist (1998) and plant names follow Viereck et al. (1992).

The Planning Unit - Alaska and Alaska Biogeographic Regions

The Alaska Environment

The State of Alaska encompasses more than 570,374 square-miles and is one-fifth the size of the contiguous United States. The state spans more than 20 degrees of latitude ($51^0$13' N - $71^0$23' N) and 57 degrees of longitude ($129^0$59' W - $172^0$27' E). The coastline of Alaska stretches for more than 33,904 miles. As the third longest river in the U. S., the Yukon River flows for 1,875 miles in Alaska and drains a watershed of 330,000 square-miles. Broad, shallow rivers, and their associated valleys, are a dominant feature of the landscape in interior Alaska; mountains are also a well-recognized feature of the Alaskan landscape. Mount McKinley (20,320 feet), located in Denali National Park, is North America's tallest mountain. Seventeen of the 20 highest peaks in the U. S. are found in Alaska; 9 of the 16 tallest peaks in North America occur within Wrangell-St. Elias National Park. More than 100,000 glaciers cover 5% of Alaska's land area.

Despite its size, Alaska's woody flora lacks diversity; only 128 species of trees and shrubs are known from Alaska (Viereck and Little 1972). Vegetation across Alaska ranges from temperate rain forests in the southeast to high arctic tundra in the north. Discontinuous permafrost is found between the Alaska and Brooks Ranges; beyond the Brooks Range, permafrost is continuous. The maritime climate of southeastern Alaska is characterized by warm winters, cool summers, heavy precipitation, and constant wind. In contrast, interior Alaska has warm summers, very cold winters, little wind, and light precipitation. Winter temperatures in interior Alaska

commonly drop to -45°F. Cool summers, cold winters, moderate winds, and light precipitation are typical of western and northwestern Alaska. Barrow, the northernmost point in Alaska, experiences 67 days of continuous darkness in the winter and 84 days of continuous sunlight in summer.

Two-thirds of Alaska is owned by the Federal government (see Appendix 2). The two largest National Forests, 9 of the 10 largest National Parks and Preserves, and 83% of all National Wildlife Refuge lands are located in Alaska. In addition, the National Petroleum Reserve - Alaska, administered by the Bureau of Land Management contains 23,000 square-miles. Included in Federal holdings are 92,654 square-miles of Wilderness or Wilderness Study Areas. Glacier Bay National Park and Wrangell-St. Elias National Park, in the U. S., and Kluane National Park and Tatshenshini-Alsek Wilderness Provincial Park, in Canada, form the largest protected wilderness on the globe.

The human population of Alaska has doubled from 302,583 people in 1970 to 615,900 people in 1995. Two-thirds of the state's population live in southcentral Alaska; 257,780 resided in Anchorage as of 1995. About 15% of the state's population is comprised of native Alaskan peoples.
About 35% of Alaska's land area is forested (201,563 square-miles). Of this, 23,437 square-miles are considered timberland (those lands capable of producing more than 20 cubic feet per acre. In central Alaska, 134,376 square-miles are covered white spruce, paper birch, aspen, or cottonwood timberlands; an additional 5,312 square-miles are located in parks or wilderness. About 20 sawmills operate in central Alaska and each process less than 300,000 board feet annually. Fires are an important component of forest dynamics in central Alaska. In an average year, more than 1.2 million acres of forests are burned. Southeastern Alaska has about 67,188 square-miles of timberlands and an additional 4,085 square-miles are located in parks or wilderness. About 291.3 million board feet were harvested in 1994. Total timber exports in 1994 were valued at $566 million.

Oil and gas development is the major revenue-producing industry in Alaska and is concentrated in Cook Inlet and on the Arctic Coastal Plain. In 1996, the State of Alaska received $1.87 billion in royalties. Alaska leads the country in oil production and Prudhoe Bay oil field is the largest producer of oil in the U.S. In 1995, Alaska oil fields produced 541.6 million barrels of oil. Fishing is another important Alaska industry; Alaska contributes 56% of all seafood production in the U. S. In 1995, a catch of 1.1 billion kilograms yielded $1.3 billion. Tourism is also an important Alaska industry and is increasing in the state. In 1995, 1.1 million visitors spent $750 million in the state.

Avian Distribution in Alaska (*adapted from Kessel and Gibson 1978***)**

Avian distribution patterns in Alaska are the result of a number of interacting factors, historic (e.g., geology, species evolutionary history, historic species ranges and migration habits) and contemporary (e.g., habitat and ecological niche, current species ranges and migration routes).

But basic to all these factors is the geographic position of Alaska relative to the earth's axis, to the arrangement of the earth's land and water masses, and to the area of geographic origin (or at least the current centers of distribution) of the various avian species:

1) Alaska is relatively far north, with over 80% of its land mass north of 60'N. Hence, most species are those associated with tundra or taiga habitats; also present are species with affinities for the edge of the sea ice.

2) Alaska is at the northwestern extremity of the North American continent, with the result that it serves as the normal terminus of migration for many species wintering farther south; also, many accidental or casual species are those that "overshoot" their usual summer ranges in interior Canada or that engage in post-breeding wanderings from these interior ranges. The distance, too, from South and Central America accounts for the relatively small number of species representing South American and Pantropical avifaunal elements (see Mayr 1946).
Bering Sea land bridge. Thus, Old World species are more frequent here than elsewhere in North America, both as regular members of the avifauna and as accidental and casual visitors.

4) Alaska incorporates much of the historical Beringian area, the hypothesized differentiation center for the Aleutican avifaunal element (see Fay and Cade 1959); consequently, many species of this group have centers of abundance in Alaska, and some are scarcely known beyond the Bering and Chukchi seas, even in winter.

5) Alaska is at the northern boundary of the Pacific Ocean and is the normal migratory terminus for many seabirds, including some trans-Pacific migrants that are seldom seen in numbers in the northern hemisphere outside of Alaska or the arctic.

The Alaska landbird avifuana is represented by 39 families and is composed of 260 species (see Appendix 3) . Just over half of these species (52%) breed in the state. The remainder are vagrants, or migrants, from either North America or Asia. Of 135 landbird species breeding in Alaska, most undergo some migration during the North American winter; only 34 species (25%) are year-round residents. Fifty-seven percent of all landbird species breeding in Alaska have some portion of their population that winters south of the U.S.-Mexico border.

Alaska's Biogeographic Regions (*based on Kessel and Gibson 1978*)

Because of the size of Alaska and the geographic variation in the abundance and distribution of birds, conservation planning for landbirds occurred within 6 Biogeographic Regions (Fig. 1). Since its inception, BPIF has used these divisions to pursue landbird conservation objectives in Alaska. Descriptions of the 6 regions follow:

Southeastern Alaska - Sitka spruce-hemlock coastal forest predominates. Interior Canada birds reach Alaska via the mainland river systems, which dissect the Coast Range. A number of species, both seabirds and others, reach either their northern or their southern distribution

extremes in this region.

Southcoastal Alaska - Sitka spruce-hemlock coastal forest predominates, but its composition is more depauperate than in southeastern Alaska. The region includes the farthest north open water for overwintering waterfowl and shorebirds and major migration stopover sites for Pacific coast migrants and for some transPacific migrants. A few members of the Aleutican avifauna reach the eastern extremity of their breeding range in this region (Red-faced Cormorant and Aleutian Tern).

Central Alaska - Taiga habitats, especially white spruce predominate; alpine tundra occurs above 2,500 feet in foothills and mountain systems. Interior Canada bird species reaching the northwestern extremity of their ranges, either breeding or migration, often extend into the eastern portions of central Alaska, usually via the major river systems—upper Yukon, upper Tanana, and upper Copper river drainages—but sometimes via the alpine tundra of the mountain systems

Southwestern Alaska - Tundra and marine influences predominate. A number of Old World species are regular migrants and visitants, and occasional breeders (Wood Sandpiper); these are more numerous in the western portions of the region, where migrants regularly pass through on their way between southeastern and northeastern Asia. Southern Hemisphere procellariiforms occur regularly in the offshore waters during our summers. Some Aleutican species breed only in this region (Red-legged Kittiwake and Whiskered Anklet); others reach their range limits in this region in winter (Emperor Goose and McKay's Bunting).

Western Alaska - Tundra and marine influences predominate. A number of taiga birds are rare to casual as far as the Bering and Chukchi sea coasts. Several Aleutican species have their entire breeding populations here (Black Turnstone, Bristle-thighed Curlew, and McKay's Bunting). Most Old World species that have become well-established as breeders have done so in this region. Other Old World species occur only as accidentals or casual migrants and summer visitants. Pack ice covers much of the sea surface in winter, and birds associated with its face are winter visitants (Ivory Gull and Black Guillemot).

Northern Alaska - Tundra and marine influences predominate; the ocean surface, except for leads, is frozen 9-10 months a year, and the ice pack is never far from shore. A number of breeding Old World and Aleutican species penetrate the region from the west, and species regularly breeding in the Canadian arctic penetrate from the east. Taiga birds reach the region casually or rarely along drainage systems from the Brooks Range. An impressive number of interior Canada species has been recorded at Point Barrow, birds that probably reached the arctic coast via the Mackenzie River Valley and then worked their way westward along the coast to be recorded in the scientist-populated Barrow area.

Figure 1. Biogeographic Regions defined by Kessel and Gibson (1978) used for landbird conservation planning in Alaska.

Vegetation Covertypes and Bird Habitats

Two vegetation classification systems have been used by BPIF to describe bird habitats. Kessel's (1979) system (Table 1) was developed specifically to describe bird habitats, whereas Viereck et al.'s (1992) system (Table 2) is hierarchical and has been used as a basis for mapping vegetation throughout Alaska. Both generally describe vertical and horizontal structure and composition at a gross level. Primary and secondary habitats, those used most regularly by the species during the summer months, were assigned, described by both schemes, to every landbird species breeding in each Biogeographic Region. For most species, these reflect primary and secondary habitats used for breeding; for a few, particularly raptors, they reflect primary nesting and foraging habitats.

Table 1. Alaska avian vegetation classification system of Kessel (1979)

Level I	Level II
1. Water/shorelines	
	A. Lacustrine waters/shorelines
	B. Fluviatile waters/shorelines
2. Marine Waters	
	A. Nearshore waters
	B. Inshore waters
	C. Offshore waters
	D. Sea ice edge
3. Unvegetated substrates	
	A. Rocky shores and reefs
	B. Beaches and tidal flats
	C. Barrier islands
	D. Alluvia and moraines
	E. Cliffs and block-fields
4. Meadows	
	A. Wet meadows
	B. Dwarf shrub meadows
	C. Grass meadows
	D. Salt grass meadows
	E. Tall forb meadows
5. Shrubbery	
	A. Dwarf shrub mats
	B. Low shrub thickets
	C. Medium shrub thickets
	D. Tall shrub thickets
6. Forests and woodlands	
	A. Deciduous forests
	B. Coniferous forests
	C. Mixed deciduous/coniferous forests
	D. Scattered woodlands/dwarf forests
7. Artificial substrates	

Table 2. Alaska vegetation classification system of Viereck et al. (1992)

Level I	Level II	Level III
I. Forest	A. Needleleaf (conifer) forest	1. Closed needleleaf forest
		2. Open needleleaf forest
		3. Needleleaf woodland
	B. Broadleaf forest	1. Closed broadleaf forest
		2. Open broadleaf forest
		3. Broadleaf woodland
	C. Mixed forest	1. Closed mixed forest
		2. Open mixed forest
		3. Mixed woodland
II. Scrub	A. Dwarf tree scrub	1. Closed dwarf tree scrub
		2. Open dwarf tree scrub
		3. Dwarf tree scrub woodland
	B. Tall scrub	1. Closed tall scrub
		2. Open tall scrub
	C. Low scrub	1. Closed low scrub
		2. Open low scrub
	D. Dwarf scrub	1. Dryas dwarf scrub
		2. Ericaceous dwarf scrub
		3. Willow dwarf scrub
III. Herbaceous	A. Graminoid herbaceous	1. Dry graminoid herbaceous
		2. Mesic graminoid herbaceous
		3. Wet graminoid herbaceous (emergent)
	B. Forb herbaceous	1. Dry forb herbaceous
		2. Mesic forb herbaceous
		3. Wet forb herbaceous (emergent)
	C. Bryoid herbaceous	1. Mosses
		2. Lichens
	D. Aquatic (non-emergent) herbaceous	1. Freshwater aquatic herbaceous
		2. Brackish water aquatic herbaceous

3. Marine aquatic herbaceous

Species Prioritization

The Prioritization Process

Partners in Flight uses a system that identifies species of conservation priority in each of its planning units, rather than planning for all species. It is assumed that if conservation measures are focused on these species and their habitats, other species in the area will benefit as well. The PIF Species Prioritization scheme was first developed in 1991, and has been continually reviewed and refined in the years following inception (Carter et al., *in press*). The system ranks each species of North American breeding bird based upon 7 measures of conservation vulnerability. These factors include 4 global criteria that are ranked at the national level, are the same for all species in all regions, and include: relative abundance (interspecific), size of breeding range, size of non-breeding range, and threats to the species in non-breeding areas. Three regional criteria have been used to assign ranks to every breeding landbird in each Biogeographic Region in Alaska: threats to the species in breeding areas, population trend, and relative density (intraspecific) in a Biogeographic Region compared to the maximum reached within its range. Each species is given a score of 1-5 in each category, with 1 indicating the least amount of vulnerability with regard to that parameter and 5 the most. Scores in each category are then summed to produce a composite score potentially ranging from 7-35. Species with relatively high overall scores (23) are considered most vulnerable to extinction (although they often are not endangered at present) and usually need conservation measures, or at least need to be carefully monitored, throughout their ranges. Currently, the prioritization system only treats full species. Regional groups have been encouraged to identify and assess the conservation risks to particular subspecies within their regions. BPIF will address this task in the near future. However, many subspecies in Alaska occur in different Biogeographic Regions and ranks reflect regional concerns.

In many states and physiographic regions, regional ranks of relative density and population trend are derived from local Breeding Bird Survey (BBS) data. Unfortunately, low density of BBS routes and lack of a long time series in Alaska prevent the use of the BBS to generate the above ranks. Information on regional, relative abundance during the summer (June and July, the principal breeding period) is based on several published sources (Isleib and Kessel 1973, Kessel and Gibson 1978, West 1994, Armstrong 1995) and recent field experience of regional experts.

The above criteria were used to develop a list of landbird species of high priority for conservation action within each Biogeographic Region of Alaska. Because of the vast size of Alaska and the high variability in avifauna among regions, a single priority species list for Alaska was not generated. Only species that regularly breed in Alaska are treated; casual and accidental breeders are not discussed. Species of conservation priority were defined as those where the rank score was 17-22; species of high conservation priority were those where the rank score was 23. Definitions of all criteria are provided below.

Global Criteria Definitions

North American abundance

Relative abundance in North American (or Palearctic) breeding range across the bulk of the area where it typically occurs. Generally corresponds to the mean number of birds recorded from 1985-1991 on the 10 highest North American Breeding Bird Survey routes on which it occurred (after Price et al. 1995). A more qualitative assessment, based on Armstrong (1995), was often used in Alaska.

1 Abundant (100 birds/route)
2 Common, includes locally abundant (30-99 birds/route)
3 Uncommon to fairly common, includes locally common (10-29 birds/route)
4 Rare to uncommon, includes locally fairly common (1-9 birds/route)
5 Very rare to rare, includes locally uncommon (< 1 bird/route)

Breeding distribution

Percent of North America (or Palearctic) that encompasses species' breeding distribution.

1 Very widespread (>20% of North America or Palearctic, >1,703,500 square-miles [4,411,940 km^2])
2 Widespread (10 - 20% of North America or Palearctic)
3 Intermediate (5 - 9.9% of North America or Palearctic)
4 Local (2.5 - 4.9% of North America or Palearctic)
5 Very local (<2.5% of North America or Palearctic)

Non-breeding distribution

Percent of North America (or equivalent area) that encompasses species' non-breeding distribution.

1 Very widespread (>20% of North America or equivalent area)
2 Widespread (10 - 20% of North America or Palearctic)
3 Intermediate (5 - 9.9% of North America or Palearctic)
4 Local (2.5 - 4.9% of North America or Palearctic)
5 Very local (<2.5% of North America or Palearctic)

-breeding areas

Scored according to the following matrix. The percentages refer to the relative capability of an area to maintain healthy populations, primarily through their influence on survival. Current conditions are defined as the percentage that exists now compared with what

existed in 1945. Future conditions are defined as the percentage of current conditions that are expected to exist in upcoming decades. Conditions are habitat or other key requirements for the species' survival.

	Current Conditions				
Future Conditions	100%	75-99%	50-74%	25-49%	<25%
Steady or gains	1	1	2	3	4
75-99%	2	2	3	4	5
50-74%	3	3	4	4	5
25-49%	4	4	4	5	5
<25%	5	5	5	5	5

Regional Criteria Definitions

Importance of the Biogeographic Region to North American (or Old World) populations

Scored according to the following table to reflect the proportion of the species' breeding range that occurs within Biogeographic Region in relation to that which occurs in Alaska and all of North America (or the Old World for Palearctic species).

% of Alaska range in Biogeographic Region	% North American breeding range in Alaska				
	<1%	1-10%	11-25%	26-50%	51-100%
<1%	0	0	1	1	1
1-10%	0	1	1	2	2
11-25%	1	1	2	2	3
26-50%	1	2	2	3	4
51-100%	1	2	3	4	5

Threats to breeding areas

Scored to estimate the amount and quality of primary breeding habitat that will exist within Alaska in 2000 in comparison with its condition 55 years ago (1945). Amount of habitat historically available was estimated from range maps of vegetation types (Viereck and Little 1972); amount of change was estimated by evaluating the current and projected extent of urbanization, timber harvesting, mining, disease, insect infestation, and other activities likely to cause successional changes or direct loss of habitat. Changes by fire were assumed to be balanced across the region. Specific habitat requirements (such as closed canopy, or large tree diameter) were considered when known.

1	Stable or increasing
2	1-10% loss
3	11-25% loss
4	26-50% loss
5	>50% loss

Population trend

Population trend based on Breeding Bird Survey data (Sauer et al. 1997) from routes in the Yukon Territories or the Closed Boreal Forest physiographic stratum (for the majority of species) or from British Columbia (for species with distinct coastal populations in Southcoastal and Southeastern Alaska). This rank incorporates information on trend and its uncertainty (PTU).

PTU	Criteria
1	28 BBS routes where trend significance is *P* 0.1
2	14 BBS routes where trend significance is *P* 0.1
3	14 BBS routes where trend significance is *P* 0.1
4	< 14 routes
5	no information

Trend rank	Criteria
1	increasing >1% per year, PTU = 1
2	increasing >1% per year, PTU = 2
2	stable, -1% < trend < 1%, PTU = 1, 2
3	trend unknown, PTU = 3, 4, or 5
4	decreasing >1% per year, PTU = 2
5	decreasing >1% per year, PTU = 1

Priority Species by Biogeographic Region

Below are listed are priority (ranks 17) breeding landbird species for each Biogeographic Region (arranged taxonomically). Because few landbirds breed in a large part of the Southwestern Biogeographic Region, it is merged with Western Alaska. Priority species in these regions were virtually identical. Two peripherally-breeding species in Southeastern Alaska (Band-tailed Pigeon and Tennessee Warbler) and 1 peripherally-breeding species in Central Alaska (Swainson's Hawk) that were ranked as priority species are not considered further. Only 2 species (McKay's Bunting and Smith's Longspur) had ranks that were 23. Besides these 2 high priority species, 8 species in Southeastern and 1 in Southcoastal scored 20. Ranks for all species are provided in Appendix 5. Note that some obvious subspecies (e.g., Queen Charlotte Island Goshawk) are not included in these priority species lists. Biogeographic Regional groups

are encouraged to consider subspecies and populations that are not represented accurately by prioritization at the species level.

Southeastern Alaska

Blue Grouse
Western Screech-Owl
Black Swift
Vaux's Swift
Rufous Hummingbird
Red-Breasted Sapsucker
Olive-sided Flycatcher
-Pewee
Hammond’s Flycatcher
Pacific-slope Flycatcher
Steller’s Jay
Northwestern Crow
Chestnut-backed Chickadee
American Dipper
Varied Thrush
Townsend's Warbler
Blackpoll Warbler
MacGillivray’s Warbler
Golden-crowned Sparrow

Southcoastal Alaska

Rufous Hummingbird
Red-breasted Sapsucker
Pacific-slope Flycatcher
Northern Shrike
Northwestern Crow
Chestnut-backed Chickadee
Gray-cheeked Thrush
Varied Thrush

Townsend's Warbler
Blackpoll Warbler
Golden-crowned Sparrow

Gyrfalcon
White-tailed Ptarmigan
Sharp-tailed Grouse
Great Gray Owl
Boreal Owl
Black-backed Woodpecker
Olive-sided Flycatcher
’s Flycatcher
Northern Shrike
American Dipper
Gray-cheeked Thrush
Varied Thrush
Bohemian Waxwing

’s Warbler
Blackpoll Warbler
Golden-crowned Sparrow
Smith’s Longspur
Rusty Blackbird
White-winged Crossbill

Western/Southwestern Alaska

Gyrfalcon
Gray-cheeked Thrush
Varied Thrush
Golden-crowned Sparrow
McKay's Bunting
Hoary Redpoll

Northern Alaska

Gyrfalcon
Snowy Owl
Gray-cheeked Thrush
Smith’s Longspur
Hoary Redpoll

Factors Contributing to High Ranks

To fully understand why a particular species is considered a priority for conservation, it is important to examine which criteria contributed to the high rank. The intensity of conservation actions are directly related to the cause for prioritization (see following section). Reasons for prioritization generally include: global responsibility for maintaining populations (Biogeographic Region importance rank 4-5), North American responsibility (exclusive boreal-breeding species), negative population trends, non-breeding season threats, or potential negative response to loss of forest cover (i.e. breeding ground threats). Southeastern Alaska had a high number of priority species because of breeding ground threats, whereas the high number of priority species in Central Alaska was due to a global or boreal responsibility to maintain populations.

Table 3. Factors contributing to high and moderate priority species rankings for Alaska Biogeographic Regions and include: global monitoring responsibility (G), boreal North America monitoring responsibility (B), decreasing population trend (T), non-breeding habitat threats (W), or potential negative response to loss of forest cover (F)

Species	Southeastern	Southcoastal	Central	Western/ Southwestern	Northern
Gyrfalcon			B	B	B
Blue Grouse	F,T				
White-tailed Ptarmigan			G		
Sharp-tailed Grouse			G		
Western Screech-Owl	F				
Snowy Owl					B
Great Gray Owl			B		
Boreal Owl			B,F		
Black Swift	T				
Vaux's Swift	F				
Rufous Hummingbird	F	F			
Red-Breasted Sapsucker	F	F			
Black-backed Woodpecker			G		
Olive-sided Flycatcher	T,F		T		
Western Wood-Pewee	T				
Hammond’s Flycatcher	G		G		
Pacific-slope Flycatcher	F	F			

Northern Shrike		B	B		
Steller's Jay	G				
Northwestern Crow	G	G			
Chestnut-backed Chickadee	G	G			
American Dipper	B		B		
Golden-crowned Kinglet	F				
Gray-cheeked Thrush		G	G	G	G
Varied Thrush	F,G	F,G	F,G	G	
Bohemian Waxwing			B		
Townsend's Warbler	F	F	F		
Blackpoll Warbler	G	G	G	G	
MacGillivray's Warbler	W				
Golden-crowned Sparrow	G	G	G	G	
Smith's Longspur			G,W		G,W
McKay's Bunting				G	
Rusty Blackbird			T, G	T,G	
White-winged Crossbill			B		
Hoary Redpoll				B	B

Habitats of priority species

When species in the priority pool are grouped by habitat, the habitats containing the greatest number of priority bird species can be identified. Conservation actions for priority species in each Biogeographic Region should focus on these habitats. Habitat affinities, based on Kessel's (1979) definitions, of priority species (those with ranks 17) are displayed for each Biogeographic Region (Fig. 2). Forested habitats, particularly coniferous forest, are important habitats for landbirds in Alaska. Shrub habitat also supports numerous priority species and is the most important landbird habitat in Western/Southwestern Alaska. Generally, diurnal raptor species choose nest sites on cliffs but require shrub habitats of riparian and subalpine areas to forage.

Figure 2. Breeding habitat affinities of priority landbirds (ranks 17) in Alaska's Biogeographic Regions.

Plan Implementation

Overview

The size of Alaska, and its Biogeographic Regions (and Bird Conservation Regions), dictates that conservation considerations for landbirds generally be framed within a landscape context. Additionally, no landbird species or habitats are eminently threatened with extirpation in the state (but see McKay's Bunting discussion in Western/Southwestern Conservation Actions). An overall conservation goal for landbirds in Alaska is, therefore, to keep species well-distributed across the landscape. To develop regional and habitat-specific objectives, the proportion of points where priority species occur in their primary breeding habitat was calculated from Breeding Bird Survey (BBS) routes and off-road point counts (ORPC). Following the notion of acceptable loss, the conservation goal of keeping populations well-distributed would be achieved if a species occurred on 74% of points where the species initially occurred after 15 years (2015); this objective represents a average 2% per year decline in site occupancy and could be evaluated annually if possible. After this time frame, no further loss of populations would be acceptable. More stringent thresholds should be developed for species with small population sizes or for regions where major land-use change has already occurred (e.g., Cook Inlet). Failure to meet conservation objectives would trigger more intensive conservation actions (e.g., enacting policies of no further loss of key habitats or initiating demographic studies to establish causes of declines). A similar process could be used to set conservation objectives for all landbird species that breed in Alaska (perhaps using density as the metric for more abundant species).

The lack of species where ranks are 23 indicate that conservation actions in Alaska Biogeographic Regions will be less intense than in other regions of North America (e.g., habitat enhance, restoration). Currently, monitoring of bird population size and health and evaluation of habitat quality will dominate conservation actions. As information becomes available on landscape processes that affect the patterns of distribution and abundance of landbirds, more explicit conservation objectives for landbird populations or habitats can be formulated. Evaluation of the configuration and health of landbird habitats on the landscape need to undertaken.

Because habitats are relatively undisturbed in Alaska, understanding ecological processes along migration routes and on wintering areas is crucial to the conservation of Alaska-nesting species. Without this knowledge, conservation efforts undertaken in Alaska may be for naught.

Although this plan focuses on priority species and habitats, the development, and evaluation, of broad-scale monitoring schemes should not be forsaken. Formal power analyses are still needed to guide efforts across taxa and Biogeographic Regions. As Bird Conservation Regions are sub-regions within these regions will need to be developed.

Designation of Important Bird Areas (IBAs) and Bird Conservation Areas (BCAs) in Alaska will help ensure persistent of populations across the landscape. Although priority landbird species should be considered, along with other avian taxa, in making designations, designation of IBAs and BCAs will benefit more than priority species.

A management plan specific to diurnal and nocturnal raptors is concurrently being developed for Alaska. Because several raptors ranked high in the PIF prioritization scheme, Boreal PIF members and raptor experts should work together to develop conservation strategies for these species. However, the remaining discussion focuses on grouse, hummingbirds, swifts, woodpeckers, and songbirds. Accounts of the distribution, natural history, habitat use, and management issues are given for all priority species in Appendix 7.

General Conservation Objectives

Dependent upon the rarity of a species, restrictiveness of its distribution, or threats to its breeding habitat, the following general conservation objectives were developed. Most objectives are applicable to all priority species within a specific Biogeographic Region, although some objectives may cross regional boundaries (e.g., determination of the population status of a rare species whose range crosses 2 regions, meet broad-scale monitoring objectives). Identification of Important Bird Areas and Bird Conservation Areas

Species that are rare or have restricted breeding distributions

1. Determine population status (i.e. size) of the Alaska population and periodically

measure population size to ensure persistence (e.g., every several years).

2. Ensure protection of breeding sites.

3. If total population size, or an index thereof, declines more than 14% in 15 years (1% per year), initiate annual monitoring and demographic studies.

4. Further declines in population would lead to restoration efforts.

Species that might be negatively affected by loss of mature forest

1. Construct reliable, broadly-applicable bird-habitat association models to predict which species will be most affected by loss/alteration of mature forest.

2. Conduct landscape-level monitoring of bird populations to determine what, or if the, configuration of remaining mature forest patches will support landbirds.

3. Monitor changes in mature forest cover across the landscape.

4. If bird populations decline, or are lost from, remaining mature forest patches, initiate intensive, species-specific demographic studies.

Species for which Alaska has global or North American responsibility

a. Conduct broad-scale monitoring of population size.

b. If population declines are detected, initiate species-specific demographic studies.

Southeastern Conservation Issues

The most significant management issue in Southeastern Alaska is the harvest of coniferous trees. Fourteen of 20 priority species use mature coniferous or mixed forests (general use of old-growth and successional forests by landbirds is given in Table 4). The Tongass National Forest includes approximately 8.65 million acres of coniferous old growth, of which about 5.5 million acres is considered productive old growth suitable for timber harvest. As of 1995, approximately 7% (400,000 acres) of the productive old growth on National Forest lands has been logged since 1954 (U.S. Dept. Agric. 1997). Current harvest may exceed 635,000 acres (John Schoen, Alaska Audubon Society, pers. commun.). Most of the harvest (377,986 acres) has been high volume, low elevation stands. A summary of the Tongass Land Management Plan's projected timber harvest during the next 100 years for 21 biogeographic provinces in Southeast Alaska is given in Table 5. If the plan is followed, a maximum of 24% of the original high volume old growth could be harvested. Currently, the area with the greatest amount of logged old growth is Prince of Wales Island; much of the private land on Prince of Wales has also been harvested. The Etolin, Kuiu, Baranof, and Revilla/Cleveland Pennisula provinces rank

among the 10 areas with the greatest amount of harvest (7-14%) and logging will continue to increase in each of these areas. Eleven of the regions have 4% or less harvested. The plan requires a 1,000 foot wide beach fringe in all areas of harvest as well as a riparian corridor for important fish streams. The anticipated (in 2005) distribution of old growth, coniferous forest among roadless areas and
1997]) 21 biogeographic provinces of the Tongass National Forest are given in Table 6.

Much of the 947,242 acres of non-federal land is available for timber harvest. Logging on Native lands began in 1979, and as of 1994 over 261,000 acres had been harvested (Alaska Rainforest Campaign 1997). Often, Native-selected lands consisted of high volume stands and harvest on Native lands may be as high as 1.0 million acres (John Schoen, pers. commun.) Besides direct harvest, construction of roads will alter the forest landscape in Southeastern Alaska. Proposed roads in Southeast that might be constructed through old growth forest include new roadways across the Cleveland Peninsula from Santa Anna Inlet to Spacious Bay, from Sitka to the east side of Baranof Island, and between Kake and Petersburg. All of these roads would facilitate access to proposed logging areas.

Besides loss of habitat, timber harvest alters patterns of forest cover at the landscape level that could add additional stress to bird populations. Virtually nothing is known about the effects of fragmentation on landbird populations in Alaska. Although researchers compared densities of landbirds in young (40 years old) and old forest stands, further information on the density and abundance of landbirds in medium-aged stands (80-100 years old) is needed to evaluate management scenarios of the Tongass Land Management Plan. Loss of snags in old growth stands were certainly negatively affect cavity-nesting species (see Schoen et al. 1988).

Deciduous, riverine forests on the mainland of Southeastern Alaska support a unique and diverse assemblage of breeding bird that includes several priority species. Riparian cottonwood forests had the highest diversity of any avian habitat sampled in Central Alaska (Kessel 1998). Few riparian corridors have a protected land use status and are often sites of present, and future, roadways. Current road-widening projects along the Chilkat River in Haines have cleared hundreds of acres of riparian forests. Anthropogenic activities such as settlement, mining, and recreation/tourism could also alter these riverine habitats. Conservation of deciduous, riparian corridors is a major issue throughout the western U. S.

Table 4. Occurrence of priority breeding landbirds (and other selected species) in mature coniferous and successional stage forests in the Tongass National Forest (from Noble [1977], Kessler [1979], DellaSala [1996], and Stotts et al. [1999]).

	Old-growth		Successional stage spruce-hemlock			
Species	open shore pine/ mixed conifer	tall, closed spruce-hemlock	20 yr; <55 cm DBH	11-17 yr; <13 cm DBH	9 yr; ≤2.5 cm DBH	<5 yr; seedlings, shrubs

Rufous Hummingbird	x	x[1]	x	x	x	
Red-breasted Sapsucker	x	x	x	x		
Hairy Woodpecker	x	x	x	x		r[1]
Pacific-slope Flycatcher	x	x	x	x		
Steller's Jay	x	x	x	x	x	x
Northwestern Crow		x				
Chestnut-backed Chickadee	x	x	x	x	x	
Brown Creeper	x	x				
Golden-crowned Kinglet	x	x	x	r		
Varied Thrush	x	x	x	x	x	
Townsend's Warbler	x	x	x	r	x	
Red Crossbill		x	x			

[1] x = common; r = present only rarely

Table 5. Amount of productive and high volume old growth forest remaining in the Tongass National Forest and the proportion harvested.

	Productive old-growth (acres)			% harvested by			High volume old-growth (acres)		
Geographic Unit	1954	1995	2095	1995	2005	2095	1954	1995	2095
Yakutat Forelands	50,766	47,720	47,212	6	6	7	27,881	27,881	27,044
Yakutat Uplands	25,142	24,136	24,136	4	4	4	11,448	11,448	11,448
East Chicagof Island	450,175	409,659	355,638	9	11	21	198,177	155,323	136,742
West Chicagof Island	72,274	72,274	72,274	0	0	0	18,984	18,984	18,984
East Baranof Island	108,764	97,888	84,836	10	12	22	42,674	31,768	26,031
West Baranof Island	232,727	218,763	209,454	6	7	10	71,361	56,691	54,234
Admiralty Island	591,407	591,407	591,407	0	0	0	337,194	337,194	337,194
Lynn Canal	155,577	155,577	144,687	0	3	7	63,743	62,363	59,280
North Coast Range	324,305	324,305	298,361	0	2	8	131,789	131,789	117,292
Kupreanof/Mitkof Island	346,661	318,928	318,928	8	11	8	134,140	104,893	75,118
Kuiu Island	325,216	302,451	250,416	7	11	23	196,889	173,022	137,822
Central Coast Range	250,066	245,065	220,058	2	5	12	110,839	105,020	96,429
Etolin Island	261,097	229,765	187,990	12	14	28	112,611	82,216	66,440
NC Prince of Wales	699,028	531,261	440,387	24	25	37	386,185	220,131	181,507
South Prince of Wales	163,617	161,981	137,438	1	4	16	76,145	74,361	229,581
Revilla/Cleveland	554,244	520,989	465,565	6	7	16	286,977	254,814	44,855
Southern Outer Islands	128,319	115,487	105,221	10	12	18	64,079	50,784	32,913
Dall Island and Vicinity	68,326	68,326	66,176	0	1	3	34,285	33,925	61,677
North Misty Fiords	198,824	198,824	194,848	0	1	2	78,282	77,162	75,934
South Misty Fiords	312,945	312,945	312,945	0	0	0	111,452	111,452	111,452
Ice Fields	119,403	115,821	109,851	3	4	8	41,869	37,798	35,589
Forest-wide	5,438,883	5,063,571	3,661,303	7	8	15	2,537,006	2,159,020	1,937,572

Table 6. Distribution of old-growth forest in the Tongass National Forest in 2005.

Geographic Province	Acres of productive old-growth in 2005	Number of old growth reserves[1]	% old-growth in roadless areas[2]
Yakutat Forelands	47,212	0	40
Yakutat Uplands	24,136	0	100
East Chicagof Island	348,525	20	40
West Chicagof Island	72,274	0	90
East Baranof Island	83,139	8	0
West Baranof Island	207,359	5	30
Admiralty Island	591,407	0	95
Lynn Canal	140,346	1	20
North Coast Range	292,394	11	10
Kupreanof/Mitkof	309,360	29	10
Kuiu Island	240,399	8	20
Central Coast Range	213,456	4	15
Etolin Island	184,230	18	20
NC Prince of Wales	435,983	39	30
South Prince of Wales	133,315	8	50
Revilla/Cleveland	460,909	23	25
Southern Outer Islands	103,117	7	80
Dall Island and Vicinity	65,514	0	0
North Misty Fiords	192,900	4	90
South Misty Fiords	312,945	0	100
Ice Fields	108,752	-	-

[1] not included in Wilderness Areas, National Monuments, or mandated roadless areas (LUD II); see U.S. Dept. Agric. 1997).
[2] Wilderness Areas, National Monuments, and mandated roadless areas (LUD II).

Southeastern Conservation Actions

Determine population status

Priority species: Vaux's Swift and Black Swift; riparian breeders.

Although listed as uncommon in Southeastern Alaska by Armstrong (1995), the Vaux's Swift is virtually undetected in all monitoring programs. Efforts need to made to determine the status of this swift in Southeastern Alaska.

Because of small population size, low reproductive potential, and limited knowledge of Alaska populations, concern about the conservation of the Black Swift is warranted. An attempt to document nesting and additional surveys of potential breeding sites in southeastern Alaska should be undertaken to determine the size of the population breeding in Alaska. The finding in 1997 of 3 small flocks, with minimal effort, in areas where swifts were undocumented suggests

that Black Swifts might be more widespread in Southeastern Alaska than previously thought (see Andres et al. 1999). Observations of individuals, pairs, and flocks should be cataloged and used to assess potential breeding sites. Because they appear to be indicative of locally breeding birds, small groups of swifts should be carefully documented and locations where small groups of swifts are observed should be searched for breeding colonies. Surveys should target mainland rivers and streams with steep cliffs and, possibly, those adjacent to extensive marshes; islands close to the mainland should also be surveyed. Annual counts of flocks near nest sites could serve as a monitoring method. Sites of breeding colonies should be given protected status in land-use plans.

Little quantitative information is available on the distribution and abundance of species that are largely restricted to mainland riverine systems. Many of these species nest in deciduous forests or shrublands. Specific objectives could be developed for the following species if more quantitative surveys were undertaken:

Vaux's Swift (priority)	Yellow Warbler
Western Wood-Pewee (priority)	American Redstart
Hammond's Flycatcher (priority)	Northern Waterthrush
Alder Flycatcher	MacGillivray's Warbler (priority)
Warbling Vireo	Common Yellowthroat
Red-eyed Vireo (rare)	Western Tanager
Gray-cheeked Thrush	

Monitor changes in mature forest cover and construct bird-habitat models

Priority species: Rufous Hummingbird, Red-breasted Sapsucker, Olive-sided Flycatcher, Pacific-slope Flycatcher, Chestnut-backed Chickadee, Golden-crowned Kinglet, Varied Thrush, and Townsend's Warbler.

Current designation of old-growth reserves and roadless areas on the Tongass National Forest should be maintained (Table 6). Landscape-scale investigations should be initiated to determine if the size and configuration of old-growth reserves will allow persistence of breeding landbirds in these reserves. Although roadless areas should provide adequate breeding habitat for numerous species, road development in these areas (Wilderness Areas and LUD IIs) should be monitored for its effect on breeding landbirds. Further summarization of habitat use by forest birds in Southeastern Alaska is needed.

Point counts made in Research Natural Areas of the Tongass National Forest were used to determine frequency of occurrence of priority species in undisturbed, coniferous forests that consisted of hemlock-spruce assemblages (Table 7). Counts were conducted for 10 minutes during June (n = 171). These counts can be used to gauge fulfillment of conservation objectives for priority species. Ideally, a monitoring program for Southeastern would distribute sampling units (randomly) in coniferous forest, or areas where coniferous forest had occurred, across the

U. S. Forest Service's 21 geographic provinces (including Yakutat).

The most appropriate survey methods might include a series of point count series (10-stop routes) in combination with checklist information. Because of the rarity of some species, analysis of presence/absence may be most appropriate. One 10-stop route for each size class of old-growth reserve should be targeted for each province (63 sites). Selection of old-growth reserves could be constrained somewhat by ease of access; other factors might be constrained to minimize environmental variability among sites (e.g., slope, elevation, plant community). According to some work done by Colleen Handel (U. S. Geological Survey) large-scale population changes could be detected in 15 years with 21 routes per old-growth size class. The most cost-effective strategy, yet one that would still achieve the conservation objective, would be to survey reserves at longer time intervals (3-5 years). A statistical power analysis of these approaches should be undertaken. Some small-scale datasets that already exist could be used to evaluate the objective of well-distributed populations.

Table 7. Current occupancy (proportion of points at undisturbed sites) and occupancy in 15 years at a 2% per year decline in coniferous forest habitats in Southeastern Alaska.

Species	Current	2% decline	Species	Current	2% decline
Rufous Hummingbird	0.13	0.10	Brown Creeper[1]	0.20	0.15
Red-breasted Sapsucker	0.11	0.08	Golden-crowned Kinglet	0.51	0.38
Pacific-slope Flycatcher	0.80	0.59	Varied Thrush	0.67	0.49
Chestnut-backed Chickadee[2]	0.36	0.26	Townsend's Warbler	0.63	0.47

[1] not priority species but Management Indicator Species for U. S. Forest Service.
[2] occurrence may be under-estimated because of survey timing.

Broad-scale population monitoring

Priority species: Blue Grouse, Northwestern Crow, Blackpoll Warbler, and Golden-crowned Sparrow.

Although the Blue Grouse and Northwestern Crow are fairly common in Southeastern, few breeding Blackpoll Warblers and Golden-crowned Sparrows occur there. Because of their rarity monitoring efforts in Southeastern are not feasible. The warbler and sparrow are much more common in other Biogeographic Regions and could be adequately monitored there.

Currently, 8 of 20 geographic provinces on the Tongass National Forest (excluding the Ice Fields Province) have 1 broad-scale monitoring station (either a BBS route or a series of 3 ORPC routes).

Southcoastal Conservation Issues

There are two main issues of management concern in Southcoastal Alaska that will negatively affect on landbird populations -- timber harvesting and the current spruce bark beetle epidemic. Seven of 11 priority bird species breed in coastal spruce forests in the region. Five additional spruce-inhabiting, priority species from the Central Biogeographic Region could be negatively affected by forest change in Cook Inlet.

Approximately 135,000 acres of forest have been logged in the Wrangell-St. Elias and Chugach Mountains, on the Copper River Delta, Kenai Peninsula, Kodiak Island and Afognak Island (Steve Albert, Alaska Dept. Fish Game, pers. commun.). Unlike forests in Southeastern Alaska, Southcoastal forests have a multitude of owners. The Kenai Penninsula Borough contains about 2.2 million acres of forested land. An estimated 81,000 of these acres have been logged (Jim Peterson, Alaska Dept. Nat. Resour., pers. commun.). On state lands, approximately 416,000 acres are available for commercial harvest that have an annual allowable cut of 3,468 acres per year (Alaska Dept. Nat. Resour. 1997). Due to the impact of the spruce bark beetle, the annual allowable cut may be increased for salvage logging. The Chugach National Forest contains about 94,000 acres of forest that are classified for commercial harvest. In the Prince William Sound and Kodiak Island area, Native corporations hold about 1.2 million acres of land, much of which is high value timber. Clear-cutting in these areas began in 1989. During the next 10-15 years, it is estimated that the annual harvest will be approximately 1,000 acres on Kodiak Island and 3,000-4,000 acres on Afognak Island (Steve Albert, Alaska Dept. Fish Game, pers. commun.).

On state lands in the Yakataga area, which includes land between Cape Suckling and Yakutat, logging will be allowed on approximately 90% of all forested areas. There are 120,115 acres (80,488 primary forestry designation and 39,627 secondary designation) available for timber harvest (Alaska Dept. Nat. Resourc. 1995). Since its beginning in 1971, logging in the area has averaged about 12 million board feet (MMBF) per year (Alaska Dept. Nat. Resourc. 1992). Until 2014, the University of Alaska has rights to harvest approximately 309 MMBF within 65,284 designated acres east of the Duktoth River. If that quota can not be fulfilled, harvest will also be permitted on the west side of the river. Harvest activity on the west side of the Duktoth River will provide easier access to approximately 13,600 acres of Native-selected lands. Timber harvest on approximately 33,000 acres of private land surrounding Icy Bay will be completed at the end of 1999. Harvest of 50 MMBF on Mental Health Trust Lands, which includes 45,312 acres on the west side of Icy Bay, is planned for the next 5 years. The Yakataga State Game Refuge includes 82,000 acres of land bordered on the west by Seal River and on the east by Kaliakh River; most of this land is forested (Alaska Dept. Fish Game 1998). Timber harvest within the refuge is not likely and would require a Special Area permit. Around Yakutat, most forested land is on private land and has been harvested. Harvest of an additional 500 acres on Forest Service land is specified under the Tongass Land Management Plan.

Other areas where timber harvest is scheduled for the near future include the south side of Kachemak Bay, the Carbon Mountain area in the Copper River Delta (about 8,000 acres), and

the Crescent River area on the west side of Cook Inlet (5,000 - 10,000 acres).

The spruce bark beetle has had a severe influence on the forests of Southcoastal Alaska; an estimated 2.3 million acres that have been affected by the spruce bark beetle, primarily in the Cook Inlet region. White spruce and Lutz spruce, a hybrid between white and Sitka spruce, appear to be susceptible to attack but Sitka spruce appears to be more resistant to attack. The most heavily affected areas are on the Kenai Penninsula (an estimated 1.1 million acres have been infested) and in the Copper River Basin. In 1997, infestation declined by 50%, due mostly to mortality of host material (U.S. Dept. Agric. 1997). Although it is on the wane, bark beetle populations increased in the nortwestern Kenai Peninsula between Pt. Possession to Tustumena lake and between Homer and Ninilchik in 1997. In Cook Inlet, new activity has appeared on the Iniskin Peninsula near Portage Creek. Other areas where the spruce bark beetle activity has increased includes the area between Eureka and Glennallen and in the Copper River Basin along the Chitina River to McCarthy. Potential for increased activity exists at Anchor Point on the Kenai Peninsula, in the Chitna River Valley, and in the Copper River Valley (U.S. Dept. Agric. 1997).

Defoliation of spruce by the bark beetle is most pronounced in the Cook Inlet; species composition in this area is similar to that found in Interior Lowlands/Uplands and is included in that Bird Conservation Region (see Appendix 4). Several priority species will likely be detrimentally affected by this forest change (e.g., Townsend's Warbler, and White-winged Crossbill). A few species, such as Great Gray Owl, Gray-cheeked Thrush, and Northern Shrike, may benefit from a moderate level of opening of the forests that allows increased growth of shrubs and grasses. The Olive-sided Flycatcher, which is declining significantly throughout its temperate breeding range, is of utmost concern within Southcoastal Alaska because of its relatively high breeding concentrations in coniferous forests in the region. Because so little is known about habitats used by these species, however, there is a great need for information on specific breeding, foraging, and wintering requirements, so that we can predict what the long-term effects will be on the populations. Because of rapid human population growth in Cook Inlet, analyses specific to this region should be undertaken.

Aside from the direct mortality of spruce trees caused by the beetle, there is a concern that forests, once the canopy has opened up, will be replaced by grasslands; the grass *Calamagrostis* is an aggressive competitor relative to sapling spruce. Thus, there is the potential for the mixed and coniferous forests as they currently dominate the region to become largely replaced by open grassland habitats. This would constitute a major permanent loss of breeding habitat for many species of forest-dependent landbirds.

Salvage logging has occurred extensively on private and state lands across the southern Kenai Peninsula in conjunction with the spruce beetle infestation and has been proposed for several tracts within the Chugach National Forest. With salvage logging there is direct loss of trees, both dead and alive, and an indirect change to the understory. In addition to the colonization of grasses, forest bird populations might also be negatively affected by complete removal of

vegetation and natural downfall, road-building activities, increased human access, and changes to erosion patterns. Important questions remain, however, regarding the best silvicultural practices to adopt to minimize impacts on landbirds and other wildlife. For example, there is little information for recommending optimal harvest tract size and configuration, the need to leave snags standing, the best methods for replanting, or the desirability of leaving downed wood.

Other habitat management issues have been identified for Southcoastal Alaska. One important issue for the region is the increase in human-caused disturbance, which includes direct loss of native habitats through urbanization, increased transportation networks, and impacts of recreational activities. Oil spills, particularly on wetlands and coastal habitats, is a concern in some areas. Grazing has been proposed for certain areas of the Kenai Peninsula and could have significant, negative effects on habitats. Finally, ectoparasites, endoparasites, salmonella outbreaks, bill deformities in winter birds, and other diseases have been documented within the region but their impacts on landbird populations are poorly understood.

Southcoastal Conservation Actions

Monitor changes in mature forest cover/construct bird-habitat models

Priority species: Rufous Hummingbird, Red-breasted Sapsucker, Pacific-slope Flycatcher, Chestnut-backed Chickadee, Varied Thrush, Townsend's Warbler.

The majority of priority species in Southcoastal Alaska rely on landscapes dominated by coastal, coniferous forest (Pacific Coast Forests/Mountains Bird Conservation Region, see Appendix 4) that are subject to alteration by the spruce bark beetle and timber harvest. Coastal coniferous forest in Southcoastal may be combined with Southeastern to achieve monitoring objectives for these species.

Point counts made on BBS routes, where stops were dominated by coniferous forest (>60% cover), at Yakutat and Cordova (n = 118 stops) and at Hope, Moose Pass, and Seward (n = 48) to determine frequency of occurrence of priority species in Southcoastal Alaska (Table 8). All counts were made for 3 minutes during June. These counts can be used to gauge fulfillment of conservation objectives for these species. Ideally, a monitoring program for Southcoastal would randomly distribute sampling units in coniferous forest in coastal, coniferous forest from Yakutat to Afognak Island. The most effective way to monitor these species will be to combine sampling units with Southeastern.

Table 8. Current occupancy (proportion of points) and occupancy in 15 years at a 2% per year decline in coastal coniferous forest habitats in Southcoastal Alaska.

	Cordova/Yakutat		Hope/Seward/Moose Pass	
Species	Current	2% decline	Current	2% decline
Rufous Hummingbird	-	-	-	-
Red-breasted Sapsucker	-	-	-	-

Olive-sided Flycatcher	-	-	-	-
Pacific-slope Flycatcher	0.08	0.06	-	-
Chestnut-backed Chickadee	0.37	0.27	-	-
Varied Thrush	0.93	0.69	0.81	0.58
Townsend's Warbler	-	-	0.77	0.57

Broad-scale monitoring

Priority species: Northwestern Crow, Gray-cheeked Thrush, Northern Shrike, Blackpoll Warbler, Golden-crowned Sparrow.

As a preliminary analysis to evaluate the ability to monitor priority species in Cook Inlet, information was examined from: 1) points counts conducted on Fort Richardson in mixed coniferous/deciduous forest (average number per 12 stops on 10-minute points [n = 224]; unlimited detection distance), 2) BBS data in 1997 from 6 routes (all 3-minute stops; average abundance and route occurrence), and 3) ORPC data from 14 routes in the Anchorage vicinity (all 12 stops; average abundance and route occurrence; Table 9).

Table 9. Density and occurrence of priority bird specie, on point counts in mixed coniferous/deciduous forest, BBS routes, and ORPC routes (12 stops) in Cook Inlet.

	Fort Richardson	Breeding Bird Survey routes		Off-road point count routes	
Priority species	average number per 12 stops	frequency of routes	average no. per route	proportion of routes	average no. per route
Black-backed Woodpecker	-	-	-	-	-
Olive-sided Flycatcher	2.04	3/6	3.00	0.71	0.80
Hammond's Flycatcher	-	-	-	-	-
Northern Shrike	-	-	-	-	-
American Dipper	-	-	-	-	-
Gray-cheeked Thrush	-	4/6	3.83	0.07	0.01
Varied Thrush	3.64	5/6	13.33	0.79	2.50
Bohemian Waxwing	-	1/6	0.17	0.14	0.06
Townsend's Warbler	3.27	-	-	0.57	2.81
Blackpoll Warbler	0.27	5/6	5.33	0.43	0.31
Golden-crowned Sparrow	-	3/6	5.83	0.50	3.97
Rusty Blackbird	-	1/6	0.33	0.07	0.04

White-winged Crossbill	0.16	4/6	9.33	0.71	2.36

Central Conservation Issues

In Central Alaska, major conservation issues for forest birds are primarily timber harvest and secondarily fire management (suppression and prescription). Issues concerning shrub-inhabiting birds include placer mining and construction of transportation and utility cooridors.

Of the 28.4 million acres within the Tanana Valley, approximately 12, 947,000 acres are forested (Crimp et. al 1997). Under the Tanana Valley State Forest and Tanana Basin Area plans, 2.9 million acres are designated as harvestable forestry lands (Crimp et. al 1997); private lands include 1.3 million acres of forest. From 1983 to 1995, 6,428 acres have been harvested on state lands (Steve Clautice, Alaska Dept. Nat. Resour., pers. commun.). Current harvest on state lands, mainly of riparian white spruce, is approximately 700 acres per year. According to the Tanana Valley State Forest Plan, most riparian areas will be available for harvest during the next 80-100 years. Since logging began in the late 1970's, approximately 53 MMBF have been harvested on 5,300 acres in the State Forest (Chris Maisch, Tanana Chiefs Council, Inc., pers. commun.).

Harvest of large white spruce trees from coniferous and mixed deciduous/coniferous forests would reduce populations of Townsend's Warblers, White-winged Crossbills, and other species dependent upon mature spruce forest. Selective harvest of aspen and birch would negatively affect the Hammond's Flycatcher and other species that use mature deciduous forests. Logging of any forest type would provide a short-term benefit to birds preferring openings, grasslands, forbs, shrub and sapling seral stages.

Historically, forest habitat in Central Alaska has been shaped by wildfires and the immigration of caucasian people at the turn of the century. During the early 1900's, there was a great demand for timber to power sternwheelers, steam engines, and townsites (Jim Roessler, Bur. Land Mangage., pers. commun.). Because of this need, much of the forest bordering the river is now second forest growth; currently, demand for timber is low. However, fires continue to structure the landscape of Central Alaska. From 1983 to 1995, 101,000 acres of forest on state lands have burned (Steve Clautice, Alaska Dept. Nat. Resour., pers. commun.).

Fire suppression favors maintenance of mature conifer forests and reduces the presence of seral forb, shrub, sapling, and deciduous stages. The Varied Thrush, Townsend's Warbler, and White-winged Crossbill would be favored under suppression, whereas post-fire shrub habitats are preferred by the Sharp-tailed Grouse and Blackpoll Warbler. Seral deciduous forests used by Hammond's Flycatcher would be less common. Just the opposite situation would occur in the event of prescribed fires, more seral-stage habitats would be available, whereas mature forests would decrease. A few species, such as the Black-backed and Three-toed Woodpecker are attracted to forests immediately following fires. Other birds, such as the Olive-sided Flycatcher

make use of snags and injured trees for perches or use woodpecker holes for nest sites in certain situations following fires.

Although significant spruce bark beetle outbreaks are occurring in white spruce forests of Southcoastal Alaska, outbreaks have occurred at localized areas in Central Alaska.

Riparian shrub and forest habitats in Central Alaska support a diverse assemblage of landbirds (Spindler and Kessel 1980, Kessel 1998). Loss of shrub and other riparian habitats to placer mining or transportation and utility corridor developments, which often follow drainages or rely on gravel mining, is another concern for landbirds. Removal of shrubs along riparian corridors would negatively affect birds such as the Gray-cheeked Thrush, Blackpoll Warbler, and other shrub dependent species. Riparian forests are important to the Olive-sided Flycatcher. Remediation of disturbed riparian may diminish the long-terms effects of vegetation removal.

Central Conservation Actions

Determine population status

Priority species: White-tailed Ptarmigan and Smith's Longspur.

Monitor changes in mature forest cover/construct bird-habitat models

Priority species: Olive-sided Flycatcher, Varied Thrush and Townsend's Warbler.

White spruce and mixed coniferous/deciduous forests ranked as bird habitats of highest priority in Central Alaska. However, little is known about the effects of harvest of white spruce on forest birds. Further information is needed from areas of riparian, old-growth white spruce forests. Additionally, the effects of fire, especially in white spruce, on birds need to be quantified. Compilation of existing information and initiation of new investigations is needed.

Broad-scale monitoring

Priority species: Black-backed Woodpecker, Hammond's Flycatcher, American Dipper, Gray-cheeked Thrush, Bohemian Waxwing, Northern Shrike, Blackpoll Warbler, Golden-crowned Sparrow, Rusty Blackbird, and White-winged Crossbill.

Results from 1997 were analyzed to determine adequacy of the BBS for monitoring priority species in Central Alaska (Table 10). Incorporation of off-road point counts would greatly expand coverage for these species. Formal power analyses need to be conducted to assess adequacy of broad-scale monitoring programs in Central Alaska.

Table 10. Distribution and abundance of priority species on BBS routes (n = 38) in Central Alaska - 1997.

Species	Proportion of routes where recorded	Average number per route
White-tailed Ptarmigan	-	-
Sharp-tailed Grouse	-	-
Black-backed Woodpecker	-	-
Olive-sided Flycatcher	0.55	2.37
Hammond's Flycatcher	0.16	0.87
Northern Shrike	0.03	0.03
American Dipper	-	-
Gray-cheeked Thrush	0.68	8.03
Varied Thrush	0.87	9.37
Bohemian Waxwing	0.18	0.50
Townsend's Warbler	0.24	0.37
Blackpoll Warbler	0.47	2.82
Golden-crowned Sparrow	0.11	0.92
Smith's Longspur	0.05	0.05
Rusty Blackbird	0.24	0.95
White-winged Crossbill	0.63	9.47

Western/Southwestern Conservation Issues

Throughout western and southwestern Alaska, habitat alteration is a relatively minor threat. In landscapes dominated by tundra, riparian corridors, consisting of tall willow and alder shrubs, support the highest diversity of landbirds. Mining activities in these areas could result in habitat loss, and recreational and subsistance activities could cause localized disturbance to birds along some rivers. Little is known about the effects that sonic booms, caused by low-altitude military overflights, has on landbird populations, particularly on riverine-nesting raptors (e.g., Gyrfalcon). Development of state-selected and Native-selected could negatively affect birds; many of these lands are located along rivers. On a local level, development of powerlines at Lake Illiamna could increase bird strike hazards.

Livestock management (i.e. reindeer herding) could potentially have negative effects on ground-nesting birds in tundra/tundra-shrub systems by altering vegetation structure and trampling nests. Establishment of exotic species in islands, particularly rats and foxes, lowers the productivity of ground-nesting species. Fox removal has been successful on islands in the Aleutians, and the U. S. Fish and Wildlife Service has rat response procedures for ships that become grounded on seabird-nesting islands.

Harvest of white spruce harvest in riparian areas is a minor concern for forest-breeding species in the eastern part of the region (see Central above).

Only recently have efforts to monitor landbirds been initiated in Western and Southwestern Alaska. Information, therefore, on distribution, abundance, and habitat use is rudimentary.

Western/Southwestern Conservation Actions

Determine population status: McKay's Bunting

The McKay's Bunting is the only passerine species endemic to Alaska. The breeding range is restricted to St. Matthew and Hall islands in the Bering Sea and comprises only 100 square-miles (300 km^2). The estimated breeding population size (based on average Snow Bunting densities elsewhere in North America) is only 2,800 birds, and the most liberal estimate of population size is < 6,000 birds. The species is apparently most common in the coastal lowlands of the islands, and nests most commonly on shingle beaches.

Insular populations of birds are particularly vulnerable to extinction. The McKay's Bunting has a tiny range, a tiny population, and the low coastal habitats it prefers are most vulnerable to disturbance from both oil spills and the potential threat of introduced predators (e.g., rats). The recent shipwreck on St. Matthew Island highlights the reality of both types of threats. The Fish and Wildlife Service should conduct a population inventory of the species. In addition, a more detailed analysis of habitat use (throughout the breeding season) would improve the ability to predict the effects of potential perturbations. Finally, a preliminary evaluation of the utility of providing rat-proof nesting boxes might provide the Service with an effective management tool in case rats do accidentally reach the breeding islands.

Broad-scale monitoring

Priority species: Gray-cheeked Thrush, Varied Thrush, Blackpoll Warbler, Golden-crowned Sparrow, Rusty Blackbird, and Hoary Redpoll.

BBS data were used to determine bird occurrence in riparian areas of Western Alaska in the Togiak area (Togiak and Kanektok Rivers; 100 stops; 2 route-years), on the Kuskokwim River (Gweek and Tupuknuk; 100 stops; 5 route-years), and on the Yukon River (900 stops; 18 one-year routes). Information was also included from Nome area BBS routes where tall shrub was present at a stop (46 stops; 4 routes). Point counts were conducted for 3 minutes and all routes were surveyed in June. These counts can be used to gauge fulfillment of conservation objectives for priority species.

New World passerines, including the Gray-cheeked Thrush, Varied Thrush, Blackpoll Warbler, and Golden-crowned Sparrow can probably be effectively monitored at the regional level in Western Alaska with a combination of river BBS routes and off-road point counts. The addition of a few more riparian routes might increase blackbird detections sufficiently to monitor this species as well. Because of the difficulty of separating redpoll species during point counts, monitoring of Hoary Redpolls is not feasible.

Table 11. Current occupancy (proportion of points) and occupancy in 15 years at a 2% per year decline in riparian shrub and shrub-forest in Western Alaska.

	Togiak		Kuskokwim		Yukon		Nome	
Species	Current	2% loss	Current	2% loss	Current	2% loss	Current	2% loss
Gray-cheeked Thrush	0.54	0.40	0.76	0.56	0.52	0.39	0.91	0.67
Varied Thrush	0.10	0.07	0.52	0.39	0.55	0.41	-	-
Blackpoll Warbler	0.19	0.14	0.79	0.59	0.67	0.50	0.06	0.04
Golden-crowned Sparrow	0.53	0.39	-	-	-	-	0.90	0.67
Rusty Blackbird	0.02	0.01	0.14	0.10	0.19	0.14	-	-

Although not priority birds, 6 species of migrants that winter in the Old World nest regularly in western Alaska, including Arctic Warbler, Bluethroat, Northern Wheatear, Yellow Wagtail, White Wagtail, and Red-throated Pipit. Among these, White Wagtail and Red-throated Pipit are probably too rare and localized to justify a concerted monitoring effort. Although the other 4 species are considerably more abundant and widespread, efforts to adequately monitor their populations will remain challenging in the foreseeable future. Although nearly 20 BBS routes are currently active in western Alaska, Bluethroats and Northern Wheatears have been detected on only 2 and 4 routes, respectively. Even on the routes where they occur, they average < 1.0 bird/route. Investigations at Cape Romanzof suggest that 1) wheatears can become extremely cryptic once incubation begins, and 2) bluethroats can be very cryptic throughout the breeding season, and display behavior is surprisingly unpredictable. Without considerably more effort than currently envisioned in western Alaska, these species may not be able to be monitored on a regional level.

Prospects for monitoring Arctic Warbler and Yellow Wagtail are considerably better. Although neither species is currently detected on more than 10 BBS routes (7 for Arctic Warbler, 9 for Yellow Wagtail), detection frequencies on the routes where they occur are reasonably high (27 and 10 individuals/route, respectively). If researchers can refine the methodology for incorporating both BBS data and Off-Road Point Count (ORPC) data into a single trend estimate, the addition of relatively few routes of either kind in western Alaska might allow for effective monitoring of Arctic Warblers and Yellow Wagtails.

Recent research at Cape Romanzof also indicates that dedicated site-specific inventories may be feasible for tracking populations of Northern Wheatears and Yellow Wagtails. Northern Wheatears are particularly conspicuous during nest-building, and in 1997, 79% of all nests discovered (11 of 14) were located during a 12-day period prior to incubation. Ten of these 11 were located during a 10-day period prior to egg-laying (5/29 - 6/7). For Yellow Wagtails, 64% of all nests found (18 of 28) were discovered in a 2-week from egg-laying to early incubation (6/4 - 6/17), and 93% of nests (26 of 28) were located in the 3-week period between 6/4 and

6/24. A concerted 2-week effort at nest-finding might be sufficient to monitor local populations of these species.

Northern Conservation Issues

Currently, and in the foreseeable future, the only significant management issue for the Northern Biogeographic Region is the potential, negative affects on birds from oil and gas development. Because all such development currently occurs on the Arctic Coastal Plain within about 20 miles of the Beaufort Sea coast, it primarily affects shorebirds and other waterbirds. However, increased development along the Dalton Highway is likely, and activity along the Colville River is also possible. Riparian corridors consisting of willow and alder shrubs contain the highest diversity of landbirds in Northern Alaska. Therefore, protection of these areas is the most important landbird conservation issue for Northern Alaska.

Northern Conservation Actions

Determine population status

Priority species: Smith's Longspur

Breeding distribution and abundance of the Smith's Longspur in northern Alaska is poorly known. Generally, longspurs nest throughout the foothills of the Brooks Range, but further information on breeding abundance and distribution is needed. The restricted winter range of this species raises some concern about the conservation of this species.

Broad-scale monitoring

Priority species: Gray-cheeked Thrush and Hoary Redpoll

Accessibility of riparian areas in Northern Alaska makes monitoring Gray-cheeked Thrushes difficult. Sites in Northern Alaska may have to be combined with sites in Central Alaska to achieve monitoring objectives. Establishment of the Colville River Bird Conservation Area would aid conservation of riparian songbirds and raptors on the North Slope. Because of the difficulty of separating redpoll species during point counts, monitoring of Hoary Redpolls is not feasible.

Summary

Thirty small landbirds (excluding the Gyrfalcon and 4 owls) have been identified as priority species for conservation among all Biogeographic Regions in Alaska. Two species, the McKay's Bunting and Smith's Longspur ranked 23 and should be considered species of high conservation priority. Except for the McKay's Bunting, the likelihood of the extirpation of any priority species in Alaska is low. Eight species that ranked 20 inhabit Southeastern Alaska.

The most important habitats for breeding landbirds are coniferous and mixed coniferous/ deciduous forests that occur at relatively low elevations and riparian, deciduous shrublands and forests. These habitats support numerous priority long-distance migrant and resident landbirds. Forest alteration, due to timber harvest, insect outbreaks, and road-building, will likely reduce, and probably already have reduced, populations of forest birds in Southeastern and Southcoastal and in Cook Inlet.

Because knowledge about landbirds in Alaska is rudimentary, quantitative assessments of variation in abundance among sites within these habitats are needed. Information at the stand level and at the landscape level is needed to reasonably predict changes in forest bird communities that result from human activities. This knowledge can then be used to generate more explicit conservation actions for priority landbirds.

As new information becomes available, it needs to be synthesized, in a timely manner, into a form that is useable to land managers and planners. This information can be used to make landbirds more prominent in terrestrial land-use planning decisions. Boreal PIF should endeavor to provide reliable information and professional input on the effects of land use decisions on landbird populations.

Formal development of a broad-scale monitoring strategy is still needed for Alaska's Biogeographic Regions. Because conservation actions for many priority species involve maintenance of boreal populations, implementation of a monitoring strategy based on a rigorous statistical framework is paramount. Some progress has been made in the Central Biogeographic Region on addressing this task.

Boreal PIF will continue to strive to provide information about Alaska's landbirds to all publics. Creating an awareness in the general public about the complex natural history of Alaska's landbirds may be the greatest contribution Boreal PIF can make to the conservation of landbirds in the Western Hemisphere. The formation of partnerships with those interested in conservation of Alaska-breeding landbirds throughout their annual cycle will ensure that any action taken in Alaska will indeed help conserve landbirds in the Western Hemisphere.

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Appendices

Appendix 1. The Partners in Flight Program

Background on the National Program

Partners In Flight / Compañeros en Vuelo/ Partenaires d'Envol was launched in 1990 in response to growing concerns about declines in the populations of many land bird species, and in order to emphasize the conservation of birds not covered by existing conservation initiatives. The initial focus was on species that breed in the Nearctic (North America) and winter in the Neotropics (Central and South America), but the focus has spread to include most landbirds and other species requiring terrestrial habitats.

Strengthened linkages with other conservation efforts is leading, at least in some cases, to comprehensive conservation efforts for the entire avifauna. The central premise of Partners In Flight (PIF) has been that the resources of public and private organizations in North and South America must be combined, coordinated, and increased in order to achieve success in conserving bird populations in this hemisphere.

Partners In Flight is a cooperative effort involving partnerships among federal, state and local government agencies, philanthropic foundations, professional organizations, conservation groups, industry, the academic community, and private individuals. Currently partners include 16 federal agencies, 40 nongovernment organizations (NGOs), over 60 state and provincial fish and wildlife agencies, numerous universities, and the forest industry, and the list is growing daily. A complete list of contacts is available in the

Partners In Flight's goal is to focus resources on the improvement of monitoring and inventory, research, management, and education programs involving birds and their habitats. The PIF strategy is to stimulate cooperative public and private sector efforts in North America and the Neotropics to meet these goals. The power of PIF lies in the synergy that builds when diverse, committed groups who care about birds work together for a common goal.

Partners in Flight Goals

Partners in Flight is a common sense approach to the conservation of birds and their habitats on a landscape level. The basic principles of PIF are:

• conservation of birds and their habitats while they are still common, thereby avoiding the risks and costs associated with endangered species;

• to focus on conservation of habitats, which harbor multiple species of birds and other biological diversity, rather than on single species;

• conservation based on sound science;

• comprehensive conservation actions that address critical needs on breeding grounds,

nonbreeding areas, and the migratory routes that connect the two;

• conservation that stresses both maintenance of natural conditions and compatible economic management of natural resources;

• to build groundbreaking partnerships within which federal and state agencies, private conservation groups, academia, and industry can work together for bird and habitat conservation; and

• to promote an informed, proactive constituency of people who are concerned about bird conservation and will take action to protect them and their habitats.

United States Organizational Structure

The following describes the formal structure and organization of Partners In Flight to clarify the names and roles of various organizational units.

National committees

Partners In Flight is coordinated by four parallel national committees representing participating agencies of the State Government, Federal Government, a variety of nongovernmental conservation organizations, and private industry. Two additional oversight committees, the Management Steering Committee and the Joint Steering Committee, provide forums for all units to discuss and resolve major issues that involve all levels of Partners In Flight. The oversight committees meet twice annually - during the North American Wildlife and Natural Resources Conference in the Spring and during the annual meeting of the International Association of Fish and Wildlife Agencies during the Fall - and additionally as necessary.

State Agency Committee

The State Agency Committee consists of representatives from State and Territorial fish and wildlife agencies. Representation on the committee is composed of one member from each regional fish and wildlife association (e.g., Western Association of Fish and Wildlife Agencies, Southeastern Association of Fish and Wildlife Agencies, Association of Midwest Fish and Wildlife Agencies, Northeast Association of Fish and Wildlife Resource Agencies), and a fifth member who chairs the committee.
The chair is appointed by the president of the International Association of Fish and Wildlife Agencies (IAFWA), and the regional representatives are designated by the presidents of the regional associations. The regional associations are affiliated with IAFWA. IAFWA is an association of all 50 state fish and wildlife agencies in the United States, fish and wildlife agencies in the U.S. Territories, Puerto Rico, Canadian Provinces, and Mexican federal government. A coordinator is staffed by IAFWA.

Federal Committee

The Federal Committee is comprised of representatives from each agency that has signed the federal Partners In Flight Memorandum of Agreement. Each agency may assign up to three representatives to the committee. Membership on the committee is open to any Federal agency interested in taking an active role in bird conservation.

Member agencies are encouraged to take appropriate actions within the limits of their respective authorities, policies and budgets. Chairmanship of the committee rotates every two years to a different member Federal agency. The U.S. Fish and Wildlife Service's Office of Migratory Bird Management serves as a technical advisory body to the committee.

Nongovernmental Organization Committee

The nongovernmental organization (NGO) committee consists of representatives from each organization that has signed a Memorandum of Understanding among individual NGOs. More broadly, participation is open to all NGOs that endorse the program and will actively commit resources to foster its goals. An elected chairperson serves the committee which meets at least twice annually. The chair of the NGO committee also is chair of the NGO Steering Committee, which consists of one representative from each of seven categories of organizations.

Industry Committee

The Industry Committee consists of representatives from private industry that have signed the Industry Committee Memorandum of Agreement. This committee was established in 1996 in recognition of the critical role that industry is playing in bird conservation action. Participation is open to all industries that endorse the program and will actively commit resources to foster its goals. Each company may appoint from 1 to 3 representatives to the committee.
An elected chairperson serves the committee by facilitating participation and representing its interests with respect to the other committees. The chair of the committee rotates every two years to a different member of the Industry Committee.

National oversight committees

Management Steering Committee

The Management Steering Committee coordinates Partners In Flight priorities and overall direction and identifies critical issues that need to be brought before the Joint Steering Committee for discussion and decisions. It also serves as an executive committee, to ensure that decisions and recommendations of the Joint Steering

Committee are implemented. It consists of the chairs of the regional and technical working groups, the National and Regional Coordinators, official Staff Coordinators from those agencies that have designated them, and representatives from both Canada and Mexico.

Joint Steering Committee

Although the Federal, State, NGO and Industry Committees exist as separate, independent entities, they act together as the Joint Steering Committee to coordinate activities, foster cooperation, and discuss program-wide policy issues and priorities. Specific responsibilities include: 1) identifying program-wide priorities and making decisions on courses of action, 2) ensuring that effective communication and coordination exists, 3) discussing policy issues that concern the structure, operation, and mission of the program, and 4) reviewing working groups to ensure that all needs are addressed and duplication is avoided. This committee consists of the chairs of the four national committees.

Technical working groups

National-level technical working groups have been established in the fields of research, monitoring and inventory, information, education, and international relations. These groups bring together experts in their respective fields to recommend actions necessary to promote the conservation of birds and their habitats. Working groups synthesize and apply the work and conclusions of experts to provide a basis for action by participating agencies, NGOs, and others. Membership in technical working groups is open to all with a desire to contribute to the conservation of birds.

National-level technical working groups produce action plans annually, identifying ongoing needs and goals as well as specific objectives or projects to be carried out in a given year. They further communicate and coordinate with their equivalents at the regional and state level for implementation. Each working group has one or two chairpersons who convene meetings and Committee.

International Working Group

The International Working Group seeks to actively involve participants from Canada, Latin America, and the Caribbean. This working group strives to adapt the Partners In Flight Program to meet local resource conservation needs. This will be accomplished by publishing a newsletter, *La Tangara*, assisting with international communication and training, strengthening in-country programs, promoting north-south linkages and integrating international issues into the other working groups.

Research Working Group

The Research Working Group generates, synthesizes, and communicates data and other information necessary to understand the problems, identify solutions, and implement conservation and management measures to maintain and restore natural populations of birds for those species within the scope of the Partners In Flight mission.

Monitoring and Inventory Working Group

The Monitoring and Inventory Working Group determines priorities and recommends techniques for monitoring and inventory of bird populations and bird habitats on breeding and nonbreeding areas, and interprets results of monitoring and inventory programs. The group communicates to users the methods that can be used to provide the solid, scientific basis for conservation plans.

Information Working Group

The Information Working Group improves communication and outreach about the conservation, management, and research of birds and their habitats. This group facilitates information networking among working groups and others. It is responsible for explaining the nature and role of Partners In Flight to the general public in the U.S. and elsewhere in the western hemisphere.

Education Working Group

The Education Working Group focuses on education of various audiences about the biology, ecology and conservation of birds and their habitats throughout the western hemisphere. The group promotes educational activities, recreational programs, and volunteer projects that target schools, private landowners and the general public in the U.S. and internationally.

Regional working groups

Four regional working groups have been established in the West, Midwest, Southeast and Northeast. Each has a chair and a committee structure that generally parallels that of the national technical working groups, i.e., research, monitoring and inventory, information, education, and international. Chairs are official members of the Management Steering Committee. The regional working group's mission is to develop a regional strategy for the conservation of birds within their respective regions by identifying problems, synthesizing information, and generating solutions through Bird Conservation Plans to be used by resource professionals and the general public. Regional working groups foster communication, coordination, and cooperation among agencies, organizations, academic institutions, and individuals interested in conserving birds within their respective regions.

Regions are defined by the states and territories listed below; note that some are in two regions

by their request.

Southeast: Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Maryland, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, Virginia, West Virginia, Puerto Rico, U.S. Virgin Islands.

Northeast: Connecticut, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont, Virginia, West Virginia, Delaware.

Midwest: Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Missouri, Nebraska, North Dakota, Ohio, South Dakota, Wisconsin.

West: Alaska, Arizona, California, Colorado, Hawaii, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, Washington, Wyoming.

State, territory & physiographic area working groups

These working groups are the level of the Partner In Flight organization that is closest to the ground. Physiographic Areas are biologically defined conservation planning units that typically include portions of more than one state. The structure of these working groups generally parallels the national and regional structure in having committees devoted to monitoring and inventory, research, information, education, and international. However, there is more variation at this level as each working group seeks to meet those local needs and issues most important in its particular area. Objectives parallel those described above for the regional working groups.

Regional Coordinators

In 1995, a new group of individuals, the Regional Coordinators and a National Planning Coordinator, were added to Partners In Flight. These were the first positions from which funding for salaries, travel and other needs were contributed jointly by partners and administered specifically as dedicated Partners In Flight positions. These are three-year positions, expiring in 1999.

Four Regional Coordinators were placed, one in each of the regions (West, Midwest, Southeast, Northeast), and a supervisor, the National Planning Coordinator, was established at the national level. The task of this group is to guide Regional Conservation Planning which is the writing of detailed Bird Conservation Plans in each state or physiographic area in the U.S. These plans are to include priority species lists, priority habitat descriptions, bird population objectives and habitat objectives with appropriate regional geographic links. Identification of research, monitoring and inventory, information, education, and international needs is part of the planning and implementation process. The various Bird Conservation Plans will then ultimately be assembled into a national plan that will be integrated with corresponding plans in the rest of North America.

Partners In Flight has succeeded partly because it has been a flexible coalition, with various organizational units adapting as necessary to meet new needs and opportunities. We see this continuing into the future and are always open to better ways of achieving the conservation of birds and their habitats.

The Boreal Partners in Flight Working Group

The Boreal Partners in Flight Working Group (BPIF) was formed in March 1992 and was modelled after the national Partners in Flight organization. The main purpose of BPIF is to develop and coordinate a network of integrated research, monitoring, and educational programs specific to Neotropical migratory landbirds that breed in Alaska. Meetings, held once a year, have focused on the standardization of monitoring techniques and the identification of monitoring and public outreach needs. Despite having to travel long distances, 40-50 participants usually attended each meeting. This high level of participation demonstrates the strong commitment of Alaskans to the conservation of Neotropical migratory birds.

Within BPIF, regional and technical working groups direct activities in their region or area of interest. Regional working groups of BPIF are comprised of representatives from Alaska's six biogeographic regions (all are larger than many of the lower 48 states). An immediate task for each regional working group is to rank species (and subspecies) of concern within their region. Five technical working groups collate information, develop methods, and draft recommendations for the BBS, Management, Netting and Banding, Off-road Point Counts, and Information and Education.

Members of BPIF focus much of their attention on the development and implementation of standardized monitoring techniques. Because many boreal forest species and subspecies of Neotropical migratory birds can be monitored on their breeding grounds in Alaska and Yukon (e.g., Alder Flycatcher, Gray-cheeked Thrush, Blackpoll Warbler, and Northern Waterthrush), BPIF encourages state and federal agencies and NGOs to participate in BBSs, off-road point counts, MAPS, and migration monitoring stations.

Since 1994, BPIF has drafted annual reports that highlight accomplishments of the previous year. These publications, often exceeding 50 pages, have been an important vehicle to inform BPIF members, and others interested in migratory landbirds, of recent work on all aspects of the PIF program in Alaska. Copies are available from Brad Andres.

The Partners in Flight Bird Conservation Strategy

An abundance of wild birds contributes to ecosystem health and provides economic, recreational, scientific, and aesthetic values for society. Fostering cooperative, voluntary, and coordinated habitat management on private and public lands that will lead to the conservation of avian diversity throughout the Western Hemisphere is the subject of the PIF Bird Conservation Strategy, or simply, “The Flight Plan”.

Introduction

The PIF Bird Conservation Strategy summarizes the collective actions that are being taken and that are necessary for the conservation of birds. The Strategy provides the framework for Bird Conservation Plans that set conservation priorities and specific objectives for bird populations and habitat for every state and ecoregion in the country. Furthermore, the Strategy lays out the means by which these Plans can be implemented. This process involves an unprecedented level of voluntary cooperation and coordination among state and federal agencies, private organizations, industry, and the public. The power in the process lies in the synergy that builds when such diverse and committed groups work together for a common goal.

Partners in Flight and the Bird Conservation Strategy are common sense approaches to the conservation of birds and their habitats. This Strategy initially addresses only nongame land birds in the United States and depends upon conservation decisions and actions taken at local and state levels. However, it lays the groundwork for international cooperation on long-term conservation of all birds throughout this hemisphere.

Basic pinciples of The Flight Plan

conservation when it should be done — before species become endangered
conservation based on sound science
conservation that stresses both healthy ecosystems and wise management of natural resources
local and timely conservation within the context of large-scale objectives and long-term plans
conservation of habitats in breeding, migration, and wintering areas
an informed constituency of people concerned about bird conservation
groundbreaking partnerships that foster voluntary cooperation among public and private landowners

Development of Bird Conservation Plans will be a simultaneous and iterative "bottom-up" and "top-down" process in which actions are decided upon and taken at grassroots and local levels in the context of priorities set at larger geographic scales. Coverage will be geographically comprehensive, with plans developed for each ecoregion and state. Although variability among national level plans will be developed to assure comprehensive attention to priority issues.

Focused, cooperative, and voluntary habitat conservation on a landscape level is the key to bird conservation. A concentration on habitat will improve conditions for all birds, whether migratory or resident, endangered or common, game or nongame, and will contribute to the protection of other animals, plants, and communities. Success will not be possible without recognition of landowner objectives and encouragement of compatible uses of the land.

Ultimately, the Strategy can be applicable to the conservation of the over 800 species of birds in the continental United States and close to 4000 in the Western Hemisphere. Many of these birds

bind our nations together through annual migrations and their dependance on the conservation of habitats across international boundaries. As plans become more international and taxonomically comprehensive, they will build on the success of international treaties, PIF, the North America Waterfowl Management Plan, the Western Hemisphere Shorebird Reserve Network, and the many conservation efforts of the federal government, state wildlife agencies, private conservation organizations, and industry. Each of these programs will retain its own special identity and constituency, yet each will become more effective through greater collaboration and cooperation.

The conservation process

The PIF Bird Conservation Strategy consists of four steps that result in the development and implementation of Bird Conservation Plans.

1. Identify species and habitats most in need of conservation

The first step is to identify birds most in need of conservation action. Priorities are set within biologically appropriate conservation planning units, such as physiographic areas (e.g., Mississippi Alluvial Plain), watersheds, or ecoregions (e.g., shortgrass prairie). The nature of planning units will vary geographically, depending upon the distribution of birds and their habitats and locally-achieved consensus decisions.

Within a planning unit, each species is prioritized according to a set of criteria including population trends, size of geographic range, and threats on the breeding and nonbreeding grounds. The values assigned to each species provide an index of conservation need. High priority species can be grouped into species suites that tend to occur together and presumably respond similarly to habitat conditions and management practices.

2. Establish population and habitat conservation objectives

There are two parts to this step:

Describe the habitat conditions and management practices favorable to priority species or species suites

Set objectives for the nature, extent, and distribution of favorable habitat conditions or populations of priority birds

In the first part, current principles of conservation biology and knowledge of the natural history of birds and the ecosystems they inhabit are used to describe conditions that will foster long-term maintenance of healthy populations. This process can result in recommendations that may include the number of birds necessary to sustain a population, the amount and configuration of habitat that a population needs, habitat characteristics that should be maintained within habitat blocks, and the temporal and spatial stability of

habitat conditions.

Turning an understanding of the needs of birds into specific landscape-level conservation objectives is perhaps the most important, and often conceptually the most difficult, component of the planning process. Objectives must be set relative to a baseline understanding of the current status of bird populations and habitat conditions. The nature of objectives will vary among planning units on the basis of geography, land use history, and conservation opportunities, and may be phrased in terms of numbers of populations or habitat patches, densities of birds, or population trends. Although PIF attention has been largely focused on breeding terrestrial birds in the United States, these objectives must include a broader consideration of potentially important migration or wintering conservation issues. Each conservation planning unit must be evaluated as a landscape rather than as a collection of independent sites, and each unit must meet its bird conservation responsibilities within the context of regional and international needs.

Conservation objectives must be set within the context of the economic and sociological factors that influence conservation potential, particularly landowner objectives. This strategy cannot succeed without the voluntary and eager participation of private landowners. Objectives must also ultimately be integrated with other conservation issues. Birds are a necessary but not sufficient component of planning for the conservation of biological diversity.

3. The Bird Conservation Plans: Actions to meet objectives

Three overlapping concepts capture the entire range of actions that have been or can be taken to enhance the conservation of birds. There have been and continue to be successes in on-the- ground application of these concepts; Bird Conservation Plans will specifically and efficiently target them for the accomplishment of defined landscape-level objectives.

Landscape Prescriptions and Best Management Practices — Many birds can benefit more from the application of Prescriptions across landscapes than from activities limited to designated sites. An example could be maintenance of certain quantities of land in various successional stages across a region. The exact sites for particular conditions will vary over time. Best Management Practices can be modifications of standard management practices, developed within landowners' varied operational and economic constraints, that improve conditions for birds in small but important ways. Examples include grazing and burning programs that benefit prairie birds, timber management programs that benefit forest birds, and maintenance of woodlots for in-transit migrants.

Bird Conservation Areas — These are large areas that sustain or are capable of sustaining healthy populations of birds. Bird Conservation Areas may be single land holdings specifically designated for conservation purposes (such as a Wilderness Area of a National Forest). More typically they include multiple cooperating landowners who voluntarily coordinate their management practices to provide a constant base of habitat

needed by birds. The nature of bird conservation efforts in these areas must be compatible with other social and economic priorities.

Important Bird Areas — Sites that are critical to rare species or large concentrations of a species should be designated and managed as Important Bird Areas. Examples include waterfowl (Laguna Atascosa National Wildlife Refuge, Texas) and shorebird (Delaware Bay) concentration areas, seabird nesting cliffs (Pribilof Islands), islands inhabited by threatened, endemic species and subspecies (Santa Cruz Island, California), endangered species areas (Kirtland's Warbler breeding habitat), and key landbird stopover sites (High Island, Texas).

4. Implement Bird Conservation Plans and monitor progress

Completion of the first three steps in this Strategy will result in a Bird Conservation Plan. Implementation is the final and most challenging step. Although the biological objectives in the Plans should be set within conservation planning units, implementation may be more effectively accomplished within politically-defined units through the efforts of state or provincial working groups. A large array of conservation tools must be included within these Plans. These include:
Partnerships — This most obvious and fundamental factor in conservation is embodied in PIF Working Groups, but requires continual expansion and improvement.

Funding — Accomplishment of these ambitious objectives will require innovative funding mechanisms, including dedicated sources of federal, state, and private funding.

Research — Development and implementation of these Plans will stimulate new research efforts focused on key conservation questions, including issues of natural history, population health, and accommodation of birds in managed landscapes.

Education and Outreach — Achieving Plan objectives will require an effective and comprehensive information and education campaign directed toward policy makers, landowners, community leaders, and the general public.

Policy — National, state, and local governments must be active and constructive partners in the conservation of birds and habitat. A policy strategy should be developed in order to encourage the effective application of existing incentives, policies, treaties, and laws and the development of new initiatives for improved governmental participation in conservation efforts.

The entire process must be "adaptive" in nature, with the flexibility for adjustments in Bird Conservation Plans and their implementation in response to observed results of actions. There will be two sources of information that may indicate that changes are necessary:

Regional, National, and International Plans — The sum of the efforts in conservation planning unit and state Bird Conservation Plans must add up to adequate levels of protection throughout the ranges of priority bird species. Simultaneous application of this Strategy at these different geographic scales will help assure achievement of this goal.

Monitoring — Finally, there must be a means of evaluating the results of all of these efforts through a long-term commitment to monitoring the status of bird populations. Beginning with the Breeding Bird Survey and other existing efforts, a comprehensive monitoring program is needed to measure results and influence further conservation and management actions.

Partners in Flight and the future of birds

Bird conservation is a complex challenge. Birds use virtually every habitat on the surface of the earth and recognize no political boundaries. A single migrating bird may pass through a dozen countries that each has its own conservation priorities and challenges. Conserving birds and their habitats is beyond the capacity of any one organization, agency, or country. But when many groups work together, and their efforts are fueled by the enthusiasm of millions of birdwatchers and wildlife supporters, tremendous synergy is possible. This Strategy and development and implementation of Bird Conservation Plans will capture this synergy and ensure the future of North America's birds.

Appendix 2. Land Ownership in Alaska

Table A-1. Land ownership, by acreage (U. S. Forest Service and Dept. of Interior lands) and percentage of the region, in Alaska's Biogeographic Regions (see Fig. 1).

Biogeographic Region Land Unit	Acres	% of region
Southeastern		
Glacier Bay National Park/Preserve	3,283,000	12.9
Tongass National Forest	12,666,290	49.8
Admiralty National Monument	937,000	4.3
Misty Fjords National Monument	2,100,000	10.4
BLM (Native/State selected)		0.9
State		13.0
Native		8.7
Southcoastal		
Kenai Fjords National Park	580,000	2.0
Wrangell-St. Elias National Park/Preserve	659,400	2.0

Tongass National Forest	1,251,423	2.9
Chugach National Forest	5,940,040	9.9
Department of Defense		0.2
BLM (Native/State selected)		2.6
State		64.5
Native		15.9
Southwestern		
Lake Clark National Park/Preserve	4,044,000	12.9
Aniachak National Monument/Preserve	603,000	2.1
Katmai National Park/Preserve	4,090,000	14.4
Alaska Peninsula National Wildlife Refuge	3,500,000	10.8
Alaska Maritime National Wildlife Refuge	3,435,639	5.1
Becharof National Wildlife Refuge	1,200,017	5.5
Izembek National Wildlife Refuge	303,094	4.6
Kodiak National Wildlife Refuge	1,656,539	3.7
BLM (Native/State selected)		9.3
Department of Defense		0.3
State		13.8
Native		17.5
Western		
Cape Krusenstern National Monument	660,000	0.7
Kobuk Valley National Park	1,750,000	1.9
Noatak National Preserve	6,574,000	7.2
Bering Land Bridge National Preserve	2,785,000	2.8
Togiak National Wildlife Refuge	4,097,431	4.1
Koyukuk National Wildlife Refuge	3,550,000	4.5
Selawik National Wildlife Refuge	2,150,000	2.7
Innoko National Wildlife Refuge	3,850,000	4.2
Alaska Maritime National Wildlife Refuge	-	0.4
Yukon Delta National Wildlife Refuge	19,131,644	15.4
BLM (Native/State selected)		23.8
State		4.2
Native		28.2
Central		
Yukon-Charley Rivers National Preserve	2,523,000	1.7
Wrangell-St. Elias National Park/Preserve	12,528,600	7.9
Denali National Park/Preserve	6,028,000	2.5
Kenai National Wildlife Refuge	1,904,756	1.1
Nowitna National Wildlife Refuge	1,560,000	1.5
Tetlin National Wildlife Refuge	700,053	0.6
Arctic National Wildlife Refuge	11,179,366	3.9
Kanuti National Wildlife Refuge	1,430,000	1.0
Yukon Flats National Wildlife Refuge	8,630,000	6.9

Steese National Conservation Area	1,220,000	0.9
White Mountain National Recreation Area	1,000,000	0.8
Utility Corridor		0.6
BLM (Native/State selected)		21.6
Department of Defense		1.1
State		36.4
Native		11.6
Northern		
Gates of the Arctic National Park/Preserve	8,472,000	12.3
Arctic National Wildlife Refuge	8,106,556	23.7
National Petroleum Reserve	23,000,000	35.0
Utility Corridor		1.8
BLM (Native/State selected)		2.4
State		13.5
Native		11.4

Appendix 3. Landbirds in the Terrestrial Landscape in Alaska.

Table A-2 Taxonomic composition of the landbird avifauna in Alaska (including unsubstantiated species).

	Number of species		
Family	Breeders	North American vagrants	Asian migrants or vagrants
Vultures	-	1	-
Hawks, Eagles	10	1	2
Falcons	4	-	2
Grouse, Ptarmigan	7	-	-
Doves, Pigeons	2	2	1
Cuckoos	-	1	2
Typical Owls	10	1	1
Goatsuckers	-	2	2
Swifts	2	1	3
Hummingbirds	1	4	-
Hoopoes	-	-	1
Kingfishers	1	-	-
Woodpeckers	7	1	2

Tyrant Flycatchers	8	8	-
Shrikes	1	-	1
Vireos	2	2	-
Jays, Magpies, Crows	6	1	-
Larks	2	-	-
Swallows	6	1	1
Chickadees	4	1	1
Nuthatches	1	-	-
Creepers	1	-	-
Wrens	1	-	-
Dippers	1	-	-
Kinglets	2	-	-
Old World Warblers	1	-	4
Old World Flycatchers	-	-	6
Thrushes	10	1	6
Mockingbirds and Thrashers	-	3	-
Starlings	1	-	-
Accentors	-	-	1
Wagtails, Pipits	5	-	4
Waxwings	2	-	-
Wood Warblers	12	15	-
Tanagers	1	1	-
Sparrows and Buntings	14	7	8
Cardinals, Grosbeaks, and allies	-	5	-
Blackbirds	3	6	-
Finches	7	5	6
Old World Sparrows	-	1	-
All species	135	71	54

Table A-3. Migration strategies of landbirds in Alaska.

Migration strategy	Number of species
Year-round Alaska resident	34
Nearctic-Nearctic migrant	24
Nearctic-Paleotropical migrant	8
Complete Nearctic-Neotropical migrant (A)	38
Mexico	5
Mexico/Central America	12
Mexico/Central America/South America	12
South America	9
Partial Nearctic-Neotropical migrant (B)	30
Mexico	16
Mexico/Central America	12
Mexico/Central America/South America	2

Table A-4. Migration strategy, breeding status, and wintering areas (type A and B migrants) of all Alaska-breeding landbirds.

Common name	Migration status[1]	Breeding status[2]	Wintering area[3]
Turkey Vulture	VN		
Osprey	A	B	MX/CA/SA
Bald Eagle	N	B	
White-tailed Eagle	R	b	
Steller's Sea-Eagle	VA		
Northern Harrier	B	B	MX/CA/SA
Sharp-shinned Hawk	B	B	MX/CA/SA
Cooper's Hawk	VN		
Northern Goshawk	B	B	MX
Swainson's Hawk	A	b	SA
Red-tailed Hawk	B	B	MX/CA
Common Buzzard	VA		
Rough-legged Hawk	N	B	
Golden Eagle	B	B	MX

Eurasian Kestrel	VA		
American Kestrel	B	B	MX/CA
Merlin	A	B	MX/CA/SA
Eurasian Hobby	VA		
Peregrine Falcon	A	B	MX/CA/SA
Gyrfalcon	N	B	
Ruffed Grouse	R	B	
Spruce Grouse	R	B	
Blue Grouse	R	B	
Willow Ptarmigan	R	B	
Rock Ptarmigan	R	B	
White-tailed Ptarmigan	R	B	
Sharp-tailed Grouse	R	B	
Rock Dove	R	B	
Band-tailed Pigeon	A	b	MX/CA
Oriental Turtle-Dove	VA		
White-winged Dove	VN		
Mourning Dove	VN		
Common Cuckoo	VA		
Oriental Cuckoo	VA		
Yellow-billed Cuckoo	VN		
Oriental Scops-Owl	VA		
Western Screech-Owl	R	B	
Great Horned Owl	R	B	
Snowy Owl	N	B	
Northern Hawk Owl	R	B	
Northern Pygmy-Owl	R	B	
Barred Owl	R	B	
Great Gray Owl	R	B	
Long-eared Owl	VN		
Short-eared Owl	B	B	MX
Boreal Owl	R	B	
Northern Saw-whet Owl	N	B	
Lesser Nighthawk	VA		
Common Nighthawk	VN		
Whip-poor-will	VN		
Jungle Nightjar	VA		
Black Swift	A	B	MX
Chimney Swift	VN		
Vaux's Swift	A	B	MX/CA/SA
White-throated Needletail	VA		
Common Swift	VA		
Fork-tailed Swift	VA		
Ruby-throated Hummingbird	VN		

Anna's Hummingbird	VN		
Costa's Hummingbird	VN		
Calliope Hummingbird	VN		
Rufous Hummingbird	A	B	MX
Hoopoe	VA		
Belted Kingfisher	B	B	MX/CA
Eurasian Wryneck	VA		
Yellow-bellied Sapsucker	B	b	MX/CA
Red-breasted Sapsucker	N	B	
Great Spotted Woodpecker	VA		
Downy Woodpecker	R	B	
Hairy Woodpecker	R	B	
Three-toed Woodpecker	R	B	
Black-backed Woodpecker	R	B	
Northern Flicker	B	B	MX
Pileated Woodpecker	VN		
Olive-sided Flycatcher	A	B	SA
Western Wood-Pewee	A	B	MX/CA/SA
Yellow-bellied Flycatcher	A	b	MX/CA
Alder Flycatcher	A	B	SA
Willow Flycatcher	VN		
Least Flycatcher	A	b	MX/CA
Hammond's Flycatcher	A	B	MX/CA
Dusky Flycatcher	VN		
Pacific-slope Flycatcher	A	B	MX
Eastern Phoebe	VN		
Say's Phoebe	B	B	MX
Great Crested Flycatcher	VN		
Tropical Kingbird	VN		
Western Kingbird	VN		
Eastern Kingbird	VN		
Scissor-tailed Flycatcher	VN		
Brown Shrike	VA		
Northern Shrike	N	B	
Cassin's Vireo	VN		
Warbling Vireo	A	B	MX/CA/SA
Philadelphia Vireo	VN		
Red-eyed Vireo	A	b	SA
Gray Jay	R	B	
Steller's Jay	R	B	
Clark's Nutcracker	VN		
Black-billed Magpie	R	B	
American Crow	N	b	

Northwestern Crow	R	B	
Common Raven	R	B	
Sky Lark	P	b	ASIA
Horned Lark	B	B	MX
Purple Martin	VN		
Tree Swallow	B	B	MX/CA
Violet-green Swallow	A	B	MX/CA
Northern Rough-winged Swallow	A	b	MX/CA/SA
Cliff Swallow	A	B	SA
Bank Swallow	A	B	SA
Barn Swallow	A	B	SA
Common House-Martin	VA		
Black-capped Chickadee	R	B	
Mountain Chickadee	VN		
Chestnut-backed Chickadee	R	B	
Boreal Chickadee	R	B	
Gray-headed Chickadee	R	b	
Great Tit	VA		
Red-breasted Nuthatch	N	B	
Brown Creeper	B	B	MX
Winter Wren	N	B	
American Dipper	R	B	
Golden-crowned Kinglet	N	B	
Ruby-crowned Kinglet	B	B	MX
Middendorff's Grasshopper-Warbler	VA		
Lanceolated Warbler	VA		
Wood Warbler	VA		
Dusky Warbler	VA		
Arctic Warbler	P	B	ASIA
Narcissus Flycatcher	VA		
Red-breasted Flycatcher	VA		
Mugimaki Flycatcher	VA		
Siberian Flycatcher	VA		
Gray-spotted Flycatcher	VA		
Gray-breasted Flycatcher	VA		
Siberian Rubythroat	VA		
Bluethroat	P	B	ASIA
Siberian Blue Robin	VA		
Red-flanked Bluetail	VA		
Northern Wheatear	P	B	ASIA
Stonechat	VA		
Mountain Bluebird	B	b	MX
Townsend's Solitaire	B	B	MX
Veery	VN		

Gray-cheeked Thrush	A	B	SA
Swainson's Thrush	A	B	MX/CA/SA
Hermit Thrush	B	B	MX
Eyebrowed Thrush	VA		
Dusky Thrush	VA		
Fieldfare	VA		
American Robin	B	B	MX/CA
Varied Thrush	N	B	
Gray Catbird	VN		
Northern Mockingbird	VN		
Brown Thrasher	VN		
European Starling	R	B	
Siberian Accentor	VA		
Yellow Wagtail	P	B	ASIA
Gray Wagtail	VA		
White Wagtail	P	B	ASIA
Black-backed Wagtail	P	b	ASIA
Tree Pipit	VA		
Olive-backed Pipit	VA		
Pechora Pipit	VA		
Red-throated Pipit	P	B	ASIA
American Pipit	B	B	MX/CA
Bohemian Waxwing	N	B	
Cedar Waxwing	B	b	MX/CA
Tennessee Warbler	A	b	MX/CA/SA
Orange-crowned Warbler	A	B	MX
Nashville Warbler	VN		
Northern Parula	VN		
Yellow Warbler	A	B	MX/CA/SA
Chestnut-sided Warbler	VN		
Magnolia Warbler	A	b	MX/CA
Cape May Warbler	VN		
Yellow-rumped Warbler	B	B	MX/CA
Black-throated Gray Warbler	VN		
Townsend's Warbler	A	B	MX/CA
Hermit Warbler	VN		
Black-throated Green Warbler	VN		
Prairie Warbler	VN		
Bay-breasted Warbler	VN		
Palm Warbler	VN		
Blackpoll Warbler	A	B	SA
Black-and-white Warbler	VN		
American Redstart	A	B	MX/CA/SA
Ovenbird	VN		

Northern Waterthrush	A	B	MX/CA/SA
Kentucky Warbler	VN		
Mourning Warbler	VN		
MacGillivray's Warbler	A	B	MX/CA
Common Yellowthroat	A	B	MX/CA
Wilson's Warbler	A	B	MX/CA
Canada Warbler	VN		
Scarlet Tanager	VN		
Western Tanager	A	B	MX/CA
Spotted Towhee	VN		
American Tree Sparrow	N	B	
Chipping Sparrow	B	B	MX/CA
Clay-colored Sparrow	VN		
Brewer's Sparrow	A	b	MX
Lark Sparrow	VN		
Savannah Sparrow	B	B	MX/CA
Fox Sparrow	N	B	
Song Sparrow	B	B	MX
Lincoln's Sparrow	A	B	MX/CA
Swamp Sparrow	VN		
White-throated Sparrow	VN		
Harris's Sparrow	VN		
White-crowned Sparrow	B	B	MX
Golden-crowned Sparrow	N	B	
Dark-eyed Junco	B	B	MX
Lapland Longspur	N	B	
Smith's Longspur	N	B	
Chestnut-collared Longspur	VN		
Pine Bunting	VA		
Little Bunting	VA		
Rustic Bunting	VA		
Yellow-breasted Bunting	VA		
Yellow-breasted Bunting	VA		
Gray Bunting	VA		
Pallas' Bunting	VA		
Reed-Bunting	VA		
Snow Bunting	N	B	
McKay's Bunting	R	B	
Rose-breasted Grosbeak	VN		
Black-headed Grosbeak	VN		
Blue Grosbeak	VN		
Lazuli Bunting	VN		
Indigo Bunting	VN		
Bobolink	VN		

Red-winged Blackbird	B	B	MX/CA
Western Meadowlark	VN		
Yellow-headed Blackbird	VN		
Rusty Blackbird	N	B	
Brewer's Blackbird	VN		
Common Grackle	VN		
Brown-headed Cowbird	B	b	MX
Bullock's Oriole	VN		
Brambling	VA		
Gray-crowned Rosy-Finch	N	B	
Pine Grosbeak	R	B	
Common Rosefinch	VA		
Purple Finch	VN		
Cassin's Finch	VN		
House Finch	VN		
Red Crossbill	N	B	
White-winged Crossbill	N	B	
Common Redpoll	N	B	
Hoary Redpoll	R	B	
Eurasian Siskin	VA		
Pine Siskin	B	B	MX
American Goldfinch	VN		
Oriental Greenfinch	VA		
Eurasian Bullfinch	VA		
Evening Grosbeak	VN		
Hawfinch	VA		
House Sparrow	VN		

[1] A - most of population migrates beyond U.S.- Mexico border, B - some of population migrates beyond U.S.-Mexico border, N - intra-North American migrant, R - resident, VA - Asian vagrant or migrant, VN - North American vagrant.

[2] B - regular breeder, b - irregular breeder or breeds in small numbers.

[3] MX - Mexico, CA = Central America, SA - South America.

Appendix 4. Bird Conservation Regions

State, provincial, federal, and non-governmental organizations from Canada, Mexico and the U. S. met in Puebla, Mexico, in November 1998, to adopt an ecological framework that would facilitate coordinated conservation planning, implementation, and evaluation of major bird initiatives. The scheme adopted by the group was based on the Commission for Environmental Cooperation's (1997) hierarchical framework of nested ecological units. Five Bird Conservation Regions (BCRs) were designated in Alaska (Fig. A-1) that roughly follow the Biogeographic Regions of Kessel and Gibson (1978). A comparison of these 2 regional schemes is given in Table A-4. In some regions, conservation actions, including monitoring, may be more

appropriately considered within a sub-region if management issues are similar within this unit (e.g., Cook Inlet). Below are descriptions of these 5 regions and delineations of subregions within each; detailed descriptions are provided in Gallant et al. (1995).

Arctic Coastal Plain/Foothills (BCR 1)

This region includes low-lying, coastal tundra and drier uplands of the Arctic Foothills of the Brooks Range. Sub-regions include : A) Arctic Coastal Plain, and B) Arctic Foothills and north slope of the Brooks Range. It extends from the Alaska-Canada border at Demarcation Point westward, and southward, to the mouth of the Noatak River.

Because of thick, continuous permafrost, surface water dominates the landscape (20-50% of the land surface on the coastal plain). Freezing and thawing form a patterned mosaic of polygonal ridges and ponds. Several rivers (e.g., Colville River) bisect the plain and flow into the Arctic Ocean. Barrow, lying near the Arctic Ocean, experiences 67 days of darkness in the winter and 84 days of continuous sunlight in the summer. The ocean surface, except for leads, is frozen 9 to 10 months a year, and the ice pack is never far from shore.

Because of the wetness, waterfowl and shorebirds dominate the breeding avian community and passerines are scarce. The most abundant breeding birds on the coastal plain include the: Northern Pintail, King Eider, Oldsquaw, American Golden-Plover, Semipalmated Sandpiper, Pectoral Sandpiper, Red-necked Phalarope, and Lapland Longspur. Few bird species winter in the region. Several Old World species penetrate the region from the west (e.g., Arctic Warbler, Bluethroat), and species regularly breeding in the Canadian arctic penetrate from the east (e.g., White-rumped Sandpiper, Black Guillemot). Taiga passerines (e.g., Gray-cheeked Thrush, Yellow Warbler) reach the region along drainage systems from the Brooks Range and raptors nest commonly along major rivers (e.g., Gyrfalcon, Rough-legged Hawk).

Western Alaska Lowlands/Uplands (BCR 2)

This region consists of the coastal plain and mountains of western and southwestern mainland Alaska. Sub-regions include: A) Subarctic Coastal Plain and Seward Peninsula, B) Ahklun and Kilbuck Mountains and Bristol Bay-Nushagak Lowlands, and C) Alaska Peninsula Mountains.

Permafrost is continuous except in southern parts of the region. Sea cliffs are present as are mountains that exceed 3,300 feet (1,000 m) in elevation. Volcanic peaks up to 8,500 feet (2,600 m) are found along the Alaska Peninsula. Wet and mesic graminoid herbaceous communities dominate the lowlands and numerous ponds, lakes, and rivers dot the landscape. Tall shrub communities are found along rivers and streams and low shrub communities occupy uplands; forests of spruce and hardwoods penetrate the region on the eastern edge.

High densities of breeding waterfowl and shorebirds are found on the coastal plain of the Yukon and Kuskokwim rivers. Intertidal areas here and lagoons of the north side of the Alaska Peninsula supports millions of shorebirds during migration (e.g., Dunlins, Western Sandpipers,

Red Knots, Bar-tailed Godwits). The coast of the Alaska Peninsula supports high concentrations of wintering sea ducks that include the: Steller's Eider, Harlequin, Oldsquaw, Surf Scoter, and Black Scoter. Western Alaska includes an unique Beringian breeding avifaunal element (e.g., Black Turnstone, Bristle-thighed Curlew) and several Old World species are regular breeders or migrants in this region (e.g., Sharp-tailed Sandpiper, Red-throated Pipit, White Wagtail). Passerine diversity is greatest in tall, riparian shrub habitats (e.g., Arctic Warbler, Gray-cheeked Thrush, Blackpoll Warbler) and raptors (e.g., Gyrfalcon, Rough-legged Hawk) nest along the riverine cliffs. Mainland sea cliffs contain nesting colonies of, largely, Black-legged Kittiwakes, Common Murres, and Pelagic Cormorants.

Aleutian/Bering Sea Islands (BCR 3)

Included in this region are the Aleutian Islands, that extend westward from the Alaskan mainland for 1,100 miles (1,800 km), and the Bering Sea islands (that include the Pribilofs, St. Matthew, Hall, St. Lawrence, and Little Diomede).

The Aleutian chain is volcanic in origin. The climate is maritime and wind is ever present. Sea ice does not extend to the Aleutians and permafrost is generally absent; however, sea ice is an important feature of the Bering Sea. Vegetation at higher elevations consists of dwarf shrub communities, mainly willow and crowberry. Meadows and marshes of herbs, sedges, and grasses are plentiful and some islands have ericaceous bogs.

Seabirds are a dominant component of this region's avifauna and several species breed only in this region (e.g., Red-legged Kittiwake, Least Auklet, Whiskered Anklet). Southern Hemisphere procellariiforms occur regularly in the offshore waters of the southern Bering Sea and northern Gulf of Alaska during Alaskan summers. Although breeding diversity of passerines (mainly Lapland Longspur, Snow Bunting, and Gray-crowned Rosy-Finch), and shorebirds (e.g., Black Oystercatcher, Dunlin, Ruddy Turnstone, Rock Sandpiper) is low, numerous Old World species are regular migrants and visitants. Some of these species regularly breed in the region (e.g., Common Ringed Plover, Wood Sandpiper, Eurasian Skylark). Rock Sandpipers have differentiated into three races among islands within the region and the only endemic Alaskan passerine (McKay's Bunting) is found here.

Interior Forests/Mountains (BCR 4)

This region is an extensive (278,800 square-miles; 722,000 km^2) patchwork of ecological types. Sub-regions include: A) Interior Highlands and Ogilvie Mountains, B) Interior Forested Lowlands and Uplands, Interior Bottomlands, and Yukon Flats, C) Alaska Range, Wrangell Mountains, and Copper Plateau, and D) Cook Inlet.

In the interior, winters are cold (average minimums -1^0F to -31^0F; -18^0C to -35^0C) and summers are warm (average maximum 63^0F to 72^0F; 17^0C to 22^0C). The Cook Inlet region has both maritime and continental influences and the state's most populous region, two-thirds of Alaska's

population reside here, enjoys a mild year-round climate.

A mosaic of vegetation communities arise from the interplay of elevation, permafrost, surface water, fire, and aspect. All forest types (needleleaf, deciduous, and mixed) are found in the region and are dominated by white spruce, black spruce, poplars, and paper birch. Tall shrub communities occur along rivers, drainages, and near treeline. Bogs, consisting of low shrubs and shrub-graminoid communities, are common in the lowlands. Alpine dwarf scrub communities are common in Interior Highlands and throughout mountainous regions; highest elevations are generally devoid of vegetation.

Despite the varied ecoregions, many bird species are shared among the regions. Lowlands, bottomlands and flats harbor many species of migrating and breeding waterfowl (e.g., Northern Pintail, Northern Shoveler, Green-winged Teal) and swans. These ecoregions, combined with forested lowlands and uplands support breeding shorebirds such as Greater and Lesser Yellowlegs, Solitary and Spotted Sandpipers, and Common Snipe. American Golden-Plovers and Surfbirds are found in alpine habitats in Interior Highland and mountainous ecoregions. The unvegetated intertidal area of Cook Inlet has recently been identified, not only as a major spring stopover site for Western Sandpipers and Dunlins, but also as the primary wintering site for the nominate form of Rock Sandpiper (C. *p. ptilocnemis*). Significant numbers of Long- and Short-billed Dowitchers and Hudsonian Godwits stop in upper Cook Inlet during migration as do Wrangel Island Snow Geese during the spring. A suite of passerines inhabit forest, scrub, and graminoid communities in the region. Black-capped and Boreal Chickadees, Ruby-crowned Kinglets, Swainson's Thrushes, Yellow-rumped Warblers and Dark-eyed Juncos are common forest species. Tall shrub communities host White-crowned, American Tree, and Fox Sparrows, Wilson's and Yellow Warblers, Gray-cheeked Thrushes, and Common Redpolls, among others. At high elevations, Horned Lark and Lapland Longspur are common breeders.

Pacific Coast Forests/Mountains (BCR 5)

The coastal rainforest stretches from extreme southern Alaska to the western Gulf of Alaska and is characterized by heavy precipitation and mild temperatures typical of a maritime climate. Sub-regions include: A) Coastal Hemlock-Spruce Forests, and B) Pacific Coastal Mountains.

The regions stark, rugged features are a result of intense glaciation during the Pleistocene and nearly all adjacent land area remains glaciated. Much of the terrain is steep sloped from sea level up to 3,300 feet (1,000 m), but large floodplains, alluvial fans, outwash plains, and river deltas also occur here. The region is dominated by needleleaf forests of Western Hemlock and Sitka Spruce; other needleleaf species also occur in coastal forests. Broadleaf forests are found along large mainland river drainages. Several other communities are present in this region and include: tall, low, and dwarf scrub; tall and low scrub bogs and swamps; and wet graminoid and forb herbaceous communities.

The Copper and Stikine River deltas and the Yakutat forelands are major stopover sites for

migrating shorebirds, especially Western Sandpipers and Dunlins. Black Oystercatchers, Rock Sandpipers, Black Turnstones, and Surfbirds are common wintering species. Nearshore marine areas support many breeding and wintering sea ducks (e.g. Surf Scoter, Harelquin Duck) and seabirds (e.g., Black-legged Kittiwakes, murres, murrelets). Coastal forests support a host of resident and breeding passerines (e.g., Chestnut-backed Chickadee, Winter Wren, Brown Creeper, Ruby and Golden-crowned Kinglets, Red-breasted Sapsucker), raptors (Bald Eagle, Northern Goshawk, Northern Saw-whet Owl), and seabirds (Marbled Murrelet).

Table A-5. Alaskan Bird Conservation Regions and corresponding Biogeographic Regions.

Bird Conservation Regions	Biogeographic Region
1. Arctic Coastal Plain/Foothills	Northern
1A. Arctic Coastal Plain	Northern
1B. Arctic Foothills/north slope of Brooks Range	Northern
2. Western Alaska Lowlands/Uplands	Western/Southwestern
2A. Subarctic Coastal Plain/Seward Peninsula	Western
2B. Ahklun and Kilbuck Mountains/Bristol Bay-Nushagak Lowlands	Western/Southwestern
2C. Alaska Peninsula Mountains	Southwestern
3. Aleutian/Bering Sea Islands	Southwestern/Western
4. Interior Forest/Mountains	Central
4A. Interior Highlands/Ogilvie Mountains	Central
4B. Interior Forested Lowlands and Uplands/Interior Bottomlands/Yukon Flats	Central
4C. Alaska Range/Wrangell Mountains/Copper Plateau	Central
4D. Cook Inlet	Southcoastal
5. Pacific Coast Forests/Mountains	Southeastern/Southcoastal
5A. Coastal Hemlock-Spruce Forests	Southeastern/Southcoastal
5B. Pacific Coastal Mountains	Southeastern/Southcoastal

Figure A-1. Bird Conservation Regions, and sub-regions, of Alaska (based on the scheme of the Commission for Environmental Cooperation 1997). See Table A-5 for definitions of regions and sub-regions.

Appendix 5. Matrix of Scores used to Generate Ranks of Priority Landbirds in

Codes used in matrix (see prioritization section for definitions)

SPP - species
BIO - Biogeographic Region
BioAb - abundance in Biogeographic Region
NaAb - abundance in North America
BrDist - breeding distribution
WiDist - wintering distribution
IaBioAk - importance of Biogeographic Region to Alaska populations
IaAkNa - importance of Alaska to North American/Old World populations
IaBioNa - importance of Biogeographic Region to North American/Old World populations
BrThr - threats to breeding populations
WiThr - threats to non-breeding populations
Pt - population trend
PtAr - population trend area (British Columbia [BC], Yukon [YT], Closed Boreal Forest [CF])
Hab1 - primary breeding habitat (see Table 1)
Hab2 - secondary breeding habitat (see Table 1)
MiSt - migration status (A = long-distance; B = partial long-distance; N = North American; R = resident)
Tax - taxonomic sorter
BrSt - breeding status in Alaska (B = regular, moderate numbers; b = irregular or small numbers)

Appendix 6. Species Accounts of Priority Landbirds in Alaska.

Below are species accounts for all priority landbirds in Alaska (including raptors). General literature cited in accounts is provided at the end of the appendix, whereas literature specific to the species is provided in each account.

GYRFALCON
(*Falco rusticolus*)

Distribution: Gyrfalcons are uncommon or rare breeders in arctic tundra and subarctic mountain areas of Alaska, Northern Canada, Greenland, Iceland, and Eurasia. In Alaska, gyrfalcons are most common in the Northern bioregion, portions of the Western bioregion (particularly the Seward and Lisburne Peninsulas), and the Alaska Range (Central bioregion). Densities up to 1 pair per 200 km^2 have been found in these areas, but densities are usually much lower throughout most of their range in Alaska. An estimated 375-635 pairs of gyrfalcons nest in Alaska, and 700-800 breeding pairs are estimated to nest in Yukon Territory, Canada. Most gyrfalcons do not migrate. Adult gyrfalcons generally remain on their breeding territories throughout the winter, but some gyrfalcons move southward to southern Canada and the northern U.S. Wintering gyrfalcons are often found near concentrations of avian prey such as near wetlands, coastal

dunes, or airports.

Biology/Natural History: Gyrfalcons are monogamous and hold individual territories. They prey on mammals, including ground squirrels and hares, and birds (primarily ptarmigan, but also grouse, seabirds, waterfowl, jaegers, and shorebirds). They generally hunt from an exposed perch (tree or rock outcrop) and chase their prey. Hunting is also done by rapid contour flying, where they fly fast and low over the terrain to surprise their prey; gyrfalcons seldom stoop as peregrines do. Gyrfalcon numbers vary directly with ptarmigan numbers, and gyrfalcons will forego breeding when prey is scarce. Though ptarmigan numbers in spring determine the number of gyrfalcons that breed, spring weather conditions influence their productivity. Gyrfalcon nests are generally located on cliffs and rock outcrops, though tree nests have been reported. Gyrfalcons tend to nest early in the season and actively seek out vertical faces of rock with overhangs to protect them from late season snows and spring thaw runoff. Suitable nesting sites may limit distribution and numbers of gyrfalcons, and they will nest in dense clusters where cliffs are abundant such as along rivers on the North Slope. Although nests are rare above 1000 m, nests in the Brooks Range have been found to 1400 m. Stick nests of ravens, golden eagles, or other raptors are often used by gyrfalcons, and nest sites are marked with excrement. One brood is produced between mid-May and mid-June. Three to 5 eggs (57 mm) are laid in a scraped nest. Eggs are creamy white suffused with some variant of pale reddish cinnamon, overlaid with spots and blotches of various reddish browns, varying from nearly unmarked to uniform brownish. early nestling phase.

Habitat: Gyrfalcons are found primarily in arctic and subarctic tundra. The vegetation structure basically consists of a shrub layer and ground cover. Shrub layers of birch and willow are found in moist areas and along waterways and rivers. Willow, Dryas, and various forbs predominate in the ground cover layer in alpine tundra areas, whereas *Eriophorum* spp., *Carex* spp., graminoids, and other forbs are prominent in lowland tundra and on the North Slope. The abundance of gyrfalcons in an area may be limited by cliff or rock outcrop availability, since these sites are required for nesting and used for perching. Nests in Denali National Park were found on rock outcrops at elevations between 750 m-1350 m; nest areas were characterized by steep slopes and primarily southerly exposures. Gyrfalcon habitat is generally remote, with few roads, powerlines, or other human impacts. Gyrfalcons cover extensive areas while foraging and are seemingly limited only by prey density (ground squirrels and ptarmigan) and nest site availability. Ground squirrels and ptarmigan fluctuate in population numbers, and the size of the breeding population is closely tied to prey abundance. When prey populations are low, gyrfalcons may irrupt south, increasing their chance of encountering human-related problems in the more populated areas of southern Canada and the northern border states of the U.S. Seabirds and hares may serve as alternate food sources during primary prey scarcity.

Management Issues and Special Concerns: Common. Populations of gyrfalcons in Alaska are presumably stable and no imminent threats have been identified. Less than 10 gyrfalcon chicks were collected annually for falconry purposes in Alaska in the early 1990's, but more are occasionally taken (Ted Swem, pers. commun.). Chick harvest for falconry is often directed at

the rare white and black morphs of the gyrfalcon; this could affect genetic composition of the population. Gas and oil exploration and development have increased human activities and structures in gyrfalcon habitat on the North Slope. Increased road access to remote areas associated with gas and oil development may increase human access to and disturbance of gyrfalcon nests during the nesting season. Slightly higher mortality from shooting, trapping, collision with autos, etc. may also occur. Conversely, gyrfalcons appear to adapt to human-made structures (e.g. drilling platforms and gold dredges) and have used them for nesting and perching sites. Specialized monitoring techniques specifically targeting gyrfalcons may be required as current Breeding Bird Survey and Off-road Point Count techniques are insufficient.

Literature Cited:

Shank, C.C. and K.G. Poole. 1994. Status of gyrfalcon *Falco rusticolus* populations in the Northwest Territories, Canada. in Meyburg, B.-U. and R.D.Chancellor, eds. Raptor Conservation Today. Proceedings of the IV World Conference on Birds of Prey and Owls. World Working Group on Birds of Prey, Berlin. 799pp.

Swem, T., C. McIntyre, R.J. Ritchie, P.J. Bente, and D.G. Roseneau. 1994. Distribution, abundance, and notes on the breeding biology of gyrfalcons *Falco rusticolus in* Alaska. in Meyburg, B.-U. and R.D. Chancellor, eds. Raptor Conservation Today. Proceedings of the IV world conference on birds of prey and owls. World Working Group on Birds of Prey, Berlin. 799pp.

BLUE GROUSE
(*Dendragopus obscurus*)

Distribution: Occurs from Southeastern Alaska and southern Yukon south through British Columbia and extreme western Alberta and throughout Rocky Mountains in the contiguous U.S. to extreme western South Dakota. Also found in coastal ranges of British Columbia, Washington, Oregon, and northern California and the Cascades and Sierra Nevada mountains to southern California and western Nevada. In Alaska, range is restricted to mainland and insular Southeastern Alaska except Prince of Wales Island (A.O.U. 1998, Gabrielson and Lincoln 1959).

Biology/Natural History: Feeds mostly on vegetative matter including conifer needles, leaves, flowers, buds and berries, also insects. Generally forages on the ground in summer, often in trees in the winter depending on snow cover. Male's low hooting during mating is conspicuous. Courtship displays include: hooting; short and loud fluttering flight; strutting with raised and fanned tail feathers; neck feathers spread showing bright skin patches. Shallow nest scrape of needles, twigs, leaves, and feathers is on ground, usually under a log, rock, or ledge. Female incubates up to 12 buff-colored eggs for 25-28 days. Young leave nest within a day of hatching; young chicks follow female, but forage on their own. Young able to fly short distances at 8-9 days and are fully grown by 13 weeks. Longest known migration of adults is approximately 50

km; migration is often accomplished by walking (Kaufman 1996).

Habitat: Habitat affinities vary by season and region. Coastal birds tend to remain in old-growth or recently logged forests all year. Inland birds prefer forest edges in summer, coniferous forests in winter (Kaufman 1996). Found in coniferous and mixed forests in Southeastern Alaska; also in dwarf conifer forests at treeline.

Management Issues/Special Concerns: Could be negatively affected by forest management practices. Show initial increases in clearcuts, but are absent in young, even-age stands. Old-growth forest appears to be preferred habitat (Kaufman 1996).

WHITE-TAILED PTARMIGAN

(*Lagopus leucurus*)

Distribution: Year-round resident in alpine from southcentral and southeastern Alaska, throughout much of Yukon Territory and into southwestern Northwest Territories, south through the Rocky Mountains of British Columbia (generally absent from Coastal Range of British Columbia) and southwestern Alberta and extending into the Cascades of Washington. Found discontinuosly throughout Rocky Mountain cordillera from Montana to northern New Mexico. Isolated populations exist on Mt. Ranier and on Vancouver Island. Has been introduced in some mountainous areas in Oregon, California, Colorado, Utah. Reintroduced in Pecos Wilderness Area of New Mexico. (Braun et al. 1993). In Alaska, it is found in alpine areas from the Kenai Peninsula, throughout Southcentral and mainland Southeastern Alaska north of the Taku River (D. Gibson, pers commun.). Not known to occur north of Alaska Range. A few records exist from Eek and Kwethluk rivers on the Yukon-Kuskokwim Delta and at Kagati Lake (Petersen et al. 1991).

Biology/Natural History: This alpine species subsists primarily on buds, stems, and seeds in winter, adding leaves, fruits, flowers, and insects to its diet in summer. Prefers willow, but will browse birch and alder in the former's absence. Found in winter on windswept ridges and areas where vegetation extends above snow cover. Non-territorial in winter (loose flocks up to 80 birds), but becomes territorial in summer. Male courtship displays include bowing, struting and chasing, the latter two with flared eye combs, extended wings, and fluffed feathers. Mate guarding from pair formation until incubation is nearly constant; mates stay in close proximity (<20 m) during breeding season. When both members of a pair return to the same breeding area, mate fidelity is high (85%). Generally monogamous; female builds nest on ground by repeated scraping with bill and feet to form a shallow bowl of dried vegetation and some body feathers. First clutches are 4-8 eggs, second clutches 2-6. Color or eggs is variable (usually cinnamon colored). Incubation usually begins with the penultimate egg. Nest attentiveness is high as female is unwilling to vacate nest when disturbed. Precocial young hatch 22-25 days after eggs are laid and leave nest within 12 hours after hatching. Young are capable of foraging at 1 day of age, and consume more invertebrates than adults do for first 3 weeks. Brooding is done solely by female (Braun et. al 1993).

Habitat: In summer, found at or above treeline from 1,200-4,300 m (1,200-1,600 m in Alaska) often in rocky areas, krummholz, moist vegetation near streams, snowfields, willow stands, and dwarf shrubs. In winter, found mostly in willow basins from near sea level (Alaska) to 3,650 m depending on location. Much altudinal variation in winter distribution due to severity of weather and snow quantity.

Management Issues/Special Concerns: Activities which impact alpine areas are potential threats to white-tailed ptarmigan habitat and populations. Road construction, relay stations, alpine ski areas, mining, water resevoirs, overgrazing and snow fences may reduce local populations. Hunting also threatens some populations. *L. l. saxatilis* on Vancouver Island is considered vulnerable by the provincial government.

Literature Cited:

Braun, C. E., K. Martin, and L. A. Robb. 1993. White-tailed Ptarmigan (*Lagopus leucurus*). *In* The Birds of North America, No. 68 (A. Poole and F. Gill, Eds.). Philadelphia: The Academy of Natural Sciences; Washington, DC: The American Ornithologists' Union.

Petersen, M., D. N. Weir and M. H. Dick. 1991. Birds of the Kilbuck and Ahklun Mountain Region, Alaska. U. S. Fish and Wildl. Serv. North American Fauna No. 76. 158 pp.

SHARP-TAILED GROUSE
(*Tympanuchus phasianellus*)

Distribution: Resident from central Alaska and Yukon to northwestern MacKenzie, northern plains provinces and Ontario to west-central Quebec, south to eastern Washington and Oregon, southern Idaho, central Utah, Colorado, and Nebraska, eastern Dakotas, central Minnesota and Wisconsin, northern Michigan and southern Ontario (A.O.U. 1998). In Alaska, found chiefly in the Interior from as far north as Anaktuvuk Pass and the north fork of the Kuskokwim River, east to the Alaska-Yukon border and west to Holy Cross and south to Alaska Range. Found along upper Yukon and Tanana valleys and associated drainages (Gabrielson and Lincoln 1959).

Biology/Natural History: Diet consists mostly of seeds, buds and leaves, flowers, shoots, grains and berries. Summer diet includes insects. Feeds in trees and shrubs in winter, on ground in summer. Males gather on display grounds in spring to attract females with elaborate courtship behaviour including inflation and deflation of neck sacs and cooing. Females mate with one male. Female builds shallow nest of grass, leaves and ferns. Large clutch (5-17) of speckled brown eggs is incubated 23-24 days by female. Female leads precocial young soon after hatching to feeding areas. Young can fly short distances within 1-2 weeks after hatching (Kaufman 1996).

Habitat: Grasslands and those associated with sparse woodlands, brushy hills, oak savannas and riparian woodland edges (A.O.U. 1983). In Alaska, found in willow flats, stunted spruce

thickets, muskegs and forest edges. Prefers more open habitat than do forest grouse (Gabrielson and Lincoln 1959, Armstrong 1995)

Management Issues/Special Concerns: Depletion of habitat in lower 48 states poses a serious threat. Habitat loss in Alaska is probably not a major concern. Its status as a game bird increases its vulnerability to a population decline due to hunting. Little data exist on populations in Alaska; more is known in the Yukon.

WESTERN SCREECH-OWL

(Otis kennicottii)

Distribution: Resident from Southeastern Alaska along coast to Baja California. East to central British Columbia and south to Washington, Oregon, Idaho, western Montana, Wyoming and Colorado, throughout Arizona and New Mexico and most parts of Nevada and California. Also in west Texas (Kaufman 1996). In Alaska, found mostly in Southeast and as far north as Yakutat (Islieb and Kessel 1973). Recent specimens have been found near Cordova and there are a few records near Seward and Tern Lake on the Kenai Peninsula. Found throughout mainland and insular Southeast (D. Gibson, pers. commun.).

Biology/Natural History: Hunts soon after dusk over meadows and treetops. Diet varies with habitat, but usually consists mostly of small mammals; may also feed on large insects, reptiles, amphibians and birds. Locates prey by sight or sound. Male bows and clicks bill during courtship (Terres 1980). Pairs preen each other and call in duets (Kaufman 1996). Nests in natural cavities, hollow stumps, and abandoned nesting holes of other birds. Usually does not use nesting materials. Breeds in late winter/early spring, laying 2-8 (usually 4-5) white, oval eggs. Incubation is by female, although male may roost in hollow with female during the day. Incubation lasts approximately 26 days. Male feeds incubating female and both parents feed young; young fly at about 28 days. Parents aggressively guard nest. Call is distinctive; a series of monotonous, evenly pitched notes, starting slowly then increasing in cadence and ending with a whinny.

Habitat: Found in a variety of habitats, especially open coniferous and deciduous forests and along rivers, creeks, ponds and bogs. Also forest edges and in suburban areas in parks, orchards and gardens. Often nest near water (Campbell et al. 1990). In southern part of range in mesquite groves and saquaros (Kaufman 1996). Probably non-migratory in Alaska due to sufficient habitat to meet year-round requirements (P. Schempf, pers. commun.). In Yakutat, appears to favor riparian spruce (B. Andres, pers. commun.).

Management Issues/Special Concerns: Very little is known about this species in Alaska. Development of an owl survey program in Southeast would provide much-needed information concerning this owl's distribution and relative abundance. Threat to this owl in Southeast Alaska is most notably loss of old growth forest. Young forests, with their high stem densities, probably

do not provide suitable nesting, roosting, or foraging areas for owls.

GREAT GRAY OWL

(*Strix nebulosa*)

Distribution: Found in boreal and coniferous forests in Alaska and throughout the Northern Hemisphere. Uncommon to rare breeder in Central, Southcoastal and Southeastern Alaska. Unevenly distributed across boreal and coniferous forests of Canada from Yukon east to Ontario and probably Quebec. In the US, from Washington, Idaho and Montana south through Cascades and Sierra Nevada to east-central California and in Rocky Mountains to northwestern Wyoming. Tendency to wander irregularly south in winter, rarely as far south as Colorado and Pennsylvannia.

Biology/Natural History: Territorial call primarily nocturnal, males lower pitched than females. With adequate prey, territories may be established in fall or be maintained all year (and pairs remain bonded). Usually monogamous, polygyny occasionally suspected. Timing of breeding varies with availability of prey. Egg-laying from late March to mid-May. Clutch size ranges from 2-5 eggs; more when prey abundant. Incubation period approximately 30 days; begin incubation with laying of first egg. Female broods young for 2-3 weeks after hatch. Males feed females and young at nest. Young leave nest about 4 weeks after hatch, and climb leaning trees to roost above ground. Capable of flight 1-2 weeks after leaving nest. Female stays near young, and male continues to provide food. Young become independent at about 3 months. Most breed first at 3 years of age, occasionally at 2, and rarely at 1. Hunts from perches, stoops on prey within 100 m. Capable of detecting and capturing prey up to 45 cm beneath snow, and through hard crust. Voles constitute 90% or more of prey. In Central Alaska, yellow-cheeked voles are most important species (50-75% of items). Active nests in abundant prey years may be 1-2 km or less apart. From aerial surveys, adult densities in Central Alaska ranged 0.01- 0.002 birds/km^2 in a 500-800 km^2 area over 4 years. Availability of nest sites, old raven and raptor stick nests, and broken-top snags (owls do not construct their own nests), may limit population growth. Predation on juveniles by Great Horned Owls and Northern Goshawks may also negatively affect populations.

Habitat: Forest interspersed with openings. In Central Alaska, white spruce/balsam poplar riparian forest with oxbow meadows; also open spruce and mixed forests. Require openings for hunting. Often nests in dead trees, especially poplars. May use dense conifers for winter roosts.

Management Issues/Special Concerns: Great gray owls are generally uncommon throughout their range. Timber harvest would reduce number of large diameter, old trees that become nest trees, and leaning trees used for roosting by fledglings. Man-made nest platforms have enhanced breeding in some locales. Boreal Partners in Flight ranking for North Amercian abundance=4 (Rare).

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BOREAL OWL

(*Aegolius funereus*)

Distribution: Found in boreal and subalpine forests in Alaska and throughout the northern hemisphere. Breeds in all regions of Alaska but Northern and Southeastern; is rare in winter in Southeast, and accidental or casual in other seasons (Armstrong. 1995). Range in North America extends east through boreal forest to southern Labrador, and south down Cascades to Oregon and in the Rockies to northern New Mexico. Winter movements in North America are poorly studied; in Europe are nomadic in response to snow depth and prey availability, females are less tied to breeding areas than males.

Biology/Natural History: Males may sing as early as December or January, but most singing is heard in March and early April. Males sing to attract mate and advertise nest cavity, and cease singing after pairing. Polygyny and biandry observed in years with abundant prey in Europe, but have not been documented in North America. Males feed female at nest. Clutches range 2-6 eggs, and vary with abundance of prey. Incubation begins with laying of 1st egg, and averages 29 days. Young remain in nest about 30 days after hatching. Male provides food for first 3 weeks while female broods young. First breed at 1-2 years, females more often at 1 year old. 'Sit-and-wait" nocturnal predator on small mammals, especially red-backed voles, and shrews; and less commonly on birds (thrushes, chickadees, redpolls). Young snowshoe hares may be important during peak of hare cycle. Home ranges in Idaho and Colorado ranged 230-2,390 ha in summer and 320-3,390 ha in winter; in Ontario 3 males used areas of 100, 250 and 500 ha. Active nests within 500 m of one another are common in productive agricultural areas in

Scandinavia. Availability of nest cavities may limit distribution and abundance; dependent primarily on Northen Flickers and other large woodpeckers for creating cavities. Predation at nest by marten and possibly red squirrels; Great Horned Owl and Northern Goshawk likely predators of young and adults (Hayward and Hayward 1993).

Habitat: Boreal forests of black and white spruce, aspen, balsam poplar, or paper birch. Nests may be more common in mixed or deciduous forests (especially aspen) where suitable cavities are available. Conifers are preferred for roosts. Boreal Owls appear to prefer closed-canopy forests, in contrast to Great Gray and Northern Hawk owls (potential competitors for prey) that use more open forests. Boreal Owls also hunt in forest openings (Meehan and Ritchie 1982).

Management Issues/Special Concerns: Extensive logging of the boreal forest would impact boreal owls. Retention of large aspen and poplar may provide nest sites. In Scandinavia, where logging has had a dramatic impact, man-made nest boxes provide nest sites and help maintain owl populations in the absence of extensive forests. Boreal owls are not monitored by Alaska BBS. Considered rare or uncommon throughout North America.

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BLACK SWIFT

(*Cypseloides niger (borealis)*)

Distribution: The breeding range of the Black Swift extends from Southeastern Alaska, and British Columbia to Washington, southwestern Alberta, and northwestern Montana. They are also found in the mountains of central and southern California, along the coast of central California, and the mesa country of western Colorado. Within this area, Black Swifts only occur in isolated colonies (Knorr 1961). The Black Swift is an uncommon probable breeder in the river valleys of the southern mainland of Southeastern Alaska from the Stikine River south, including adjacent islands (Kessel and Gibson unpubl. rep.). The Black Swift is a casual spring migrant and summer visitant as far north as Haines (B. Browne, pers. comm.). There are no repeated annual observations north of the Stikine River (Kessel and Gibson unpubl. rep.). Swarth (1911)

reported it as common in June 1909 in large flocks at the head of Marten Arm of Boca de Quadra and at Portage Cove on Revillagigedo Island. Eleven years later, Swarth (1922) documented flocks of 75-100 birds at Sergief Island on the Stikine River. Gibson and McDonald (1975) observed Black Swifts on the Unuk (27 birds), Salmon (56 birds) and Stikine (26 birds) rivers. McDonald (1975) reported the largest flock (100 birds) on the Chickamin River on 13 August. Nine swifts were observed at Annette Island, near Ketchikan (Isleib et al.1986). Andres et al. (1997) observed Black Swifts 11 miles upriver flying over the Chickamin lowlands (6 birds), upriver on the Marten (8 birds) and Walker (8) Rivers and in the south Arm of Rudyerd Bay(7 birds) in Misty Fiords National Monument. Variation in flock size is dependent on season; large groups appear to be dispersing or migrating flocks. Black Swifts winter in southern and western Mexico south to Costa Rica and the Greater Antilles (except Puerto Rico) and into northern South America (Ehrlich et al. 1988, Stiles et al. 1989).

Biology/Natural History: Black Swifts are summer residents in select river valleys in southern Southeastern Alaska, occurring from May to September. Black Swifts begin arriving in late May (McDonald 1975). Alaska's latest fall record is September 12 on Annette Island (Isleib et al. 1986). Black swifts fly fairly high in the air, feeding exclusively on flying insects captured on sustained, long-distance foraging flights. Swifts forage over extremely wide areas, often far from their breeding site (USDA Forest Service 1994). Foraging height seems to be influenced by weather and topography; they often use updrafts associated with cliffs or storm fronts and may be found foraging near ground or water within low pressure systems. Gibson and McDonald (1975) noted they are most often seen in changing weather and observed Black Swifts foraging over both fluviatile and lacustrine waters. Black Swifts nest in small colonies and have a very low reproductive potential, laying just 1 egg each year. Individuals return to traditional breeding sites and add fresh nest material to existing nests (USDA Forest Service 1994). Kondola (1973) found Black Swifts nesting at the same site in Alberta where they had been reported 46 years earlier and then for 7 successive years. Nest failures are apparently common although the cause is unknown, but may be most often related to heavy precipitaion events (Hunter and Baldwin 1962).

Habitat: During the breeding season in Southeastrn Alaska, Black Swifts appear to be restricted to river valleys with steep unvegetated cliffs. Although nesting has not been confirmed in Southeastern Alaska, summer sightings in adequate habitat suggest Black Swifts are a probable breeder. Five physical factors were found to be present in a study of Black Swift nest sites in the Colorado Rockies (Knoor 1961); presence of water at nesting site, high relief, inaccessibility to ground-dwelling predators, darkness and unobstructed flyways. Water seems to be one of the most significant factors. These features are found in abundance in fiords and river valleys of mainland mountains and, to a lesser degree, on adjacent islands in southeastern Alaska. In Misty Fiords Monument, swifts were observed in mid June 1977, from 0.25-11 miles up several mainland river systems, foraging at forest canopy level to about 700 feet (Canterbury 1997, unpub. data). McDonald (1975) documented the arrival of Black Swifts in May foraging over estuarine meadows; 3 days later they began appearing upriver. In July flocks of 20-40 birds were observed 11 miles upriver where the steep cliffs and large freshwater marshes of the Chickamin River provide suitable nesting and foraging sites. Wet sea cliffs may also provide

nesting habitat for Black Swifts in Southeastern Alaska; such habitats along the outer coast have not been surveyed.

Management Issues/Special Concerns: Concern for Black Swifts should be high due to their small population size, low reproductive potential, and documented high frequency of nest failure. Habitat features, such as cliffs, are available throughout the mainland and many areas offer dark, moist inaccessible niches for nest sites. The factors causing Swifts to colonize some areas, but not others are unknown. The Black Swift may be influenced by the availability of freshwater marshes. These marshes, usually formed by beaver dams, are found in major river valleys of mainland Southeastern Alaska.

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VAUX'S SWIFT
(*Chaetura vauxi*)

Distribution: Breeds from southeastern Alaska, southern and western British Columbia to northern Idaho, northwestern Montana, northern and western Washington, through the Cascade and Sierra Nevada ranges to central California. Local breeder in eastern Mexico. Winters in

southern Mexico and Central America. North American migrants and Central American populations may mix in winter. Southern limit of winter range is unknown (DeGraaf and Rappole 1995). In Alaska, observations are restricted to Southeast. Observed on mainland rivers: Chickamin, Unuk, Salmon, Stikine, and Taku, in Boca de Quadra, on Revillagigedo Island and near Juneau, Sitka, Wrangell and Petersburg (Gabrielson and Lincoln 1959, Gibson and MacDonald 1975, Gibson 1976). No confirmed breeding records exist in Southeastern Alaska, but a female with a partly formed egg was collected on the Chickamin River (Gabrielson and Lincoln 1959).

Biology/Natural History: Very little is known about this species in Alaska. Feeds mostly on flying insects such as flies, bees, ants, moths, aphids, beetles and mayflies. Occassionally eats spiders and flightless insects. Forages singly and in flocks. May nest in colonies or as solitary pairs. Will nest in unused chimneys. Courtship involves much chasing, gliding with wings in a "V" above body is common. Both male and female build nest, usually in a hollow tree, from twigs acquired during flight. Nest is a half cup and secured to inside wall of tree; twigs are glued together with saliva. Eggs (3-7, usually 6) are incubated (18-19 days) by both parents. Both sexes feed and care for young. Additional help for incubation and nestling care may come from other adults. Young fledge at 28-32 days, but may remain near or return to nest for several days after hatching (Kaufman 1996, Campbell et al. 1990).

Habitat: Nests in coniferous and mixed forests, expecially old-growth. Often observed foraging over lakes, rivers, open country and clearcuts. Many records from Southeastern Alaska are along rivers and estuaries (Kaufman 1996, Gibson and MacDonald 1975).
Management Issues/Special Concerns: Need to determine breeding status of Vaux's Swift in Alaska. Monitoring should include repeat visits to known observation sites, which may lead to breeding status information. Trend data from other regions varies.

RUFOUS HUMMINGBIRD
(*Selasphorus rufus*)

Distribution: Breeds from Southcoastal Alaska souheast to southwestern Yukon, northwestern and southern British Columbia, southwestern Alberta, throughout Washington, northern Oregon and Idaho and western Montana. Coastally, breeds south to northern California (Kaufman 1996). In Alaska, breeds from Cook Inlet east and south throughout Prince William Sound and Southeast Alaska. Winter range extends from southern Texas south to Guerrero and Veracruz, Mexico.

Biology/Natural History: Arrives in Alaska as early as late April via a Pacific coast migratory route (Kessel and Gibson 1978). Males usually precede females to breeding grounds. Polygynous, and during courtship, male flies a steep "U" or vertical oval, popping and whining at the completion of diving portion. May also buzz back and forth before perching female. Female builds nest of plant down, spider webs, buds, lichens, moss and other plant fibers and

lines it with plant down. Nests are often refurbished and used in succeeding years. Nests low (up to 10 m) in conifers, deciduous shrubs, and vines. White eggs (usually 2) are incubated 15-17 days. Chicks are fed by female and fledge at about 21 days. Diet is predominately nectar, but occassionally insects. Tends to aggressively defend feeding territories against intruding birds and small mammals (Kaufman 1996, Erlich et al. 1988). Leaves Alaska beginning in late July. Thought to migrate south via an inland route along the Rockies and Sierras and through the southwestern U.S.

Habitat: Found in a variety of habitats throughout breeding range including old growth, second growth, thickets, and shrubby hillsides (A.O.U. 1983). Multiple sources from Southeastern Alaska reflect the diverse habitats used by this species in summer. Found in hemlock/spruce forests, deciduous woodlands, muskeg forests, early successional spruce/hemlock forests, riparian shrubs, old growth and scrub forests (Pogson et al. 1997). High densities have been reported in a variety of habitats, most often in scrub or early successional habitats. In wintering areas, found in pine and pine-oak forests and second-growth scrub (Stotz et al. 1996). Clarification of nesting and foraging habitat-use patterns is needed.

Special Concerns/Mangement Issues: Not adequately monitored by Alaska BBS; specialized survey may be needed to ascertain population trends for this species.

RED-BREASTED SAPSUCKER
(*Sphyrapicus ruber*)

Distribution: Breeds from southeastern Alaska, western, coastal and insular British Columbia, south through western Washington and Oregon to northwestern California. Also found in Sierra Nevada and in extreme western Nevada. Found locally in southern California mountains. Possibly breeding in extreme western Arizona. Winters throughout much of the breeding range except interior British Columbia, and south to Baja California (Kaufman 1996, A.O.U. 1998). In Alaska, restricted to Southeast. On mainland, Gibson and MacDonald (1975) found them to be more common south of the Stikine River. Gibson (1976) found them common throughout the islands of Southeast, and Gabrielson and Lincoln (1959) considered them “an uncommon resident from Icy Straits and Skagway south to Dixon Entrance, being more frequently seen from Petersburg to Ketchikan”.

Biology/Natural History: Many life history details of this species remain to be elucidated, but are thought to be similar to Yellow-bellied and Red-naped Sapsuckers. Diet is variable, including insects found in tree bark, sap, berries and fruit. Courtship display not well described, but thought to differ from Yellow-bellied Sapsucker due to lack of sexual dimorphism. Outside of Alaska, nests commonly in deciduous trees, but also in spruce (B.A. Andres, pers. commun.). In Southeast, known to nest in hemlock/spruce forest (Gibson 1976). Studies in British Columbia reveal a tendency to nest in dead trees versus live trees. Nest site is often on edge of forest, near a marsh, lake or other opening. Nests in cavities ranging from 1.8 m to 24.3 m, usually below 10 m. Clutch size is up to at least 6 eggs and nestling period is at least 22 days (Campbell et al.

1990). If like Yellow-bellied Sapsucker, both parents incubate eggs and tend to young. Incubation probably about 12-13 days (Kaufman 1996).

Habitat: Often associated with mature stands, especially hemlock and/or spruce in Pacific Northwest and Southeastern Alaska, but may not be an obligate old-growth species. Dellasala et al. (1996) had significantly higher detections in virgin old-growth forest than in any of 3 other stand types. Kessler and Kogut (1985) found them commonly nesting in riparian clearcut snags. Kessler (1979) recorded them only on old-growth transects, but also observed them in recent clearcuts.

Special Concerns/Management Issues: Numbers have probably declined elsewhere, but the bird is still considered numerous (Kaufman 1996). The species is frequently observed on Alaska BBS; it occurs on all routes in Southeastern (11.3 birds per route). Adding more off-road point count routes to monitoring scheme may be sufficient for monitoring this species.

BLACK-BACKED WOODPECKER

(*Picoides arcticus*)

Distribution: Resident throughout the boreal forest of North America. Occurs from western and central Alaska, southern Yukon and Northwest Territories, northern Alberta and Saskatchewan, central Manitoba, most of Ontario, southern Quebec and Labrador to Newfoundland, and south through most of British Columbia (except coast) to northern Idaho, western Montana, and down the Cascade and Sierra Nevada ranges, and east across central plains provinces to Great Lakes states and northern New England, and maritime provinces (Kaufman 1996, A.O.U. 1998). In Alaska, found throughout Interior forests from base of Alaska and Seward peninsulas eastward. Generally, not found on the coast.

Biology/Natural History: Eats larvae of wood-boring beetles; also other insects and spiders, fruits and nuts. Forages by flaking bark from dead trees or logs; sometimes gleans insects from live trees. Exhibits a large repertoire of aggressive and courtship displays (Kaufman 1996, Ehrlich et al. 1988). Both sexes excavate nest 2-15 feet in dead tree or stub; usually a conifer, but also in deciduous trees. Both sexes incubate the 3-4 white eggs; male usually incubates at night. Eggs hatch at 12-14 days. Both sexes feed nestlings; male forages farther from nest. Young are thought to fledge at about 25 days. Migration is erratic, birds often move into new burns. Southward irruptions in winter are not uncommon.

Habitat: Boreal coniferous forests. Prefers areas with many dead or dying trees; found in high densities in burns and flooded areas with dying trees. Occurs in lowland forests in the north, mountains in the west (Kaufman 1996). Uncommon in mixed or coniferous forests (A.O.U. 1998).

Management Issues/Special Concerns: Due to sporadic movements and preference for new burns and flooded areas, it is difficult to monitor. Population is thought to be stable.

OLIVE-SIDED FLYCATCHER

(*Contopus cooperi*)

Distribution: Regularly breeds at low densities throughout the coniferous boreal and coastal forests of Alaska (often characterized as uncommon or rare [Armstrong 1995]). Ranges to northern and western extent of coniferous forest to Noatak River in the northwest, Bethel and Katmai areas in the west/southwest, and to Colleen and Porcupine rivers in the northeast (Kessel and Gibson 1978). North American breeding range extends east through coniferous forests to southern Labrador, in the Northeast south to Massachusetts and locally to North Carolina, in the Midwest south to northern Wisconsin and northeastern Ohio, and in the West south along coastal ranges to Baja California and in the Rockies to southeastern Arizona and western Texas. Winters primarily in mountains of northern and western South America from Venezuela south to se Peru and n Bolivia. Also reported wintering as far east as Sao Paolo, Brazil, and north to Panama and uncommonly from Costa Rica into Mexico (Altman 1997).

Biology/Natural History: Males return to Central Alaska breeding areas in mid- to late May, with most females returning 1-2 weeks later. Remains in Central region through late August. Feeds from prominent perches by aerial hawking large insects such as Hymenoptera (bees, wasps, ants), and Coleoptera (especially bark beetles); in Central Alaska, especially yellowjacket wasps, and dragonflies, especially the large blue *Libellula* (6.5 cm long and 0.6 g). Nests almost exclusively in conifers, from 1.5 to 25 m above ground, on a horizontal limb. In Central Alaska, 19 nests averaged 6.4 m above ground (range 3-12 m) in trees averaging 9.4 m tall (range 4.5-17 m), primarily black spruce (n=15), also 3 nests in white spruce and 1 nest in larch. One clutch of 4 eggs, 2 clutches with 3 eggs were observed in renests. Incubation lasts 14-15 days, fledging 16-18 days after hatch. Adults and young remain together on or near territory for at least 14-17 days after fledging. One brood per season, renesting not uncommon after nest failure. May occasionally be polygynous. In Central Alaska, 50% of 14 first nest attempts failed; predation by red squirrels and gray jays suspected. Very limited marking of adults indicates both breeding (by both sexes) and wintering site fidelity. Males use large singing territories; in Central Alaska 17 territories averaged 17.9 ha (range 9.7-26.4); in other parts of range, breeding densities suggest territories in 8-16 ha range but some up to 40-45 ha per male. Therefore, caution should be used in calculation of territory size from density. In Central Alaska territories did not saturate open coniferous forest habitat, but were often aligned along drainages or otherwise associated with openings or water, interspersed with large gaps of unused habitat (Wright 1997).

Habitat: Considered an indicator species of the coniferous forest biome throughout North America, although it is occasionally found in mixed deciduous/coniferous forests. In Central Alaska, most often found in open conifer forest. Usually associated with openings (muskegs, meadows, burns, and logged areas) and water (streams, beaver ponds, bogs, and lakes).

Apparently requires an uneven canopy or openings for aerial hawking, and wet areas productive of insect prey. Regularly uses prominent dead or partially dead trees for perching, singing, and hawking. In Central Alaska, perches averaged 1.4 times the height of surrounding tree canopy; 25% of perches were dead trees, 51% were partially dead (most with dead tops), and 24% were live. Nests were placed in live trees slightly shorter than surrounding canopy.

Management Issues/Special Concerns: BBS data provide strong evidence for population declines over most of breeding range. Because no consistent impact is immediately obvious across its broad breeding range, declines may relate to problems on the winter range. As noted above, its primary wintering habitat (based on limited anecdotal information) -- mature evergreen forests of low-mid elevation in the Northern and Central Andes -- is one of the most heavily altered habitats in South America. Andean valleys are almost completely deforested, and 85% or more of montane forests have been cut. Potential impacts on the breeding range are less obvious. Fire suppression policies may have reduced breeding habitat by eliminating or reducing a primary mechanism for creating forest openings and uneven canopy structure. Singing males have been detected in logged areas where snags remain, but some speculate that logging is not equivalent to fire, and that logged areas may not provide adequate prey or may expose olive-sideds to increased predation.

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WESTERN WOOD-PEWEE
(*Contopus sordidulus*)

Distribution: From east-central Alaska, southern Yukon, southwestern Northwest Territories, south through British Columbia, Alberta, Saskatchewan, Washington, Idaho, Montana, Oregon, Wyoming, Colorado, Utah, Nevada, northern and coastal California, and throughout Sierra Nevada, eastern Arizona, western New Mexico, and extreme west Texas (Kaufman 1996). Winters from Panama to Peru. In Alaska, it is an uncommon breeder along mainland Southeast rivers, and in east central Interior as far west as Denali National Park, south to northern Kenai Peninsula. Occasional spring and summer visitant in northern and western Alaska to the Kobuk and Ambler rivers and Nome (Kessel and Gibson 1978, B.A. Andres, pers. commun.). Rare in Southcoastal Alaska (Kessel and Gibson 1978).

Biology/Natural History: Nearly obligate insect eater. Diet includes flies, bees, wasps, ants, moths, beetles. Sallies from exposed perches to catch flying insects; sometimes hovers while

gleaning insects from leaves and twigs. Male defends territory by singing. Little is known of courtship behaviors. Nest is probably built by female and placed some distance from trunk 15-40 feet from ground. Nest is an open cup of grass, plant fibers, plant down with an exterior of moss, lichen, and leaves; usually placed in a deciduous tree. Female incubates 2-4 whitish (often with brown and lavender blotches on large end) eggs 12-13 days. Both parents care for young which fledge at 14-18 days (Kaufman 1996).

Habitat: Found in a variety of wooded habitats. Aspen groves, pine-oak woods, and riparian cottonwood/willow. In Southeastern Alaska, occurs along large mainland rivers, much less common on islands (Kessel and Gibson 1978). Found in pure deciduous stands on Fort edges and scrub woods are winter habitats (Kaufman 1996).

Management Issues/Special Concerns: Common through much of its range, but has experienced long-term declines (DeGraaf and Rappole 1995). Degredation of riparian habitats throughout this species' range could negatively affect the population.

HAMMOND'S FLYCATCHER

(*Empidonax hammondii*)

Distribution: Common breeding species in east-central Alaska. Uncommon, local breeder in southeastern Alaska along mainland rivers. Casual/accidental in Southcentral. (Armstrong 1995). One record from northern Alaska (Sadlerochit R. 1937; Kessel & Gibson 1978). Breeds south through Rockies to southern Utah and north-central New Mexico, south through coastal ranges and Cascades to northern California, and in Sierra Nevada to east-central California. Winters from southeast Arizona, western Chihuahua, southern Coahuila, central Nuevo Leon and central Tamaulipas through highlands of Mexico, Guatamala, and El Salvador to Honduras and probably norht-central Nicaragua (Sedgwick 1994).

Biology/Natural History: Earliest returning flycatcher in Central Region; average first arrival in Fairbanks around 1 May. Departs late August (Kessel & Gibson 1978). Feeds within forest on small insects primarily by aerial hawking, but may occasionally forage extensively on leaf surfaces or on ground. Foraging tactics vary with stage of breeding cycle; foraging high in canopy and from leaves commonly occurs early in season. Eats Coleoptera, Diptera, Homoptera, Hymenoptera, and Lepidoptera. Prefers horizontal limbs for nest, but may also nest in crotch of trunk/limb (especially in deciduous trees). Cup nest of weeds, grass, bark, lichens with lining of feathers, fur and plant down is constructed by female. Average nest height is 7.5-19 m (range 3.2-31 m). First breed as second-year birds. Clutch of 3-4 eggs, 4 eggs predominating; incubation 15 days; fledge 16-18 days after hatch. One brood per season. Nest success to fledging is about 50% in a study in Pacific Northwest coniferous forest; significant predation was by jays. Very limited information indicates possible nest site fidelity by breeding adults. Estimates of density in deciduous or mixed deciduous/coniferous forests range from 14-47 birds/km^2 in 3 studies (Sedwick 1994); 1.3 territories/10 ha in aspen forest near Northway,

Alaska (Spindler and Kessel 1980).

Habitat: In Central Alaska, most often in deciduous stands, especially mature aspen (Spindler and Kessel 1980). In southeastern Alaska, found in riparian deciduous forests (Kessel and Gibson 1978, Armstrong 1995). In remainder of range, dense fir forests and other coniferous forests are primary habitat, though use of pure aspen stands has been observed in Colorado (Sedgwick 1994). Prefers mature stands with openings (Spindler and Kessel 1980), generally of at least 10 ha (Sedgwick 1994). Openings and hetereogeneous vertical structure may be acceptable or even preferred in Alaska. Winters in highland forests of Mexico and Central America (Stotz et al. 1996).

Management Issues/Special Concerns: Prefers mature and old-growth forests for nesting in Washington, California and Alaska. Stands of >10 ha and minimum of 80-90 years old recommended in northern California Douglas-fir/tan oak forests; intact stands >15ha are of more benefit than stands with openings of scattered large trees. More study of specific habitat requirements in Alaska is needed. Large-scale harvest of aspen forests for pulp and other uses would eliminate suitable habitat in Central region.

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PACIFIC-SLOPE FLYCATCHER
(*Empidonax difficilis*)

Distribution: Breeds from southcoastal Alaska and western British Columbia south through western Washington, Oregon and California, west of Cascade and Sierra Nevada ranges, and south to Baja (Pogson et al. 1999). Winters from southern Baja to southern Mexico. In Alaska, fairly common to common breeder throughout Southeast (Brann and Andres 1997, Gibson 1976,

Gibson and MacDonald 1975). Sparse breeder north to Yakutat (B.A. Andres, pers. commun.).

Biology/Natural History: Arrives in Southeastern Alaska in mid-May (Pogson et al. 1998). Eats insects, especially wasps, bees, flies, catepillars, moths and beetles by sallying from a below-canopy perch. Occasionally eats berries and seeds and gleans insects from foliage. Female constructs nest low in forest subcanopy or on the ground, but may nest higher up if building on an unnatural structure. In British Columbia, known to nest in deciduous and coniferous trees as well as shrubs. Cup nest is built of moss, grass, rootlets, strips of bark, lichens, leaves and lined with hair, feathers and plant down; nest construction takes up to 6 days. Lays 3-5 white eggs with brown blotches. Female incubates 14-15 days, bu both parents attend nestlings. Young fledge at 14-18 days (Kaufman 1996). Often produces 2 broods each year in British Columbia, but such detailed information is lacking for Alaska.

Habitat: Prefers old-growth coniferous forests, especially near streams. DellaSala et al. (1992) found them to be 7-16 times more numerous in old-growth than in 20-year old successional forests. Coastal birds are more closely associated with forest habitats than are interior birds in British Columbia. Winters in west Mexican cloud forests.

Management Issues/Special Concerns: This species is common throughout Southeastern Alaska; occurs on all BBS routes in the region (>19 birds per route) and is adequately monitored in the region.

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NORTHERN SHRIKE
(*Lanius excubitor*)

Distribution: In summer, found from northern and western Alaska (west to Unimak Island) east to Northwest Territories and northern edge of prairie provinces to northern Ontario, Quebec and central Labrador. Winter range includes much of breeding range from central Alaska, south to central California, southern New Mexico and central Arizona and eastward across midwestern states to central Illinois, Indiana and Great Lakes states and southern Canada, eastward to Maryland and northern Virginia and north to New Brunswick, Nova Scotia and insular Newfoundland (Terres 1980). During summer in Alaska, shrikes are found from the arctic coastal plain south to the northern foothills of the Brooks Range and Chukchi and Bering Sea coasts, west to Adak Island in the Aleutians, east to Canada and south to northern Prince William Sound (Islieb and Kessel 1973, Cade and Swem 1995). In winter, from Alaska Peninsula, lower Kuskokwim and Fairbanks south to Kodiak, Prince William Sound and

Southeast (Gabrielson and Lincoln 1959).

Biology/Natural History: Perches high in territory watching for prey. Frequently changes perches by flying low and rising rapidly just before alighting on new perch. Diet is varied and includes grasshoppers, crickets, ants, beetles, wasps, cutworms, caterpillars, spiders, flies and bees; small mammals including voles, gophers, lemmings and mice; also birds ranging in size from chickadees and redpolls to mourning doves; when available will feed on lizards, snakes and frogs. Lays 2-9 (usually 4-6) green/grey-white eggs with brown/lavender spots in a bulky, twig nest 5-45 feet above ground in a willow, spruce, or bush. Incubation period is unknown, but young are thought to leave nest appproximately 20 days after hatching (Terres 1980). Successful nests in Alaska have fledged 5-6 young (Cade 1967). Parents feed young out of the nest for up to 10 days.

Habitat: Lives throughout coniferous forest region, but prefers edges and open willow shrub areas in Alaska and swamps and bogs with shrub borders elsewhere. On tundra, inhabits tall shrubs along riparian corridors.

Management Issues/Special Concerns: Alaska may be breeding grounds for a high percentage of total population. Threats on breeding grounds do not seem imminent, but threats on wintering grounds could be more substantial. Concern based on rarity and reported declines in other shrike species. Lack of sufficient monitoring effort may be greatest reason for concern.

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STELLER'S JAY
(*Cyanocitta stelleri*)

Distribution: From southcoastal Alaska, south along coast to central California, east across central British Columbia to western Alberta. Occurs throughout Rocky Mountains of western Montana, Wyoming, Colorado, and New Mexico, northern and southeastern Idaho, south through Utah and Arizona. Also found in Cascades of Washington and Oregon, northeastern Oregon, and in the Sierra Nevada of California (Kaufman 1996, A.O.U. 1998). In Alaska, from Cook Inlet and Anchorage east across Prince William Sound and south through mainland and insular Southeast (Gabrielson and Lincoln 1959).

Biology/Natural History: Omnivorous, but probably eats mostly vegetable matter; eats many

seeds, berries and wild fruits. Also eats beetles, wasps, spiders, bees, and other insects and vertebrates (bird eggs, lizards and rodents) and food scraps. Generally forages high in trees, but also on the ground. Courting male feeds female; pair is quiet during nesting season, except if nest is threatened. Nest is built by both sexes usually 10-30 feet from ground. Nest is large and constructed of twigs, leaves, moss and lined with grass, rootlets, and pine needles, and cemented with mud. Up to 6 (usually 4) blue-green eggs spotted with brown or olive are incubated by female for 16-18 days. Both parents feed young andfFledging is probably about 3 weeks. Usually a permanent resident throughout its range; sometimes migrates short distances in winter to a better food supply (Kaufman 1996).

Habitat: In Alaska, found predominately in coniferous forests; Dellasala et al. (1996) found no difference in densities between several young-growth treatments and old-growth forests in Southeastern Alaska. In other areas may be in pine, pine-oak or deciduous forests; also found in woodlands and orchards (Kaufman 1996).

Management Issues/Special Concerns: Forest management practices may impact this species; its range in Alaska is entirely within timber producing regions of the state.

NORTHWESTERN CROW

(*Corvus caurinus*)

Distribution: Coastal species from Cook Inlet and Kodiak Island south and east to southwestern Washington and occasionaly northwestern Oregon (A.O.U. 1998). In Alaska, it inhabits coastal areas from the Alaska Peninsula to Kodiak, Prince William Sound, Yakutat, and throughout Southeast (Isleib and Kessel 1973, Gabrielson and Lincoln 1959).

Biology/Natural History: Closely related to American Crow, but is an obligate tidewater inhabitant. Feeds on fish and other animal carcasses as well as clams, mussels, marine worms, and other intertidal fauna. Also eats eggs of nesting gulls and other seabirds, and, occasionally elderberries and salmonberries (Gabrielson and Lincoln 1959). Often seen dropping clams and mussels while flying and retrieving exposed contents on beach. Sometimes caches food on territory. Solitary nesters; both sexes build nest of twigs, sticks, bark, plant fibers, mud which is lined with grasses, hair and other soft materials. Sixty-four percent of 391 nests in British Columbia were in trees, mostly conifers. Also nests in shrubs or on ground. Nest height usually is 1.2 - 8 m, but can be as high as 45 m. Eggs (4-5) are blue-green or gray-green with brown and gray blotches. Incubation from last egg laid is 18-19 days. Information on fledging date is variable; reports from British Columbia are 23-35 days (Campbell et al. 1997).

Adapts easily to human-induced environmental changes and are becoming increasingly common in and around coastal towns and cities. Systematic status has always been debated as some feel it is conspecific with American Crow (Campbell et al. 1997).

Habitat: Coastal beaches, rocky shores, estuaries, coastal ponds and inshore islands. Rarely wanders more than a few kilometers of the coast, except during salmon runs when it is known to forage upriver (Cambpell et al. 1997).

Management Issues/Special Concerns: Due to its strict adherence to the coast, may be vulnerable to ocean pollutants such as oil spills, sewage, or industrial wastes dumped into estuaries and coves. Numbers are thought to be stable in British Columbia (Campbell 1997).

CHESTNUT-BACKED CHICKADEE
(*Phoeciles rufescens*)

Distribution: Occurs from southcoastal Alaska, south to southeastern Alaska, western and insular British Columbia, throughout western and northern Washington, southeastern British Columbia, northern Idaho and northwestern Montana. South through western Oregon and California to Santa Barbara County. Also present through Cascade and Sierra Nevada to central California. Occurs locally in western Alberta (A.O.U. 1998). In Alaska, a resident of coastal spruce/hemlock forests from Kenai Peninsula throughout Prince William Sound to Yakutat and south to mainland and insular Southeastern Alaska (Gabrielson and Lincoln 1959).

Biology/Natural History: Forages mainly by gleaning insects such as catepillars, moths, beatles, leafhoppers, and small wasps; probes into bark for insects. Also eats berries and seeds; often caches food for later use. Common visitant to feeders. Little is known about its reproductive biology, but pairs appear to remain together all year. Nests in cavities left by other birds or may excavate their own cavity. Nest is often less than 7 m above ground, but occasionally much higher. Nest is composed of moss, lichens, feathers, bark, plant down and animal hair. Lays 5-9 white eggs with small reddish-brown dots on large end. Incubation is approximately 15 days, and brooding is approximately 16-19 days (Campbell et al. 1997). Details of incubation and brooding are not well known, but female is suspected of incubation. Both parents are probably involved with caring for young.

Habitat: Coniferous forests, including shore pine muskegs. Tree species variable depending on location. In Southeastern Alaska, common in mature hemlock/spruce forests and also in pole and sawtimber stages of successional forests (Kessler and Kogut 1985, Gibson 1976, Gibson and MacDonald 1975). Common in hemlock/spruce forests in Prince William Sound (Isleib and Kessel 1973).

Management Issues/Special Concerns: This species' preference of old-growth forests makes it vulnerable to timber harvesting and clearcutting. Well represented on BBS routes in Southeast (present on all routes, >16 birds/route/year), less so in Southcoastal. Supplemental monitoring via off-road counts, especially in Southcoastal, would be useful. Possible candidate as an indicator species due to its status as a year-round resident, relative high abundance, and reliance

on cavities.

AMERICAN DIPPER

(*Cinclus mexicanus)*

Distribution: Resident species from northwestern Alaska and northeastern British Columbia south to southern California and New Mexico, eastern foothills of Rocky Mountains, and into central Mexico. In Alaska, from Norton Sound and Kotzebue Sound, west along the Aleutians, and south to Ketchikan. Local distribution reflects preference for fast-flowing mountain streams, whereas they avoid low, relatively flat areas such as the Columbia basin and Snake River. Local altitudinal migrations occur on occasion in search of open water.

Biology/Natural History: Dippers primarily feed on aquatic insect larvae, but occasionally take other invertebrates, small fish, and plant material. Nests are typically dome-shaped of woven moss, constructed on rocks, ledges, upturned roots of fallen trees, or bridges in close proximity to running water. Probably raises two broods in a season under favorable conditions throughout most of its range, except the more northerly latitudes. Polygyny has been documented in dippers, dependent on access to larger food supplies where nesting sites are infrequent, and therefore territory size increases (Price and Bock 1973). Dippers lay 3-6 eggs, incubate for 13 days; young fledge at 18 days (Bent 1964). Ground-nesting dippers are susceptible to predation from mink, marten, weasel, skunk, and water snake. Dippers may compete to some extent with Harlequin Duck, Spotted Sandpiper, and Belted Kingfisher for suitable habitat; however, these other species feed in a wider range of habitats and differ in their foraging behavior relative to dippers.

Habitat: Dippers are a riparian-obligate species and are totally dependent on the productivity of streams and rivers. Territories are oriented linearly along streams, and may vary from 950 m to over 2,000 m in length, depending on the availability of suitable nesting sites. While dippers will forage in deep and swift water, they typically wade in shallow water with their heads submerged, or make short dives into deeper pools. Habitat suitablity depends on the stream substrate as well as the amount of food. Favorable bottom substrate consists of rock rubble (3-20 cm in size) with many emergent rocks for perching.

Management Issue/Concerns: Average counts for American Dipper on the North Amercian BBS is less than one in most of its range; therefore, population trends are difficult to monitor for this species. Habitat loss or indirect impacts may occur from mining, forestry (erosion, water levels), river engineering projects, pollution, and water drawdowns for agricultural, industrial or domestic uses. Positive effects on populations may be realized by the construction of walls, bridges and buildings near streams which may otherwise have limited nesting sites.

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GOLDEN-CROWNED KINGLET
(*Regulus satrapa*)

Distribution: Breeds from Cook Inlet south and east to southern Yukon, northern Alberta, Saskatchewan and Manitoba, central Ontario, southern Quebec and throughout maritime provinces of Canada south along coast and eastern mountains to southern and eastern California, northern Nevada, southern Utah, southeastern and central Arizona, southcentral New Mexico and throughout highlands of Mexico and western Guatemala. In the east, breed in northeastern Minnesota, northern Wisconsin, Upper Peninsula of Michigan, throughout New England states and south through the Appalachian mountains. Not found in Great Plains states and provinces. Winters from Southcoastal Alaska throughout the U.S. and southern Canada except the plains, southern California, Nevada and southwestern Arizona, south to Baja, Guatemala, Tamaulipas, the Gulf Coast and Florida (A.O.U. 1998, Kaufman 1996). In Alaska, breeds coastally in Southcentral from Kodiak, throughout Prince William Sound and south through Southeast. Winters in smaller numbers throughout breeding range in Alaska (Gabrielson and Lincoln 1959, Isleib and Kessel 1973).

Biology/Natural History: Eats a myriad of small insects including beetles, gnats, caterpillars, aphids. Also eats spiders and, occasionally, sap, and fruit. Active feeder in trees and shrubs, especially conifers, where it often hangs upside to retrieve food from the underside of needles and leaves. Rarely hovers or sallies for food. Singing male defends breeding territory, sometimes aggressively, by raising crown feathers and flicking wings and tail. Female builds nest high over 4-6 days in conifer (up to 20 m). Nest is usually attached to horizontal branch, often close to trunk, and is made of moss, lichens, bark stripes, spider webs, twigs and lined with plant down, feathers, and rootlets. Lays 5-11 eggs. Eggs are whitish with brown and gray spots. Female incubates 14-15 days and may be fed by male while on nest. Both parents feed young. Young fledge at 14-19 days (Campbell et al. 1997, Kaufman 1996).

Habitat: Found in coniferous forests (spruce, fir, and hemlock) all times of year; also in mixed forests in southcoastal and central Alaska. In winter and migration, can be found in other trees and shrubs.

Management Issues/Special Concerns: Reliance on dense coniferous forests makes this species particularly vulnerable to intensive timber cutting. Data from British Columbia shows a slight decrease in kinglet numbers over the past 3 decades (Campbell et al. 1997). May be a candidate for forest health monitoring in Southeast Alaska where sufficient numbers overwinter.

GRAY-CHEEKED THRUSH

(*Catharus minimus*)

Distribution: Breeds from northeastern Siberia, northern Alaska, across Yukon and Northwest Territories to Quebec, Labrador and Newfoundland, south to northern British Columbia and plains provinces, northern Ontario, central Quebec, and northern New England; Vermont, Maine and New Hampshire. Winters on Hispaniola, the Guianas, Venezuela, Columbia, Ecuador, Peru and Bolivia (DeGraaf and Rappole 1995). Breeds in Alaska from Chukchi and Bering Sea coasts across northern foothills of Brooks Range as far as shrubby willows are found (records from Wales, Barrow and Wainwright may be migrants), south to base of Alaska Peninsula, throughout the Interior and to northwestern Kenai Peninsula. Uncommon and local in Southcoastal and Southeastern Alaska (Kessel and Gibson 1978, Gabrielson and Lincoln 1959).

Biology/Natural History: Diet is variable, includes beetles, ants, caterpillars, cicadas, sow bugs and earthworms; also crowberries, blueberries. Often forages on ground. Male arrives on breeding grounds first, establishes territory and defends it by singing. Courting consists of male chasing female. Eggs (3-6, usually 4) are green/blue to pale blue with dark spots and laid in a nest of sedges, grasses, mud, leaves, bark, and mosses. Nest height is up to 5-6 m above ground (usually about 2 m) in alders, willows or spruces. Nests found on the Yukon-Kuskokwim Delta were approximately 1 m above ground (B. J. McCaffery, pers. com.). Incubation is 12-14 days and young fledge 11-13 days post-hatching. Both parents feed young. In fall, Alaska birds are thought to migrate far east before flying south to their wintering areas in South America (Kaufman 1996).

Habitat: In Alaska found in a variety of habitats: willow and alder thickets in lowland, upland and subalpine areas; upland and riparian deciduous woodlands; coniferous forests and woodlands (McCaffery 1996, Gabrielson and Lincoln 1959). On Yukon Delta National Wildlife Refuge total numbers and frequency of observation much higher on tall shrub (lowland riparian and alpine riparian) point count routes than on forest (mixed spruce/birch and spruce woodland) routes. Prefers broadleaf forest and woodlands in winter (DeGraaf and Rappole 1995).

Management Issues/Special Concerns: Considered vulnerable to human alteration of tropical

broadleaf forest (Petit, et al. 1993). Analysis of BBS data suggests a decline in eastern North America between 1978-1988 (Sauer and Droege 1992).

Literature Cited:

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VARIED THRUSH

(*Ixoreus naevius*)

Distribution: Breeds from northern and western Alaska, south to base of Alaska Peninsula and Kodiak Island east throughout Alaska and Yukon (except extreme northern portion of territory), and south throughout British Columbia, southeastern Alaska, southwestern Alberta, northern Idaho, western Montana, northern and western Washington, western (and portions of eastern) Oregon, and extreme northern California. Winters in much of southern portion of breeding range; also in northern California, California coast, and Sierra Nevada (Kaufman 1996, A.O.U. 1998). In Alaska, breeds from extreme western Alaska as far north as the Kobuk River, south to Yukon-Kuskokwim Delta, and Kodiak, and east to Kenai Peninsula, Prince William Sound, Yakutat, and throughout Interior to the Canadian border. Also breed throughout insular and mainland Southeast. In winter, found coastally from Seward, Prince William Sound, and throughout Southeast (Isleib and Kessel 1973, Gabrielson and Lincoln 1959).

Biology/Natural History: Diet is predominately insects and berries. Summer diet of mostly insects includes beetles, ants, caterpillars, crickets, millipedes, sowbugs, earthworms, spiders and other invertebrates. Winter diet includes more berries and seeds. Often feeds on ground in heavy brush, but is also seen in open lawns; eats berries and seeds in trees or on ground. Male defends nesting territory by singing. Nest is usually in conifer, except in northern portion of range where nest may be in deciduous thickets, and can be on the ground or in trees at various heights. Bulky nest of twigs, moss, leaves, bark, and lined with softer grasses and rootlets is probably constructed by female. Eggs (2-5, usually 3-4) are pale blue with brownish spots are incubated by female for about 2 weeks. Both parents feed nestlings; fledging times are not well

documented (Kaufman 1996).

Habitat: Found mostly in thick, wet, coniferous forests of the coast; also in dense inland mixed forests. In western Alaska, found also in deciduous shrub and thickets (often riparian) and foraging in open tundra (Kaufman 1996, Armstrong 1995).

Management Issues/Special Concerns: Loss of forests, especially old-growth, is probably greatest conservation concern. Large scale logging may negatively affect populations, especially in coastal areas where this species is found in highest densities.

BOHEMIAN WAXWING

(*Bombycilla garrulus*)

Distribution: Breeding range extends from western Alaska southeast through western and central Canada (Bent 1965; Gabrielson and Lincoln 1959; Godfrey 1986). The northern edge of the breeding range extends from Kotzebue Sound, along the south side of the Brooks Range to the Mackenzie Delta, southeast through the Northwest Territories along Great Bear and Great Slave Lakes to Nueltin Lake, and along the southern edge of Hudson Bay from northeast Manitoba to James Bay. The southern boundary of the breeding range extends from western (excluding coastal) and southcentral Alaska, through the Yukon Territory and British Columbia (except for the coast) to northern Washington, Idaho, and Montana, and through northern Alberta, Saskatchewan, and Manitoba to Ontario. Winter range extends from southcoastal Alaska through central and southern British Columbia, Alberta, Saskatchewan, and Manitoba and continues south to southern California, northern Arizona, and New Mexico, western Kansas, central Nebraska, and the eastern Dakotas (Bent 1965; Gabrielson and Lincoln 1959; Godfrey 1986). It is an irregular winter visitor to Minnesota, the Great Lakes area, Ontario, southern Quebec and on to Nova Scotia and New England (Bent 1965; Godfrey 1986). Found throughout the forested areas of Alaska (Kessel and Gibson 1978). Fairly common migrant and breeder, but rare winter visitor throughout central Alaska . Uncommon to rare migrant and breeder in western and southwestern Alaska, casually visiting treeless areas beyond the spruce edge. Uncommon breeder and common fall/early winter resident in Anchorage area and at Seward, otherwise rare visitor or migrant in other areas of southcoastal Alaska. Fairly common migrant and winter visitor and rare summer visitor and possible breeder in southeastern Alaska.

Biology/Natural History: Feeds primarily on fruits and insects including mountain ash berries, soapberries, cranberries (highbush and lowbush), blueberries, crowberries, bearberries, rose hips, wild raspberries, juniper and cedar berries, hawthorn fruit, crabapples, chokecherries, flowers, tree sap, flies, dragonflies, beetles, and bees (Bent 1965; Gabrielson and Lincoln 1959). Also feed on poplar buds and birch seeds (Bent 1965). Frequently dart out from perches to catch insects or catch them while flying. Nests in spruce, tamarack, fir, or pine (Bent 1965). Nests are usually 1-17 m above ground on horizontal branches often close to the trunk, occasionally farther out on a limb (Bent 1965). Nest is usually constructed of twigs, grasses, leaves, lichens, and mosses and is lined with fine materials such as rootlets, fine grass, plant fibers, conifer

needles, mammal hair, insect cocoons and feathers (Bent 1965). The 4-6 eggs are incubated for 14 days, and chicks fledge in 15-17 days (Baicich and Harrison 1997). Not strongly territorial during the breeding season and are nomadic and sociable during the non-breeding season; will form large feeding flocks in the fall and winter, sometimes mixed with cedar waxwings and robins (Bent 1965). An irruptive species which will invade farther south or east if food supplies fail in their usual range (Bent 1965). Very tame and can often be approached closely (Gabrielson and Lincoln 1959).

Habitat: Breed in coniferous and mixed woods, open muskeg, and burned areas (Godfrey 1986). Winter in areas with abundant berry-producing trees and shrubs, such as urban areas centers with ornamental shrubs (Godfrey 1986).

Management Issues/Special Concerns: Major increases have been recorded by western Breeding Bird Surveys, while slight decreases have been noted during the Christmas Bird Count (Stokes and Stokes 1996). This species is not adequately monitored by BBS or off-road point counts in Alaska and is captured in very small numbers during statewide banding activities.

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TOWNSEND'S WARBLER
(*Dendroica townsendi*)

Distribution: Breeds from eastern interior Alaska and southern Yukon Territory, through British Colombia and southwestern Saskatchewan, and south through the Rocky Mountains to northwestern Wyoming and southern Idaho. The southern portion of the breeding range extends west to the Cascades and interior ranges of Oregon and through most of Washington excluding the Central Basin (Wright et al. in review). Occurs in interior Alaska along the Tanana River drainage where it is a common summer resident near Fairbanks but uncommon east toward Tok and Northway (Kessel and Springer 1966, Spindler and Kessel 1980, T. Doyle pers. commun.). In southcentral Alaska, the species is locally abundant in the greater Anchorage area, on the Kenai Peninsula, and near Cordova in the eastern Prince William Sound-Copper River Delta (Gabrielson and Lincoln 1958, Kessel and Isleib 1973, Matsuoka et al. in review, unpublished BBS data). Abundant throughout southeastern Alaska (Gabrielson and Lincoln, Kessel and

Gibson 1981). Winter range extends from the coast of California through Mexico and Central America and south to Nicaragua and Panama. Large concentrations of wintering birds occur along the central California coast (Root 1988) and the highlands of Chiapas, Mexico (Vidal-Rodriguez 1992).

Biology/Natural History: The Townsend's Warbler first appears in Alaska late April to early May and departs between early August to mid-September (Gabrielson and Lincoln 1958, Matsuoka et al. 1997a). During the breeding season feeds almost entirely on insects. Prefers coniferous foliage for foraging (Mannan and Meslow 1984, Matsuoka et al. 1997b). Nests almost exclusively in coniferous trees (Mannan et al. 1983, Matsuoka et al. 1997a). Prefers to nests in large trees where the incidence of nest predation is low relative to smaller trees (Matsuoka et al. 1997a). The bulky, open-cup nest is typically placed on a main limb or in a group of branchlets of a spruce or fir and is generally well concealed by foliage (Matsuoka et al. 1997a, Wright et al. in review). Composition of the base and the walls of the nest may include bark, conifer needles, small twigs, small branchlets, plant fibers, dried grass, lichens, or spider cocoons depending on local availability. The cup is neatly lined with fine grasses, moss sporophyte stalks, and the hairs of cervids (Mannan et al. 1983, Matsuoka et al. 1997a, Wright et al. in review). Clutch size varies with lattitude with clutches in Alaska (5-7 eggs) larger than those reported in the contiguous United States (3-5 eggs; Matsuoka et al. 1997a). The incubation period is 11-14 days; young fledge 9-10 days following hatch (Matsuoka et al. 1997a). Raises one brood per year. In southcental Alaska, nests are initiated mid-May to early June; young fledge mid-June to early July.

Habitat: Largely restricted to mature forests with tall coniferous trees throughout its breeding range (AOU 1983). Most abundant in large undisturbed tracts of contiguous forest, but will also use forests in late successional stages (Mannan and Meslow 1984, Kessler and Kogut 1985, Wetmore et al. 1985, Hejl et al. 1995, Wright et al. in review). In the Tanana Valley of interior Alaska, this species is largely restricted to mature white spruce forests where breeding density is positively related to the density and dominance of white spruce (Spindler and Kessel 1980). Near Anchorage in southcentral Alaska, territories are selected in areas with relatively high densities of large white spruce, steep-sided slopes, and relatively low densities of alders (Matsuoka et al. in review). In southeastern Alaska, found in coniferous forests and muskegs; post-breeding flocks occur in riparian red alders (B.A. Andres, pers. commun.). Selection of breeding habitats appears to be more closely associated with the selection of nest sites than selection of foraging sites (Matsuoka et al. in review).

Management Issues/Special Concerns: No significant population trend detected from data collected by the Breeding Bird Survey, but the species may not be monitored with sufficient intensity to detect a trend in the population (Peterjohn et al. 1995). Current lack of information on population trends in Canada and Alaska (Wright et al. in review). Populations of breeding birds maybe susceptible to traditional timber harvest methods of clear-cutting and even-aged management (Wright et al. in review). These methods typically result in the loss of habitat features Townsend's Warblers have been found to select (Spindler and Kessel 1980, Mannan and

Meslow 1984, Kessler and Kogut 1985, Matsuoka et al. in review). In addition to direct losses of habitat, timber harvest may also reduce breeding densities in small remnant patches of old-growth with highly fragmented landscapes (Wetmore et al. 1985, Freemark et al. 1995), presumably by increasing exposure to edge related predators and parasites as reported in other species of migrant passerines (Robinson 1992, Hoover et al. 1995). The effects of natural agents of forest disturbance on populations of this species are largely unknown. Townsend's Warblers have been found to occur in relatively low densities in early post-fire forests, but response to changes in forest structure and function resulting from insect epidemics, forest diseases, and large scale wind storms remain unassessed. Populations of this species may be particularly susceptible to winter habitat loss (Wright et al. in review). The Townsend's Warbler has been identified as one of the long-distance migratory landbirds most likely to be negatively affected by alterations of tropical forest habitat (Petit et al. 1995) because of their predominant use of mature coniferous and pine-oak forests habitats in Mexico and Central America (Rappole et al. 1983, Hutto 1992, Vidal-Rodriguez 1992). These preferred montane habitats are undergoing rapid conversion to pasture land, corn and coffee plantations, and residential developments (Rappole et al. 1983, Terborgh 1989). Such land use practices may eliminate Townsend's Warblers from traditional wintering areas.

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BLACKPOLL WARBLER
(*Dendroica striata*)

Distribution: Breeds from northern and western Alaska, throughout Yukon and southern Northwest Territories, east and south to central plains provinces to northern Ontario, central Quebec, throughout Labrador and Newfoundland; south to New York, Maine and Massachusetts. Winters in Ecuador, Columbia, Venezuela, Peru, Chile and Peru (Terres 1980). In Alaska, blackpolls breed in western Alaska as far north as Selawik and the Kobuk and lower Noatak drainages, south to Katmai, common east to central Interior, less common breeder in eastern Interior and Kenai Peninsula. Rare migrant in Southeastern Alaska (Kessel and Gibson 1978).

Biology\Natural History: One of the latest arriving migrants in Alaska. Eats aphids and other tree-infesting insects, flies, beetles, gnats, mosquitoes, wasps, ants and spiders. Often gleans in higher branches and, occasionally, hawks for flying insects (Kauffman 1996). Nests low (0.5 - 4 m) in conifers; occasionally on ground. Female builds bulky nest of twigs, bark, grasses, weeds, moss, lichens and often lined with rootlets, hair and feathers. Lays 3-5 white/pale green eggs speckled with brown. Incubation 11-12 days and chicks fledge about 12 days after hatching. Both parents feed young (Kauffman 1996, Terres 1980, Gabrielson and Lincoln 1957).

Habitat: Habitat preference variable, but usually found in tall shrubs (riparian woodland) or in coniferous or deciduous forest or woodland (McCaffery 1996, Gabrielson and Lincoln 1957). On Yukon Delta National Wildlife Refuge, blackpolls were most abundant in mixed spruce/birch forests and very common in riparian woodlands. Considered uncommon to rare in alpine shrub and medium shrub communities (McCaffery 1996). Elsewhere in western Alaska it is found in taiga/coastal tundra transition zones (Kessel and Gibson 1978). Found in and near broadleaf evergreen forest throughout wintering range. In Costa Rica, prefers second growth and edges (DeGraaf and Rappole 1995).

Management Issues/Special Concerns: Considered “highly vulnerable” to tropical forest deforestation by Petit, et al. (1993). BBS data indicate a downward population trend (-2.4% per year) of blackpoll warblers between 1966-1996 (Sauer et al. 1997).

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MACGILLIVRAY'S WARBLER

(*Oporornis tolmiei*)

Distribution: Breeds from southeastern Alaska, southwestern Yukon south through most of British Columbia to western Alberta, western Montana, Wyoming, Colorado, and northwestern New Mexico, and west through Utah, northern Nevada, northern California, most of Oregon, Washington and Idaho. Winters from southern Baja and central Mexico to western Baja (DeGraaf and Rappole 1995). In Alaska, restricted to Southeast, especially on the mainland. Ventures onto islands near mainland and islands near mouths of larger mainland rivers, such as Mitkof and Revilagigedo Islands (Gibson 1976, Gibson and MacDonald 1975).

Biology/Natural History: Arrives in Southeastern Alaska in late May (Gabrielson and Lincoln 1959). Feeds mostly on insects which it gleans from leaves and picks from ground. Also known to take sap from sapsucker borings. Male sings throughout breeding season, presumably to defend nesting territory. Nest site is usually near ground (rarely more than 2 m above ground) in dense shrubs and thickets, almost always on an upright fork of a branch. Both sexes are thought to help build nest which is a loose cup of weeds, bark, grass lined with grass, hair and rootlets. Eggs (3-6) are white with brown spots. Female incubates about 11-13 days. Both parents care for and feed young which fledge at 8-9 days. A difficult species to view as it skulks in and near low vegetation, rarely holding a pose for more than a moment before retreating to dense cover.

Habitat: In thickets and dense shrubs. In southeastern Alaska, it is found in shrubs along hemlock/spruce edges, deciduous woodlands with shrubs, clearcuts, and riparian shrubs (Pogson et al. 1999). Near Skagway, found in subalpine shrubs.

Management Issues/Special Concerns: Poorly monitored in Alaska. BBS does not adequately cover habitat where this warbler is found. Off-road point counts may help in monitoring. More

information on status and distribution is needed. The species' restricted range in Alaska makes gathering useful information difficult.

GOLDEN-CROWNED SPARROW

(*Zonotrichia atricapilla*)

Distribution: Breeds in northwestern North America, west of the Rockies, from nothern Washington to northwestern Alaska. Winters along the west coast of North America, west of the Rockies, from southwest British Columbia to northern Baja California. In Alaska, it is found breeding from the Kobuk and Noatak River drainages in the northwest, north and west on Seward Peninsula to Ear Mountain, south along the coast where sufficient shrub habitat exists, to Yukon-Kuskokwim Delta, Alaska Peninsula and west to Unimak Island (Kessel and Gibson 1978). Common to abundant in some areas of the Kilbuck Mountains (B. J. McCaffery, pers. commun.) Rare to probable breeder east throughout major mountain systems, common to abundant local breeder in southcoastal, including Kenai Peninsula and Kodiak Island. Uncommon to rare breeder in Southeast and most of Interior Alaska (Kessel and Gibson 1978).

Biology/Natural History: Suprisingly little is known about this species. Begins arriving on breeding grounds in early May (Gabrielson and Lincoln 1959). Near Anchorage, singing rate of male is highest between 0100 - 0400 h, before dropping to a lower, more consistent rate until approximately 2100 h. Singing is rare between 2200 h and 0030 h (Holmes and Dirks 1978). Variants of three note song are known and as many as eight songs have been reported from 1 male (B. J. McCaffery, pers. com.). Food is primarily seeds, berries and fruits. Pre-fledged young in Alaska were fed lepidoptera larvae, and adult butterflies, craneflies and stoneflies. Nesting sites range from open dwarf shrub to dense low-mid shrub thickets.The nest, built of small twigs, moss and grass, is usually on ground, but occasionally found low in shrubs or young conifers. Clutches are 3-5 pale green-white and brown eggs. Males may cease singing once clutch is completed. Limited data suggest only females incubate and brood, but both parents fed nestlings and remove fecal sacs. Often feed on open dwarf shrub tundra when collecting food for young. Parents of successful early nest may attempt to raise second brood; female builds second nest and lays eggs while male feeds fledglings. At Cold Bay and Cape Romanzof, incubation was determined to be 12-12.5 days and nestling period 9.5-10.5 days (Hendricks 1987; B. J. McCaffery, pers. com.).

Habitat: Prefers low to tall alder and willow scrub on hillsides and near tundra. Commonly found in proximity to lakes, streams and bogs. In winter, prefers interrupted brushland, streamside thickets, and chaparral (Davies 1973).

Management Issues/Special Concerns: Due to remote breeding areas, threats on breeding grounds are probably minimal. Continued urbanization of wintering areas may reduce habitat. Need more details on habitat requirements and distribution in Alaska.

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SMITH'S LONGSPUR

(*Calcarius pictus*)

Distribution: Breeds in northern Alaska, northern Yukon Territory and Mackenzie District, southwestern Keewatin, northern Manitoba and Ontario. Isolated breeding population in northwestern British Columbia, southwestern Yukon and eastcentral Alaska. Extent of breeding range is unknown. In winter, found from central Iowa, south to Missouri, Arkansas, southwestern Illinois, west Tennessee, northwestern Mississippi, northern Louisiana to east Texas, Oklahoma and Kansas (Briskie 1993). Found in two areas in Alaska: Brooks Range and northern foothills and uplands of southeastern central Alaska. In the Brooks Range they are found as far west as the Noatak headwaters (Kessel and Gibson 1978), and north to the confluence of the Colville and Kogosukruk rivers (Johnson and Herter 1989). Confirmed or probable breeder in the Kongakut, Sheenjek, Hulahula, Canning, Atigun, Sagavanirktok, and Ribdon river valleys. Breeder or probable breeder in Wrangell Mountains, along Denali highway, Mt. Fairplay area, Tanana-Yukon highlands and White Mountains (Kessel and Gibson 1978).

Biology/Natural History: Diet is mostly seeds of grasses, sedges, weeds, wheat, clover, crabgrass, ragweed, bulrush and other plants before switching to invertebrates (larval and adult forms of terrestrial and flying insects) by the time chicks hatch. Considered polygynandrous (both males and females mate with multiple mates); a female mates with 2 or 3 males sequentially to complete her clutch of 5-6 eggs. A study near Churchill, Manitoba showed that 76.2% of females in a small color-banded population mated with 2 males, 9.5% with 3 males, and 14.3 with one male. Sequential males are known as alpha, beta, and gamma; the alpha male has been shown to be the father of 67% of a female's offspring. Males show intense mate guarding prior to egg laying. Frequent copulations usually solicited by female (averaging 350 copulations/week). Such intense activity is probably an adaptation to sperm competition and may function to displace or dilute rival sperm. Very few extra-pair copulations observed. Female

builds sunken nest on open tundra (often on or near flat hummocks) with grasses and sedges, often lined with caribou hair and ptarmigan feathers. Eggs are clay colored or pale green with purplish spots and blotches. Incubation by female lasts 11.5-12 days. Males and females feed nestlings; often multiple males will feed chicks. Young leave nest within 7-9 days and can fly short distances within 12 days of hatching (Briskie 1993).

Habitat: In northern Alaska, prefers moist tussock meadows in wide valleys, often near water. In central Alaska prefers dry ridgetop tundra (Kessel and Gibson 1978). Elsewhere found at treeline. May be found in low areas of tundra interspersed with spruce. In winter, found near airports, pastures and lakes (Briskie 1993).

Conservation Issues/Special Concerns: Isolated breeding areas protect them from most human disturbance. Will use man-made structures on or near breeding grounds and on wintering grounds. May be susceptible to land-use changes on wintering grounds. Concern mostly due to low breeding densities and the inability to monitor population changes with existing methods. Total population may be as few as 75,000 birds (Briskie 1993). considered by Ehrlich et al. (1988) to be one of the least known birds in North America.

Literature Cited:

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MCKAY'S BUNTING
(*Plectrophenax hyperboreus*)

Distribution: Alaska's sole endemic passerine. Winter and summer range limited to western Alaska. Breeds on Hall and St. Matthew islands regularly, and possibly on St. Lawrence and St. Paul Islands (Sealy 1967). In winter it is found along the Bering Sea coast of Alaska from St. Michael, south to Nushagak, Nunivak Island and along the Alaska Peninsula to Cold Bay. regular visitor in winter at Bethel. It is a rare visitant in winter to the Pacific coast of Alaska Peninsula, southcoastal Alaska, and Aleutian Islands. Accidental in British Columbia, Washington, and Oregon (Lyon and Montgomerie 1995).

Biology/ Natural History: Leaves breeding grounds in early October for west coast of Alaska. May join flocks of Snow Buntings. Arrives in Bethel in late November-mid-December. During breeding season males display by singing while flying in broad circles. Nest is a shallow, grass cup lined with fine grass, set in a hollow drift log or rock crevice on shingle beaches (Kauffman 1996). The occurance of eggs and fledged young at the same time and the varying age of juveniles observed in early July suggest they may be double brooded. Eggs (mean = 23.2 mm x 17.3 mm) are light green with pale brown dots and probably laid in June. One male collected on St. Lawrence Island exhibited an incubation patch, suggesting males may help incubate. If

similar to Snow Bunting, young leave nest 10-17 days post-hatch (Lyon and Montgomerie 1995). May hybridize with Snow Bunting on St. Lawrence Island (Sealy 1969).

Habitat: Similar to Snow Bunting. Breeds on vegetated and rocky tundra, especially on coastal lowlands. Winters on beaches, open tundra, fields or anywhere exposed vegetation is present. regular visitor to feeders in Bethel (B. J. McCaffery, pers. com.).

Management Issues/Special Concerns: No imminent threats. Small population (estimated at no greater than 6000 birds) and restricted range increase its vulnerability to introduction of pest animals (e. g. rats) to breeding islands. Need detailed information on basic biology, breeding chronology, systematics, habitat-use patterns, and population size.

Literature Cited:

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RUSTY BLACKBIRD
(*Euphagus carolinus*)

Distribution: Breeding range extends from the west coast of Alaska to the east coast of Canada (Avery 1995). The northern extent is delineated by Kotzebue Sound and the Brooks Range in Alaska, Mackenzie Delta, Great Bear Lake, Great Slave Lake, and Nueltin Lake in Northwest Territories, the coast of Hudson Bay from Churchill, Manitoba to northern Quebec, and across Quebec to the coast of central Labrador. The southern edge of the breeding range extends from southern Alaska, through central Canada from the interior of British Columbia to the northern shores of Lake Superior and Lake Huron, through southeastern Ontario to Vermont, New Hampshire, and Maine. Also breeds on the upper peninsula of Michigan, in the Adirondack Mountains of New York, and in western Massachusetts. Winter range is primarily in the eastern half of the United States from eastern Nebraska, Kansas, Oklahoma, and Texas to the Atlantic coast between southern Massachusetts and central Florida, and from southern Wisconsin and Michigan to the Gulf of Mexico (Avery 1995). Also winters very locally across the northernmost part of the U.S. and the southern edge of Canada from Maine to the coast of British Columbia and into southeast Alaska. A few winter in eastern Colorado; otherwise very rare

visitor to western and southwestern United States and south Florida. Found throughout most of mainland Alaska south of the Brooks Range (Kessel and Gibson 1978). Fairly common spring migrant and breeder, locally common fall migrant, and very rare winter visitor in central Alaska. Fairly common to rare migrant and breeder in western and southwestern Alaska (Brann and Andres 1997). Rare spring migrant and possible breeder in the Brooks Range. Very rare to casual spring migrant and summer and fall visitor to the coasts of the Beaufort and Chukchi seas, the Bering Sea islands, and the coast of Bristol Bay. Uncommon spring migrant and fairly common fall migrant, rare breeder, and rare winter visitor in southcoastal Alaska. Uncommon migrant and rare to uncommon local breeder (mainland), and rare winter visitor in southeast Alaska.

Biology/Natural History: Usually arrive in the interior of Alaska during late April (general observations). Eat a variety of plant and animal matter including aquatic insects, grasshoppers, ants, beetles, caterpillars, spiders, crustaceans, snails, small fish, salamanders, acorns, corn, wheat, oats, pine seeds, berries, and weed seeds. Usually feed on the ground, especially along the edges of ponds, streams, and other wetlands, but will wade into shallow water or forage at the water's surface from logs or debris. Also feed in open pasture, agricultural fields, and feedlots. Glean prey from moss and litter and will excavate rotten wood to obtain insect larvae; sometimes hawk mosquitoes or emerging caddisflies. Occasionally attack and eat other birds during harsh weather (Avery 1995). Breeds in open habitats near water including spruce, fir, tamarack, birch, willow, and alder. Nests are placed 1-7 m above the ground or over water in living or dead shrubs or small trees and are often surrounded by dense vegetation. Sometimes nests are placed on stumps or on ground at the base of a shrub. The bulky nest of twigs, grass, moss, and lichens is packed with rotting vegetation or mud and lined with grass and plant fibers. From 3-6 eggs (usually 5) are incubated for 14 days, and chicks remain in the nest for 11-14 days. Males bring food to incubating females, which leave the nest to join the male for feeding. Both sexes sing on the breeding grounds; the female sings while on the nest incubating. Nests are rarely parasitized by cowbirds since they generally nest north of cowbird range in habitat that is not often visited by cowbirds (Avery 1995).

Gregarious and are sometimes loosely colonial during the breeding season. Begin to form post-breeding flocks during mid-July. The peak of fall migration in central Alaska occurs in late August and early September. During winter, often form large flocks mixed with other blackbirds, cowbirds, and starlings (Avery 1995).

Habitat: Breeds in wet coniferous and mixed forest from the edge of tundra south to the beginning of deciduous forest and grasslands. Frequently found in fens, alder-willow thickets and bogs, muskeg, beaver ponds, tall riparian shrub, swampy shores of lakes and streams, and other forest openings such as those created by logging, fire, windthrow, and beaver activity. Likes large numbers of conifer saplings and dense foliage 2-4 m above ground. During spring and fall migration will forage in stubble, pasture, plowed fields, and edges of swamps. Usually roost in wooded areas, but will occasionally roost on the ground in open fields. Wintering habitats include swamps, wet woodlands, pond edges, stream borders, cypress lagoons, marsh

edges, and fields adjacent to wet areas (Avery 1995).

Management Issues/Special Concerns: Population densities tend to be relatively low during the summer and sporadically clumped during the winter, so not well represented in most surveys (Avery 1995). Breeding Bird Surveys do not adequately monitor this species and slight declines are detected in the Christmas Bird Count data. This species is not frequently encountered on the existing Alaskan BBS routes or off-road point counts and is captured only in small numbers during statewide banding activities. Reduction of wet woodland habitat, particularly in their breeding range, would adversely affect Rusty Blackbird populations. Possibly could be affected by placer mining or fire management practices in Alaska. On wintering grounds where they join large, mixed species aggregations, they may be affected by roost control programs in areas where the large aggregations are a nuisance and health risk and cause crop damage (Avery 1995).

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WHITE-WINGED CROSSBILL
(*Loxia leucoptera*)

Distribution: Breeds throughout boreal forest from northwestern Alaska, east and south to Yukon and Northwest Territories to coniferous forests of western North America as far south as Oregon, Utah, Wyoming, and southern Colorado; east across boreal forests of Canada and northern U.S. to Maine and Newfoundland. Winter range is similar to breeding range, but are occasionally observed in California, Texas, Nevada and Florida (Benkman 1992). In Alaska, in coniferous forests from Kobuk River valley and southeastern Seward Peninsula, east to southern foothills of Brooks Range, south throughout Interior to Bristol Bay, Cook Inlet, Kenai Peninsula, Prince William Sound and along Southeastern coast to Dixon Entrance (Gabrielson and Lincoln 1959, Isleib and Kessel 1973).

Biology/Natural History: Diet is predominately conifer seeds; especially white spruce, black spruce, red spruce, Engelmann spruce and tamarack, occasionally fir in the eastern U.S. Occasionally eat buds and seeds of non-coniferous plants including alder, birch, cottonwood, and sedge; also will forage on insects, especially spruce budworm, spruce coneworm, ants and

spiders (Benkman 1992). In contiguous U.S. it is known to breed in all months of the year, but rarely in November and December. Breeding throughout the year has not been documented in Alaska. Nesting appears most dependant on abundance of conifer cones. Female builds well hidden nest on a limb (usually spruce) at varying distances from trunk. Nest is approximately 10 cm in diameter and 6.5 cm in depth and is made of conifer twigs, grasses, forbs, lichen, bark and lined with roots, moss, lichen, hair, and cocoons. Eggs (2-5) are bluish/green-white with brown or lavender splotches on large end (Benkman 1992). Incubation is thought to be 12-14 days (Terres 1980). Crossbills do not strictly adhere to typical seasonal songbird breeding patterns. Apparently, cone abundance, not seasonality, is the major determinant for breeding in this species (Benkman 1992). True to their nomadic nature, crossbills may be present in large numbers one year and absent the next in any locality, a phenomenon dictated by the local abundance of conifer seeds.

Habitat: Breeding distribution reflects their reliance on conifer seeds as their primary food; they nest across boreal North America, preferably in forests of white spruce, but also in black spruce and tamarack. Breeding densities are lower south of this region in forests of red spruce (eastern NA), Engelmann spruce (southwest NA) and, occasionally, Sitka spruce (northwestern, coastal NA). Seem to prefer closed canopy forests, but are also commonly observed in open spruce (Benkman 1992).

Management Issues/Special Concerns: Do not appear to be in imminent danger. Logging of mature forests may limit food supply and nesting habitat. Beetle infestations may have similar effects. This species is difficult to monitor due to its nomadic nature.

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HOARY REDPOLL
(*Carduelis hornmanni*)

Distribution: Circumpolar distribution. In North America, found breeding from western and northern Alaska east to northern Yukon and Northwest Territories, southern Victoria Island, northeastern Manitoba, Southhampton Island, and northern Quebec, Ellesmere, Bylot, and northern Baffin islands. Winters throughout much of breeding range except for extreme north; southern extent of wintering range varies with year, sometimes reaching northern tier states of contiguous U.S (A.O.U. 1998). In Alaska, breeds in tundra, shrub, and shrub riparian areas in the north and west including the Brooks Range, North Slope and the western coast. In winter, found throughout the Interior and western Alaska (Gabrielson and Lincoln 1959).

Biology/Natural History: Eats mostly seeds, especially from willows, alders, and birches, but also from conifers, weeds, grasses; also insects in summer. Forages in flocks, except during nesting season. Pouch in throat enables survival of long, cold winter nights by allowing the storage of foodstuffs which can be digested when bird is unable to forage. Semi-colonial nesting is not uncommon; little territoriality during nesting. Courting male feeds female; female may exhibit bowing and wing-flutter behaviors (P. Cotter, pers. obs.). Female builds small nest in shrub or on ground; nest is constructed of rootlets, grass, twigs and lined with ptarmigan feathers, plant down and animal hair. Eggs (3-6, usually 4-5) are light green to blue-green with reddish brown spots on larger end. Female incubates 9-14 days; male feeds her on nest. Both parents are thought to feed nestlings. Young fledge at 9-14 days (Kaufman 1996).
Habitat: During breeding season found on open tundra; often in willow, alder, and dwarf birch thickets; also in tundra riparian zones, and sometimes, along forest edges. In winter, found along woodland edges and weedy fields (Kaufman 1996). Often occurs in mixed flocks with common redpolls.

Management Issues/Special Concerns: No imminent threats to population. Human-induced population declines are unlikely due to remoteness of breeding and wintering areas.

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