Boreal Partners in Flight Working Group

2000 Annual Report

July 2001

Compiled by:

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INTRODUCTION

Boreal Partners in Flight will have quit a different look for the year 2001 due to the departure of two key figures in the leadership of our group. Brad Andres has migrated south to take on the National Shorebird Coordinator position in Arlington, Virginia. Brad has been an instrumental member of Boreal Partners in Flight since its inception in 1991 and served as the Program Chair from 1994-2000. His leadership has helped define many of *Boreal Partners and Flight's* goals to conserve northern populations of landbirds. In particular his development of the *Landbird Conservation Plan for Alaska Biogeographic Regions* and success in expanding the North American Breeding Bird Survey in Alaska have provided us with a strong foundation from which to grow. We wish Brad the best of luck with his new position.

Heather Johnson, will also be giving up her position as the Outreach and Education Chair. Heather has made great strides in bolstering our Outreach program from 1996-2000. She will also be moving on to the National Office for Migratory Bird Management in Arlington. Good luck Heather with your new position.

Current leadership for *Boreal Partners in Flight*

Steve Matsuoka, *Program Chair*
Andrea Swingley, *Outreach and Education Chair*
Phil Schempf, *Raptor Conservation*
Inventory and Monitoring
- Colleen Handel, *Alaska Off-road Breeding Bird Survey*
- Vacant, *North American Breeding Bird Survey*
- Anna-Marie Benson, *Migration Monitoring*
- Steve Matsuoka, *Monitoring Avian Productivity and Survivorship*
- Carol McIntyre, *Developing methods to monitor forest owls*

Bird Conservation Area Coordinators
- Dave Yokel, *Arctic Coastal Plain/Foothills*
- Rob McDonald/Brian McCaffery, *Western Alaska and Aleutian/Bering Seas Islands*
- John Wright/Colleen Handel, *Interior Forests and Mountains*
- Peg Robertson/Don Youkey, *Pacific Coast Forests and Mountains*

WORKSHOP AGENDA

U. S. Fish and Wildlife Service Regional Office, Anchorage, Alaska
23 - 25 January 2001

Tuesday, 23 January

9:30 Welcome and introductions — Brad Andres, Chair, Boreal PIF.
9:40 Updates on national, international, and western regional programs — Brad Andres, USFWS.
10:40 Re-structuring of the working group — Brad Andres.
10:50 Alaska landbird poster -- concept and use — Brad Andres, Heather Johnson, USFWS.
11:00 International Migratory Bird Day 2001 — Heather Johnson.
11:20 Boreal Partners in Flight website — Steve Matsuoka, USGS-BRD.
12:00 Lunch.
1:15 Report on owl surveys in 2000 — Anna-Marie Benson, ABO.
1:45 Discussion on further work on owl surveys for 2001 — Phil Schempf.
3:00 Break.
3:15 2000 banding efforts in Alaska — Anna-Marie Benson.
3:30 Further review of MAPS and migration banding programs — Anna-Marie Benson, Steve Matsuoka.
5:00 Adjourn.

Wednesday, 24 January

8:30 Issues with the Breeding Bird Survey in Alaska — Brad Andres.
8:50 Current thoughts on the off-road point count program — Colleen Handel, USGS-BRD.
9:20 Sample allocation for Yukon-Charley — Debbie Nigro, NPS.
9:50 Bird Monitoring on the Togiak NWR — Rob MacDonald, Togiak NWR
10:15 Break.
10:30 Is implementation of a statewide monitoring program for Alaska impossible? — Brad Andres.
12:00 Lunch.
1:15 BIOGEOGRAPHIC REGION BREAK OUT GROUPS
Review of actions accomplished in biogeographic regions in 2000.
Should we consider sub-BCRs?
Actions for 2001 to further implement plan in BCR.
3:45 Report to full group on accomplishments/future actions.
4:30 Future meetings, officers — Brad Andres.
5:00 Adjourn.

Thursday, 25 January - Outreach for Landbirds

8:30 Welcome, introductions, overview — Heather Johnson.
8:40 Education at the Alaska Bird Observatory — Andrea Swingley, ABO.
9:00 Migratory bird education at the Togiak NWR — Rob MacDonald, Togiak NWR.
9:20 Statewide needs for landbird education and outreach — Heather Johnson.
10:00 Break.
10:15 Bolstering outreach to implement the Alaska Landbird Conservation Plan — Heather Johnson.
12:00 Adjourn.

UPCOMING MEETINGS

2002 International *Partners In Flight* Conference and Workshop, Partners In Flight Conservation Plans: A Workshop on Implementation and Integration in the Americas
20-24 March 2002
Asilomar State Park Conference Center, Monterey, California

Just over a decade after its inception, *Partners in Flight* has proven to be an incredibly effective initiative. Partners currently include 16 federal agencies, 146 nongovernmental organizations, over 60 state and provincial fish and wildlife agencies, numerous universities, the forest products industry and countless individuals. *PIF* Conservation Plans containing the most up-to-date scientific information on over 400 species of landbirds are nearly complete for virtually all of the continental United States and on-the-ground, adaptive implementation is under way.

The third international *PIF* conference, "*Partners In Flight* Conservation Plans: A Workshop on Implementation and Integration in the Americas," will take place at the Asilomar State Park Conference Center in Monterey, California, on 20-24 March 2002. Presentations, panel discussions, workshop and demonstrations will provide tools for putting bird conservation plans in place with other bird initiatives and partners.

Conference sessions will cover Project Case Studies, Species and Habitat Monitoring, Outreach to New Partners, Education and Information, Birding Economics, Measuring Success, International Cooperative Projects, Research Progress and Applications, the Interface of Biology and Politics, and Strategic Planning for the Next Decade.

A poster session, large vendor display and many interesting field trips will be offered. There will be opportunities for adjunct meetings of committees, working groups and other entities. A proceedings also will be published.

Mark your calendars and watch for the first conference circular (also see http://www.prbo.org/PIF/NPIF2002.htm). This will be a very popular conference.

The *PIF* steering committee is looking for $100,000 in conference support. If your agency, organization, or company might be a source of support, please contact us now. If you are able to help with any aspect of the conference, including helping to organize sessions, please contact Terry Rich (terry_rich@fws.gov) or C. J. Ralph (cjr2@axe.humboldt.edu).

***Boreal Partners in Flight* annual meeting**

We are planning on having our next annual meeting in late October at the U.S. Fish and Wildlife Service Regional Office in Anchorage. We also plan on holding a half-day session in conjunction with the Alaska Bird Conference in Fairbanks early March 2002. Please contact Steve Matsuoka (USGS, steve_matsuoka@usgs.gov) if you would like to suggest topics for discussion.

OUTREACH AND EDUCATION

Heather Johnson, U.S. Fish and Wildlife Service
Andrea Swingley, Alaska Bird Observatory

Action items

A number of topics related to educating the public about conservation issues facing landbirds in Alaska were discussed during the annual meeting. Some action items that developed from our discussion included.

Using radio as an outreach tool - Several members have been involved in producing regular natural history pieces for local radio stations in Ketchikan, Barrow, Nome, Wrangell, Juneau, McGrath, Dillingham, and Fairbanks. Members of the group will contact the Alaska Public Radio Network to see if they might be interested in airing some of these radio pieces from around the state. Some suggested that many of these shows could be saved digitally on a CD and made available to APRN or served off of the *BPIF* website. Kathy Turco, who specializes in recording natural sounds and producing science segments for radio broadcast could be a key contact. [Andrea Swingley and Rob McDonald]

Tapping into existing outlets for public information and education – Educating the public on the conservation problems facing landbirds in Alaska could be bolstered by simply working through existing outlets of public information. This might include:

1) Providing brochures, lists of birding areas, posters, and other materials to Alaska Public Lands Information Center (APLIC) and the Alaska Natural Resource and Outreach Education (ANROE) program. [Maureen deZeeuw and Andrea Swingley]

2) All members involved in producing education and outreach materials and programs related to migratory birds should consider making them available in *A Guide to Bird Education Resources, Migratory Birds of the Americas* (http://www.partnersinflight.org/birdbib).

3) We need to update the *BPIF* website to include new bird outreach materials and programs. We also should solicit other websites to include descriptions of bird education programs available in Alaska. Descriptions of materials can be sent to Steve Matsuoka (steve_matsuoka@usgs.gov).

Develop an outreach strategy/plan for BPIF in 2001 – Heather Johnson and Andrea Swingley.

Items to focus on in the future

Identifying outreach opportunities with adults – Members of *BPIF* agreed that the adult sector is being missed through our current outreach efforts. Some areas to focus on might included:

1) Developing partnerships with corporate Alaska and recreation (i.e. snow machiners and ATV enthusiasts) and native groups. Some examples of developing these kinds of partnerships include the Western Hemisphere Shorebirds Reserve Network and the Chugach National Forest Plan. Timing may be good to work with native groups due to heightened concerns about the cumulative effects of contaminants on subsistence-based communities.

2) Giving presentation to traditional clubs and organizations, such as the Lions and Rotary clubs, Elks Foundation, or Daughters of the American Revolution, to let them know how they can get involved in our conservation efforts. The Alaska Bird Observatory has done this with success in the Fairbanks area.

3) Working with ecotourism groups to help with our outreach efforts. This might include:

    - Request tour operators to broaden the ecological scope of their presentations to include information on the conservation problems facing birds in Alaska.

    - Promote local birding in tourist locations by providing bird checklists and descriptions and maps of places to view birds.

    - Speak to local communities about the business opportunities associated with ecotourism.

4) Providing education and outreach materials to Convention and Visitor Bureaus to spread awareness of landbirds in Alaska.

Improving outreach to junior high and high school students – We need to begin developing programs to educate students and teachers on the types of careers that are available in the fields of conservation and wildlife sciences. Some approaches to reach this group might include:

- Mentoring local students toward college programs in conservation and wildlife biology.

- Hiring more students from local high schools and colleges rather than bringing people up from other states.

- Working with school districts to explore the possibility of bringing on high school students under "On the Job Training" programs.

- Exploring the use of exchange programs to train teachers and students. These exchanges might include statewide, national, or international exchanges depending on the programs or grants available.

Boreal Partners in Flight website

Several suggestions were made to update the *Boreal Partners in Flight* website (http://www.absc.usgs.giv/research/bpif/bpif/html) and make it a more effective in articulating our efforts to conserve landbirds in Alaska. Some of these included:

1) Emphasize results of our program by adding pages that highlight recent findings by our contributors. All contributors are encouraged to post a power point presentation on the site. Please contact Steve Matsuoka for the details.

2) Update the directory of research projects and monitoring efforts.

3) Update maps and databases of bird distribution. Current information is based on data from the Alaska Off-road Breeding Bird Survey, 1992-1997.

4) Include the Conservation Plan and species accounts for priority species.

5) Include maps and descriptions of the Bird Conservation Areas.

6) Add section for Raptor Conservation.

If you have additional suggestions for the website, please contact Steve Matsuoka (USGS; steve_matsuoka@usgs.gov).

INVENTORY AND MONITORING

NORTH AMERICAN BREEDING BIRD SURVEY

Brad Andres, U.S. Fish and Wildlife Service

Below I summarize the current distribution of Breeding Bird Survey (BBS) routes among Alaska ecoregions and Bird Conservation Regions (BCR). Percentages of areas and percentages of routes should be compared to assess geographic distribution of routes within a BCR (Table 1). For example, further allocation of BBS routes within the Northwestern Interior Forest BCR should target Interior Forested Lowlands and Uplands and Interior Highlands.

I also calculated the mean number of birds/route in each ecoregion and the mean coefficient of variation (CV; Appendix 1). The CV was determined for each route by calculating the standard error of annual counts and dividing by the mean. CVs within an ecoregion were then averaged to produce a mean measure of annual variability. As a first assessment, species could be considered adequately monitored if the CV is 0.25 with an ecoregion or BCR.

Table 1. Distribution of active Breeding Bird Survey routes among Bird Conservation Regions and ecoregions of Alaska.

BCR	Ecoregion	Number of routes	Area (km^2)	% routes (n = 88)	% of area (n = 1,495,000 km^2)
Arctic Plains and Mountains		2	308,000	2.3	20.6
B3A	Arctic Coastal Plain	0	50,000	0.0	3.3
B3B	Arctic Foothills	1	124,000	1.1	8.3
B3C	Brooks Range	1	134,000	1.1	9.0
Northwestern Interior Forest		45	722,000	51.1	48.2
B4A	Interior Forested Lowlands and Uplands	10	269,000	11.4	18.0
B4B	Interior Highlands	4	115,000	4.5	7.7
B4C	Interior Bottomlands	6	103,000	6.8	6.9
B4D	Cook Inlet	7	28,000	8.0	1.9
B4E	Yukon Flats	2	33,000	2.3	2.2
B4F	Ogilvie Mountains	0	11,000	0.0	0.7
B4G	Alaska Range	9	117,000	10.2	7.8
B4H	Copper Plateau	6	17,000	6.8	1.1
B4I	Wrangell Mountains	1	29,000	1.1	1.9
Western Alaska		17	298,000	19.3	19.9
B2A	Subarctic Coastal Plain	3	91,000	3.4	6.1
B2B	Seward Peninsula	5	47,000	5.7	3.1
B2C	Ahklun and Kilbuck Mountains	3	51,000	3.4	3.4
B2D	Bristol Bay-Nushagak Lowlands	3	61,000	3.4	4.1
B2E	Alaska Peninsula Mountains	3	48,000	3.4	3.2
Northern Pacific Rainforests		24	167,000	27.3	11.2
B5B	Pacific Coastal Mountains	7	106,000	8.0	7.1
B5A	Coastal Western Hemlock-Sitka Spruce Forests	17	61,000	19.3	4.1

ALASKA OFF-ROAD BREEDING BIRD SURVEY

Update for 2000

Colleen Handel, USGS – Alaska Biological Science Center

Update of 2000 Survey Efforts – We now have surveyed a total of 281 routes across Alaska, 241 of which had 12 or more points censused during the standard survey periods. We have data from over 3000 points across Alaska! In 2000 statewide, we surveyed 86 standardized Off-road Breeding Bird Survey routes that had a minimum of 12 points. This represented a significant (24%) decrease from 1999 efforts. In most regions the number of routes run remained the same. One exception was in Northern Alaska, which more than doubled its routes (9 in 2000 vs. 4 in 1999) due to an increased effort by Arctic NWR and consistent effort by BLM. Another exception was Central Alaska, for which we have data from only 21 routes this year compared to 57 surveyed in 1999. Some of these were surveyed but have not yet been received; a set of routes established to monitor the effects of spruce beetle infestation in Wrangell-St. Elias National Park and Preserve not run in 2000 will be run again in 2001. We also received a backlog of data from past years in Southeastern, which greatly improves our information from that region.

Table 1. Number of standardized Off-road Breeding Bird Survey routes that have been run in each region.

	Year									
Region	1992	1993	1994	1995	1996	1997	1998	1999	2000	Total
Northern	0	4	1	1	5	6	5	4	9	12
Western	0	6	8	6	6	11	5	8	9	19
Southwestern	0	5	8	11	10	13	11	6	10	39
Central	3	29	67	39	31	25	52	57	21	105
Southcoastal	8	17	14	14	17	19	18	18	18	28
Southeastern	0	13	13	30	21	19	19	19	19	38
Total	11	74	111	101	90	93	110	112	86	241

We now have 71 routes (29% of all routes run from 1992-2000) that have been surveyed for five years or longer. Most of these routes are from Central (46%) and Southcoastal Alaska (20%). Routes that have been run a single year still dominate our survey efforts (36% of all routes run from 1992-2000). Single-year surveys are valuable for providing an inventory of species in different habitats across each region. Multiple-year efforts, however, are necessary to document long-term population trends.

Table 2. Number of years standardized off-road point count routes have been replicated in each region.

	Year							
Region	1 yr	2 yr	3 yr	4 yr	5yr	6yr	7yr	8 yr
Northern	6	1	0	0	4	0	1	0
Western	6	7	2	2	0	1	3	0
Southwestern	24	2	6	5	2	1	0	0
Central	42	23	4	7	9	10	11	3
Southcoastal	3	5	1	0	0	0	1	13
Southeastern	5	2	7	11	6	6	0	0
Total	86	40	20	25	21	18	16	16

Evaluation of the Off-road Breeding Bird Survey as a monitoring tool – We have recorded 205 species on this survey over the years, including shorebirds, waterfowl, raptors, seabirds, and grouse in addition to the small landbirds. This survey, like the Breeding Bird Survey, can be used to monitoring some of these other species as well as landbirds. For landbirds, we have determined that we need to survey at least 15 routes per area to detect a 50% population decline of a species over a 25-year period. This survey will do a good job of monitoring population status of the more common species of birds but we were interested in examining how well it would monitor the species of concern that have been identified for each biogeographic region. We looked at how many species of concern have been recorded on at least 15 routes run at any time during the past 8 years within each biogeographic region or within Alaska as a whole. We found that only 17 of 35 species of concern (about 50%) had reached these minimum detection levels for successful monitoring at the state level. For the bioregional level, 9 of 20 species met the minimum monitoring level for Southeastern, 2 of 11 for Southcoastal, 7 of 19 for Central, 2 of 8 for Southwestern, 1 of 8 for Western, and 0 of 5 for Northern. We determined that some of these species will require special surveys (Vaux's Swift, Boreal Owl, White-tailed Ptarmigan), some will be able to be monitored if we target their specific habitat (e.g., McKay's Bunting, Smith's Longspur), and others may not be possible to monitor in Alaska (e.g., Snowy Owl). We need to recognize this gap in our monitoring efforts and develop a plan to monitor the populations of these species of concern.

Table 3. Number of Off-road Breeding Bird Survey routes on which species of concern have been recorded within each biogeographic region. Number of routes surveyed in each region is listed in parentheses. Those recorded on 15 or more routes could be monitored at this level of effort. Bold numbers indicate species is of concern within that region.

SPECIES OF CONCERN	SE (42)	SC (34)	C (116)	SW (54)	W (23)	N (12)
Gyrfalcon			**0**	**0**	**0**	**0**
White-tailed Ptarmigan			**0**			
Blue Grouse	**3**					
Sharp-tailed Grouse			**0**			
Western Screech-Owl	**0**					
Snowy Owl				2		**1**
Great Gray Owl			**6**			
Boreal Owl			**2**			
Black Swift	**1**					
Vaux's Swift	**0**					
Rufous Hummingbird	**22**	**3**				
Red-breasted Sapsucker	**31**	**0**				
Black-backed Woodpecker	1		**0**			
Olive-sided Flycatcher	**8**	**12**	**50**	0	4	1
Western Wood-Pewee	**2**	8	14			
Hammond's Flycatcher	**2**		**12**			
Pacific-slope Flycatcher	**37**	0				
Northern Shrike		**0**	**0**	7		1
Steller's Jay	**28**	8				
Northwestern Crow	**18**	**4**				
Chestnut-backed Chickadee	**39**	**6**				
American Dipper	**1**	3	**0**		2	
Golden-crowned Kinglet	**36**	16	4			
Gray-cheeked Thrush	5	**5**	**42**	**25**	**13**	**7**
Varied Thrush	**40**	**22**	**68**	**0**	**5**	3
Bohemian Waxwing		3	**31**		2	
Townsend's Warbler	**40**	**14**	**7**			
Blackpoll Warbler	**1**	**8**	**37**	**0**	**10**	1
MacGillivray's Warbler	**5**					
Golden-crowned Sparrow	**1**	**15**	**4**	**37**	**13**	1
Smith's Longspur			**3**		1	**1**
McKay's Bunting				**0**	**0**	
Rusty Blackbird	1	5	**29**		**4**	1
White-winged Crossbill	1	14	**71**		2	1
Hoary Redpoll				**0**	1	**4**

Table 4. Number of Off-road Breeding Bird Survey routes on which species of concern have been recorded within Alaska as a whole. Number of routes surveyed is listed in parentheses. Those species recorded on 15 or more routes could be monitored at this level of effort and are highlighted in bold.

SPECIES OF CONCERN	ALASKA (281)
Gyrfalcon	0
White-tailed Ptarmigan	0
Blue Grouse	3
Sharp-tailed Grouse	0
Western Screech-Owl	0
Snowy Owl	3
Great Gray Owl	6
Boreal Owl	2
Black Swift	1
Vaux's Swift	0
Rufous Hummingbird	**25**
Red-breasted Sapsucker	**31**
Black-backed Woodpecker	1
Olive-sided Flycatcher	**75**
Western Wood-Pewee	**24**
Hammond's Flycatcher	14
Pacific-slope Flycatcher	**37**
Northern Shrike	8
Steller's Jay	**36**
Northwestern Crow	**22**
Chestnut-backed Chickadee	**45**
American Dipper	6
Golden-crowned Kinglet	**56**
Gray-cheeked Thrush	**97**
Varied Thrush	**138**
Bohemian Waxwing	**36**
Townsend's Warbler	**61**
Blackpoll Warbler	**57**
MacGillivray's Warbler	5
Golden-crowned Sparrow	**71**
Smith's Longspur	5
McKay's Bunting	0
Rusty Blackbird	**40**
White-winged Crossbill	**89**
Hoary Redpoll	5

Methods of analysis – There are some concerns about how to analyze trends from the Off-road Breeding Bird Survey data. The survey has been styled after the Breeding Bird Survey (BBS) and can be analyzed using the same statistical methods. This requires, however, that data can only be included if the route has been run for a minimum of 3 years by the same observer, because of significant observer effects in detections of birds. Among 116 routes observed for at least 3 years, 64% of those have had the same observer for at least 3 years, so that is encouraging. In some regions, particularly Southwestern, there has been a lot of turnover in observers from year to year, so relatively few (14%) of the routes could be included in trend analysis. The data can still be used to examine habitat relationships and distributional patterns, but not for population trend monitoring. Continuing with the BBS-style survey would argue for surveying the same routes annually to increase the probability of having the same observer for 3 years.

Table 5. Number of Off-road Breeding Bird Survey routes that have been surveyed for at least 3 years and proportion of those that have had the same observer for at least 3 years. A minimum of 3 years by the same observer is required for a route to be able to be analyzed for population trends.

	Number	With same observer	
Region	Surveyed	#	%
Northern	5	5	100%
Western	8	6	75%
Southwestern	14	2	14%
Central	44	32	73%
Southcoastal	15	14	93%
Southeastern	30	15	50%
Total	116	74	64%

An alternative to the BBS-style survey and analysis is the distance-sampling method, which requires observers to estimate distances to each bird. Using these distances, one can estimate detectability functions for different species, which can and do vary among observers. From these one can estimate "true" densities of birds in different areas. This method would allow us to make comparisons of densities across years (correcting for different observers) as well as across habitat types (which would be expected to have different detectability functions). Routes would not have to be sampled every year. The downside is that distance sampling requires more training so that distances are estimated correctly and birds are not missed while concentrating on estimating a distance for other birds. Several of the larger projects have been using distance-sampling methods, so we will be examining the data to see if we can use a modified method (fewer distance intervals) as a compromise to solve several of these problems.

We will continue analysis of data this year and will determine if a simplified distance-sampling method will work well for our needs in Alaska. We will be setting up a sampling grid to select random sampling sites across Alaska. Routes will be set up in clusters of 3 to be equivalent to a single 50-point BBS and to minimize logistical costs. Finally, we will begin to explore possible alternatives to monitor those species of concern that are not covered well by any of our existing programs.

Incorporating boat-based surveys into Alaska Off-road Breeding Bird Surveys on the Glacier Ranger District, Chugach National Forest.

Aaron Poe, USDA Forest Service, Chugach National Forest

Prince William Sound (PWS) represents the northwestern extent of the Alaskan coastal rainforest and shares many of the same species of special concern with southeastern Alaska (Andres 1999). In order to develop a comprehensive landbird management plan for the Northern Pacific Rainforest BCR, data on landbird populations from the Chugach National Forest are needed. Given that PWS is almost completely devoid of secondary roads, point-count surveys as described by Handel (1999) are the most suitable method for monitoring landbird population in this area. Unfortunately, much of coastal habitat in the Sound is very difficult to access due to steep-sided topography and dense vegetation. Therefore, land-based routes cannot be run consistently in a safe manner in much of PWS.

Wildlife staff from the Glacier Ranger District (GRD) collaborated with Brad Andres (USFWS) to develop a technique in which an observer travels the shoreline by small craft and conducts point-count surveys from the boat, immediately adjacent to the shoreline. This technique is most applicable in steep-sided bays and fiords where birdsong from forested habitat above the observer can be detected. Initial comparisons between an inland surveys in PWS run by the Forest Service an two water-based surveys operated by USFWS in PWS resulted in detection rates slightly over half of those from traditional land-based routes. Additionally, boat-based surveys resulted in counts of many priority species as defined in the *Landbird Conservation Plan for Alaskan Biogeographic Regions* (Andres 1999).

Prior to route placement, western PWS was divided into 54 sample units, each being a 4-township conglomerate (373 km^2). The long-term landbird-monitoring plan for GRD is to establish clusters of 3 off-road point count routes within a subset of these units. It is our intent that these clusters will include both boat-based counts and more traditional land-based counts. Three routes in Harriman Fiord were established in 2000. Two of these routes are land-based counts and one, along a steep section of shoreline, was surveyed from the water. All routes occurred primarily in needleleaf forests.

We used a 4.3-m inflatable boat powered by an outboard motor to survey the boat-based route. Points were located 400-500 m apart as it was thought that steep slopes adjacent to water would allow for some bird songs to be transmitted over longer distances than at a typical land-based count. The center of each 50-m radius count points was placed 25 m inland from mean high tide. Each point was surveyed from the water <25 m from the shoreline. Distance to birds was estimated as if the observer was standing at the center of each point. The boat motor was turned off 2 minutes prior to and during every count. Surveys were only conducted in locations and at times when wave action at the shoreline would not interfere with detection rates. The protocol for conducting each 5-minute count is identical to those established by Handel (1999) for point counts. An accurate (+/- 10 m) GPS reading was taken at each point to ensure that counts are conducted at the same location in subsequent years. Additionally a recognizable landmark adjacent to each point was noted to assist in navigation when returning to each point.

Although these methods are a slight deviation from those established for the Alaska Off-road

Breeding Bird Survey (Handel 1999), it is our belief that data from boat-based routes can be used in combination with land-based routes from the same clustered areas. Additionally these techniques offer the most practical method for surveying a large percentage of PWS and offer a more complete survey of the avian community in coastal fiords.

BIRD BANDING

Monitoring fall migrants with intensive mist-netting

Anna-Marie Benson, Alaska Bird Observatory

The Tetlin National Wildlife Refuge (TNWR) and Alaska Bird Observatory (ABO) have operated large standardized mist-netting stations in the Tanana Valley from 1992-2000. The objectives of the netting programs are to capture and band migrating passerines to examine: 1) population dynamics; 2) timing of life history events (e.g., migration, reproduction, molt, juvenal dispersal, and seasonal differences in body condition); and 3) to provide public education programs relating to avian ecology and conservation.

Despite increasing evidence that intensive, standardized netting can be a useful population monitoring tool (e.g., Dunn et al. 1997), biologists are still faced with several questions: Do migration counts provide accurate population trend data? Do migration stations monitor the same population from year to year? And, which species can be adequately monitored with migration monitoring?

Evaluating the accuracy of survey techniques is difficult because, in most cases, the actual population size is unknown to provide a basis for comparison. One possible mechanism for evaluating the accuracy of monitoring techniques is to collect data from multiple methods within a sampling region to determine agreement in trends in avian abundance. When independent methods agree in their estimates of trends in abundance, researchers may have more confidence in each technique. Similarly, if methods do not agree, then one or both methods may not be valid.

The close proximity of CFMS and TNWR to the probable breeding grounds of migrants reduces variation in the patterns of migration among populations that is likely to occur at migration stations at lower latitudes. We hypothesize that we are sampling the same populations at CFMS and TNWR based on the location of these two sites in the Tanana Valley.

Objective: We will test the assumption that independent monitoring protocols provide similar accounts of population trend data in the Tanana Valley. Specifically, we will:

1. Compare the timing of bird movements detected from migration monitoring stations at TNWR and CFMS.
2. Determine the effect of weather on daily migration counts.
3. Compare trends in abundance from migration monitoring stations at CFMS and TNWR.
4. Compare trends in abundance between migration monitoring stations and point-count surveys from data collected in the Tanana Valley.

Monitoring Avian Productivity and Survival (MAPS): where do we go from here?
Steve Matsuoka, USGS-Alaska Biological Science Center

The group discussed the status of the MAPS Program in Alaska to determine what steps need to be taken to focus future sampling in the state. Twenty-five stations have been run for various lengths of time between 1992 and 2000 with some stations reaching the 10-year mark this summer. We agreed that the highest priority must be given to analyzing the current data to determine (1) what species are being sampled adequately to estimate survival, productivity, and potentially recruitment; (2) how estimates of these demographic parameters vary across years and geographic locations; and (3) how future sampling should be allocated to monitor demographics of landbirds in a cost effective manner. Pat Heglund (USFWS), Joel Schmutz (USGS), and Steve Matsuoka are currently looking into answering some of these questions.

A cursory examination of the MAPS data by Brad Andres last year showed that few priority species are being sampled by the current distribution of MAPS stations. This suggests that we may need to target particular species, regions, and habitats if we want to obtain precise estimates of survival and productivity for our priority birds. For example we might consider selecting a small group of species to focus on for a five-year period. During this time we could intensively sample those regions and habitats used by these species to come up with good estimates survival and productivity. Monitoring trends in demographics could be accomplished by resampling these sites following a 5-to-10-year intermission during which other species could be similarly targeted.

Summary of banding activities in Alaska, 2000.
Anna-Marie Benson, Alaska Bird Observatory

Below I have summarized the number of birds banded by species and age during Monitoring Avian Productivity and Survivorship (Table 1), Migration Monitoring (Table 2), and other training and research (Table 3) activities.

Table 1. Monitoring Avian Productivity and Survival activities in Alaska, 2000.

BIOREGION:	Southeast				Southcoastal				Southwest			
SITE NAME:	Hoonah, Mendenhall				Yakutat				Mother Goose Lake			
CONTACT/AFFILIATION:	Don Youkey, USFS				Don Youkey, USFS				Susan Savage/USFWS			
Number of Stations	2				1				3			
No. days banding:	16				9				28			
Range of dates:	4 June-2 Aug				10 June-7 Aug				10 June - 4 Aug			
No. net-hours:	811				405				1,078			
SPECIES	HY	AHY	UNK	TOT	HY	AHY	UNK	TOT	HY	AHY	UNK	TOT
Solitary Sandpiper												
Common Snipe												
Three-toed Woodpecker												
Western Wood-Pewee												
Alder Flycatcher										6		6
Tree Swallow										5		5
Gray Jay												
Steller's Jay	1			1	1			1				
Black-capped Chickadee									11	2		13
Boreal Chickadee												
Chestnut-backed Chickadee	5	1		6								
Brown Creeper	8	1		9	1							
Winter Wren	2	4	5	11								
Arctic Warbler												
Ruby-crowned Kinglet	13	20	2	35		5	1	6				
Gray-cheeked Thrush									4	13		17
Swainson's Thrush		4		4								
Hermit Thrush*	20	18	26	64	21	8		29	36	21		57
American Robin		2		2					10	9		19
Varied Thrush	17	10	1	28	1	1		2				
Bohemian Waxwing												
Orange-crowned Warbler	8	27	1	36	8	15		23	46	34		80
Yellow Warbler									17	39		56
Myrtle Warbler		6		6		3		3				
Audubon's Warbler		2		2								
Townsend's Warbler		4		4								
Blackpoll Warbler												
Northern Waterthrush	1	2		3								
Wilson's Warbler	4	17	1	22	17	19	1	37	371	177	1	549
American Tree Sparrow									5			5
Chipping Sparrow												
Savannah Sparrow									9	3		12
Fox Sparrow	1	4		5	4	5		9	16	17		33
Song Sparrow	2	1	3	6	2			2				
Lincoln's Sparrow	2	3	3	8	28	8		36				
White-throated Sparrow		1		1								
Golden-crowned Sparrow									19	27		46
White-crowned Sparrow									1	2		3
Slate-colored Junco												
Oregon Junco	6	14		20								
Dark-eyed Junco					3			3				
Rusty Blackbird												
Pine Grosbeak		1		1								
White-winged Crossbill												
Common Redpoll									43	107		150
Pine Siskin						1		1				
TOTAL OF ALL SPECIES	90	158	42	216	86	65	2	152	588	462	1	1051
CAPTURE RATE (#/100nh)	11.1	19.5	5.2	26.6	21.2	16.0	0.5	37.5	54.6	42.9	0.1	97.5

Table 1. Continued

BIOREGION:	Southcentral			Central			Central			**TOTAL**			
SITE NAME:	Girdwood			Denali National Park			Canvasback Lake						
CONTACT/AFFILIATION:	Aaron Poe USFS			Daniel O'Grady, IBP			Kristine Sowl, USFWS						
Number of Stations	2			6			1			15			
No. days banding:	12			36			6						
Range of dates:	13 June-8Aug			10 June-4 Aug			11 June-31 July						
No. net-hours:	709			1,842			360						
SPECIES	HY	AHY	TOT	HY	AHY	TOT	HY	AHY	TOT	HY	AHY	UNK	TOT
Solitary Sandpiper								3	3		3		3
Common Snipe								1	1		1		1
Three-toed Woodpecker	1	1	2		1	1				1	2		3
Western Wood-Pewee							2	10	12	2	10		12
Alder Flycatcher				9		9		4	4	9	10		19
Tree Swallow											5		5
Gray Jay				3	1	4				3	1		4
Steller's Jay										2			2
Black-capped Chickadee				1	2	3				12	4		16
Boreal Chickadee	6	3	9	10	3	13	12	2	14	28	8		36
Chestnut-backed Chickadee										5			5
Brown Creeper										9			9
Winter Wren										2	5	5	12
Arctic Warbler				14	7	21				14	7		21
Ruby-crowned Kinglet	39	17	56	3	1	4	5	2	7	60	27	3	90
Gray-cheeked Thrush				5	2	7	3	2	5	12	17		29
Swainson's Thrush	2	3	5	9	5	14	10	10	20	21	18		39
Hermit Thrush*	19	16	35	3		3				99	71	26	196
American Robin		3	3	3		3	8	20	28	21	32		53
Varied Thrush	4	2	6	3	1	4	1		1	26	5	1	32
Bohemian Waxwing								4	4		4		4
Orange-crowned Warbler	7	19	26	22	12	34	2	3	5	93	84	1	178
Yellow Warbler		2	2				75	60	135	92	101		193
Myrtle Warbler	5	9	14	13	11	24	34	51	85	52	74		126
Audubon's Warbler											2		2
Townsend's Warbler	2		2							2			2
Blackpoll Warbler				2	1	3	1	1	2	3	2		5
Northern Waterthrush					1	1	5	2	7	6	3		9
Wilson's Warbler	4	23	27	59	85	144				455	305	3	763
American Tree Sparrow				18	23	41	14	3	17	37	26		63
Chipping Sparrow								3	3		3		3
Savannah Sparrow	1	1	2	6	2	8	12	2	14	28	8		36
Fox Sparrow	4	12	16	9	4	13	5	4	9	39	42		81
Song Sparrow										4	3	3	10
Lincoln's Sparrow	1	1	2		1	1	11	5	16	42	18	3	63
White-throated Sparrow											1		1
Golden-crowned Sparrow	2		2		1	1				21	28		49
White-crowned Sparrow				39	41	80	11	3	14	51	46		97
Slate-colored Junco	5	7	12				42	4	46	47	11		58
Oregon Junco										6			6
Dark-eyed Junco				14	25	39				17	25		42
Rusty Blackbird							9	1	10	9	1		10
Pine Grosbeak								1	1		1		1
White-winged Crossbill							6	19	25	6	19		25
Common Redpoll	19	15	34	49	10	59	1	16	17	112	148		260
Pine Siskin											1		1
TOTAL OF ALL SPECIES	121	134	255	294	240	534	271	240	505	1,448	1,182	45	2,675
CAPTURE RATE (#/100nh)	17.1	18.9	35.9	16.0	13.0	29.0	75.3	66.7	140.3				

Table 2. Migration monitoring activities in Alaska, 2000.

BIOREGION:	Western				Southcentral				Southwest			
SITE NAME:	BIA Site, Bethel, AK				Campbell Tract				Mother Goose Lake			
CONTACT:	C. Harwood, USFWS				Bruce Seppi-BLM				Susan Savage/USFWS			
Range of dates:	20 July - 4 August				15 Aug-15 Sept				5 Aug - 13 Sept			
Number of days:	9				22				32			
No. net-hours:	294				1,076				1,534			
SPECIES	HY	AHY	UNK	TOT	HY	AHY	UNK	TOT	HY	AHY	UNK	TOT
Sharp-shinned Hawk					1			1				
Downy Woodpecker									3	1		4
Three-toed Woodpecker												
Northern Flicker												
Olive-sided Flycatcher												
Western Wood-Pewee												
Yellow-bellied Flycatcher												
Alder Flycatcher	3	2		5	9		1	10	1			1
Hammond's Flycatcher												
Steller's Jay						1		1				
Black-capped Chickadee					46	10		56	43	1		44
Boreal Chickadee					4	1		5				
Red-breasted Nuthatch					1			1				
Brown Creeper												
Arctic Warbler												
Golden-crowned Kinglet					4	1		5				
Ruby-crowned Kinglet					119	4		123	4			4
Townsend's Solitaire												
Gray-cheeked Thrush	9	13		22					50	8		58
Swainson's Thrush					7			7				
Hermit Thrush					57	3	1	61	230	7		237
American Robin	5	10		15	1			1	11	1		12
Varied Thrush	1			1								
Northern Shrike		1		1					2			2
Orange-crowned Warbler		1		1	63	1		64	241	35	1	277
Yellow Warbler	6	18		24	75	9		84	230	11	1	242
Myrtle Warbler		4		4	134	7		141				
Townsend's Warbler					4		1	5				
Blackpoll Warbler					15			15				
Northern Waterthrush		2		2	7	1		8				
Wilson's Warbler	12	63	2	77	183	8	1	192	2158	52	1	2211
American Tree Sparrow	4	12		16	2			2	136	3		139
Chipping Sparrow					1			1				
Savannah Sparrow					1			1	78	1	1	80
Fox Sparrow	1	9		10	21			21	117	3		120
Lincoln's Sparrow					4			4	1			1
Golden-crowned Sparrow					20	1		21	79	5		84
White-crowned Sparrow	3	4		7	13			13	21	2		23
Slate-colored Junco					375	28		403	1			1
Rusty Blackbird												
Pine Grosbeak									1			1
White-winged Crossbill												
Common Redpoll	3	3		6		7		7	141	78		219
Pine Siskin						1		1				
Total	47	142	2	191	1,167	83	4	1,254	3,548	208	4	3,760
Capture Rate (#/100nh)	16.0	48.3	0.7	65.0	108.5	7.7	0.4	116.5	231.3	13.6	0.3	245.1

Table 2. Continued

BIOREGION:	Southcentral			Central			Central			**TOTAL**			
SITE NAME:	Girdwood			Denali National Park			Canvasback Lake						
CONTACT/AFFILIATION:	Aaron Poe USFS			Daniel O'Grady, IBP			Kristine Sowl, USFWS						
Number of Stations	2			6			1			15			
No. days banding:	12			36			6						
Range of dates:	13 June-8Aug			10 June-4 Aug			11 June-31 July						
No. net-hours:	709			1,842			360						
SPECIES	HY	AHY	TOT	HY	AHY	TOT	HY	AHY	TOT	HY	AHY	UNK	TOT
Solitary Sandpiper								3	3		3		3
Common Snipe								1	1		1		1
Three-toed Woodpecker	1	1	2		1	1				1	2		3
Western Wood-Pewee							2	10	12	2	10		12
Alder Flycatcher				9		9		4	4	9	10		19
Tree Swallow											5		5
Gray Jay				3	1	4				3	1		4
Steller's Jay										2			2
Black-capped Chickadee				1	2	3				12	4		16
Boreal Chickadee	6	3	9	10	3	13	12	2	14	28	8		36
Chestnut-backed Chickadee										5			5
Brown Creeper										9			9
Winter Wren										2	5	5	12
Arctic Warbler				14	7	21				14	7		21
Ruby-crowned Kinglet	39	17	56	3	1	4	5	2	7	60	27	3	90
Gray-cheeked Thrush				5	2	7	3	2	5	12	17		29
Swainson's Thrush	2	3	5	9	5	14	10	10	20	21	18		39
Hermit Thrush*	19	16	35	3		3				99	71	26	196
American Robin		3	3	3		3	8	20	28	21	32		53
Varied Thrush	4	2	6	3	1	4	1		1	26	5	1	32
Bohemian Waxwing								4	4		4		4
Orange-crowned Warbler	7	19	26	22	12	34	2	3	5	93	84	1	178
Yellow Warbler		2	2				75	60	135	92	101		193
Myrtle Warbler	5	9	14	13	11	24	34	51	85	52	74		126
Audubon's Warbler											2		2
Townsend's Warbler	2		2							2			2
Blackpoll Warbler				2	1	3	1	1	2	3	2		5
Northern Waterthrush					1	1	5	2	7	6	3		9
Wilson's Warbler	4	23	27	59	85	144				455	305	3	763
American Tree Sparrow				18	23	41	14	3	17	37	26		63
Chipping Sparrow								3	3		3		3
Savannah Sparrow	1	1	2	6	2	8	12	2	14	28	8		36
Fox Sparrow	4	12	16	9	4	13	5	4	9	39	42		81
Song Sparrow										4	3	3	10
Lincoln's Sparrow	1	1	2		1	1	11	5	16	42	18	3	63
White-throated Sparrow											1		1
Golden-crowned Sparrow	2		2		1	1				21	28		49
White-crowned Sparrow				39	41	80	11	3	14	51	46		97
Slate-colored Junco	5	7	12				42	4	46	47	11		58
Oregon Junco										6			6
Dark-eyed Junco				14	25	39				17	25		42
Rusty Blackbird							9	1	10	9	1		10
Pine Grosbeak								1	1		1		1
White-winged Crossbill							6	19	25	6	19		25
Common Redpoll	19	15	34	49	10	59	1	16	17	112	148		260
Pine Siskin											1		1
TOTAL OF ALL SPECIES	121	134	255	294	240	534	271	240	505	1,448	1,182	45	2,675
CAPTURE RATE (#/100nh)	17.1	18.9	35.9	16.0	13.0	29.0	75.3	66.7	140.3				

Table 3. Other banding activities in Alaska, 2000.

BIOREGION:	Southeast	Southcoastal			Western	Southwest		
SITE NAME:	Pilot	Cook Inlet			Cape Romanzof	King Salmon		
CONTACT:	Don Youkey	Steve Matsuoka			Brian McCaffery	Susan Savage		
Affiliation:	USFS	USGS			USFWS	USFWS		
Type of Banding:	Training	Research			Nesting Study	Training		
No. days banding:	2					15		
Range of dates:	31 May-1 Jun				8 June - 6 July	09 May- 31 May		
No. net-hours:	8					303		
SPECIES	AHY	HY	AHY	TOT	AHY	AHY	HY	TOT
Sharp-shinned Hawk								
Solitary Sandpiper								
Alder Flycatcher								
Hammond's Flycatcher								
Tree Swallow						3		3
Gray Jay						1	3	4
Black-capped Chickadee		335	91	426		2		2
Boreal Chickadee		118	24	142		2		2
Chestnut-backed Chickadee	1							
Red-breasted Nuthatch		70	25	95				
Brown Creeper	1							
Ruby-crowned Kinglet								
Bluethroat					1			
Gray-cheeked Thrush					1	1		1
Swainson's Thrush								
Hermit Thrush								
American Robin						17		17
Varied Thrush						2		2
American Pipit								
Northern Shrike						1		1
Orange-crowned Warbler	2					5		5
Yellow Warbler	3							
Myrtle Warbler						3		3
Townsend's Warbler								
Blackpoll Warbler						1		1
Northern Waterthrush								
Wilson's Warbler	1				3	10		10
American Tree Sparrow						3		3
Savannah Sparrow								
Fox Sparrow					1	6		6
Lincoln's Sparrow	2							
Golden-crowned Sparrow					11			
White-crowned Sparrow					1	8		8
Slate-colored Junco						1		1
Oregon Junco	2							
Rusty Blackbird								
Common Redpoll					7	33		33
Hoary Redpoll					12			
Redpoll spp.					3			
TOTAL OF ALL SPECIES	12	523	140	663	40	99	3	102
CAPTURE RATE (#/100nh)						32.7	1.0	33.7

Table 3. Continued

BIOREGION:	Southwest	Southwest	Central	Central		**Total**		
SITE NAME:	Naknek	Bible Camp	Creamer'sField	Creamer'sField				
CONTACT:	Susan Savage	Susan Savage	AM Benson	AM Benson				
Affiliation:	USFWS	USFWS	ABO	ABO				
Type of Banding:	Bird Camp	Science Camp -BICA	Spring Migration	Summer Banding				
No. days banding:	1	1	37	6				
Range of dates:	26-May	08-Sep	25 April-15 June	16 June-14 July				
No. net-hours:	10	2	6177	989				
SPECIES	AHY	AHY	AHY	AHY	HY	AHY	HY	TOT
Sharp-shinned Hawk			2			2		2
Solitary Sandpiper			7			7		7
Alder Flycatcher				4		4		4
Hammond's Flycatcher			11		1	11	1	12
Tree Swallow	2					5		5
Gray Jay					1	1	4	5
Black-capped Chickadee					19	93	354	447
Boreal Chickadee						26	118	144
Chestnut-backed Chickadee						1		1
Red-breasted Nuthatch						25	70	95
Brown Creeper						1		1
Ruby-crowned Kinglet			1			1		1
Bluethroat						1		1
Gray-cheeked Thrush						2		2
Swainson's Thrush			13			13		13
Hermit Thrush		1	2			3		3
American Robin			34	11	1	62	1	63
Varied Thrush			1			3		3
American Pipit			1			1		1
Northern Shrike						1		1
Orange-crowned Warbler	1		13	5		26		26
Yellow Warbler			10	3		16		16
Myrtle Warbler			127	3	7	133	7	140
Townsend's Warbler				1		1		1
Blackpoll Warbler						1		1
Northern Waterthrush			10	4		14		14
Wilson's Warbler	1		8			23		23
American Tree Sparrow		1	10			14		14
Savannah Sparrow			18			18		18
Fox Sparrow						7		7
Lincoln's Sparrow			1		3	3	3	6
Golden-crowned Sparrow	1					12		12
White-crowned Sparrow	2		14	1	3	26	3	29
Slate-colored Junco			37	2	19	40	19	59
Oregon Junco						2		2
Rusty Blackbird			4			4		4
Common Redpoll	3		115	3	4	161	4	165
Hoary Redpoll	1					13		13
Redpoll spp.						3		3
TOTAL OF ALL SPECIES	11	2	439	37	58	780	584	1,364
CAPTURE RATE (#/100nh)			7.1	3.7	5.9			

RAPTORS

BPIF welcomes the Alaska Raptor Working Group

The Alaska Raptor Working Group formally joined *Boreal Partners in Flight* due to the shared focus of conservation of birds and the terrestrial habitats they rely upon. Phil Schempf of the U.S. Fish and Wildlife Service will oversee the integration of the raptor group into *Boreal Partners in Flight*.

Methods for monitoring populations of cavity-nesting owls
Carol McIntyre, Denali National Park and Preserve

One of the first tasks of the Raptor Group will be to develop methods to inventory and monitor populations of forest owls in Alaska. To institute this program, however, we need to determine if spring counts of forest owls can be used as reliable indices of breeding activity or population size. Carol McIntyre is leading up a review of the literature and current monitoring programs to determine whether we can rely upon existing models or if we need to develop new strategies. Some of the specific questions that will be addressed include:

1) Do call/singing surveys provide reliable data to monitor population trends? What do call/singing surveys provide us an index of?

2) Can we use nest boxes to monitor population trends? What are the pros and cons of using nest boxes? Are data from nest boxes representative of the entire population (i.e. differences in nest boxes versus natural cavities)?

3) What type of data do we need to monitor population trends? Do we also want to collect data on survival and reproductive success?

Summary of owl surveys conducted in Alaska, 2000
Anna-Marie Benson, Alaska Bird Observatory

Members of *Boreal Partners in Flight* conducted owl surveys during spring of 2000. These surveys were conducted as part of a preliminary investigation into the effort required to develop a long-term owl monitoring protocol in Alaska. Our objective here is to summarize the data collected on owl surveys in Alaska during 2000. We also examine the daily variation in singing phenology.

Methods - Owl surveys were conducted in Alaska from 22 March to 29 April 2000. Survey locations were selected based on several criteria: accessibility, low levels of human disturbance, and expectations of high numbers of owl detections. Point-count stations were spaced 0.5 mile to 1.0 mile apart and observers drove between stops. Visual and auditory cues of owls were recorded during 8-minute periods. Weather variables were recorded and surveys were not conducted in adverse weather conditions. Surveyors also recorded distance (and usually direction) to the owl. Owls that may have been double counted were removed from this compilation.

Several routes were repeated more than once to examine the seasonal and daily variation in singing phenology. We determined whether detections were disproportionately high within days by comparing the number of owl detections to the expected number of detections based on survey effort.

We grouped surveys from throughout Alaska for this compilation because low sample sizes prevented a more refined grouping of biogeographic areas. These results may therefore be confounded by the geographic variation among owl populations within Alaska.

Results - Twenty-five routes were surveyed in Alaska during 2000 (Table 1). Many of these routes were repeated more than once, with one route surveyed 14 times. A total of 895 points were surveyed and 63 Great-horned Owls, 42 Boreal Owls, 35 Saw-whet Owls, 3 Barred Owls, 3 Western Screech Owls, 2 Great Gray Owls, and 1 Short-eared Owl were detected (Table 1). Additionally, Northern Hawk Owls were detected in Girdwood on two different days.

On most routes, few or no owls were detected even if the route was repeated several times. Only 26% of all detections were recorded on 85% of the routes. The Aleknagik, Fort Greely, and Hope surveys had the most detections of owls; these surveys comprised 12% of all of the surveys conducted in Alaska, yet 56% of detections were recorded on these routes.

We did not make inferences about the peak singing periods of owls within the season because surveys only sampled a one-month period; however, Figures 1 and 2 provide a description of surveys conducted and number of detections. Repeating surveys did not seem to increase the number of detections associated with most routes.

Peak detection periods were 2-5 hours after sunset (Fig. 3); however, all dark hours were not sampled evenly, i.e., most points were surveyed 2-5 hours after sunset (Fig. 4). Boreal Owls were detected most frequently 4-5 hours after sunset; this difference was significantly different from the expected number of detections based on survey effort (X^2=17.9, df=6, P<0.01). There was no difference in times that Great Horned Owls were detected compared with expected number of detections based on survey effort. Saw-whet Owls were detected in disproportionately high numbers in the 5-6 hours-after-sunrise category (X^2=23.2, df=6, P<0.001).

Discussion - Several owl surveys were conducted throughout Alaska during 2000, but few owls were detected on 21 of 25 routes. Several factors could explain the low numbers of owls counted on most surveys. First, densities of owls may be extremely low in most parts of Alaska, indicating a large number of surveys would be required to have adequate sample sizes to determine long-term trends in detections of Boreal Owls and Great Horned Owls in Alaska. Second, owl densities may fluctuate from year to year; perhaps densities were lower than average in 2000 in areas where surveys were conducted. Third, our non-random sample of surveys may have created a bias toward low density of owls near population centers. Finally, the survey period may not have adequately sampled the peak singing periods for owls, i.e., surveys may have been conducted too late.

Recommendations

1. Repeat survey routes that have potential for long-term monitoring.
2. Avoid establishing surveys near towns. Two routes in Fairbanks (Murphy Dome and Goldstream) were problematic because noise from dog teams and cars distracted surveyors. These two surveys will not be conducted in future years.
3. Begin surveys on 15 February, rather than 15 March, to determine whether more individuals could be detected earlier in the year.
4. More study is needed to determine whether singing males adequately represent abundance of owls in Alaska.

Acknowledgments - We would like to thank Brad Andres, USFWS Migratory Bird Management, for gathering funds for this compilation. Thanks to the many agency biologists whom contributed the survey data herein: Buddy Johnson (USFWS), Liz Jozwiak (USFWS), Jeff Mason (Colorado State University), Rob MacDonald (USFWS), Deb Nigro (NPS), Susan Savage (USFWS), Stacy Prosser (USFS), Aaron Poe (USFS), and Ellen Lance (USFS). Many thanks to David Shaw (ABO) for entering and maintaining records and convincing many volunteers to conduct surveys: Amal Ajmi, Michelle Ambrose, Laurel Devaney, Adia DeWitt, Dana Durham, Catherine Egan, Greg Egan, Rebecca Gilbert, Lorrie Hawkins, Brita and Janlee Irving, Sherry Lewis, Jim Logan, Tony Payne, Joyce Potter, Mark Ross, Ken Russell, Kristine Sowl, and Judy Williams.

Fig. 1. Timing of owl detections in Alaska during 2000.

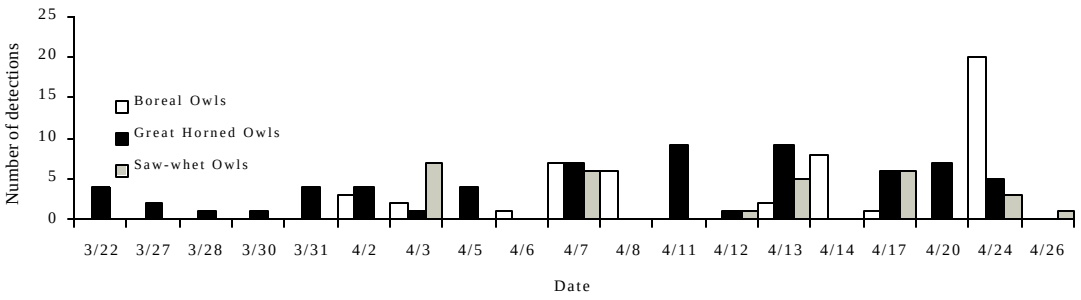


Fig. 2. Timing of owl surveys in Alaska during 2000.

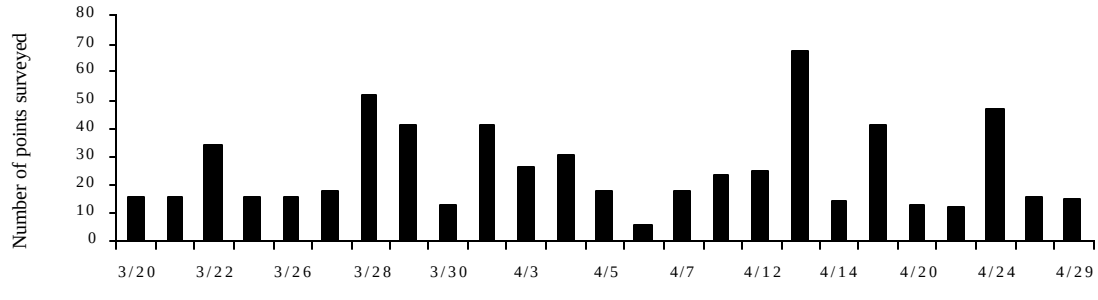


Table 1. Summary of owl survey effort in Alaska during 2000.

Route	Location	No. of stops (mean)	No. of surveys	Date	Total Number of Detections						
					Boreal	Great Horned	Saw-whet	Western Screech	Barred	Great Gray	Short-eared
Aleknagik	Dillingham	13	4	30 Mar-24 Apr	14	2	0	0	0	0	0
East Chena Hot Springs	Fairbanks	8	2	28 Mar-4 Apr	2	0	0	0	0	0	0
West Chena Hot Springs	Fairbanks	20	1	28 Mar	0	0	0	0	0	0	0
Goldstream	Fairbanks	13	4	28 Mar-13 Apr	0	3	0	0	0	0	0
King Salmon	King Salmon	10	1	8 Apr	0	0	0	0	0	0	0
Murphy Dome	Fairbanks	22	14	27 Mar-24 Apr	0	3	0	0	0	2	0
Steese	Fairbanks	14	6	7 - 29 Apr	6	4	0	0	0	0	1
Tetlin	Tok	15	1	22 Mar	0	4	0	0	0	0	0
Fort Greely	Fort Greely	13	4	31 Mar-20 Apr	0	24	0	0	0	0	0
Charlie River North	Yukon Charley	16	1	26 Mar	0	0	0	0	0	0	0
Charlie River South	Yukon Charley	16	1	27 Mar	0	0	0	0	0	0	0
Copper Creek	Yukon Charley	16	1	29 Mar	0	0	0	0	0	0	0
Crescent Creek	Yukon Charley	12	1	28 Mar	0	0	0	0	0	0	0
Washington Creek	Yukon Charley	16	1	22 Mar	0	0	0	0	0	0	0
Kandik	Yukon Charley	16	2	23 Mar, 4 Apr	3	0	0	0	0	0	0
Yukon IV	Yukon Charley	16	2	20 Mar, 4 Apr	0	0	0	0	0	0	0
Yukon V	Yukon Charley	16	2	21 Mar, 3 Apr	1	0	0	0	0	0	0
Seward	Seward	12	2	12 Apr, 26 Apr	0	1	2	0	0	0	0
Cooper Landing	Cooper Landing	13	1	7 Apr	1	0	0	0	0	0	0
Hope	Hope	23	5	3 -24 Apr	4	16	24	0	0	0	0
CRCR	Girdwood	12	4	3 Mar-25 Apr	6	0	1	0	0	0	0
POVA	Girdwood	12	4	2 Apr-4 May	1	4	1	0	0	0	0
Sandy Beach Road	Thorne Bay	15	1	4 Apr	0	0	0	1	0	0	0
Sweetwater	Thorne Bay	10	1	12 Apr	0	0	5	2	3	0	0
Swan Lake Road	Soldotna	10	2	29 Mar, 27 Apr	4	2	2	0	0	0	0
	All sites				42	63	35	3	3	2	1

Fig. 3. Timing of owl detections in Alaska from 22 March to 29 April, 2000.

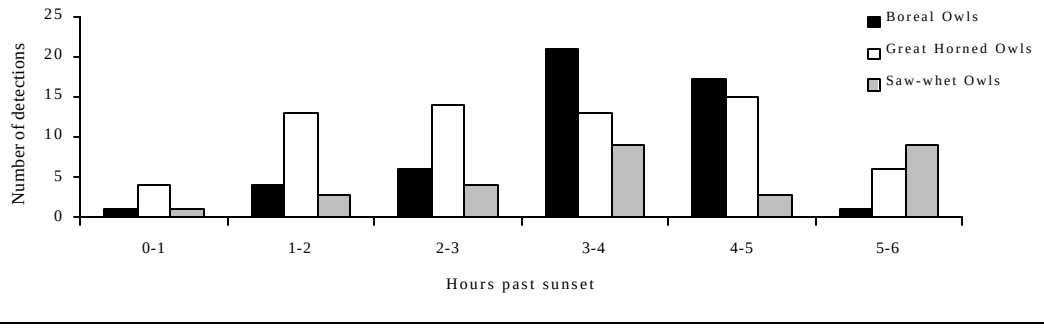
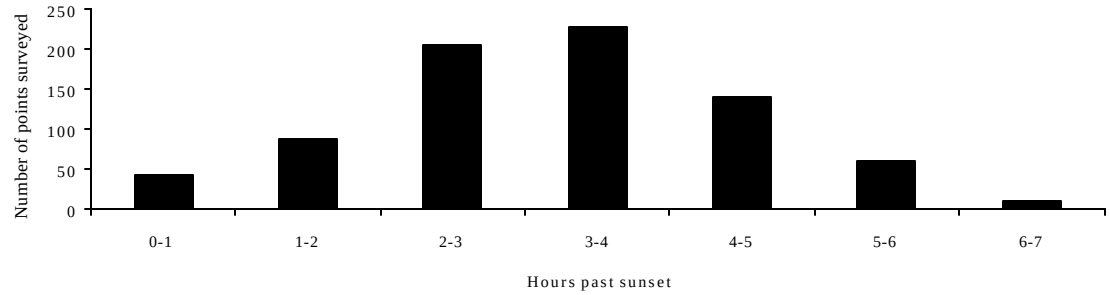


Fig. 4. Timing of owl surveys conducted in Alaska from 22 March to 29 April, 2000.



Reports from Bird Conservation Regions

We discussed transitioning the stratification of the state from a system of biogeographic regions (Kessel and Gibson 1978) to Bird Conservation Regions (BCR) as defined for the North American Bird Conservation Initiative. The delineations of the BCRs are very similar to those outlined by Kessel and Gibson (1978), therefore, the reclassification should impose little change to our current sampling strategies.

Many of the BCRs for Alaska transcend traditional political boundaries to encompass shared habitats in Canada and the contiguous United States. For example, the Northern Pacific Rainforest BCR extends along the coast from the Kenai Peninsula south to northern California. This may open up new funding opportunities for biologists with the Chugach and Tongass National Forests to collaborate with biologists in British Colombia, Washington, Oregon, and California to address shared conservation problems.

The American Bird Conservancy has recently begun bringing on BCR coordinators to help organize conservation efforts and look for new sources of funding within regions. Bob Altman is the new coordinator for the Pacific Northwest Rainforest BCR and is interested in working with our group to address conservation problems facing birds in Alaska.

Northern Pacific Rainforest (Formerly Southcoastal and Southcoastal Alaska)
Peg Robertson, USDA Forest Service, Wrangell District

In attendance were Ellen Campbell, Peg Robertson, Don Youkey (USDA Forest Service-Tongass National Forest), Aaron Poe (USDA Forest Service-Chugach National Forest), Brad Andres (USFWS), and Steve Matsuoka (USGS).

Improving consistency of monitoring – A top priority for this BCR was given toward improving communication among biologists in the region to better organize a consistent effort to monitor populations of landbirds over time. In particular more effort is needed to maintaining current Breeding Bird Survey and Alaska Off-road Breeding Bird Survey routes in the face of high turnover of personnel. Peg Robertson and Don Youkey agreed to look into this issue.

Priority species for conservation – We ran through a list of twenty priority species for conservation for our region to determine what species are being monitored by our current survey efforts. Most species (n = 13) could be monitored effectively with a modest expansion of the BBS and AORBBS programs. Species which will require specialized survey efforts include: MacGillivray's Warbler, Western Wood Pewee, American Dipper, Blue Grouse, Western Screech Owl, Black Swift, and Vaux's Swift.

Very little is known about Black Swifts in Southeast making this species a research priority. Brad Andres wrote a status report titled "Review of the status of the Black Swift in Alaska" that details our current understanding of the species in Alaska. More information is needed to assess the breeding status of this species in Alaska.

Sampling – We discussed modifying the off-road point count method in Southeast by using a shoreline-survey method to access points by boat. Aaron Poe and Brad Andres have used this method with success in Prince William Sound (see page 13 for a description of this method). Wrangell biologists found this a useful method for surveying birds as a part of timber sale inventories.

It would be helpful to have some guidance in expanding our survey efforts. Colleen Handel (USGS) plans to develop a sampling grid for the State to use in setting up survey routes. Brad Andres suggested that we could allocate our routes by ecoprovince (Biodiversity section of Forest Plan, Table 1) in Southeast Alaska. A short-term goal might be to establish one survey route in each of the ecoprovinces to assure even coverage of areas in southeast Alaska.

Recent research and monitoring projects – Ongoing research projects in Southeast include Jim Johnson's research on bird-habitat relationships along the major riparian corridors in the Southeast and a Rufous Hummingbird study with some fieldwork in Juneau. Michelle Kissling of the University of Idaho is also conducting research that compares the density of forest birds breeding along natural forest edges (beach fringes) to those breeding adjacent to clear-cuts.

Table 1. Distribution of off-road point count routes and Breeding Bird Survey routes among ecological provinces in Southeastern Alaska.

Ecological Province	Number of Off-road Point Count routes	Number of Breeding Bird Survey routes
Yakutat Forelands		2
Yakutat Uplands		0
East Chicagof Island	X	2
West Chicagof Island		0
East Baranof Island		0
West Baranof Island		1
Admiralty Island		0
Lynn Canal	X	2
North Coast Range	X	1
Kupreanof/Mitkof Island		1
Kuiu Island		0
Central Coast Range		1
Etolin Island		2
NC Prince of Wales	X	3
South Prince of Wales	X	0
Revilla/Cleveland		1
Southern Outer Islands		0
Dall Island and Vicinity		0
North Misty Fiords		1
South Misty Fiords	X	0

Western Alaska and Aleutian/Bering Sea Islands (Formerly Western and Southwestern Alaska). *Rob McDonald, U.S. Fish and Wildlife Service, Togiak NWR.*

In attendance for the Western Alaska and Aleutian/Bering Sea Islands BCR were Fred Broerman (Yukon Delta NWR), Donna Dewhurst (USFWS Subsistence Division), Rob MacDonald (Togiak NWR), Heather Moore (Alaska Maritime NWR), Susan Savage (Alaska Peninsula/Becharof NWR Complex), and Brad Andres (USFWS Migratory Birds Management).

Appropriate sampling frames for point count surveys

1) The group will need to work with Colleen Handel (USGS) to determining the best way to incorporate non-standard monitoring into the statewide monitoring protocol. Heather Moore and Vern Byrd (USFWS) recently suggested that we need a better justification than the "better than nothing" response to continue this type of sampling. We also need to explore the possibility of using the area search method to record landbird distribution, abundance, and breeding status.

2) Chris Harwood (USFWS) recently examined data from the North American Breeding Bird Survey (BBS) and the Alaska Off-road Breeding Bird Survey (AORBBS) to determine what species are being sampled in the region. The group needs to use work with Chris to determine how well we are currently sampling our priority species in the region.

3) The group agreed that we should emphasize continuing monitoring survey routes (particularly BBS) already in place.

4) *Other comments regarding sampling*. Some members suggest that we need to address the potential problem of having high turnover of observers in the AORBBS program. Members also suggested that a biennial-sampling strategy for the AORBBS program would allow each conservation unit to sample a broader area and potentially a larger number of species. We discussed monitoring priority species by working cooperatively with other agencies or landowners, such as the Wood-Tikchik State Park in the Dillingham area, Katmai National Park in the King Salmon area, BLM, native corporation lands, and others. Upper level managers with the USFWS may need to be involved to help foster such cooperative projects since efforts by biologists and refuge managers have not been effective.

Owl Monitoring - Interested parties will continue to explore options for planning and/or implementing owl monitoring. Brad Andres has distributed an updated *Suggestions for Breeding Owl Surveys in Alaska* for our use in 2001. Of the members present, Rob MacDonald and Susan Savage (USFWS) expressed interest. Bruce Seppi (BLM) also plans to run an owl survey on the Iditarod Trail between Unalakleet and Kaltag.

McKay's Bunting population status - We need to work with Alaska Maritime NWR to summarize information on the natural history of McKay's Bunting collected by Refuge staff at St. Matthew Island. Alaska Maritime Refuge staff will be going to St. Matthew Island in 2002. This will be a good opportunity to examine the status of the only endemic landbird in the state. We need to determine whether an assigned biologist will work with the Refuge staff or if the Refuge biologists already planning to go will be able to conduct research on the species. Abby Powell of the University of Alaska, Fairbanks was interested in helping head up this research.

Threats to riparian habitats through sale of lands - We need to determine to what extent existing data can be used to evaluate the importance of riparian habitats to landbirds in the region. We also need to generate maps that show where the important riparian habitats are in relation to land ownership patterns. This information could be used to help prioritize the acquisitions of important landholdings in the region.

Obtaining natural history information on priority species

1) Togiak and Yukon Delta Refuges hope to examine nest occupancy and productivity of Gyrfalcons at several sites in the region.

2) Ongoing studies examining the nesting biology of Golden-crowned Sparrows at Mother Goose Lake and Cape Romanzof will help determine the reproductive ecology of this species in Alaska. Susan Savage reported that her staff monitored 22 nests in 2000. She plans to do more work on the species in 2001.

3) Fred Broerman reported that Brian McCaffery (Yukon Delta NWR) hopes to initiate a breeding biology study of Hoary Redpolls at Cape Romanzof. He also plans on completing a study on nesting Northern Wheatears this summer at the same site.

4) The group hopes to continue collecting information on nesting Wilson's Warblers. Susan Savage reported on monitoring 40 nests at Mother Goose Lake last year. Brian McCaffery would like to continue to synthesize the information on Wilson's Warblers in the state to develop a paper describing the natural history of the species in Alaska.

Long-term standardized mist-net stations - With the loss of the Bible Camp mist-net station, we recognized the importance of maintaining the Mother Goose Lake station. Susan Savage reported that Mother Goose Lake will staffed in 2001, but may not be staffed in the future. We will look into sources of funding to continue this long-term data set.

Northwestern Interior Forests (Formerly Central Alaska with the addition of Cook Inlet)
John Wright, Alaska Department of Fish and Game

The group examined monitoring coverage of priority species in the region.

Identification of distinct populations of priority species – The group suggested that particular priority species should be examined to determine if their populations in Interior Alaska are genetically distinct. This could be determined by collecting samples of genetic material (blood or feathers) from existing capture sites. It was recommended that Colleen Handel contact Sandy Talbot (USGS) to see if her lab is available to help with this project. Suggested species for analysis included Arctic Warbler, Gray-cheeked Thrush, Townsend's Warbler, Blackpoll Warbler, and Golden-crowned Sparrow.

Early season surveys for selected priority species and other early nesters – We may need to conduct surveys earlier than recommended for summer breeding surveys (mid to late June) to pick up several priority species. These surveys could potentially be incorporated into training programs given by the Alaska Bird Observatory. Species in this group include:

Black-backed Woodpecker: Surveys would need to be done in recent burns in late March/April. There is also a need to develop a protocol to identify the location of recent fires to possibly conduct surveys.

Hammond's Flycatcher and Western Wood Peewee: Surveys need to be conducted in deciduous forests in late May (last week best). We may need more information on selection of breeding habitats by Western Wood Peewee as patterns of habitat use in this species are unclear. For example this species uses clearcuts on the Kenai Peninsula, mature quaking aspen near Delta and Anchorage, and wetland/mixed forest in interior Alaska.

Northern Shrike: This is another early nesting species, however, it poses a particular problem because it is widespread but breeds at low densities. A centralized database of sightings might be useful approach. There is also a general need to record and document the song of this species in Alaska.

Other priority species that are being missed by current BBS/AORBBS coverage.—Several priority species are being missed by our current coverage in the region due to specialized use of habitats and low population densities. This group of birds will likely require surveys that are specifically designed to monitor trends in their population size in the region. These species include:

Gyrfalcon: Need to compile existing data to better determine the status of this species in Alaska. Several data sets could be looked at including those from Denali National Park and Preserve (Carol McIntyre), Colville River (Ted Swem), Seward Peninsula/Brooks Range (Peter Bente, John Wright), Yukon Delta NWR (Brian McCaffery). [John Wright]

White-tailed Ptarmigan: We should conduct a literature search to determine what has been learned in more southern portions of the species range and from Weeden's early work. Herman Griese (ADFG Palmer) could be contacted to find out more about early work in Alaska.

Sharp-tailed Grouse: Population size of this species increased in Tetlin NWR after fire, presumably because of its habitat preference for clearings. This species also appears to use black spruce and quaking aspen forest. Surveying leks in early May may be a viable means of monitoring this species. [Jeff Mason]

Great Gray Owl: This species is widespread but occurs at low densities and is difficult to detect. Because this species will be so challenging to survey, maintaining a centralized database of sightings could be useful to better determine the status of this species. We might contact trappers in the region to participate in this project.

Boreal Owl: We need to develop a protocol for surveying this species. We should consider the possibility of comparing singing rates to patterns of nest box occupancy and productivity. [John Wright, Carol McIntyre, Todd Trapp, Anna-Marie Benson]

Bohemian Waxwing: Winter surveys such as the Christmas Bird Count or other urban counts may be most effective means of monitoring this species.

American Dipper: We should consider the use of winter surveys of targeted streams similar to methods used in Canada. [Carol McIntyre]

Townsend's Warbler: We need to target surveys in mature white spruce forests in Central Alaska. Good numbers are encountered on routes on the Kenai Peninsula and in Upper Cook Inlet.

Golden-crowned Sparrow: adequate sample on Cook Inlet/Kenai?

Rusty Blackbirds: We need targeted surveys of wetland habitats for this species.

White-winged Crossbill: Check sources of data on this nomadic species (i.e. BBS, AORBBS, CBC, etc.).

Appendix 1: Mean density (birds/route) and mean coefficient of variation (CV) of temporal variability of landbirds recorded on BBS routes in ecoregions of Alaska. CV is for temporal variation on routes where the species was recorded between 1993 and 2000. Routes were chosen that had the same observer and were run for at least 4 years.

Brad Andres, U.S. Fish and Wildlife Service

Species	Ecoregion	Mean no.	Mean CV	No. rts.
Osprey	Subarctic Coastal Plains	0.714	0.258	1
	Arctic Foothills	0.200	1.000	1
	Interior Bottomlands	0.806	0.564	3
	Yukon Flats	0.250	1.000	1
Bald Eagle	Subarctic Coastal Plains	0.125	1.000	1
	Bristol Bay-Nushugak Lowlands	1.188	0.450	2
	Alaska Peninsula Mountains	4.075	0.470	3
	Interior Forested Lowlands and Uplands	0.925	0.712	2
	Interior Bottomlands	1.135	0.615	4
	Cook Inlet	0.137	1.000	3
	Yukon Flats	0.500	0.535	1
	Copper Plateau	1.264	0.519	3
	Coastal Western Hemlock-Sitka Spruce Forests	13.448	0.236	14
	Pacific Coastal Mountains	8.357	0.423	4
Northern Harrier	Subarctic Coastal Plains	0.134	1.000	2
	Seward Peninsula	0.250	0.744	2
	Brooks Range	0.200	1.000	1
	Interior Forested Lowlands and Uplands	0.217	1.000	3
	Interior Higlands	0.200	1.000	1
	Interior Bottomlands	1.250	0.293	1
	Alaska Range	0.714	0.400	1
	Copper Plateau	0.143	1.000	1
	Coastal Western Hemlock-Sitka Spruce Forests	0.200	1.000	1
Sharp-shinned Hawk	Interior Forested Lowlands and Uplands	0.125	1.000	1
	Interior Bottomlands	0.333	1.000	1
	Copper Plateau	0.286	0.645	1
	Coastal Western Hemlock-Sitka Spruce Forests	0.236	0.915	5
	Pacific Coastal Mountains	0.196	1.000	2
Northern Goshawk	Subarctic Coastal Plains	0.286	0.645	1
	Northwestern Interior Forests	0.250	1.000	1
	Interior Bottomlands	0.208	0.827	2
	Yukon Flats	0.146	1.000	2
	Copper Plateau	0.143	1.000	1
	Coastal Western Hemlock-Sitka Spruce Forests	0.196	0.827	2
	Pacific Coastal Mountains	0.286	0.645	1
Red-tailed Hawk	Subarctic Coastal Plains	0.571	0.354	1
	Northwestern Interior Forests	0.250	1.000	1
	Interior Forested Lowlands and Uplands	0.625	0.383	1
	Interior Higlands	0.400	0.704	2
	Interior Bottomlands	1.000	0.507	3
	Cook Inlet	0.571	0.520	1

Species	Ecoregion	Mean no.	Mean CV	No. rts.
Red-tailed Hawk	Yukon Flats	0.125	1.000	1
	Copper Plateau	0.337	0.752	4
	Coastal Western Hemlock-Sitka Spruce Forests	0.982	0.702	3
	Pacific Coastal Mountains	0.388	0.800	3
Rough-legged Hawk	Subarctic Coastal Plains	0.143	1.000	1
	Seward Peninsula	0.705	0.703	4
	Bristol Bay-Nushugak Lowlands	0.250	1.000	1
	Alaska Peninsula Mountains	0.143	1.000	1
	Arctic Foothills	0.600	0.408	1
	Brooks Range	0.200	1.000	1
	Interior Forested Lowlands and Uplands	0.200	1.000	1
	Interior Bottomlands	0.562	0.704	2
Golden Eagle	Seward Peninsula	0.298	0.764	3
	Alaska Peninsula Mountains	0.286	1.000	1
	Interior Forested Lowlands and Uplands	0.400	0.612	1
	Alaska Range	0.305	0.706	3
	Pacific Coastal Mountains	0.500	1.000	1
American Kestrel	Alaska Peninsula Mountains	0.143	1.000	1
	Interior Forested Lowlands and Uplands	0.392	0.823	3
	Alaska Range	0.125	1.000	1
	Coastal Western Hemlock-Sitka Spruce Forests	0.143	1.000	1
	Pacific Coastal Mountains	0.250	1.000	1
Merlin	Subarctic Coastal Plains	0.125	1.000	1
	Seward Peninsula	0.143	1.000	1
	Bristol Bay-Nushugak Lowlands	0.225	1.000	2
	Alaska Peninsula Mountains	0.167	1.000	1
	Northwestern Interior Forests	0.250	1.000	1
	Interior Forested Lowlands and Uplands	0.200	1.000	1
	Interior Bottomlands	0.125	1.000	1
	Cook Inlet	0.143	1.000	1
	Alaska Range	0.274	0.783	3
	Copper Plateau	0.671	0.722	2
	Coastal Western Hemlock-Sitka Spruce Forests	0.134	1.000	2
	Pacific Coastal Mountains	0.946	0.637	2
Peregrine Falcon	Arctic Foothills	0.400	1.000	1
	Interior Bottomlands	0.438	0.819	2
	Yukon Flats	0.125	1.000	1
Gyrfalcon	Seward Peninsula	0.131	1.000	3
	Bristol Bay-Nushugak Lowlands	0.250	1.000	1
	Alaska Range	0.571	0.354	1
Ring-necked Pheasant	Coastal Western Hemlock-Sitka Spruce Forests	3.976	0.419	2
Spruce Grouse	Bristol Bay-Nushugak Lowlands	0.163	1.000	2
	Northwestern Interior Forests	0.250	1.000	1
	Cook Inlet	0.205	0.823	2
	Yukon Flats	0.167	1.000	1
	Coastal Western Hemlock-Sitka Spruce Forests	0.250	1.000	1
Blue Grouse	Coastal Western Hemlock-Sitka Spruce Forests	2.882	0.580	5
	Pacific Coastal Mountains	10.857	0.253	2
Sharp-tailed Grouse	Alaska Range	0.200	1.000	1

Species	Ecoregion	Mean no.	Mean CV	No. rts.
Willow Ptarmigan	Subarctic Coastal Plains	15.000	0.265	1
	Seward Peninsula	6.281	0.434	4
	Bristol Bay-Nushugak Lowlands	29.938	0.357	2
	Alaska Peninsula Mountains	0.171	1.000	2
	Arctic Foothills	1.800	0.509	1
	Brooks Range	1.000	0.548	1
	Interior Forested Lowlands and Uplands	0.200	1.000	1
	Alaska Range	4.571	0.268	2
Rock Ptarmigan	Seward Peninsula	0.830	0.516	4
	Alaska Range	0.571	0.750	1
	Pacific Coastal Mountains	0.286	1.000	1
Ruffed Grouse	Subarctic Coastal Plains	0.143	1.000	1
	Interior Forested Lowlands and Uplands	0.625	0.818	3
	Interior Higlands	0.183	1.000	2
	Interior Bottomlands	1.486	0.639	3
	Yukon Flats	0.146	1.000	2
Rock Dove	Coastal Western Hemlock-Sitka Spruce Forests	15.583	0.272	3
Great Horned Owl	Subarctic Coastal Plains	0.286	1.000	1
	Interior Forested Lowlands and Uplands	0.258	0.900	3
	Interior Bottomlands	0.206	1.000	3
	Cook Inlet	0.143	1.000	1
	Yukon Flats	0.125	1.000	1
	Alaska Range	0.162	1.000	2
	Copper Plateau	0.267	0.852	4
	Coastal Western Hemlock-Sitka Spruce Forests	0.143	1.000	1
	Pacific Coastal Mountains	0.400	1.000	1
Barred Owl	Coastal Western Hemlock-Sitka Spruce Forests	0.125	1.000	1
Northern Hawk Owl	Seward Peninsula	0.125	1.000	1
	Interior Forested Lowlands and Uplands	0.242	0.871	3
	Interior Higlands	0.200	1.000	1
	Cook Inlet	0.143	1.000	1
	Alaska Range	0.286	1.000	1
	Copper Plateau	0.321	0.767	2
Northern Pygmy -Owl	Coastal Western Hemlock-Sitka Spruce Forests	0.274	0.824	3
Great Gray Owl	Northwestern Interior Forests	0.250	1.000	1
	Interior Bottomlands	0.146	1.000	2
	Yukon Flats	0.167	1.000	1
	Copper Plateau	0.125	1.000	1
Short -eared Owl	Subarctic Coastal Plains	0.375	0.701	1
	Seward Peninsula	0.781	0.773	4
	Bristol Bay-Nushugak Lowlands	0.500	1.000	1
	Alaska Peninsula Mountains	0.167	1.000	1
	Arctic Foothills	0.200	1.000	1
	Brooks Range	0.600	0.408	1
	Interior Forested Lowlands and Uplands	0.300	0.806	2
	Alaska Range	0.500	0.832	2
	Copper Plateau	0.125	1.000	1
	Pacific Coastal Mountains	0.500	1.000	1
Boreal Owl	Bristol Bay-Nushugak Lowlands	0.200	1.000	1

Species	Ecoregion	Mean no.	Mean CV	No. rts.
Northern Saw-whet Owl	Coastal Western Hemlock-Sitka Spruce Forests	0.286	0.645	1
Vaux's Swift	Coastal Western Hemlock-Sitka Spruce Forests	0.205	1.000	2
Rufous Hummingbird	Copper Plateau	0.143	1.000	1
	Coastal Western Hemlock-Sitka Spruce Forests	3.509	0.422	12
	Pacific Coastal Mountains	3.429	0.183	2
Belted Kingfisher	Bristol Bay-Nushugak Lowlands	0.200	1.000	1
	Alaska Peninsula Mountains	1.179	0.582	3
	Interior Forested Lowlands and Uplands	2.912	0.353	2
	Interior Higlands	0.283	0.806	2
	Interior Bottomlands	1.333	0.340	3
	Cook Inlet	0.369	0.607	3
	Yukon Flats	0.125	1.000	1
	Alaska Range	0.163	1.000	2
	Copper Plateau	1.324	0.349	3
	Coastal Western Hemlock-Sitka Spruce Forests	1.683	0.590	13
	Pacific Coastal Mountains	0.591	0.730	4
Yellow-bellied Sapsucker	Copper Plateau	0.200	1.000	1
Red-breasted Sapsucker	Coastal Western Hemlock-Sitka Spruce Forests	8.075	0.358	11
	Pacific Coastal Mountains	1.143	0.263	2
Downy Woodpecker	Subarctic Coastal Plains	0.286	0.645	1
	Alaska Peninsula Mountains	0.714	0.792	1
	Interior Forested Lowlands and Uplands	0.150	1.000	3
	Interior Bottomlands	0.458	1.000	2
	Cook Inlet	1.429	0.258	1
	Yukon Flats	0.208	1.000	2
	Alaska Range	0.250	0.655	1
	Copper Plateau	0.714	0.589	1
	Coastal Western Hemlock-Sitka Spruce Forests	2.882	0.628	4
	Pacific Coastal Mountains	0.329	0.741	3
Hairy Woodpecker	Interior Forested Lowlands and Uplands	0.200	1.000	3
	Interior Higlands	0.167	1.000	1
	Interior Bottomlands	0.200	1.000	1
	Cook Inlet	0.327	0.666	3
	Yukon Flats	0.125	1.000	1
	Alaska Range	0.750	0.418	1
	Copper Plateau	0.348	0.760	2
	Coastal Western Hemlock-Sitka Spruce Forests	1.717	0.516	13
Hairy Woodpecker	Pacific Coastal Mountains	1.464	0.409	2
Three-toed Woodpecker	Alaska Peninsula Mountains	0.667	0.500	1
	Interior Forested Lowlands and Uplands	0.225	0.827	2
	Interior Higlands	0.200	1.000	1
	Interior Bottomlands	0.167	1.000	1
	Cook Inlet	0.143	1.000	2
	Yukon Flats	0.312	1.000	2
	Copper Plateau	0.318	0.695	3
	Coastal Western Hemlock-Sitka Spruce Forests	2.750	0.464	2
	Pacific Coastal Mountains	0.331	0.889	3
Black-backed Woodpecker	Interior Bottomlands	0.146	1.000	2
Yellow-shafted Flicker	Alaska Peninsula Mountains	0.167	1.000	1

Species	Ecoregion	Mean no.	Mean CV	No. rts.
Yellow-shafted Flicker	Northwestern Interior Forests	2.000	0.354	1
	Interior Forested Lowlands and Uplands	0.394	0.629	4
	Interior Higlands	2.500	0.227	2
	Interior Bottomlands	1.267	0.574	3
	Cook Inlet	0.357	0.875	2
	Yukon Flats	0.750	0.488	1
	Alaska Range	0.771	0.643	2
	Copper Plateau	0.909	0.460	4
	Coastal Western Hemlock-Sitka Spruce Forests	0.226	1.000	2
	Pacific Coastal Mountains	3.000	0.304	1
Red-shafted Flicker	Copper Plateau	0.429	1.000	1
	Coastal Western Hemlock-Sitka Spruce Forests	0.654	0.681	5
	Pacific Coastal Mountains	1.071	1.000	2
Olive-sided Flycatcher	Subarctic Coastal Plains	3.000	0.317	1
	Alaska Peninsula Mountains	0.167	1.000	1
	Northwestern Interior Forests	1.750	0.534	2
	Interior Forested Lowlands and Uplands	3.480	0.612	5
	Interior Higlands	2.356	0.380	3
	Interior Bottomlands	3.915	0.495	6
	Cook Inlet	2.833	0.385	3
	Yukon Flats	2.812	0.173	2
	Alaska Range	0.134	1.000	2
	Copper Plateau	4.080	0.220	4
	Coastal Western Hemlock-Sitka Spruce Forests	2.020	0.607	12
	Pacific Coastal Mountains	1.673	0.797	4
Western Wood-Pewee	Seward Peninsula	0.125	1.000	1
	Interior Forested Lowlands and Uplands	0.125	1.000	1
	Interior Higlands	1.000	0.739	2
	Interior Bottomlands	1.000	0.775	1
	Cook Inlet	6.027	0.206	2
	Alaska Range	0.500	0.535	1
	Copper Plateau	3.110	0.420	4
	Coastal Western Hemlock-Sitka Spruce Forests	1.583	0.602	3
	Pacific Coastal Mountains	0.621	1.000	4
Yellow-bellied Flycatcher	Northwestern Interior Forests	0.750	0.638	1
	Interior Higlands	0.600	0.864	2
	Copper Plateau	0.600	0.667	1
Alder Flycatcher	Subarctic Coastal Plains	30.571	0.156	2
	Seward Peninsula	0.792	0.622	3
	Bristol Bay-Nushugak Lowlands	6.800	0.317	1
	Alaska Peninsula Mountains	0.833	0.369	1
	Northwestern Interior Forests	57.000	0.057	2
	Interior Forested Lowlands and Uplands	21.717	0.180	6
	Interior Higlands	23.517	0.186	4
	Interior Bottomlands	42.822	0.165	6
	Cook Inlet	68.196	0.101	3
	Yukon Flats	31.771	0.164	2
	Alaska Range	12.605	0.397	4
	Copper Plateau	31.388	0.116	4

Species	Ecoregion	Mean no.	Mean CV	No. rts.
Alder Flycatcher	Coastal Western Hemlock-Sitka Spruce Forests	7.613	0.525	10
	Pacific Coastal Mountains	10.048	0.389	4
Least Flycatcher	Cook Inlet	0.143	1.000	1
	Copper Plateau	0.143	1.000	1
	Pacific Coastal Mountains	0.286	0.645	1
Unidentified Empidonax	Interior Bottomlands	0.200	1.000	1
Hammond's Flycatcher	Northwestern Interior Forests	9.500	0.195	1
	Interior Forested Lowlands and Uplands	0.935	0.521	5
	Interior Higlands	2.350	0.714	3
	Interior Bottomlands	2.088	0.701	5
	Yukon Flats	0.500	1.000	1
	Copper Plateau	0.200	1.000	1
	Coastal Western Hemlock-Sitka Spruce Forests	5.893	0.592	3
	Pacific Coastal Mountains	3.286	0.290	2
Pacific-slope Flycatcher	Coastal Western Hemlock-Sitka Spruce Forests	17.701	0.157	11
	Pacific Coastal Mountains	3.929	0.239	2
Say's Phoebe	Subarctic Coastal Plains	0.125	1.000	1
	Seward Peninsula	0.384	0.759	2
	Interior Forested Lowlands and Uplands	0.200	1.000	1
	Interior Higlands	0.200	1.000	1
	Alaska Range	1.286	0.222	1
	Coastal Western Hemlock-Sitka Spruce Forests	1.400	0.833	1
	Pacific Coastal Mountains	0.371	0.833	2
Western Kingbird	Coastal Western Hemlock-Sitka Spruce Forests	0.250	1.000	1
Horned Lark	Seward Peninsula	1.125	0.311	1
	Brooks Range	1.000	0.548	1
	Cook Inlet	3.714	1.000	1
Tree Swallow	Subarctic Coastal Plains	11.964	0.199	2
	Seward Peninsula	0.188	0.827	2
	Bristol Bay-Nushugak Lowlands	13.412	0.280	2
	Alaska Peninsula Mountains	3.187	0.515	3
	Northwestern Interior Forests	0.250	1.000	1
	Interior Forested Lowlands and Uplands	1.950	0.661	4
	Interior Higlands	0.200	1.000	2
	Interior Bottomlands	3.318	0.549	5
	Cook Inlet	6.310	0.369	3
	Alaska Range	5.125	0.490	1
	Copper Plateau	2.462	0.316	4
	Coastal Western Hemlock-Sitka Spruce Forests	5.627	0.483	12
	Pacific Coastal Mountains	6.312	0.713	4
Violet-green Swallow	Alaska Peninsula Mountains	0.486	0.760	2
	Northwestern Interior Forests	1.000	0.707	1
	Interior Forested Lowlands and Uplands	2.267	0.689	3
	Interior Higlands	1.529	0.512	4
	Interior Bottomlands	2.988	0.727	5
	Cook Inlet	2.232	0.661	2
	Yukon Flats	0.333	0.632	1
	Alaska Range	4.375	0.299	1
	Copper Plateau	2.093	0.480	3

Species	Ecoregion	Mean no.	Mean CV	No. rts.
Violet-green Swallow	Coastal Western Hemlock-Sitka Spruce Forests	4.463	0.654	9
	Pacific Coastal Mountains	4.101	0.583	5
Bank Swallow	Subarctic Coastal Plains	13.920	0.599	2
	Seward Peninsula	0.313	0.827	2
	Bristol Bay-Nushugak Lowlands	25.438	0.156	2
	Alaska Peninsula Mountains	4.394	0.566	3
	Northwestern Interior Forests	0.500	1.000	2
	Interior Forested Lowlands and Uplands	11.600	0.270	2
	Interior Higlands	3.722	0.765	3
	Interior Bottomlands	41.931	0.374	3
	Cook Inlet	0.702	0.806	3
	Yukon Flats	22.729	0.386	2
	Alaska Range	1.625	0.771	1
	Copper Plateau	3.641	0.775	4
	Coastal Western Hemlock-Sitka Spruce Forests	0.929	0.855	3
	Pacific Coastal Mountains	2.502	0.818	4
Cliff Swallow	Subarctic Coastal Plains	0.696	0.790	2
	Seward Peninsula	0.857	0.645	1
	Northwestern Interior Forests	10.125	0.494	2
	Interior Forested Lowlands and Uplands	0.200	1.000	1
	Interior Higlands	11.322	0.604	3
	Cook Inlet	1.518	0.604	3
	Alaska Range	7.643	0.603	2
	Copper Plateau	16.933	0.560	3
	Coastal Western Hemlock-Sitka Spruce Forests	6.551	0.417	4
	Pacific Coastal Mountains	2.662	0.803	3
Barn Swallow	Coastal Western Hemlock-Sitka Spruce Forests	2.649	0.587	10
	Pacific Coastal Mountains	1.114	0.624	3
Gray Jay	Subarctic Coastal Plains	3.554	0.586	2
	Bristol Bay-Nushugak Lowlands	8.500	0.218	2
	Alaska Peninsula Mountains	7.833	0.306	1
	Northwestern Interior Forests	16.000	0.169	2
	Interior Forested Lowlands and Uplands	5.636	0.284	7
	Interior Higlands	16.696	0.223	4
	Interior Bottomlands	6.694	0.250	6
	Cook Inlet	3.286	0.328	3
	Yukon Flats	8.562	0.157	2
	Alaska Range	3.857	0.259	2
	Copper Plateau	14.759	0.142	4
	Coastal Western Hemlock-Sitka Spruce Forests	4.667	0.302	2
	Pacific Coastal Mountains	8.550	0.133	2
Steller's Jay	Coastal Western Hemlock-Sitka Spruce Forests	6.980	0.257	14
	Pacific Coastal Mountains	1.929	0.368	4
Black-billed Magpie	Bristol Bay-Nushugak Lowlands	0.925	0.525	2
	Alaska Peninsula Mountains	12.637	0.446	3
	Interior Bottomlands	0.200	1.000	1
	Cook Inlet	1.155	0.688	3
	Alaska Range	11.455	0.189	2
	Copper Plateau	2.586	0.258	2

Species	Ecoregion	Mean no.	Mean CV	No. rts.
Black-billed Magpie	Coastal Western Hemlock-Sitka Spruce Forests	7.354	0.297	3
	Pacific Coastal Mountains	8.498	0.597	3
Northwestern Crow	Alaska Peninsula Mountains	8.386	0.311	2
	Coastal Western Hemlock-Sitka Spruce Forests	28.459	0.304	13
	Pacific Coastal Mountains	27.714	0.202	2
Common Raven	Subarctic Coastal Plains	4.205	0.235	2
	Seward Peninsula	1.929	0.348	4
	Bristol Bay-Nushugak Lowlands	8.117	0.364	3
	Alaska Peninsula Mountains	1.437	0.355	3
	Arctic Foothills	1.000	0.447	1
	Brooks Range	0.400	1.000	1
	Northwestern Interior Forests	3.875	0.320	2
	Interior Forested Lowlands and Uplands	2.571	0.475	7
	Interior Higlands	3.600	0.497	3
	Interior Bottomlands	2.510	0.554	6
	Cook Inlet	2.851	0.449	3
	Yukon Flats	4.750	0.230	2
	Alaska Range	0.913	0.695	4
	Copper Plateau	3.176	0.310	4
	Coastal Western Hemlock-Sitka Spruce Forests	11.192	0.313	14
	Pacific Coastal Mountains	3.879	0.358	5
Black-capped Chickadee	Subarctic Coastal Plains	0.920	0.727	2
	Bristol Bay-Nushugak Lowlands	1.888	0.565	2
	Alaska Peninsula Mountains	1.778	0.551	3
	Northwestern Interior Forests	0.500	1.000	1
	Interior Forested Lowlands and Uplands	1.519	0.504	4
	Interior Higlands	1.667	0.369	1
	Interior Bottomlands	1.064	0.616	6
	Cook Inlet	7.315	0.267	3
	Yukon Flats	0.167	1.000	1
	Alaska Range	7.538	0.292	2
	Copper Plateau	0.920	0.623	2
	Coastal Western Hemlock-Sitka Spruce Forests	1.132	0.751	5
	Pacific Coastal Mountains	1.011	0.626	4
Boreal Chickadee	Subarctic Coastal Plains	0.714	0.400	1
	Bristol Bay-Nushugak Lowlands	0.500	0.378	1
	Alaska Peninsula Mountains	1.667	0.369	1
	Northwestern Interior Forests	1.625	0.425	2
	Interior Forested Lowlands and Uplands	2.700	0.358	4
	Interior Higlands	0.811	0.646	3
	Interior Bottomlands	0.852	0.791	4
	Cook Inlet	1.196	0.510	3
	Yukon Flats	1.854	0.277	2
	Alaska Range	1.729	0.431	2
	Copper Plateau	2.536	0.382	4
	Coastal Western Hemlock-Sitka Spruce Forests	1.667	0.449	2
	Pacific Coastal Mountains	1.675	0.682	2
Chestnut-backed Chickadee	Coastal Western Hemlock-Sitka Spruce Forests	16.072	0.205	12
	Pacific Coastal Mountains	4.190	0.277	3

Species	Ecoregion	Mean no.	Mean CV	No. rts.
Red-breasted Nuthatch	Bristol Bay-Nushugak Lowlands	0.200	1.000	1
	Alaska Peninsula Mountains	0.310	0.816	2
	Interior Forested Lowlands and Uplands	0.200	1.000	1
	Cook Inlet	1.000	0.535	1
	Alaska Range	1.125	0.458	1
	Copper Plateau	0.350	0.878	2
	Coastal Western Hemlock-Sitka Spruce Forests	3.068	0.465	4
	Pacific Coastal Mountains	0.532	0.653	4
Brown Creeper	Alaska Peninsula Mountains	1.143	0.298	1
	Cook Inlet	0.429	0.471	1
	Alaska Range	0.250	1.000	1
	Coastal Western Hemlock-Sitka Spruce Forests	0.901	0.773	12
	Pacific Coastal Mountains	0.371	0.833	2
Winter Wren	Alaska Peninsula Mountains	13.229	0.335	2
	Coastal Western Hemlock-Sitka Spruce Forests	30.180	0.243	13
	Pacific Coastal Mountains	5.019	0.442	3
American Dipper	Alaska Peninsula Mountains	0.200	1.000	1
	Interior Bottomlands	0.500	1.000	1
	Alaska Range	0.125	1.000	1
	Coastal Western Hemlock-Sitka Spruce Forests	0.200	1.000	1
	Pacific Coastal Mountains	0.143	1.000	1
Arctic Warbler	Subarctic Coastal Plains	3.143	0.659	2
	Seward Peninsula	25.853	0.184	4
	Bristol Bay-Nushugak Lowlands	41.000	0.286	1
	Arctic Foothills	0.400	1.000	1
	Northwestern Interior Forests	1.750	0.589	1
	Interior Forested Lowlands and Uplands	0.600	0.864	2
	Interior Bottomlands	0.653	0.715	3
	Cook Inlet	2.000	0.618	2
	Alaska Range	5.714	0.246	2
	Copper Plateau	0.125	1.000	1
	Pacific Coastal Mountains	11.150	0.683	2
Golden-crowned Kinglet	Alaska Peninsula Mountains	0.998	0.807	3
	Interior Forested Lowlands and Uplands	1.200	0.486	1
	Interior Bottomlands	0.250	1.000	1
	Cook Inlet	0.393	0.512	2
	Alaska Range	0.250	1.000	1
	Coastal Western Hemlock-Sitka Spruce Forests	7.802	0.326	14
	Pacific Coastal Mountains	3.371	0.257	3
Ruby-crowned Kinglet	Subarctic Coastal Plains	1.205	0.641	2
	Bristol Bay-Nushugak Lowlands	4.600	0.327	1
	Alaska Peninsula Mountains	7.333	0.335	1
	Northwestern Interior Forests	8.000	0.415	2
	Interior Forested Lowlands and Uplands	9.464	0.285	7
	Interior Higlands	19.362	0.152	4
	Interior Bottomlands	7.447	0.378	6
	Cook Inlet	12.845	0.124	3
	Yukon Flats	6.000	0.264	2
	Alaska Range	0.662	0.761	3

Species	Ecoregion	Mean no.	Mean CV	No. rts.
Ruby-crowned Kinglet	Copper Plateau	17.110	0.228	4
	Coastal Western Hemlock-Sitka Spruce Forests	16.540	0.233	14
	Pacific Coastal Mountains	15.997	0.208	5
Bluethroat	Seward Peninsula	1.165	0.497	4
	Arctic Foothills	0.600	1.000	1
	Brooks Range	0.200	1.000	1
Northern Wheatear	Seward Peninsula	0.656	0.564	4
	Brooks Range	0.200	1.000	1
	Alaska Range	1.286	0.529	1
Townsend's Solitaire	Northwestern Interior Forests	1.000	0.707	1
	Interior Higlands	1.200	0.667	1
	Interior Bottomlands	0.167	1.000	1
	Cook Inlet	0.143	1.000	1
	Alaska Range	0.375	0.488	1
	Coastal Western Hemlock-Sitka Spruce Forests	0.162	1.000	2
	Pacific Coastal Mountains	2.000	0.289	1
Gray-cheeked Thrush	Subarctic Coastal Plains	44.545	0.106	2
	Seward Peninsula	28.522	0.130	4
	Bristol Bay-Nushugak Lowlands	21.800	0.258	2
	Alaska Peninsula Mountains	10.070	0.237	3
	Northwestern Interior Forests	7.250	0.192	2
	Interior Forested Lowlands and Uplands	4.564	0.411	7
	Interior Higlands	17.242	0.330	4
	Interior Bottomlands	8.817	0.298	4
	Cook Inlet	4.690	0.646	3
	Alaska Range	0.750	0.701	1
	Copper Plateau	28.717	0.129	3
	Coastal Western Hemlock-Sitka Spruce Forests	0.354	0.876	4
	Pacific Coastal Mountains	14.050	0.407	2
Swainson's Thrush	Subarctic Coastal Plains	1.286	0.406	1
	Bristol Bay-Nushugak Lowlands	5.600	0.655	1
	Alaska Peninsula Mountains	44.667	0.113	1
	Northwestern Interior Forests	53.875	0.100	2
	Interior Forested Lowlands and Uplands	39.146	0.224	7
	Interior Higlands	47.604	0.120	4
	Interior Bottomlands	39.196	0.154	6
	Cook Inlet	43.923	0.131	3
	Yukon Flats	80.854	0.123	2
	Alaska Range	12.069	0.231	4
	Copper Plateau	68.115	0.080	4
	Coastal Western Hemlock-Sitka Spruce Forests	21.700	0.326	14
	Pacific Coastal Mountains	4.539	0.441	5
Hermit Thrush	Subarctic Coastal Plains	1.625	0.231	1
	Bristol Bay-Nushugak Lowlands	4.292	0.440	3
	Alaska Peninsula Mountains	44.221	0.150	3
	Northwestern Interior Forests	3.250	0.194	1
	Interior Forested Lowlands and Uplands	2.850	0.632	4
	Interior Higlands	2.517	0.559	3
	Interior Bottomlands	12.788	0.389	4

Species	Ecoregion	Mean no.	Mean CV	No. rts.
Hermit Thrush	Cook Inlet	4.143	0.281	3
	Alaska Range	1.281	0.516	3
	Copper Plateau	19.571	0.138	1
	Coastal Western Hemlock-Sitka Spruce Forests	43.450	0.150	14
	Pacific Coastal Mountains	39.766	0.114	5
American Robin	Subarctic Coastal Plains	20.536	0.115	2
	Seward Peninsula	18.446	0.115	4
	Bristol Bay-Nushugak Lowlands	45.025	0.141	2
	Alaska Peninsula Mountains	3.200	0.426	2
	Arctic Foothills	1.200	0.312	1
	Northwestern Interior Forests	14.125	0.275	2
	Interior Forested Lowlands and Uplands	13.632	0.156	7
	Interior Higlands	39.283	0.170	4
	Interior Bottomlands	17.574	0.205	6
	Cook Inlet	36.470	0.119	3
	Yukon Flats	18.021	0.106	2
	Alaska Range	14.855	0.131	4
	Copper Plateau	45.398	0.086	4
	Coastal Western Hemlock-Sitka Spruce Forests	30.550	0.151	14
	Pacific Coastal Mountains	30.323	0.131	5
Varied Thrush	Subarctic Coastal Plains	21.786	0.106	2
	Seward Peninsula	1.125	0.584	2
	Bristol Bay-Nushugak Lowlands	16.688	0.157	2
	Alaska Peninsula Mountains	33.959	0.198	3
	Northwestern Interior Forests	17.750	0.218	2
	Interior Forested Lowlands and Uplands	11.171	0.212	7
	Interior Higlands	11.246	0.201	4
	Interior Bottomlands	5.721	0.270	6
	Cook Inlet	15.935	0.195	3
	Yukon Flats	9.708	0.250	2
	Alaska Range	4.596	0.223	3
	Copper Plateau	21.507	0.109	4
	Coastal Western Hemlock-Sitka Spruce Forests	53.699	0.124	14
	Pacific Coastal Mountains	31.199	0.166	5
Yellow Wagtail	Subarctic Coastal Plains	0.750	0.488	1
	Seward Peninsula	7.603	0.184	4
	Arctic Foothills	27.200	0.235	1
	Brooks Range	1.400	0.833	1
American Pipit	Seward Peninsula	1.821	0.571	2
	Bristol Bay-Nushugak Lowlands	22.250	0.034	1
	Interior Forested Lowlands and Uplands	0.200	1.000	1
	Interior Higlands	0.200	1.000	1
	Pacific Coastal Mountains	1.000	0.436	1
Bohemian Waxwing	Subarctic Coastal Plains	0.143	1.000	1
	Northwestern Interior Forests	0.500	1.000	1
	Interior Forested Lowlands and Uplands	0.733	0.911	3
	Interior Higlands	1.833	0.506	3
	Interior Bottomlands	2.269	0.979	4
	Cook Inlet	0.196	1.000	2

Species	Ecoregion	Mean no.	Mean CV	No. rts.
Bohemian Waxwing	Yukon Flats	0.646	0.581	2
	Alaska Range	1.800	0.369	1
	Copper Plateau	2.575	0.517	4
	Coastal Western Hemlock-Sitka Spruce Forests	0.143	1.000	2
Northern Shrike	Seward Peninsula	0.125	1.000	1
	Bristol Bay-Nushugak Lowlands	0.125	1.000	1
	Interior Bottomlands	0.208	1.000	2
	Coastal Western Hemlock-Sitka Spruce Forests	0.286	1.000	1
European Starling	Coastal Western Hemlock-Sitka Spruce Forests	5.940	0.601	3
Warbling Vireo	Coastal Western Hemlock-Sitka Spruce Forests	0.339	0.867	3
	Pacific Coastal Mountains	8.571	0.104	2
Red-eyed Vireo	Coastal Western Hemlock-Sitka Spruce Forests	0.143	1.000	1
Tennessee Warbler	Northwestern Interior Forests	0.250	1.000	1
	Copper Plateau	0.200	1.000	1
	Coastal Western Hemlock-Sitka Spruce Forests	0.143	1.000	1
	Pacific Coastal Mountains	0.143	1.000	1
Orange-crowned Warbler	Subarctic Coastal Plains	50.536	0.091	2
	Seward Peninsula	14.531	0.184	4
	Bristol Bay-Nushugak Lowlands	28.112	0.180	2
	Alaska Peninsula Mountains	30.802	0.090	3
	Northwestern Interior Forests	15.375	0.229	2
	Interior Forested Lowlands and Uplands	20.832	0.199	7
	Interior Higlands	14.846	0.356	4
	Interior Bottomlands	16.912	0.299	6
	Cook Inlet	19.220	0.158	3
	Yukon Flats	13.771	0.168	2
	Alaska Range	26.069	0.171	4
	Copper Plateau	8.363	0.282	4
	Coastal Western Hemlock-Sitka Spruce Forests	40.023	0.142	14
	Pacific Coastal Mountains	39.489	0.119	5
Yellow Warbler	Subarctic Coastal Plains	27.732	0.124	2
	Seward Peninsula	15.786	0.163	4
	Bristol Bay-Nushugak Lowlands	7.658	0.301	3
	Alaska Peninsula Mountains	32.000	0.203	3
	Arctic Foothills	1.400	0.700	1
	Northwestern Interior Forests	7.250	0.323	2
	Interior Forested Lowlands and Uplands	4.371	0.446	7
	Interior Higlands	3.229	0.557	4
	Interior Bottomlands	14.503	0.448	6
	Cook Inlet	1.476	0.606	3
	Yukon Flats	16.021	0.183	2
	Alaska Range	2.274	0.612	4
	Copper Plateau	1.246	0.398	4
	Coastal Western Hemlock-Sitka Spruce Forests	2.518	0.433	11
	Pacific Coastal Mountains	7.649	0.229	5
Myrtle Warbler	Subarctic Coastal Plains	12.946	0.360	2
	Bristol Bay-Nushugak Lowlands	6.962	0.293	2
	Alaska Peninsula Mountains	15.798	0.427	2
	Northwestern Interior Forests	18.000	0.180	2

Species	Ecoregion	Mean no.	Mean CV	No. rts.
Myrtle Warbler	Interior Forested Lowlands and Uplands	28.279	0.186	7
	Interior Higlands	25.888	0.232	4
	Interior Bottomlands	18.043	0.296	6
	Cook Inlet	41.976	0.107	3
	Yukon Flats	18.146	0.201	2
	Alaska Range	20.871	0.191	3
	Copper Plateau	37.954	0.120	4
	Coastal Western Hemlock-Sitka Spruce Forests	9.543	0.355	9
	Pacific Coastal Mountains	13.320	0.345	5
Audubon's Warbler	Coastal Western Hemlock-Sitka Spruce Forests	0.607	0.767	2
Townsend's Warbler	Northwestern Interior Forests	0.500	1.000	1
	Interior Forested Lowlands and Uplands	2.175	0.598	2
	Interior Higlands	0.261	0.877	3
	Interior Bottomlands	0.548	0.864	5
	Alaska Range	0.125	1.000	1
	Copper Plateau	0.501	0.642	3
	Coastal Western Hemlock-Sitka Spruce Forests	19.766	0.292	12
	Pacific Coastal Mountains	18.713	0.337	4
Blackpoll Warbler	Subarctic Coastal Plains	30.464	0.084	2
	Seward Peninsula	0.583	0.557	3
	Bristol Bay-Nushugak Lowlands	21.388	0.151	2
	Alaska Peninsula Mountains	8.000	0.180	1
	Northwestern Interior Forests	3.500	0.378	1
	Interior Forested Lowlands and Uplands	7.005	0.294	5
	Interior Bottomlands	12.953	0.414	5
	Cook Inlet	8.952	0.172	3
	Alaska Range	1.512	0.439	2
	Copper Plateau	10.561	0.518	3
	Coastal Western Hemlock-Sitka Spruce Forests	1.414	0.489	3
	Pacific Coastal Mountains	8.583	0.518	3
American Redstart	Pacific Coastal Mountains	2.857	0.315	2
Northern Waterthrush	Subarctic Coastal Plains	58.080	0.061	2
	Seward Peninsula	10.826	0.382	4
	Bristol Bay-Nushugak Lowlands	6.475	0.222	2
	Alaska Peninsula Mountains	7.000	0.242	1
	Northwestern Interior Forests	3.125	0.343	2
	Interior Forested Lowlands and Uplands	14.367	0.361	6
	Interior Higlands	1.354	0.589	4
	Interior Bottomlands	33.803	0.321	6
	Cook Inlet	17.994	0.211	3
	Yukon Flats	7.521	0.397	2
	Alaska Range	0.884	0.674	2
	Copper Plateau	9.927	0.401	4
	Coastal Western Hemlock-Sitka Spruce Forests	0.989	0.796	5
	Pacific Coastal Mountains	1.381	0.648	5
MacGillivray's Warbler	Coastal Western Hemlock-Sitka Spruce Forests	0.312	0.823	4
	Pacific Coastal Mountains	6.143	0.124	2
Common Yellowthroat	Interior Higlands	0.200	1.000	1
	Copper Plateau	0.200	1.000	1

Species	Ecoregion	Mean no.	Mean CV	No. rts.
Common Yellowthroat	Coastal Western Hemlock-Sitka Spruce Forests	1.263	0.648	7
	Pacific Coastal Mountains	6.571	0.255	1
Wilson's Warbler	Subarctic Coastal Plains	43.616	0.105	2
	Seward Peninsula	15.000	0.146	4
	Bristol Bay-Nushugak Lowlands	27.850	0.157	2
	Alaska Peninsula Mountains	47.333	0.115	3
	Arctic Foothills	0.200	1.000	1
	Northwestern Interior Forests	7.125	0.455	2
	Interior Forested Lowlands and Uplands	6.368	0.302	7
	Interior Higlands	9.112	0.498	4
	Interior Bottomlands	7.558	0.445	6
	Cook Inlet	6.435	0.330	3
	Yukon Flats	2.479	0.594	2
	Alaska Range	30.274	0.167	4
	Copper Plateau	11.195	0.274	4
	Coastal Western Hemlock-Sitka Spruce Forests	17.762	0.322	14
	Pacific Coastal Mountains	34.673	0.165	5
Western Tanager	Coastal Western Hemlock-Sitka Spruce Forests	0.250	1.000	1
	Pacific Coastal Mountains	1.929	0.306	2
American Tree Sparrow	Subarctic Coastal Plains	30.821	0.121	2
	Seward Peninsula	22.571	0.132	4
	Bristol Bay-Nushugak Lowlands	68.375	0.083	1
	Alaska Peninsula Mountains	14.833	0.145	1
	Arctic Foothills	44.000	0.160	1
	Brooks Range	20.800	0.275	1
	Interior Forested Lowlands and Uplands	3.425	0.631	5
	Interior Higlands	10.633	0.347	3
	Interior Bottomlands	2.000	0.880	1
	Cook Inlet	0.375	1.000	1
	Yukon Flats	0.958	0.750	2
	Alaska Range	28.232	0.398	3
	Copper Plateau	1.750	0.400	1
	Pacific Coastal Mountains	2.286	0.684	2
Chipping Sparrow	Northwestern Interior Forests	1.000	1.000	1
	Interior Higlands	3.922	0.705	3
	Yukon Flats	0.583	0.750	2
	Alaska Range	0.400	0.612	1
	Copper Plateau	0.271	1.000	2
	Coastal Western Hemlock-Sitka Spruce Forests	0.508	0.785	3
	Pacific Coastal Mountains	2.495	0.504	3
Savannah Sparrow	Subarctic Coastal Plains	39.884	0.188	2
	Seward Peninsula	35.013	0.093	4
	Bristol Bay-Nushugak Lowlands	24.625	0.295	3
	Alaska Peninsula Mountains	21.029	0.147	3
	Arctic Foothills	107.200	0.162	1
	Brooks Range	74.600	0.118	1
	Northwestern Interior Forests	1.250	0.600	1
	Interior Forested Lowlands and Uplands	6.090	0.404	5
	Interior Higlands	5.133	0.276	3

Species	Ecoregion	Mean no.	Mean CV	No. rts.
Savannah Sparrow	Interior Bottomlands	2.447	0.572	3
	Cook Inlet	5.839	0.333	3
	Yukon Flats	4.125	0.265	1
	Alaska Range	19.479	0.205	4
	Copper Plateau	14.548	0.117	4
	Coastal Western Hemlock-Sitka Spruce Forests	5.882	0.505	9
	Pacific Coastal Mountains	6.796	0.201	5
Fox Sparrow	Subarctic Coastal Plains	55.348	0.115	2
	Seward Peninsula	24.277	0.090	4
	Bristol Bay-Nushugak Lowlands	11.017	0.292	3
	Alaska Peninsula Mountains	101.729	0.112	2
	Arctic Foothills	1.600	0.580	1
	Brooks Range	0.200	1.000	1
	Northwestern Interior Forests	11.875	0.236	2
	Interior Forested Lowlands and Uplands	7.071	0.369	7
	Interior Higlands	13.878	0.504	3
	Interior Bottomlands	9.229	0.486	6
	Cook Inlet	5.190	0.318	3
	Yukon Flats	12.875	0.241	1
	Alaska Range	4.182	0.290	4
	Copper Plateau	19.171	0.116	4
	Coastal Western Hemlock-Sitka Spruce Forests	13.066	0.210	14
	Pacific Coastal Mountains	13.356	0.182	5
Song Sparrow	Alaska Peninsula Mountains	0.503	0.785	3
	Interior Bottomlands	0.125	1.000	1
	Cook Inlet	0.714	0.663	1
	Alaska Range	1.491	0.486	2
	Coastal Western Hemlock-Sitka Spruce Forests	6.999	0.359	13
	Pacific Coastal Mountains	8.393	0.338	4
Lincoln's Sparrow	Subarctic Coastal Plains	2.018	0.399	2
	Bristol Bay-Nushugak Lowlands	0.500	0.535	1
	Alaska Peninsula Mountains	0.167	1.000	1
	Northwestern Interior Forests	5.625	0.388	2
	Interior Forested Lowlands and Uplands	2.392	0.450	6
	Interior Higlands	8.096	0.399	4
	Interior Bottomlands	2.036	0.652	6
	Cook Inlet	18.440	0.154	3
	Yukon Flats	2.562	0.639	2
	Alaska Range	4.688	0.358	2
	Copper Plateau	5.077	0.205	4
	Coastal Western Hemlock-Sitka Spruce Forests	8.555	0.322	13
	Pacific Coastal Mountains	7.840	0.511	5
Golden-crowned Sparrow	Subarctic Coastal Plains	0.250	0.655	1
	Seward Peninsula	54.125	0.083	4
	Bristol Bay-Nushugak Lowlands	21.808	0.110	3
	Alaska Peninsula Mountains	35.449	0.137	3
	Brooks Range	0.200	1.000	1
	Interior Higlands	0.250	1.000	1
	Cook Inlet	5.000	0.227	1

Species	Ecoregion	Mean no.	Mean CV	No. rts.
Golden-crowned Sparrow	Alaska Range	10.946	0.231	3
	Coastal Western Hemlock-Sitka Spruce Forests	22.839	0.274	3
	Pacific Coastal Mountains	5.605	0.348	3
White-crowned Sparrow	Subarctic Coastal Plains	22.455	0.125	2
	Seward Peninsula	23.237	0.114	4
	Bristol Bay-Nushugak Lowlands	34.288	0.230	2
	Alaska Peninsula Mountains	26.167	0.177	1
	Arctic Foothills	16.400	0.149	1
	Brooks Range	10.600	0.160	1
	Northwestern Interior Forests	26.250	0.115	2
	Interior Forested Lowlands and Uplands	24.214	0.197	7
	Interior Higlands	36.421	0.138	4
	Interior Bottomlands	3.979	0.434	6
	Cook Inlet	24.411	0.164	3
	Yukon Flats	21.875	0.202	2
	Alaska Range	53.994	0.133	4
	Copper Plateau	44.336	0.109	4
	Coastal Western Hemlock-Sitka Spruce Forests	1.051	0.608	3
	Pacific Coastal Mountains	27.031	0.680	3
Slate-colored Junco	Subarctic Coastal Plains	2.116	0.392	2
	Bristol Bay-Nushugak Lowlands	1.062	0.806	2
	Alaska Peninsula Mountains	21.333	0.113	1
	Northwestern Interior Forests	65.125	0.092	2
	Interior Forested Lowlands and Uplands	34.779	0.183	7
	Interior Higlands	47.371	0.207	4
	Interior Bottomlands	25.418	0.265	6
	Cook Inlet	47.411	0.121	3
	Yukon Flats	42.104	0.121	2
	Alaska Range	22.092	0.250	4
	Copper Plateau	57.688	0.082	4
	Coastal Western Hemlock-Sitka Spruce Forests	8.106	0.376	3
	Pacific Coastal Mountains	21.500	0.336	3
Oregon Junco	Coastal Western Hemlock-Sitka Spruce Forests	25.898	0.190	11
	Pacific Coastal Mountains	9.214	0.180	2
Lapland Longspur	Subarctic Coastal Plains	31.884	0.568	2
	Seward Peninsula	17.795	0.203	4
	Bristol Bay-Nushugak Lowlands	56.062	0.089	2
	Alaska Peninsula Mountains	0.798	0.668	2
	Arctic Foothills	9.600	0.215	1
	Brooks Range	78.000	0.178	1
	Interior Higlands	0.500	1.000	1
	Alaska Range	0.554	0.736	2
Smith's Longspur	Arctic Foothills	2.800	0.612	1
Snow Bunting	Seward Peninsula	0.125	1.000	1
Red-winged Blackbird	Interior Higlands	0.800	0.468	1
	Cook Inlet	0.143	1.000	1
	Copper Plateau	0.400	0.612	1
	Coastal Western Hemlock-Sitka Spruce Forests	0.804	0.666	4
	Pacific Coastal Mountains	2.429	0.152	1

Species	Ecoregion	Mean no.	Mean CV	No. rts.
Rusty Blackbird	Subarctic Coastal Plains	10.429	0.161	1
	Seward Peninsula	0.375	0.701	1
	Bristol Bay-Nushugak Lowlands	0.250	0.655	1
	Interior Forested Lowlands and Uplands	2.262	0.564	4
	Interior Higlands	1.200	0.486	1
	Interior Bottomlands	5.083	0.330	3
	Cook Inlet	0.571	0.520	1
	Yukon Flats	0.500	0.756	1
	Copper Plateau	1.879	0.543	4
	Coastal Western Hemlock-Sitka Spruce Forests	0.271	1.000	2
	Pacific Coastal Mountains	0.143	1.000	1
Brown-headed Cowbird	Coastal Western Hemlock-Sitka Spruce Forests	0.125	1.000	1
Gray-crowned Rosy-Finch	Pacific Coastal Mountains	0.286	0.645	1
Pine Grosbeak	Subarctic Coastal Plains	1.143	0.673	1
	Bristol Bay-Nushugak Lowlands	0.425	1.000	2
	Alaska Peninsula Mountains	1.598	0.529	3
	Northwestern Interior Forests	1.000	0.577	1
	Interior Forested Lowlands and Uplands	1.500	0.548	2
	Interior Higlands	2.700	0.589	2
	Interior Bottomlands	0.200	1.000	1
	Cook Inlet	0.786	0.837	2
	Yukon Flats	0.167	1.000	1
	Alaska Range	0.375	1.000	1
	Copper Plateau	2.290	0.388	4
	Coastal Western Hemlock-Sitka Spruce Forests	0.981	0.706	8
	Pacific Coastal Mountains	1.600	0.381	2
Red Crossbill	Cook Inlet	0.286	1.000	1
	Coastal Western Hemlock-Sitka Spruce Forests	20.151	0.536	11
	Pacific Coastal Mountains	8.543	0.688	3
White-winged Crossbill	Subarctic Coastal Plains	0.143	1.000	1
	Northwestern Interior Forests	3.875	0.442	2
	Interior Forested Lowlands and Uplands	4.225	0.627	5
	Interior Higlands	9.433	0.548	4
	Interior Bottomlands	4.746	0.690	4
	Cook Inlet	6.798	0.566	3
	Yukon Flats	8.312	0.459	2
	Alaska Range	18.062	0.650	2
	Copper Plateau	14.125	0.353	4
	Coastal Western Hemlock-Sitka Spruce Forests	3.019	0.815	7
	Pacific Coastal Mountains	5.873	0.788	4
Common Redpoll	Subarctic Coastal Plains	46.366	0.173	2
	Seward Peninsula	79.911	0.138	4
	Bristol Bay-Nushugak Lowlands	22.592	0.238	3
	Alaska Peninsula Mountains	13.986	0.185	3
	Arctic Foothills	33.400	0.075	1
	Brooks Range	16.400	0.150	1
	Northwestern Interior Forests	7.500	0.224	2
	Interior Forested Lowlands and Uplands	13.282	0.338	7
	Interior Higlands	12.700	0.342	4

Species	Ecoregion	Mean no.	Mean CV	No. rts.
Common Redpoll	Interior Bottomlands	16.100	0.343	6
	Cook Inlet	20.440	0.392	3
	Yukon Flats	6.375	0.392	2
	Alaska Range	13.822	0.245	4
	Copper Plateau	14.281	0.197	4
	Coastal Western Hemlock-Sitka Spruce Forests	2.486	0.486	2
	Pacific Coastal Mountains	10.509	0.550	4
Pine Siskin	Alaska Peninsula Mountains	1.729	0.479	2
	Interior Higlands	0.400	1.000	1
	Interior Bottomlands	1.250	0.757	1
	Cook Inlet	10.857	0.469	2
	Alaska Range	2.500	0.338	1
	Copper Plateau	1.171	0.858	2
	Coastal Western Hemlock-Sitka Spruce Forests	13.739	0.465	14
	Pacific Coastal Mountains	17.927	0.480	5