

2000 BREEDING BIRD SURVEYS  
OFF-ROAD POINT COUNTS

Gates of the Arctic National Park and Preserve

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## INTRODUCTION

Many of the avian species found in Gates of the Arctic National Park and Preserve are neotropical migrants, wintering in the southern United States, the tropics, and South America. Several species, such as the bluethroat and northern wheatear, migrate to Asia and North Africa. Migrating birds are facing widespread loss of habitat in critical feeding and staging areas along migration routes and in wintering areas. Pesticides and herbicides constitute additional threats to migrating birds, particularly those wintering in third world countries. Impacts of these threats on neotropical migrant bird populations may be detected first through changes in bird abundance, distribution, and reproductive success on the breeding grounds.

In 1993, Boreal Partners in Flight coordinated a 3-year pilot program using off-road point counts to monitor bird species abundance throughout Alaska. As part of this program, resource management staff established 3 off-road point count transects within the park. Goals for this region-wide program are to:

- 1) Identify resident or breeding bird species;
- 2) Collect baseline information on bird species abundance; and
- 3) Obtain habitat use information for bird species.

The 2000 off-road point count bird survey is the seventh year of this long-term monitoring project.

## STUDY AREA

Gates of the Arctic National Park and Preserve is located above the Arctic Circle (66° 33' N latitude) in the central Brooks Range, Alaska. Two climate zones occur in the park and preserve: the subarctic zone which occurs south of the continental divide at lower elevations, and the arctic zone which occurs north of the continental divide at higher elevations. Precipitation is low within the park and preserve and yearly averages are between 13 - 45 cm (National Park Service 1986). Snowfall averages south of the divide range between 152 - 203 cm and averages of 89 - 127 cm are typical in the north. Yearly temperatures in the south fluctuate from an average July maximum of 21° C (70° F) to an average January minimum of -34° C (-30° F). Temperatures in the north fluctuate from an average July maximum of 18° C (65° F) to an average February minimum of -23° C (-10° F).

Boreal forest, tundra, and shrub thicket are the major vegetation communities in the park and preserve (National Park Service 1986). Boreal forest covers the southern flanks and valleys of the Brooks Range and is composed of black spruce (*Picea mariana*), white spruce (*P. glauca*), paper birch (*Betula papyrifera*), aspen (*Populus tremuloides*), and balsam poplar (*Populus balsamifera*). Tall dense willow (*Salix* spp.)/alder (*Alnus* spp.) thickets up to 3.5 m in height occur along stream channels and gravel bars. The Middle Fork Koyukuk off-road point count transect (Figure 2) is located within this plant community.

Moist tundra is the predominant vegetation community on the north side of the Brooks Range. It is composed primarily of cotton sedge (*Eriophorum* spp.) and forms on moderate to poorly drained

soils. Low willow thickets line stream channels and low-lying areas in the northern tundra, but willow thickets up to 3 m in height occur along stream channels in the western tundra. The Anaktuvuk Pass and Pingo Lake off-road point count transects (Figures 1 and 3) are located within this vegetation community.

## **METHODS**

Three off-road breeding bird survey transects, consisting of 12 points each, were established in 3 areas of Gates of the Arctic National Park and Preserve in 1993: the Middle Fork Koyukuk River (MFK), Pingo Lake on the Noatak River (PIN#1), and Anaktuvuk Pass (AKP#1). An additional two transects were established in 2000 at Pingo Lake (PIN#2) and Anaktuvuk Pass (AKP#2) (Figures 1-3). Point count sites within each transect were separated by >200 m in treed habitats and >400 m on tundra or along the river. The Middle Fork Koyukuk River transect was completed by canoe and the Anaktuvuk and Pingo Lake transects were traversed on foot. Surveys were conducted 16-27 June 2000, starting at 0300 A.M. and finishing by 0800 A.M. All birds were identified by sight, song and call during a 5-minute interval and mapped according to their location and distance from the center point. Methodology follows Ralph et al. (1993) modified by the Alaska Chapter of Boreal Partners in Flight.

All point count sites were classified according to the Alaska Vegetation Classification (Viereck et al. 1992). Analysis of variance was used to test for significant differences in the number of species detected per habitat class, and number of total birds per habitat class for all surveys conducted in Gates of the Arctic National Park and Preserve, 1993 – 2000. Elevation ranges of individual species were also examined for Pingo Lake transect # 2 conducted in 2000; the transect spanned an elevation gradient of 2300 – 4400 ft.

## **RESULTS AND DISCUSSION**

The Middle Fork Koyukuk transect had the highest number of total species detected in 2001 (41), while Pingo Lake transect # 1 and Anaktuvuk transect # 1 had 24 and 34 species detected, respectively. The new Pingo Lake (# 2) and Anaktuvuk (# 2) transects only detected 18 and 8 total species, respectively. This may be because they are alpine transects that are a greater distance from riparian areas relative to the former 3 transects. High winds, and therefore poor listening conditions during the survey period, may have also contributed to the low number of species detected on AKP#2. Because of this, it is not recommended that this transect be run in the future.

Attempts to test for significant differences in the number of species detected per habitat class, and the number of total birds per habitat class (Alaska Vegetation Classification levels II and III (Viereck et al. 1992)) using analysis of variance were unsuccessful. It was quickly realized that sample points were not properly distributed among habitat types and sample sizes were inadequate to test for differences among habitat types, as well as account for survey year and transect effects. Quantitatively examining bird/habitat relationships is inappropriate with this limited data set. Due to the Alaska-wide spatial extent of the overall Boreal Partners in Flight study design, habitat type analyses would be more suitable on a regional scale. Bird species detected in each habitat class for

all point count survey transects conducted in Gates of the Arctic National Park and Preserve, 1993 – 2000, are presented in Table 2.

### **Anaktuvuk Pass Transect #1**

One hundred and twenty-six birds comprising 15 species were detected on the original Anaktuvuk Pass transect in 2000 (Table 1). Two new avian species were identified this year: the red-breasted merganser and the upland sandpiper. An additional nine species, including northern pintail, mallard, rough-legged hawk, least sandpiper, American golden plover, horned lark, common raven, bluethroat, and Smith's longspur, were observed but never recorded during a point count interval. The most abundant species on this transect was the common redpoll (19% of all birds recorded) followed by the savannah (17%) and American tree sparrow (16%). Sparrow species comprised nearly half (46%) of total birds recorded in 2000, with shorebird species constituting 9% of total birds recorded.

A total of 861 birds from 32 species have been identified from point count surveys on Anaktuvuk Pass transect #1 since 1993. An additional 4 bird species have been observed on this transect but have not been detected during a point count interval. This cumulative species total (36 species) compares favorably to the species richness prediction (39 species) made in the 1998 report (Swanson 1998), though only 26 -41% of this predicted population (10-16 species) are typically detected during any single point count survey.

### **Anaktuvuk Pass Transect #2**

Seventeen birds comprising eight species were detected on the new Anaktuvuk Pass breeding bird transect #2 in 2000 (Table 1). Twenty-nine percent of all birds recorded on this transect were American pipits. Wandering tattlers (18%), American tree sparrows (12%), golden-crowned sparrows (12%), and gray-crowned rosy finches (12%) were also regularly observed. Only 1.4 birds were observed per survey point, with 3 out of 12 points having zero birds detected.

### **Pingo Lake Transect #1**

One hundred and ninety-eight birds from 22 species were detected on Pingo Lake transect #1 in 2000 (Table 1). Three new species were identified this year: pacific loon, greater scaup, and bank swallow. American widgeon, long-tailed jaeger, gyrfalcon, golden eagle, northern harrier, northern shrike and willow ptarmigan were also observed on the transect, but were not detected during point count intervals. American tree sparrows (19%), white-crowned sparrows (18%), American robins (11%), upland sandpipers (9%), and common redpolls (7%) were the most abundant species observed.

A total of 35 species were identified on Pingo Lake transect #1 between 1993 and 2000. This cumulative species total compares favorably to the species richness prediction (37 species) made in the 1998 report (Swanson 1998), though only 35-59% of this predicted population (13-22 species) are typically detected during any single point count survey.

## **Pingo Lake Transect #2**

One hundred and twelve birds from 16 species were detected along the new Pingo Lake transect #2 in 2000 (Table 1). Overall, American pipits (18%), horned larks (16%), common redpolls (12%) and golden-crowned sparrows (10%) were the most abundant species.

Common redpolls and American robins were observed throughout the entire alpine transect, which ranged between 2300 – 4400 feet elevation. Gray-cheeked thrushes and bank swallows were only detected below 2350 ft, while surfbirds, horned larks, bluethroats and northern wheatears occurred only at elevations greater than 3900 ft. Savannah sparrows, golden-crowned sparrows and Wilson's warblers were most common between 3000 – 4000 ft, the transitional ecotone between open low shrub and dryas-dominated tundra (Figure 4).

## **Middle Fork Koyukuk River**

One hundred and twelve birds from 23 species were detected along the Middle Fork Koyukuk transect in 2000 (Table 1). One new bird species, the pine grosbeak, was detected this year during a point count, while 4 new species were observed but not recorded during a point count interval this year (bald eagle, northern harrier, downy woodpecker, and northern flicker). The Swainson's thrush (21%) was the most abundant species, followed by bank swallows (11%), ruby-crowned kinglets (9%), yellow-rumped warblers (9%) and dark-eyed juncos (9%). Thrush (29%), warbler (20%), and sparrow species (18%) comprised 67% of the total birds detected along the Koyukuk River transect.

A total of 710 birds from 43 species have been recorded during point count intervals on the Middle Fork transect since 1993. An additional 5 species have been observed on this transect, but have never been picked up during point count intervals. This overall cumulative total of 48 species is equal to the species richness value (48 species) predicted for this transect in the 1998 report (Swanson 1998). However, the number of species detected annually is much lower (16-23), resulting in an annual detection rate of only 33-48%.

## **RECOMMENDATIONS**

- 1) Do not continue to run the Anaktuvuk Pass transect # 2 due to high winds, and therefore poor listening conditions.
- 2) Obtain the geographic coordinates of points along the Anaktuvuk Pass and Pingo Lake transects with a GPS. This would allow sample points to be quickly and accurately located in the future.
- 3) Set up additional transects that traverse an elevation gradient, i.e. ascend from valley bottoms into alpine areas. Such a series of breeding bird transects (similar to Pingo Lake transect #2) not only would yield information on many lesser-known alpine birds, but would provide data on species distributions across elevation gradients.

- 4) Reserve habitat association studies for the regional scale. The current study design is not appropriate to quantitatively examine bird/habitat relationships for the subset of transects within Gates of Arctic National Park and Preserve.

## REFERENCES CITED

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- Ralph, C.J., G.R. Geupel, P. Pyle, T.E. Martin, and D.F. DeSante. 1993. Handbook of field methods for monitoring landbirds. Gen. Tech. Rep. PSW-GTR-144. U.S.D.A. Forest Service, Pacific Southwest Research Station, Albany, CA. 41 pp.
- Swanson, S.A. 1998. 1998 Bird off-road point counts surveys and analysis of species richness data, 1993-1998. Report GAAR-98-06. Gates of the Arctic National Park and Preserve, Fairbanks, AK. 13 pp.
- Viereck, L.A., C.T. Dyrness, A.R. Batten, and K.J. Wenzlick. 1992. The Alaska vegetation classification. Gen. Tech. Rep. PNW-GTR-286. U.S.D.A. Forest Service, Pacific Northwest Research Station, Portland, OR. 278 pp.

# Anaktuvuk Pass Off-road Point Count Routes

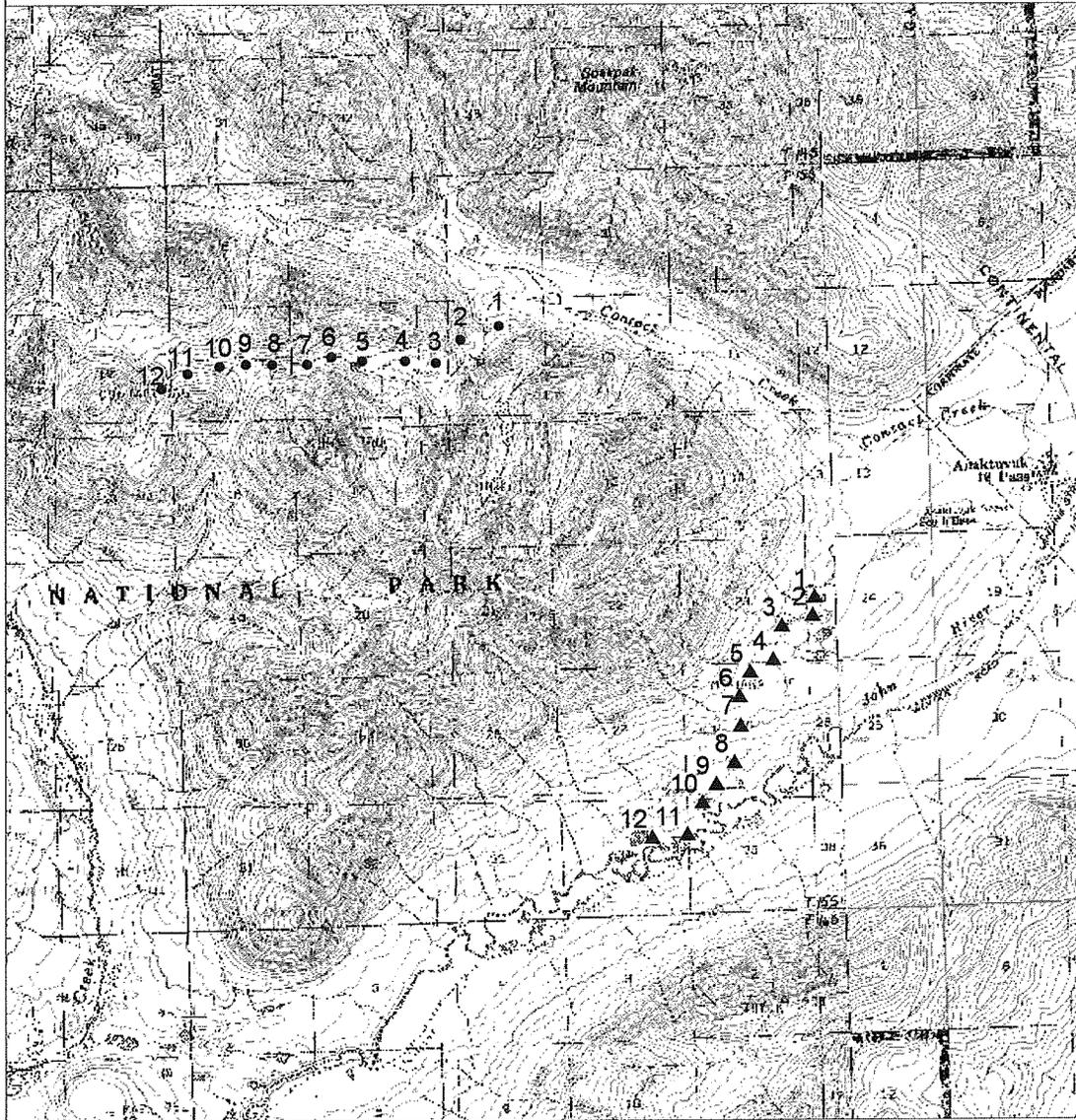


Figure 1. Location of off-road point count routes, AKP1 and AKP2, near Anaktuvuk Pass, Gates of the Arctic National Park and Preserve, AK, 16-27 June 2001.

- ▲ AKP1
- AKP2

Map Location



National Park Service  
Gates of the Arctic National Park and Preserve  
Biological Resources



0.5 0 0.5 1 1.5 Kilometers



## Middle Fork Koyukuk Off-road Point Count

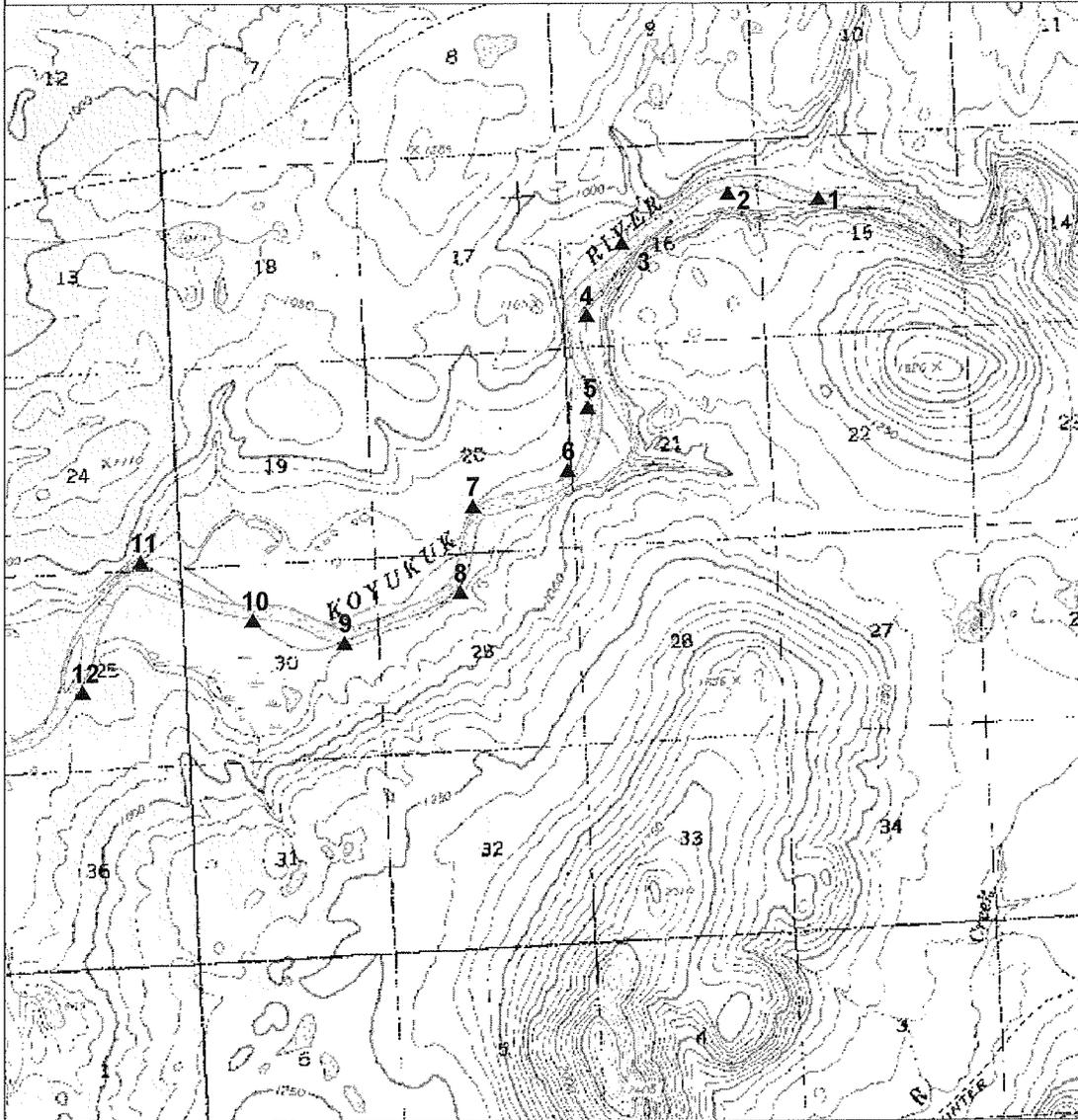


Figure 2. Location of off-road point count route, MFK1, located on the Middle Fork Koyukuk River, Gates of the Arctic National Park and Preserve, AK, 16-27 June 2000.

Map Location



National Park Service  
Gates of the Arctic National Park and Preserve  
Biological Resources

0.5 0 0.5 1 1.5 Kilometers



# Pingo Lake Off-road Point Count Routes

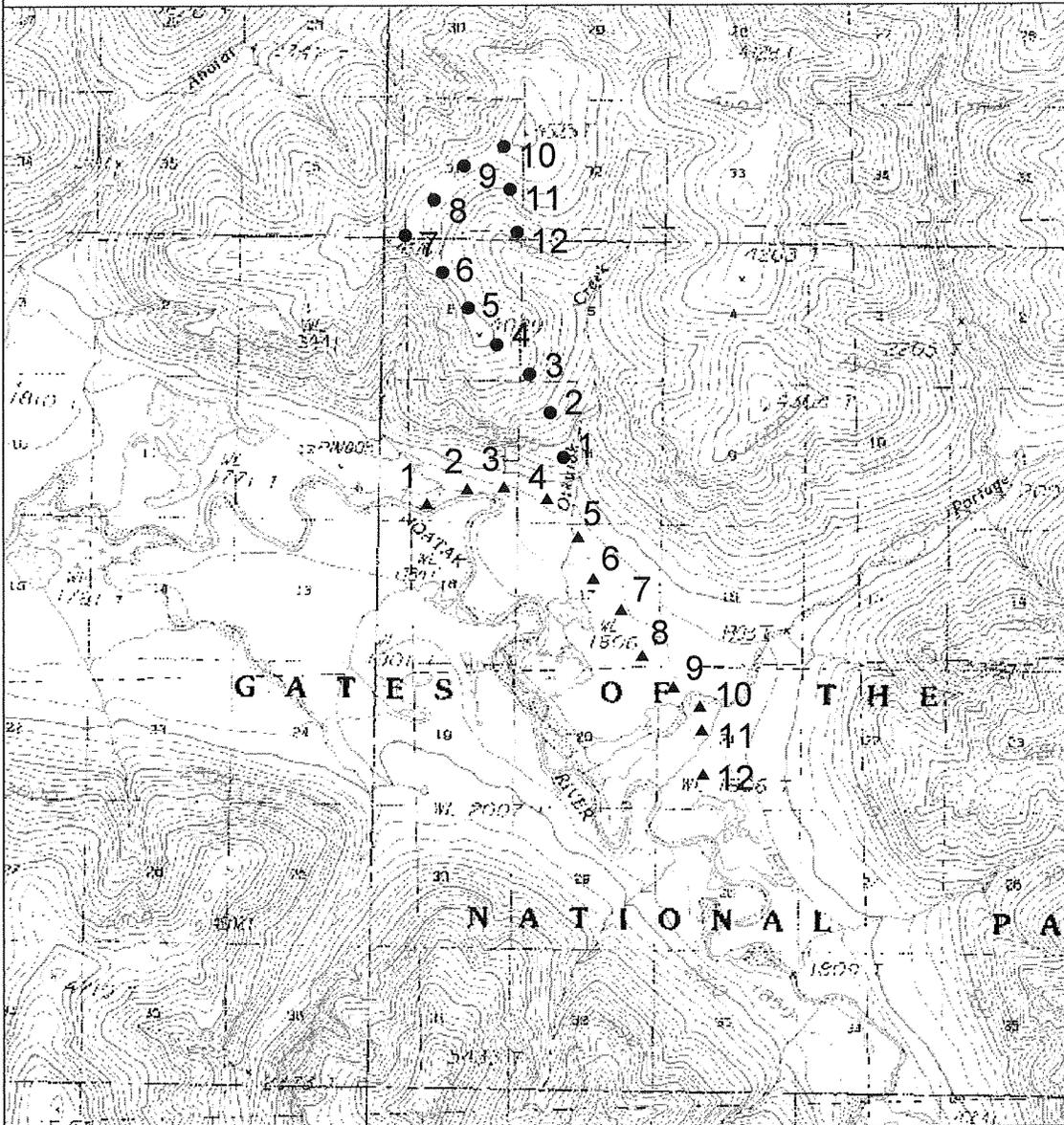
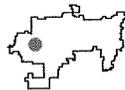


Figure 3. Location of off-road point count routes, PINGO1 and PINGO2, near Pingo Lake, Gates of the Arctic National Park and Preserve, AK, 16-27 June 2000.

▲ PINGO1      ● PINGO2

Map Location



National Park Service  
Gates of the Arctic National Park and Preserve  
Biological Resources

0.5 0 0.5 1 1.5 Kilometers



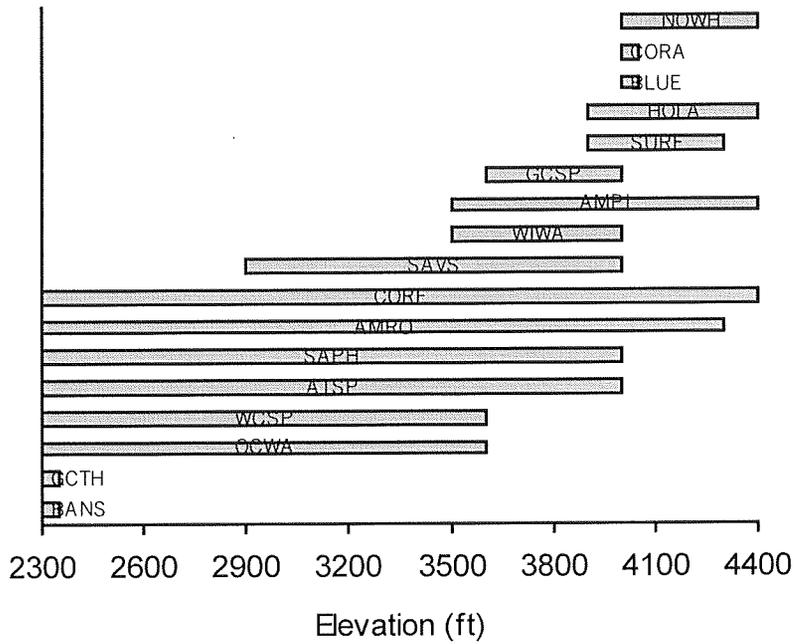


Figure 4. Elevation ranges of individual species detected on Pingo Lake transect #1, Gates of the Arctic National Park and Preserve, Alaska, 2000. See Appendix 1 for species code definitions.

Table 1. Number of birds detected by species on five off-road point count surveys near Anaktuvuk Pass (AKP1 and AKP2), Pingo Lake (PIN1 and PIN2), and the Middle Fork Koyukuk River (MFK), Gates of the Arctic National Park and Preserve, Alaska, 2000. Birds identified between point count periods are marked as x, and a question mark signifies an uncertain identification.

SPECIES	AKP1	AKP2	PIN1	PIN2	MFK
Pacific Loon			3		
Canada Goose					1
Oldsquaw	2		x		
Greater Scaup	5		3		
American Wigeon			x		
Green-winged Teal					
Mallard	x				
Northern Pintail	x				
Red-breasted Merganser	1				x
Bald Eagle					x
Golden Eagle			x		
Rough-legged Hawk	x				
Northern Harrier			x		x
Northern Goshawk					x
Red-tailed Hawk					x
Gyrfalcon			x		
Peregrine Falcon					x
Willow Ptarmigan			x		
Lesser Yellowlegs	1		7		
Upland Sandpiper	2		18		5
Spotted Sandpiper					
Least Sandpiper	x		?		
Common Snipe	8		7		
Wandering Tattler		3			
American Golden Plover	x				
Surf-bird				3	
Red-necked Phalarope			1		
Mew Gull	x		5		x
Glaucous Gull	1				
Long-tailed Jaeger	2		x		
Great Horned Owl					
Horned Lark	x			18	
Northern Wheatear	1			1	
Bluetthroat				1	
Belted Kingfisher					x
Downy Woodpecker					x
Northern Flicker					x
Olive-sided Flycatcher					6
Alder Flycatcher					4

SPECIES	AKP1	AKP2	PIN1	PIN2	MFK
Hammond's Flycatcher					x
Western Wood-pewee					x
Say's Phoebe			1	3	
Tree Swallow					x
Bank Swallow			5	1	12
Cliff Swallow			x		
Gray Jay			x		1
Common Raven	x		2		x
Northern Shrike			x		
Boreal Chickadee					x
Ruby-crowned Kinglet					10
Gray-cheeked Thrush			7	1	6
Swainson's Thrush					23
Varied Thrush					4
American Robin	1		22	7	x
American Pipit		5		20	
Bohemian Waxwing					x
Orange-crowned Warbler			12	5	4
Yellow-rumped Warbler					10
Yellow Warbler			5		2
Blackpoll Warbler			1		1
Wilson's Warbler			5	4	5
Northern Waterthrush					1
American Tree Sparrow	20	2	37	9	
Savannah Sparrow	21		6	7	
Fox Sparrow			1		3
White-crowned Sparrow	17	1	36	8	7
Golden-crowned Sparrow		2		11	
Lapland Longspur	6				
Smith's Longspur	x		1		
Dark-eyed Junco					10
Snow Bunting		1			
Pine Grosbeak					3
Gray-crowned Rosy Finch		2			
White-winged Crossbill					7
Common Redpoll	24	1	13	14	2
Species Recorded	15	8	22	16	23
All Species	24	8	34	18	41
Birds Recorded	126	17	198	113	112

Table 2. Bird species detected in each habitat type for all point count survey transects conducted in Gates of the Arctic National Park and Preserve, 1993 – 2000. Habitats coincide with level II of the Alaska Vegetation Classification (Vioreck et al. 1992), and birds were only included in lists if they were detected within the 50-m radius circle for which the habitat class was estimated. Number of points in each habitat class is presented in parentheses beside each habitat class.

Needleleaf Forest (IA) (5 points <sup>a</sup> )	Broadleaf Forest (IB) (5 points <sup>a</sup> )	Mixed Forest (IC) (2 points <sup>a</sup> )	Tall Scrub (IIB) (2 points <sup>a</sup> )	Low Scrub (IIC) (18 points <sup>b</sup> )	Dwarf Scrub (IID) (6 points <sup>c</sup> )	Graminoid Herbaceous (IIIA) (6 points <sup>d</sup> )
American Robin	Alder Flycatcher	Alder Flycatcher	American Robin	American Robin	American Pipit	American Golden Plover
Blackpoll Warbler	Bank Swallow	Bank Swallow	American Tree Sparrow	American Tree Sparrow	American Tree Sparrow	American Tree Sparrow
Boreal Chickadee	Boreal Chickadee	Black-capped Chickadee	Blackpoll Warbler	Common Redpoll	Common Redpoll	Common Merganser
Common Redpoll	Canada Goose	Common Redpoll	Common Redpoll	Common Snipe	Horned Lark	Common Redpoll
Common Snipe	Common Redpoll	Dark-eyed Junco	Gray Jay	Golden-crowned Sparrow		Common Snipe
Dark-eyed Junco	Dark-eyed Junco	Orange-crowned Warbler	Gray-cheeked Thrush	Gray-cheeked Thrush		Horned Lark
Gray Jay	Fox Sparrow	Red-breasted Merganser	Lesser Yellowlegs	Green-winged Teal		Lapland Longspur
Gray-cheeked Thrush	Gray-cheeked Thrush	Red-breasted Nuthatch	Northern Shrike	Horned Lark		Least Sandpiper
Olive-sided Flycatcher	Northern Waterthrush	Ruby-crowned Kinglet	Orange-crowned Warbler	Lapland Longspur		Lesser Yellowlegs
Orange-crowned Warbler	Olive-sided Flycatcher	Sandpiper Sp.	Savannah Sparrow	Lesser Yellowlegs		Long-tailed Jaeger
Ruby-crowned Kinglet	Orange-crowned Warbler	Swainson's Thrush	White-crowned Sparrow	Long-tailed Jaeger		Northern Pintail
Sandpiper Sp.	Pine Grosbeak	Varied Thrush	Wilson's Warbler	Northern Shrike		Oldsquaw
Savannah Sparrow	Red-breasted Merganser	White-crowned Sparrow		Northern Wheatear		Orange-crowned Warbler
Semipalmated Sandpiper	Ruby-crowned Kinglet	Yellow Warbler		Orange-crowned Warbler		Savannah Sparrow
Spotted Sandpiper	Sandpiper Sp.	Yellow-rumped Warbler		Red-necked Phalarope		Smith's Longspur
Swainson's Thrush	Semipalmated Sandpiper			Savannah Sparrow		Upland Sandpiper
Tree Swallow	Spotted Sandpiper			Shorebird Sp.		White-crowned Sparrow
Varied Thrush	Swainson's Thrush			Smith's Longspur		
White-crowned Sparrow	Swallow Sp.			Upland Sandpiper		
Yellow Warbler	Tree Swallow			White-crowned Sparrow		
Yellow-rumped Warbler	Violet-green Swallow			Wilson's Warbler		
	White-crowned Sparrow					
	White-winged Crossbill					
	Wilson's Warbler					
	Yellow-rumped Warbler					

<sup>a</sup> All points surveyed in 1993-98 and 2000.

<sup>b</sup> 3 points surveyed in 2000 only, 7 surveyed in 1993-00, and 8 surveyed in 1993-98 and 2000.

<sup>c</sup> 5 points surveyed in 2000 only, 1 surveyed in 1993-00.

<sup>d</sup> 4 points surveyed in 1993-00, and 2 surveyed in 1993-98 and 2000.

Appendix 1. Species codes for those species detected during point count surveys conducted in Gates of the Arctic National Park and Preserve, Alaska, 1993 – 2000.

SPECIES	SpCode	SPECIES	SpCode	SPECIES	SpCode
Alder Flycatcher	ALFL	Herring Gull	HERG	Sandpiper Sp.	Sandpiper Sp.
American Golden Plover	AMGP	Horned Lark	HOLA	Savannah Sparrow	SAVS
American Kestrel	AMKE	Lapland Longspur	LALO	Say's Phoebe	SAPH
American Pipit	AMPI	Least Sandpiper	LESA	Scalp Sp.	Scalp Sp.
American Robin	AMRO	Lesser Scaup	LESC	Semipalmated Sandpiper	SESA
American Tree Sparrow	ATSP	Lesser Yellowlegs	LEYE	Semi-palmated Sandpiper	SESA
Arctic Tern	ARTE	Long-tailed Jaeger	LTJA	Shorebird Sp.	Shorebird Sp.
Bank Swallow	BANS	Mallard	MALL	Smith's Longspur	SMLO
Black-capped Chickadee	BCCH	Merlin	MERL	Snow Bunting	SNBU
Blackpoll Warbler	BLPW	Mew Gull	MEGU	Snowy Owl	SNOW
Bluethroat	BLUE	Northern Flicker	NOFL	Solitary Sandpiper	SOSA
Bohemian Waxwing	BOWA	Northern Goshawk	NOGO	Spotted Sandpiper	SPSA
Boreal Chickadee	BOCH	Northern Harrier	NOHA	Surfbird	SURF
Boreal Owl	BOOW	Northern Pintail	NOPI	Swainson's Thrush	SWTH
Canada Goose	CAGO	Northern Shoveler	NSHO	Swallow Sp.	Swallow Sp.
Common Merganser	COME	Northern Shrike	NSHR	Tree Swallow	TRES
Common Raven	CORA	Northern Waterthrush	NOWA	Tundra Swan	TUSW
Common Redpoll	CORE	Northern Wheatear	NOWH	Upland Sandpiper	UPSA
Common Snipe	COSN	Oldsquaw	OLDS	Varied Thrush	VATH
Dark-eyed Junco	DEJU	Olive-sided Flycatcher	OSFL	Violet-green Swallow	VGSW
Downy Woodpecker	DOWO	Orange-crowned Warbler	OCWA	Wandering Tattler	WATA
Fox Sparrow	FOSP	Pacific Loon	PALO	Warbler Sp.	Warbler Sp.
Glaucous Gull	GLGU	Peregrine Falcon	PEFA	White-crowned Sparrow	WCSP
Golden-crowned Sparrow	GCSP	Pine Grosbeak	PIGR	White-winged Crossbill	WWCR
Gray Jay	GRAJ	Red-breasted Merganser	RBME	White-winged Scoter	WWSC
Gray-cheeked Thrush	GCTH	Red-breasted Nuthatch	RBNU	Wilson's Warbler	WIWA
Gray-crowned Rosy Finch	GCRF	Red-necked Phalarope	RNPH	Woodpecker Sp.	Woodpecker Sp.
Great Horned Owl	GHOW	Red-tailed Hawk	RTHA	Yellow Warbler	YWAR
Greater Scaup	GRSC	Red-throated Loon	RTLLO	Yellow-rumped Warbler	MYWA
Green-winged Teal	GWTE	Ruby-crowned Kinglet	RCKI		