

NESTING SHOREBIRDS AND LANDBIRDS
OF INTERIOR ALASKA

Boreal zone-breeding species in the avian families Charadriidae, Scolopacidae, Strigidae, Alcedinidae, Picidae, Tyrannidae, Laniidae, Corvidae, Alaudidae, Hirundinidae, Paridae, Sittidae, Certhiidae, Cinclidae, Regulidae, Phylloscopidae, Turdidae, Sturnidae, Motacillidae, Bombycillidae, Calcariidae, Parulidae, Emberizidae, Icteridae, and Fringillidae

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INTRODUCTION

PREVIOUS STUDIES

ANTEDATING and indeed influencing the purchase of Alaska from Russia, the Russo-American Telegraph Expedition was a \$3,000,000 endeavor in 1865-1867 to lay a telegraph line from San Francisco—through Oregon, Washington Territory, the Colony of British Columbia, and Russian America, under the Bering Sea, and across Russia—to Moscow and Saint Petersburg, where it was to connect with the rest of Europe. The route was proposed as an alternative to long, deep underwater cables across the Atlantic Ocean. But the venture was abandoned in 1867, considered an economic failure. Among many benefits to the various regions traversed, however, the explorations involved provided the first information on the avifauna of interior Alaska, all previous Alaska investigations having been conducted along the coast, as were most of those immediately following (e.g., Turner 1886, Nelson 1887, McLenegan 1889).

Following the unexpected death of the expedition's naturalist, Major Robert Kennicott, on 13 May 1866 at Nulato, the scientific work was taken over by William Healey Dall, who with Henry M. Bannister published just a few years later the first extensive English-language paper on Alaska birds and the first to include information on birds from the Interior (Dall and Bannister 1869).

Founded as a Russian trading post in 1838, the settlement of Nulato was a historically important Yukon River locality in the early scientific exploration of interior Alaska. Telegraph-expedition headquarters were located at Saint Michael, on the Norton Sound coast just north of the Yukon Delta, but to avoid the many shallow river miles of the Delta and the lower river to

reach the Interior, a portage was used from the Bering Sea to the (forested) Yukon River—from Unalakleet, on the Bering Sea coast 69 km northeast of Saint Michael, up the North Fork of the Unalakleet River, over the Nulato Hills, and down the Nulato River to the Yukon, at Nulato. Dall first crossed that portage in December 1866 and spent the winter in Nulato; in spring 1867 he arranged to boat upriver to Fort Yukon, then a post of Hudson’s Bay Company. It was on his return the length of the river, to Saint Michael, in summer 1867, that he learned the expedition had been terminated, at which point he decided to remain in the country and to continue the explorations alone, and at his own expense. He departed in 1868.

All subsequent 19th-century explorations in the Interior were also conducted via its navigable waterways—e.g., Edward W. Nelson (1887) portaged from Saint Michael to the Anvik River and reached as far inland as the Innoko River. And all explorations in the early decades of the 20th century were also by those waterways, although roads, and later aircraft, came to wield important and familiar impacts—on access to localities, and on timing and length of studies.

The first biological survey of the upper Yukon River was conducted in the summer of 1899 by Wilfred H. Osgood and Louis B. Bishop (1900), from the headwaters in northwestern Canada downriver to between Fort Yukon and Fort Hamlin. That work was soon followed by Osgood’s (1909) “biological investigations in Alaska and Yukon Territory,” conducted in 1903 in Alaska along the ‘middle’ Yukon River, between Eagle and Circle, and in the mountains west of Eagle near the sources of Mission Creek.

Founded in 1905, the Alaska Road Commission (U.S. Army Corps of Engineers) was charged with constructing and maintaining trails and roads to connect mining districts with navigable waterways. The ARC's first monumental project was to build a road from Valdez to Fairbanks, the Richardson Highway, which was open to its first traffic as early as 1917 and by

the 1920s provided the very first road access to interior Alaska, from the Alaska Range to Fairbanks (as well as in Alaska south of the Alaska Range).

Charles Sheldon (1909), Eliot Blackwelder (1919), Lee Raymond Dice (1920), Olaus J. Murie (1924, 1925, 1928), Joseph Dixon (1927, 1933, 1938), Herbert Brandt (1943), Adolph Murie (1946, 1956, 1963), and Ira N. Gabrielson (*in* Gabrielson and Lincoln 1959) all made seminal contributions to the ornithology of the Alaska Range and the Interior in the first half of the 20th century, and Laurence Irving (1960, 1961) provided important, fundamental insights into the avifauna of the Brooks Range, 1949-1954. Brina Kessel arrived at the University of Alaska, in Fairbanks, in 1951, and thus began a singular, half-century legacy of Alaska bird studies—in northern Alaska (Kessel 1961) on the North Slope (Kessel and Cade 1958) and in the Brooks Range (Kessel and Schaller 1960), in western Alaska on the Yukon-Kuskokwim Delta (Kessel et al. 1964) and on the Seward Peninsula (Kessel 1989), in south-central Alaska from the North Gulf Coast (Isleib and Kessel 1973) to the upper Susitna River valley (Kessel et al. 1981, 1982; Kessel 1998), in the Interior (Kessel 1955, 1960, 1966, 1967, 1979b; Kessel and Kelly 1958, Kessel and Springer 1966, Spindler and Kessel 1978, Kessel et al. 1980, Spindler and Kessel 1980, Murphy et al. 1984), in single-species studies (Kessel 1984, Kessel 1986, Gibson and Kessel 1989, Badyaev et al. 1996, Badyaev et al. 1998, Kessel et al. 2002, Gibson and Kessel 2006), and in Alaska-wide assessments (Kessel and Gibson 1978, Kessel 1979a, Gibson and Kessel 1992, Kessel and Gibson 1994, Gibson and Kessel 1997). Kessel held different positions over the years at the University of Alaska—Professor of Zoology, Dean of the College of Biological Sciences, Dean of Graduate Studies, and Curator of Terrestrial Vertebrates at the University of Alaska Museum—and her influence was pivotal for many years to Alaska bird students and to those in the Interior in particular. The ‘phenological data sheets’ maintained on

bulletin boards around the campus, year in and year out for decades, combined with an uncompleted draft manuscript (B. Kessel and D. D. Gibson) on the birds of Alaska have been the sources of much of the migration data and nesting information presented in this report.

DESCRIPTION OF THE STUDY AREA

PHYSICAL CHARACTERISTICS

Interior Alaska is defined here as that region of the Alaska boreal forest drained by the Yukon and Kuskokwim rivers, including and bounded by mountains and alpine, the region in which all lesser watercourses—e.g., the Alatna, Aniak, Anvik, Chatanika, Chena, Cheslina, Chisana, Clearwater, Delta, Dietrich, Dishna, Fortymile, Gerstle, Gisasa, Iditarod, Innoko, John, Kantishna, Kanuti Kilolitna, Kanuti, Koyukuk, Kutuk, McKinley, Nation, Old Crow, Porcupine, Reindeer, Robertson, Salcha, Salmon, Sanctuary, Savage, Sheenjek, Takotna, Tanana, Teklanika, Thorofare, Tok, Toklat, Tozitna, Tuluksak, Unakserak, and Wood rivers—flow into the Yukon or into the Kuskokwim. Thus the Interior is bounded on the east by the Canada boundary at 141°W, on the north by the crest of the Brooks Range, on the west by the Nulato Hills, on most of the south by the crest of the Alaska Range, and on the lower Yukon and Kuskokwim rivers by the downstream limits of continuous taiga (and conversely the upstream limit of marine and coastal influences). The “limit of timber is reached at Andraefski, 90 miles above the mouth of the Yukon” (Osgood and Bishop 1900:14).

The Interior “presents a great driftless area, in the basins of the Yukon, Tanana, and Kuskokwim Rivers, where low relief and dry climate prohibited the formation of glaciers. This unglaciated region was encroached upon by the continental ice sheets from the east and by mountain glaciers from the north and south. Along its margins at several localities there have

already been found evidences of glacial advances preceding the last great glaciation...” (Capps 1931:1). The entire Brooks Range was occupied by a great glacier, while the most heavily glaciated areas of the Alaska Range were all higher elevations, e.g., 13,740 ft/4187 m at Mount Hayes, and 20,320 ft/6193 m at Mount McKinley (ibid.). The region is underlain by discontinuous permafrost (see Davis 2001). Elevation extremes include North America’s highest point (above), in the Alaska Range, and Mount Isto (9058 ft/2760 m), the highest point in the Brooks Range; elevations on the Yukon River extend from 853 ft/259.9 m at Eagle to <100 ft/30.4 m above sea level at Holy Cross (70 ft/ 21.3 m) and Anvik (52 ft/15.8 m).

CLIMATE

The Interior is well known for both the hottest and the coldest temperatures in Alaska, with records of +100°F/+37.7°C on 27 June 1915 at Fort Yukon and –79°F/–61.6°C on 23 January 1971 at Prospect Creek camp, near Bettles. In Fairbanks the extremes have been +96°F/+35.5°C on 15 June 1969 and –66°F/–54.4°C on 14 January 1934. According to 1971-2000 monthly averages from the National Climatic Data Center (on line), Fairbanks, Alaska, has the greatest range in temperature of all U.S. cities, with a 72.1 degree (F) range from winter to summer. The average January temperature is –9.7°F/–22.7°C, while the average in July is +62.4°F/+16.8°C.

Critical to winter bird populations here is surviving the reality of winter cold in interior Alaska, where temperature inversions, created by unmoving high pressure systems, trap the coldest air near the ground and, in the commonplace absence of air movement, result in hardly noticeable day/night temperature differences during cold ‘snaps’. Under such circumstances, temperatures in the Interior often remain intensely cold, day in and day out, for some time, e.g., at Fairbanks during 30 December 1968-5 January 1969 maximum was –40°F/–40°C and

minimum $-61^{\circ}\text{F}/-51.6^{\circ}\text{C}$, during 23-29 January 1971 maximum was $-43^{\circ}\text{F}/-41.6^{\circ}\text{C}$ and minimum $-59^{\circ}\text{F}/-50.5^{\circ}\text{C}$; at Fairbanks the *average* temperature for the month of January 1906 was $-36.4^{\circ}\text{F}/-38^{\circ}\text{C}$, for January 1971 $-31.7^{\circ}\text{F}/-35.3^{\circ}\text{C}$, and for February 1979 $-25.3^{\circ}\text{F}/-31.8^{\circ}\text{C}$, for examples. Precipitation is often less than 10 in/250 mm/year, but precipitation that falls in the winter tends to stay the entire winter, disappearing by a combination of sublimation and, ultimately, spring breakup.

AVIAN HABITATS

Most of the broad avian habitats described for Alaska by Kessel (1979a:86-93) are found widely in the Interior, and many of her descriptions were doubtless founded on Interior examples:

FRESH WATER –

Lacustrine waters and shorelines (Spotted Sandpiper, Belted Kingfisher, Bank Swallow).

Fluviatile waters and shorelines (Semipalmated Plover, Spotted Sandpiper, Wandering Tattler, American Dipper).

UNVEGETATED SUBSTRATES –

Alluvia and moraines (Semipalmated Plover).

Inland cliffs and block-fields (Great Horned Owl, Common Raven, Violet-green Swallow, Cliff Swallow, Northern Wheatear, Mountain Bluebird, Townsend's Solitaire, Snow Bunting, Gray-crowned Rosy-Finch).

Subterranean soil (Belted Kingfisher, Bank Swallow).

MEADOWS --

Wet meadow -- Shallow pond margins with dense emergent vegetation; typical plant components are hydrophytic (e.g., *Carex*, *Eriophorum*, *Equisetum*); includes sedge-grass marsh,

sedge-moss bog, cattail marsh, etc. (Hudsonian Godwit, Least Sandpiper, Wilson's Snipe, Red-necked Phalarope, Red-winged Blackbird).

Dwarf shrub meadow -- Generally more mesic than wet meadow; sedges or forbs are predominant; shrubs include *Betula*, *Empetrum*, *Vaccinium*, *Salix* less than 0.4 m tall; includes tussock-shrub tundra, hummock-ridge tundra, sedge-dwarf shrub bog, seral margins of taiga ponds, herb-willow or *Equisetum*-willow floodplain (Upland Sandpiper, Whimbrel, Short-eared Owl, Lapland Longspur, Smith's Longspur).

SHRUBBERY –

Dwarf shrub mat -- Dominated by woody shrubs <0.4 m high, often prostrate. Might include sedge, grass, forb, moss, and lichen, and much of the ground might be bare. Includes dry tundra, mat and cushion fellfield, tundra barrens, shrub-heath tundra, dwarf shrub bog (American Golden-Plover, Surf-bird, Baird's Sandpiper, Horned Lark, American Pipit, Lapland Longspur).

Low shrub thicket – Closed, open, or sparse stands of shrubs 0.4-1.1 m tall (Savannah, American Tree, Brewer's, White-crowned, Golden-crowned, and Lincoln's sparrows).

Medium shrub thicket -- Closed, open, or sparse stands of shrubs 1.2-2.4 m tall (Gray-cheeked Thrush, Arctic Warbler, Wilson's Warbler, Fox Sparrow).

Tall shrub thicket -- Closed, open, or sparse stands of shrubs 2.5-4.9 m tall (Alder Flycatcher; Orange-crowned, Yellow, and Blackpoll warblers; Northern Waterthrush).

FORESTS AND WOODLANDS --

Deciduous forest -- Closed or open stands in which deciduous species constitute 90% or more of the tree canopy; habitat can be further subdivided on basis of dominant tree species (Boreal Owl, Yellow-bellied Sapsucker, Downy Woodpecker, Northern Flicker, Western Wood-

Pewee, Hammond's Flycatcher, Black-capped Chickadee, Hermit Thrush, Yellow-rumped Warbler).

Coniferous forest -- Closed or open stands in which coniferous species constitute 90% or more of the tree canopy (American Three-toed Woodpecker, Gray Jay, Boreal Chickadee, Red-breasted Nuthatch, Brown Creeper, Ruby-crowned Kinglet, Townsend's Warbler, White-winged Crossbill, Pine Siskin).

Mixed deciduous-coniferous forest -- Closed or open stands where neither deciduous nor coniferous trees make up 90% of canopy (Solitary Sandpiper, Great Gray Owl, Hairy Woodpecker, Swainson's Thrush, Varied Thrush, Dark-eyed Junco, Pine Grosbeak).

Scattered woodland and dwarf forest -- Open stands of growth-stunted trees, forming a "hybrid" between forests and shrub thickets. Tree canopy <20%. Considered a woodland as long as there are enough trees to attract tree-using species to the area, which can mean a canopy of as little as 0.2%. Includes spruce bogs (muskeg) when scattered or dwarfed trees are present, white spruce-birch woodland, treeline spruce woodland, etc. (Lesser Yellowlegs, Northern Hawk Owl, Olive-sided Flycatcher, Northern Shrike, Tree Swallow, Arctic Warbler, Bohemian Waxwing, Chipping Sparrow, Rusty Blackbird, redpolls).

ARTIFICIAL HABITATS –

Human-made habitats sufficiently different from the 'natural' habitats that the previous epithets are inappropriate. Includes bridges, buildings, bird nest-boxes and feeding stations, discarded gasoline cans and oil barrels, garbage dumps and other refuse sources, freshly cultivated fields until vegetative recovery places them in one of the natural habitats (Killdeer, Say's Phoebe; Tree, Violet-green, and Cliff swallows; Common Raven; Snow Bunting).

METHODS

Based on published and unpublished information, 100 species accounts have been prepared to discuss seasonal phenology and abundance, breeding distributions, and associated habitat parameters for 17 species of nesting shorebirds (Charadriidae 3 and Scolopacidae 14), 12 near-passerines (Strigidae 5, Alcedinidae 1, Picidae 6), and 61 passerines (Tyrannidae 6, Laniidae 1, Corvidae 3, Alaudidae 1, Hirundinidae 4, Paridae 3, Sittidae 1, Certhiidae 1, Cinclidae 1, Regulidae 1, Phylloscopidae 1, Turdidae 8, Sturnidae 1, Motacillidae 1, Bombycillidae 1, Calcariidae 3, Parulidae 7, Emberizidae 9, Icteridae 2, and Fringillidae 6) within the taiga and associated habitats and landforms of interior Alaska, plus 10 additional species—in the families Scolopacidae 1, Caprimulgidae 1, Tyrannidae 1, Hirundinidae 1, Regulidae 1, Parulidae 2, Emberizidae 1, Icteridae 1, and Fringillidae 1—whose nesting ranges might be expected to expand in the near future into the Interior from northwestern Canada (or, in a very few cases, from western or southwestern Alaska).

The enthusiasm of resident and transient birdwatchers over much of the second half of the 20th century resulted in voluminous phenological data on (primarily) spring arrivals of birds in interior Alaska each year. The numbers and zeal of these birdwatchers reached a critical mass in the 1970s, and Brina Kessel's 'phenological datasheets', posted on bulletin boards at a half dozen or more locations on the university campus, invited everyone's participation. Those sheets, primarily from the 1960s through the early 1990s, have never been collated, but provide here important insight into the arrivals and departures of migrant birds in the Interior. Most of the information for this report has come from the eastern Interior, from Anaktuvuk Pass, Denali National Park, and Fairbanks to the Canada border, and many status and abundance evaluations for the western Interior are inferences from status and abundance beyond the Interior, in northern, western, or southwestern Alaska.

CONVENTIONS USED IN SPECIES ACCOUNTS

Phylogenetic sequence and scientific and English names of species follow the Seventh *Check-list of North American Birds* (AOU 1998) and supplements through 2010 (Chesser et al. 2010). Nomenclature and limits of subspecies generally follow Gibson and Kessel (1997). Many of the species discussed here are monotypic, and of those that are polytypic only two are known in this region from more than one nesting subspecies (Gray Jay, Gray-crowned Rosy-Finch). Conventional citation (author, year) follows first mention of each avian scientific name; details of these historically important citations, not included here, are found readily elsewhere (e.g., AOU 1957, Gibson and Kessel 1997). Type localities are included for taxa described from Alaska and northwestern Canada. Most Alaska localities are identified by names published in the *Dictionary of Alaska Place Names* (Orth 1971); exceptions are identified.

An authority for original data is cited by initials and last name on first mention in a species account; subsequent references to that person in the same account are by initials; the writer is cited throughout by initials alone (DDG).

ANNOTATED LIST OF SPECIES

CHARADRIIDAE: Lapwings and Plovers

► *Pluvialis dominica* (Müller, 1776). American Golden-Plover. Monotypic. Fairly common migrant throughout the Interior; breeds in Alaska Range, Tanana-Yukon highlands, and Brooks Range. Usually arrived in spring in second week of May. Earliest included one on 3 May 1980, Delta Junction (J. Jolis, DDG, and P. D. Martin); one on 6 May 1977, Fairbanks,

Smith Lake (E. R. Hutson); first on 8 May 1951 and 10 May 1950, Anaktuvuk Pass (Irving 1960); two on 10 May 1979, Delta Junction (B. E. Lawhead and R. H. Day); in 1982 one on 10 May at Fairbanks (D. and A. Ronsse), followed by 18 birds on 11 May (PDM), and 40 on 12 May (B. A. Anderson); in other years at Fairbanks, on 11 May 1980 170 at Fort Wainwright, 40 at Creamer's Field, plus 156 at Experimental Farm (DDG, BEL, and S. M. Murphy); one, 12 May 1984 (DDG+); at Anaktuvuk Pass in other years first on 12 May 1948, 16 May 1949, 17 May 1954, 18 May 1953, and 19 May 1952 (all Irving 1960); one on 13 May 1975 at Tanana (T. Sniffen); and 30+ on 15 May 1977 at Mile 20 Denali Park Road (K. Kertell). Usually in numbers over the two weeks following first individuals (e.g., total of 113 during 18-23 May 1995 at Tok, T. J. Doyle). Late spring migrants in lowlands included 15-20 birds on 28 May 1969, 'a number' on 30th, and a lone bird on 8 June 1969—all Fairbanks (DDG).

Nesting habitat: Alpine tundra—sparse, low vegetation on higher, well-drained, rocky slopes (Johnson and Connors 2010); open *Dryas*-Lichen-Gravel terraces (Spindler et al. 1980); at elevations to 1546 m (Sage 1975) and to near 1830 m (Frisch 1982). Nested in Alaska Range (e.g., nest/4 eggs, 16 June 1982, Mile 61 Denali Park Road, K. Laing and K. Kertell; nest/4 eggs, 17 June 1981, Denali NP, Little Stony Creek flats, and same date three nests/3 eggs, Kantishna Hills—N. S. Proctor; defensive pair 19 June 1994 at Gold Hill, TJD and B. Route, and several defensive breeding pairs 23-24 June and 15-16 July 1994 in upper Cheslina River drainage on Tetlin NWR, TJD and R. C. Means; nest/4 eggs on 27 June 1978, Denali NP, KK), in Tanana-Yukon highlands (e.g., conspicuous tundra bird in Ray Mountains 1979...not in upper elevation areas, but fairly common in rolling tundra lowlands around the mountains...where prostrate scrub cover of a gently sloping rolling tundra ridgetop broken by a small areas of dry upland fellfield barren; also in dwarf scrub/tussock-graminoid meadows and in moister hummock ridge

meadows as well—Matthews 1980), and Brooks Range (e.g., at Anaktuvuk Pass laying females were collected on 28 May, 30 May, and 1 June; first two nests found on 9 June 1949, first one on 8 June 1951, and nest/3 eggs on 10 June 1952; nested on dry ridges near the river and over the valley in dry spots as far as the slopes leading to the steep valley walls; first young on 25 June; flight-capable young on 24 July 1950—all Irving 1960).

Adults were numerous at elevation, usually still in pairs, until beginning of August; none was seen in Tuluak (= Tulugak) Creek valley, Brooks Range, later than 15 August (Irving 1960). Juveniles were at elevation in late July-early August (e.g., four, 25 July 1977, Highway Pass, Denali NP, KK; six birds, probably a family, 7 August 1975, at 1036 m just north of Little Brushman, C. G. Batten), followed by fall migration extending from early August to mid-September (e.g., at least 12 juveniles, including flock of 11, on 7-8 August 1989, Fairbanks, Cushman flats, DDG, PDM, and A. Kondratiev; one juvenile, 17 August 1982, Fairbanks, DDG; two juveniles, 27 August 1987, and flock of eight juveniles, 1 September 1987, Fairbanks, Cushman flats—DDG and PDM; flock of seven, 2 September 1962, Fort Yukon, Yocom 1964; eight, 4 September 1980, Fairbanks, D. M. Troy; five, 7 September 1984, Murphy Dome, H. Haid; two at Dry Lake at Mile 1376 Alaska Highway, east of Dot Lake, 9 September 1987, 10 on 10th, five on 12th, singles on 14th, 15th, and 16th, none thereafter—all M. W. Britten; 30-50 birds, 17 September 1967, Fairbanks, DDG and R. S. Hadley+; one, 18 September 1981, Fairbanks, D. M. Troy). Latest: one juvenile, 26-28 October 2004, Fairbanks, Cushman flats (L. H. DeCicco).

► *Charadrius semipalmatus* Bonaparte, 1825. Semipalmated Plover. Monotypic. Common migrant and breeder throughout the Interior. Arrived in spring in eastern Interior in first two weeks of May (e.g., one, 27 April 1980, Fairbanks, Smith Lake, L. Babb; one, 1 May

1988, Fairbanks, DDG; two, 2 May 1977, Smith Lake, T. G. Tobish, Jr., E. R. Hutson; one, 3 May 1978, Fairbanks airport, TGT; one, 4 May 1985, Fairbanks airport, DDG and P. D. Martin; 15+, 8 May 1972, Fairbanks airport, DDG; one, 8 May 1982, Smith Lake, D. R. Herter; one, 10 May 1983, Fairbanks, R. H. Day, B. E. Lawhead, and S. M. Murphy; six on 12 May 1984, Fairbanks, Moose Creek, DDG+) and in other areas shortly thereafter (e.g., one, 16 May 1984, Galena, T. O. Osborne; two, 17 May 1977, Denali NP, Horseshoe Lake, K. Kertell; specimen collected [not examined] 19 May 1949, Anaktuvuk Pass, Irving 1960).

Nesting habitat: Well-drained, gravel or shale areas in subarctic and low-arctic regions; sand and gravel bars in rivers, shorelines, and tundra, including sparsely vegetated raised beach ridges with sand, gravel, dry peaty ground, gravel aircraft runways (Nol and Blanken 1999). Nested throughout the Interior, from the Porcupine River (Yocom 1964), upper Yukon River (e.g., Circle, Fort Yukon—Gabrielson and Lincoln 1959), and Tanana River (e.g., defensive pair, 18 June 1950, at old gravel pit on Alaska Highway east of mouth of Delta River, *ibid.*) to Anvik River (five pairs at scattered localities, 27-30 June 1977, C. M. White), Aniak River (recorded 16-23 June 1982 and 15 birds counted along 45 km of Aniak on 24 July 1982, B. A. Anderson), Brooks Range (e.g., nest/3 eggs, 12 June 1949, Anaktuvuk Pass, Irving 1960; nest/3 eggs, 23 June 1956, and five pairs recorded in 1-h walk along upper river, 13 July 1956, Sheenjek River—Kessel and Schaller 1960; nest/4 eggs, 25 June 1979, Firth River, Spindler et al. 1980) and Alaska Range (Denali NP, Dixon 1938; KK).

Fall migration started in late July and was mostly completed in August (e.g., assemblage of 22+ birds, 80% of them juveniles, 3 August 1982, Fairbanks, Cushman flats, DDG; juvenile collected [not examined] 6 August, Anaktuvuk Pass, Irving 1960; three or four birds, 10 August 1899, a few about 15 miles above Circle on 12th, and the last at Circle on 15 August—all

Osgood and Bishop 1900; four juveniles, 30 August 1984, Cushman flats, BAA). Last migrants on 1 September 1950 at Anaktuvuk Pass, Contact Creek (Irving 1960); migrants noted 1-2 September 1962 passing through the Fort Yukon area (Yocom 1964); last one, 7 September 1944, Richardson Highway (I. N. Gabrielson). Extreme late: one, 13 October 1990, Harding Lake (B. Kessel).

► *Charadrius vociferus* Linnaeus, 1758. Killdeer. Subspecies is nominate *vociferus*. Rare migrant and breeder in eastern Interior. Arrived usually in first half of May. Earliest records included one, 26 April 1978, Fairbanks, D. M. Troy; one, 27 April 1976, Fairbanks, T. G. Tobish, Jr.; one, 1 May 1971, Fairbanks, G. E. Hall and DDG+; pair, 7 May 1964, Fort Yukon, Kessel and Springer 1966; one, 11 May 1963, Fairbanks, *ibid.*; one, 11 May 1996, Northway airport, T. J. Doyle; pair, 12 May 1953, Fairbanks, Kessel 1960; one, 15 May 1965, Fairbanks, Kessel and Springer 1966; one, 15 May 1984, Fairbanks, Cushman flats, B. A. Anderson).

Nesting habitat: Open areas, such as beaches, bare lake and river shores and bars, inland block-fields, airstrips, roads, and mine tailings to 450 m asl (see Petersen et al. 1991, Jackson and Jackson 2000). Few, and widely scattered, Interior nesting records (e.g., pair at nest, late June 1962, Mansfield Lake, near Tanacross, Weeden 1966; at least two downies, 11 June 1977, Smith Lake, B. Kessel; pair at nest/4 eggs, 2 July 1983, still 4 eggs on 7th, pair with at least two downies on 11 July 1983—all Cushman flats, Fairbanks, BAA; adult with three young, 11 July 1991, adult with two young on 20 July and 29 July, in gravel pit 12.8 km east of Tok, T. J. Doyle; pair at nest/4 eggs, 9 June 1993, after which single birds seen 16 June, 12-13 July, and 3-4 August 1993—Scottie Creek; also a single bird on 30 June 1993 in the gravel pit east of Tok where the species nested in 1991--all TJD), but additional breeding behavior, including

distraction displays, was noted (Kessel and Gibson 1978) in other years at Fort Yukon (1963 and 1964, C. J. Lensink and J. N. Eisenhart, and 1972, S. Peterson) and at Fairbanks (1966, GEH, and 1967, BK).

Records of occurrence at additional localities included Anaktuvuk Pass (29 May 1950 and 29 May 1951, Irving 1960), near Tetlin (June 1959, Kessel and Springer 1966), Moon Lake (24 May 1986, R. L. Scher), Denali NP (upper Toklat River, 8 June 1977, P. and G. Pederson), and Miller Creek, Mile 217.6 Richardson Highway (near Trans-Alaska Pipeline, 8 July 1985, G. M. Watson). Occurred singly, in pairs, or family groups—maximum counts six (pair and four fledglings together, 4 August 1983, Fairbanks, Cushman flats, DDG and R. H. Day) and seven (five adults and two juveniles together, 14 July 1987, Fairbanks, Cushman flats, DDG). North and west of the Interior, Killdeers have been recorded at intervals in northern Alaska (Bailey 1948, West and White 1966, Childs 1969, Kessel and Gibson 1978) and in western Alaska (Gabrielson and Lincoln 1959, Kessel et al. 1964, Kessel 1989) .

Seasonally latest records included one juvenile still present 23 August 1983, Fairbanks, Cushman flats (BAA); one, 4 September 1977, Fairbanks (BK); and one, 7 September 1976, Fairbanks (C. M. Boise+).

SCOLOPACIDAE: Sandpipers, Phalaropes, & Allies

► *Actitis macularius* (Linnaeus, 1766). Spotted Sandpiper. Monotypic. Common migrant and breeder throughout the Interior (the most widespread-breeding sandpiper in North America—Oring et al.1997), becoming less numerous in Alaska Range (K. Kertell+) and Brooks Range (Irving 1960) and beyond, to northern Alaska (see Bee 1958, Kessel and Cade 1958, Hines 1963, West and White 1966, Dean and Chesemore 1974, Pitelka 1974, Kessel and Gibson

1978) and western Alaska (see Kessel 1989, Petersen et al. 1991). Arrived in the Interior in spring usually in mid-May (Earliest: one, 4 May 1981, Fairbanks, P. D. Martin; one, 7 May 1971, Fairbanks, G. E. Hall; one, 8 May 1972, Fairbanks, DDG and S. R. Johnson; one, 11 May 1980, DDG, B. E. Lawhead, and S. M. Murphy; 12 May 1978, Fairbanks, T. G. Tobish, Jr.; one, 16 May 1973, Fairbanks, DDG; one, 16 May 1984, Galena, T. O. Osborne; one, 22 May 1983, Fairbanks, T. H. Pogson).

Nesting habitat: Fluvial and lacustrine shorelines, at elevations to over 1400 m, to include semiopen areas for nesting and patches of dense vegetation for brood cover; islands surrounded by deep water and broad areas of semiopen herbaceous cover favored (Oring et al. 1997 and citations therein); also in old mine tailings (to 365 m and well above riparian timberline, Tuluksak River, Petersen et al. 1991). Breeds at elevations to 1828 m (Paulsen 1993). Density information included 6.9 pr/km² “[a]long disturbed and undisturbed riparian habitat within the timberline,” Tuluksak River area in 1983 (Petersen et al. 1991:60) and seven birds along 45 km of Aniak River, 24 July 1982 (B. A. Anderson). Egg dates 10 June to 22 July (n = 26 Alaska records)—Oring et al. 1997 (but see beyond). Nested throughout the Interior in appropriate habitat (e.g., nest/4 eggs on 7 June 1979, Fairbanks airport, D. M. Troy and DDG; 4-egg clutch completed 10-11 June 1983, Fairbanks area, Tanana River, D. W. Norton and S. M. Patten; nest/2 eggs on 12 June 1995, Porcupine River, K. M. Sowl; not common, Sheenjek River, Kessel and Schaller 1960; ubiquitous in Yukon-Charley Rivers NP, where nest/4 eggs on 5 July, Moldenhauer 1982; ubiquitous on Yukon River, first downies on 4 July 1966, and on 17th near Coal Creek broods of recently hatched and of nearly fully feathered young seen only a few yards apart, White and Haugh 1969; two nests still under incubation at Tetlin Lake on 16 July 1962 and a pair with young were seen on 17 July, Yocom 1963a; recorded frequently along the

Koyukuk River from Bettles to Allakaket and on the lower Alatna River, Irving 1960; adult with two young on 7 July 1977, and a nest/4 eggs on 10 July 1977 at Horseshoe Lake in Denali NP, K. Kertell, E. R. Hutson; ubiquitous 27-30 June 1977 on Anvik River, C. M. White; and present 26 June-1 August 1982 on Aniak River, BAA).

Fall departure began by mid-August (e.g., four on 13 August 1979, Tozitna River, Ray Mountains, were last of the season, Matthews 1980; one juvenile, 23 August 1989, Fairbanks, Cushman flats, DDG+; two as late as 24 August 1962, Yukon River 32 km west of Fort Yukon, Yocom 1964; one juvenile, 27 August 1987, Fairbanks, Cushman flats, DDG and PDM; some as late as 28 August 1985, Kisaralik River, Petersen et al. 1991; total 20 birds, 31 August 1984, Clearwater and Tanana rivers, B. A. Cooper+). Not recorded in flocks. Latest: one, 3 October 1965, Fairbanks (M. C. T. Smith); and one, 23 October 1972, Fairbanks (T. T. Wetmore).

► *Tringa solitaria* Wilson, 1813. Solitary Sandpiper. Subspecies is *cinnamomea* Brewster, 1890. Fairly common migrant and breeder throughout the Interior taiga (see Kessel and Gibson 1978). As with many other species, much interannual variation in arrival timing, but usually arrived in first half of May (e.g., one, 29 April 1984, Fairbanks, S. R. Meyer; one, 1 May 1975, and three, 1 May 1976, at Fairbanks, B. Kessel; total two, 2 May 1981, Fairbanks, P. D. Martin; total three, 3 May 1980, Delta Junction, DDG, PDM, and J. Jolis; one, 4 May 1983, Fairbanks, T. H. Pogson; at least four on 4 May 1985, Fairbanks airport, DDG and PDM; one, 7 May 1987, North Pole, J. F. Kelly; one, 8 May 1978, Goldstream Valley, B. E. Lawhead; group of three, R. G. Hunter, plus three separate single birds, DDG—all 8 May 1986, Fairbanks area; recorded 10 May 1867 at Nulato, fide Gabrielson and Lincoln 1959; one, 11 May 1982, Fairbanks, D. R. Herter; recorded 12 May 1914 at Takotna Forks (ibid.); loose flock of six, 12 May 1979, Delta Junction, DDG, R. H. Day, and BEL).

“The Solitary Sandpiper remains poorly known compared to most other North American shorebirds, especially on its nesting grounds. Remote breeding habitat and inaccessible nest sites appear to have discouraged study of its breeding biology. Behavioral studies by Oring (1968, 1973) provided some of the few documented glimpses of this species on its nesting grounds. In addition, its tendency to remain alone or in small flocks during migration has limited the data available on its movements, at least compared to other North American shorebirds” (Moskoff 1995: Introduction).

Nesting habitat: Vicinity of muskeg ponds, up to 200 m from water. Uses abandoned nests of arboreal passerines, particularly [in Alberta] American Robin, Rusty Blackbird, Eastern Kingbird *Tyrannus tyrannus*, Gray Jay, and Cedar Waxwing *Bombycilla cedrorum* (Oring 1968, Oring 1973). Thus Solitary Sandpiper nests can be found at any height in coniferous or deciduous tree...up to 13 m from the ground on treetops, branches, or tree stumps... frequently close to tree trunks (Moskoff 1995 and citations therein). At Fairbanks habitats were dominated by alder (38%), paper birch (25.4%), and willow (24.4%), with vegetation heights of 1.4 m to canopy bottom and 4.2 m to canopy top (Spindler 1976).

Breeding or circumstantial evidence of breeding recorded widely in the Interior (e.g., copulation 28 May 1980 and pair of defensive adults 9-27 June 1980, Firth River, Spindler et al. 1980; pair in distraction display, 14 June 1983, Goldstream Valley, T. H. Pogson; young just hatched, 27 June 1907, Eagle, Laing and Taverner 1929; pair with three downy young, 22-23 June 1903, Charley Creek, Osgood 1909; sparsely distributed, June-July 1956, Sheenjek River, Kessel and Schaller 1960; adult/4 young, 17 July 1962, near Tetlin, Yocom 1963a; young, 8 July 1951, Fairbanks, T. J. Cade; defensive pair, summer 1951, Minto Lakes, Hooper 1951; breeding female, 19 June 1950, Chatanika, and two breeding males, 27 June 1950, Fairbanks area—I. N.

Gabrielson; defensive adult, 14 July 1972, upper Alatna River, H. E. Kingery; defensive pair, 17 June 1912, North Fork, Kuskokwim River, Dice 1920) and beyond, at least as far west as Bethel (set of eggs, 14 June 1951, fide Gabrielson and Lincoln 1959), Kobuk River (Grinnell 1900), and the Seward Peninsula (Kessel 1989).

Departures usually in August, but little information (one juvenile, 10 August 1985, Fairbanks, Peger Road, DDG; “somewhat late” on 25 August 1992, Tok, T. J. Doyle; one, 12 September 1976, Northway, DDG and T. G. Tobish, Jr.; one, 21 September 1975, Harding Lake, F. G. Hering).

► *Tringa incana* (Gmelin, 1789). Wandering Tattler. Monotypic. Fairly common migrant and breeder in the Alaska Range—where very first nest and eggs discovered 1 July 1923 in Denali NP (Savage River, Murie 1924), in the Tanana-Yukon highlands, and in the Brooks Range. Arrived directly on breeding grounds from seacoast in second half of May (e.g., in Alaska Range two on 16 May 1968 at Black Rapids, DDG; arrived 18 May 1908, upper Toklat River, Sheldon 1909; pair, 20 May 1978, Denali NP, Caribou Creek, P. and G. Pederson; one, 22 May 1974, Denali NP, Savage River, D. K. Porter; in Tanana-Yukon highlands at Eagle Creek below Eagle Summit arrived 16 May 1961, 21 May 1960, 23 May 1962, and 27 May 1957—all Weeden 1965; and in Brooks Range at Anaktuvuk Pass earliest were recorded on 18 May 1954, 19 May 1950, 22 May 1953, 25 May 1949, 26 May 1951, and 29 May 1952 at Anaktuvuk Pass, Irving 1960; first on 22 May 1983, Gisasa River, T. O. Osborne; first seen 30 May 1979, Firth River, Spindler et al. 1980). Seldom recorded in Interior lowlands, away from breeding habitat (e.g., one, 18 May 1974, Northway airport, DDG+; singles on 23 May 1983 and 29 May 1984, Galena, TOO).

Nesting habitat: Tattlers focus much of their daily activity (flight displays, foraging) about the montane, sparsely vegetated riverine gravel bars or adjacent rocky substrates earlier thought to constitute obligatory nesting habitat, but nests just as often placed on tundra or sparsely vegetated ground many hundreds of meters removed from rivers and streams (Gill et al. 2002). Nests in solitary pairs. Nest/eggs/young unknown to science until 1922-1923, when discovered at head of Delta River, off Savage River (Murie 1924). Breeding elevations [entire breeding range] 61 to 1230 m above sea level (mean 850 m \pm 356 SD, $n = 25$)—Gill et al. 2002 and citations therein. Egg dates 28 May-29 June (Eagle Creek, Weeden 1965). Examples of nesting phenology include (Alaska Range) brood of three downies on 22 June 1926, in 1932 first brood seen 14 July and a late brood, of four just-hatched young, on 20 July—all Denali NP (Dixon 1933); (Tanana-Yukon highlands) nest/4 newly-hatched young on 22 June 1957, and hatch dates 22/23 June 1960, 23 June 1963, and 29 June 1962—all Eagle Creek (Weeden 1959, 1965); adult with one downy, 11 July 1979, Ray Mts (Matthews 1980); (and Brooks Range) pair with three downies on 9 July 1951, Anaktuvuk (Irving 1960).

Adult and juvenile tattlers moved from nesting grounds to seacoast without stopping, and there were few postbreeding-season Interior records (e.g., one, 2 September 1962, Mile 62 Steese Highway, R. B. Weeden), none in the lowlands.

► *Tringa melanoleuca* (Gmelin, 1789). Greater Yellowlegs. Monotypic. Breeds in western Alaska adjacent to the Interior (e.g., on Salmon, Tuluksak, Kisaralik, and Togiak rivers, see Petersen et al. 1991), possibly at western periphery of Interior (e.g., several single birds identified on upper Takotna River late July 1912, including a specimen [not examined] taken 21 July 1912, Dice 1920; species reported 27-30 June 1977, Anvik River, C. M. White; and reported summer 1981, Aniak River, B. A. Anderson). In spring casual farther north (e.g., one, 29-30

April 1983 and one on 16 May 1984, Galena, T. O. Osborne) and, in or north of the Alaska Range, farther east (e.g., one, c. 1 May 1966, Fairbanks, Creamer's Field, D. Hatler; one with Lesser Yellowlegs, 9 May 1981, Smith Lake, F. C. Dean; one on 13 June 1982, Denali NP, McKinley River and two pairs on 27 June 1982, McKinley Bar Trail, K. Laing and K. Kertell; one with Lesser Yellowlegs, 4 May and 10 May 1985, Fairbanks, Cushman flats, DDG and P. D. Martin+; one with Lesser Yellowlegs, 6 May 2004, Fairbanks, L. H. DeCicco), and casual in late summer, in August (e.g., one, 11 August 1982, near Wonder Lake, and two, 13 August 1982, McKinley Bar Trail, KL and KK; juvenile [UAM specimen, examined], 25 August 1982, Fairbanks, Cushman flats, DDG and B. E. Lawhead; one juvenile, 27 August 1987, Fairbanks, Cushman flats, DDG and PDM; one juvenile, 7-8 August 1989, Fairbanks, PDM, DDG, and A. Kondratiev; one, 4 August 2005, Fairbanks, Cushman flats, LHD),

Alaska nesting range of the Greater Yellowlegs lies almost entirely south of the Alaska Range, in southwestern, south-central, and southeastern Alaska (see Elphick and Tibbitts 1998, Heinl and Piston 2009). Nesting habitat: Breeds throughout boreal zone, in muskeg, wet bogs with small wooded islands, and forests (usually coniferous) with abundant clearings. Areas characterized by wet, hummocky ground, covered with mosses, lichens, and sedges and interspersed with slightly higher and drier areas of low shrubs; breeding areas generally have many small ponds or lakes, sometimes sloughs and scattered tall trees used as perches (Elphick and Tibbitts 1998).

► *Tringa flavipes* (Gmelin, 1789). Lesser Yellowlegs. Monotypic. Common migrant and breeder throughout the Interior. Arrived in spring from late April to mid-May (e.g., at Fairbanks in 1980 first one on 26 April at Smith Lake, J. R. Rose and C. Linkswiler, total four on 27 April, DDG and R. H. Day, totals of 20 and 30 birds on 28 April, P. G. Mickelson, M. Robus,

and total 32 on 30 April, DDG and S. O. MacDonald; one, 27 April 1978, Fairbanks, Smith Lake, DDG, B. E. Lawhead, and R. H. Meehan; two flocks of eight, 29 April 1982, Fairbanks, Smith Lake and Creamer's Field, DDG+, R. B. Weeden, peak of 150 on 10 May 1982, Fairbanks airport, R. J. Ritchie; two on 29 April 1984 and flock of 115 on 11 May 1984, Galena, T. O. Osborne; one, 1 May 1981, Ester, SOM; flock of nine on 2 May 1984, Fairbanks, DDG and R. S. Hadley; total 100+ on 3 May 1985, Fairbanks airport, DDG, B. A. Cooper, and RSH, followed by total 400+, including flock of 185+, 4 May 1985, Fairbanks airport, DDG and P. D. Martin; 20 birds, 8 May 1983, Moose Creek, A. M. Springer; earliest at Anaktuvuk Pass on 15 May 1949, 16 May 1950 and 1952, 18 May 1951, and 23 May 1953—all Irving 1960). Courting birds on 18 May 1979 at Firth River/Mancha Creek (Spindler et al. 1980). One bird on 20 May 1978, Denali NP, Horseshoe Lake (K. Kertell).

Nesting habitat: Common breeder in boreal forest (generally open forest) and forest/tundra transition habitats. (Where sympatric with Greater Yellowlegs often nests in drier, more vegetated habitats, but occasionally found nesting within tens of meters of Greater in wet bogs and open muskegs.) Breeders move between nesting and foraging areas daily, sometimes traveling up to several kilometers one way. Typical nesting areas contain a combination of shallow wetlands, trees or shrubs, and open areas. Habitat at nesting areas has been described as open or semiopen forest (coniferous or deciduous) interspersed with marshes, bogs, ponds, lakes, and sedge meadows; burned-over barrens littered with fallen trees and adjacent to muskegs; bogs or fens dotted with small (about 30 × 30 m) wooded islands; grass meadows with patches of tall second-growth shrubs; and damp tussock-heath tundra adjacent to bogs (Tibbitts and Moskoff 1999 and citations therein). Open black spruce-sphagnum bogs up to 150 m from open water, in

dense brush, alder and willow, and seral birch habitats dotted with water-filled polygon troughs (Spindler 1976).

Examples of nesting phenology include nest/4 eggs found 7 June and first independent young on 2 July, Firth River/Mancha Creek (Spindler et al. 1980); nest/4 eggs on 10 June 1975, another nest/4 eggs on 13th, upper Sheenjek River (C. G. Batten); nest/4 eggs found 13 June, Anaktuvuk (Irving 1960); nest/4 eggs on 13 June 1996, Yukon Flats NWR at Canvasback Lake, 53 km southwest of Fort Yukon (K. M. Sowl); nest/4 eggs, 13 June 1997, Yukon Flats NWR (M. Maxwell); nest/3 eggs, 20 June 1956, not-quite-flight-capable young 27 July 1956, and fully-feathered young on 2 August 1956—Sheenjek River valley (Kessel and Schaller 1960); defensive pair, 23 June 1912, Lake Minchumina (Dice 1920); nest/4 eggs, 2 July 1977, Denali NP, Big Creek (KK); flight-capable young on 17 July 1962, Tetlin (Yocom 1963a). Probably nesting Aniak River, where recorded first half of July 1982 (B. A. Anderson); and at Anvik River, where about two pairs seen during 27-30 June 1977 (C. M. White).

Fall movement began in early August and lasted to mid-September, as, over a period of weeks, every last Lesser Yellowlegs departed the Interior, e.g., 10 birds present 1-2 August 1979, Ray Mountains.(Matthews 1980); hundreds of juveniles, 3-10 August 1962, Fort Yukon area, Ohtig Lake, few remained by 15 August, last on 19 August at Tiinkdhul Lake (all Yocom 1964); 50+, most juveniles, 3 August 1982, Fairbanks, Cushman flats (DDG); 40+ juveniles, 3 August 1985, Cushman flats (DDG+); flock of eight, 10 September 1982, Cushman flats (DDG); species common on 15 September 1973, Minto Lakes (J. C. Bartonek); one on 16 September 1972, Fairbanks (T. T. Wetmore). Latest: one juvenile, 27 September 1986, Cushman flats (DDG); and one juvenile, 28 September 1985, Fairbanks, Peger Road (DDG and RHD).

► *Bartramia longicauda* (Bechstein, 1812). Upland Sandpiper. Monotypic. Uncommon or fairly common migrant and breeder. Usually arrived in interior Alaska in mid-May (e.g., one, 8 May 1980, Delta Junction, S. O. MacDonald; at Fairbanks and vicinity one on 12 May 1957 and one on 13 May 1962, Kessel and Springer 1966; two on 13 May 1985, A. Weaver, P. D. Martin and R. S. Hadley; five on 15 May 1955, one on 17 May 1954, and three on 17 May 1965, *ibid.*; flock of nine, 18 May 1974, B. Kessel; one on 20 May 1982, C. Moitoret and PDM; one on 21 May 1953, BK; five on 22 May 1982, R. B. Weeden; two on 25 May 1952 and one on 30 May 1964, both BK; and three migrants with 23 Buff-breasted Sandpipers *Tryngites subruficollis*, 28 May 1969, DDG and G. E. Hall). Elsewhere, arrived at Eagle Summit on 17 May 1961 and 24 May 1960 (RBW); earliest at Fort Yukon on 13 May 1963, 15 May 1962, and 19 May 1964 (*ibid.*); one on 21 May 1974, Denali NP, Igloo Creek (R. A. Hudson and M. A. Archie); and a specimen [not examined] was collected at Anaktuvuk Pass on 24 May 1949 (Irving 1960). Species arrived on the upper Toklat River, Alaska Range, on 28 May 1908 (Sheldon 1909).

Nesting habitat: Elsewhere a grassland species (Houston and Bowen 2001). In Alaska uses fairly well drained, sloping tussock-heath tundra with a few scattered spruces on which to perch; dwarf shrub–tussock-graminoid meadow near treeline where scattered tall shrubs or trees extended into tundra meadows (Kessel and Schaller 1960); not found in tundra meadows very far from treeline or from this treeline shrub community (Matthews 1980). In Sheenjek River valley at elevations from 731 m to 1036 m (1975, C. G. Batten). Nests, young, and/or territorial and defensive behavior observed in Brooks Range and foothills, e.g., probably Porcupine River (Ritchie and Ambrose 1992), upper reaches of Sheenjek River (Kessel and Schaller 1960; D. McCargo, C. G. Batten), Junjik River (E. Witt), upper Middle Fork Koyukuk River (DDG and

BK), John River (Campbell 1967), Unakserak River (G. and V. Staender), upper Alatna and Kutuk rivers (H. E. Kingery), upper Noatak River (Kessel and Springer 1966, Campbell 1967); in the Tanana-Yukon highlands, e.g., Yukon-Charley Rivers NP (Moldenhauer 1982), Ray Mountains (Matthews 1980), upper Kanuti River (DDG); and in the Alaska Range and foothills, e.g., nest/2 eggs, 2 June 1961, Delta "Dry Bar" [63°45'N 146°50'W, elevation 487 m]; probably nested at Donnelly Dome, where a male in breeding condition was collected 20 May 1952, defensive adult seen 8 July 1961, female in breeding condition was collected on 24 May 1962, two pairs on territories summer 1964 (all Kessel and Springer 1966); pair present all summer 1960, Eagle Summit (RBW).

Nesting phenology included one bird on 8 June 1974 in Denali NP, near Toklat ranger station (RAH and MAA); nesting pair on 9 June 1978 at Camp Denali (at 457 m, R. H. Armstrong); a defensive bird on 17 June 1993, Tetlin NWR, was first suggestion of nesting on the refuge (T. J. Doyle); breeding pairs on 18-19 June 1994 at Gold Hill, Nutzotin Mountains, and on 23-24 June and 15-16 July 1994 on Tetlin NWR, upper Cheslina River (TJD+); nesting pair on 20 June 1978, Donnelly Dome (RHA); in Denali NP six probably breeding birds on 24 June 1982, West Branch, Toklat River, nest/3 eggs, 28 June 1982, Calico Creek, and six probably breeding birds on 2 July 1982, East Branch, Toklat River (all K. Laing and K. Kertell); nest/4 eggs on 30 June 1956, above Last Lake, Sheenjek River (Kessel and Schaller 1960); two pairs each with three young on 4 July 1979, Ray Mountains (Matthews 1980); defensive pair on 5 July 1978 on ridgetop above Teklanika River (KK); common breeder on 6 July 1980 near Sukakpak Mountain, where two pairs in distraction displays and four other pairs in the area (D. R. Herter and J. S. Hawkings; and a downy (UAM specimen, examined) was collected on 17 July 1980 in a small-mammal trap near Healy, at the head of Gold Run (C. Elliot).

Postbreeding movements began as early as late July. In Yukon-Charley Rivers NP one bird was seen 2 July 1982 in fellfield near American Summit, and on 8 July two Upland Sandpipers were observed just above timber east of Flume Creek (Moldenhauer 1982). There were few late-summer or fall records, e.g., two on 8 August 1975 west of Lobo Lake, Sheenjek River, and another on 9th (C. G. Batten); one on 6 August 1963 at Eagle Creek below Eagle Summit (RBW); most birds had left Ray Mountains by 1 August 1979, but two were seen on 2 August 1979 near streams in valleybottoms (Matthews 1980). Latest were one bird seen 25 August 1960 at North Pole (H. K. Springer), one on 27 August 1952 at Eagle Summit (BK), and one on 1 September 1979 at Eagle Creek below Eagle Summit (RBW).

► *Numenius phaeopus* (Linnaeus, 1758). Whimbrel. Subspecies is *hudsonicus* Latham, 1790—or *rufiventris* Vigors, 1829 (see Engelmoer and Roselaar 1998, Dickinson 2003). Uncommon migrant and breeder. Arrived in the Interior usually in second and third weeks of May (e.g., at Fairbanks flock of seven on 6 May 1983, T. H. Pogson, and total 17 on 7 May 1983, P. D. Martin+—all Cushman flats; arrived 6 May 2008, Kanuti Lake, C. M. Harwood; 18 on 10 May 1979, Delta Junction, B. E. Lawhead and R. H. Day; flock of c. 50 on 11 May 1927, Denali NP, Wonder Lake, Dixon 1938; specimen [not examined], 12 May 1866, Nulato, fide Gabrielson and Lincoln 1959; two on 12 May 1980, Fairbanks Experimental Farm, DDG and S. O. MacDonald; five on 12 May 1984 at Moose Creek, Fairbanks, D. G. Roseneau and W. R. Tilton; on 13 May 1978 one at Delta Junction, BEL+, and one in flight at Denali NP, S. Misik and S. Ellison; 24 on 13 May 1984, Galena, T. O. Osborne; flock of 12 on 14 May 1982, Fairbanks, Experimental Farm, M. Robus and D. Haynes; earliest arrival dates at Anaktuvuk Pass, where species was a through-migrant, were 14 May 1953, 19 May 1951, 20 May 1949, 23 May 1950, 26 May 1952, and 31 May 1954—all Irving 1960). Earliest arrival in Alaska Range

was 16 May 1908, upper Toklat River (Sheldon 1909). Late spring migrants included one on 5 June 1956 in upper Sheenjek River valley (Kessel and Schaller 1960) and two on 14 June 1974 at Fairbanks airport (DDG+).

Nesting habitat: Subarctic and alpine tundra and taiga, variable, ranging from dry heath uplands to poorly drained hummocky, grass-sedge, dwarf shrub, and mossy lowlands; nested [in Manitoba] in wet, hummocky taiga bogs characterized by numerous dry lichen *Cladonia*- and heath-topped hummocks and mounds (usually 30–75 cm high); sparsely scattered, stunted black spruce *Picea mariana* and tamarack *Larix laricina*; and abundant dwarf shrubs (e.g., dwarf birch *Betula glandulosa* and Lapland rosebay *Rhododendron lapponicum*); also nested in low-lying wet, flat sedge *Carex* tundra with widely distributed shrubs and small hummocks (usually 10–20 cm high); and in upland dry flat heath tundra characterized by dense, prostrate lichen associations (Skeel and Mallory 1996 and citations therein).

Nesting phenology included Whimbrels at all points of a 20-count point (>500m between points) circuit of the nearest 5-km² patch of tundra south/southeast of Kanuti Lake on 19 May 2008 (CMH); defensive adults as early as 2 June 1979, Firth River/Mancha Creek (Spindler et al. 1980); two nests/4 eggs on 4 June 1957, Old Crow Mountains (L. J. Peyton and S. B. Peyton in Irving 1960); nest/4 eggs on 5 June 1978, Denali NP (K. Kertell); “three breeding pairs,” 16 June 1926, Denali NP, on the divide between Sanctuary and Savage rivers (Dixon 1938:73); nest/4 eggs on 17 June 1981, Denali NP, Little Stony Creek flats (N. S. Proctor); defensive pair/2 downies on 30 June 1979 in Ray Mountains on ridge north of the Kanuti Kilolitna River, and a fledgling the same day near Torment Creek; defensive pairs encountered through July (Matthews 1980); several defensive pairs 23-24 June 1994 and again 15-16 July in upper Cheslina River (T. J. Doyle and R. J. Means); and species recorded there 27-29 June 1995 (TJD); adult with

three downies on 13 July 1926, Denali NP, Muldrow Glacier near Copper Mountain (Dixon 1938). Nesting density in Ray Mountains, where locally common in dwarf shrub-tussock-graminoid meadows, c. 1 pr/100 m²; four pairs in one area near Torment Creek and three pairs in another area (Matthews 1980). Elsewhere, in western Alaska, earliest nest was 18 May, peak nest initiation in second half of May; peak hatching in second half of June, latest 6 July (all B. J. McCaffery *in* Skeel and Mallory 1996).

Vanishingly little information on postbreeding activity in the Interior, and most Whimbrels probably move directly from nesting habitat to the seacoast in western, southwestern, or south-central Alaska. In Ray Mountains the last bird was seen on 12 August 1979 (Matthews 1980); at Anaktuvuk Pass, where the species did not nest and fall migrants were rare, one bird was reported on 19 August 1950 (Irving 1960). In Interior lowlands the species was unusual in fall; latest record was one bird on 17 September 1979 at Fairbanks (R. B. Weeden).

► *Limosa haemastica* (Linnaeus, 1758). Hudsonian Godwit. Monotypic. Uncommon spring migrant and local breeder in the Interior. A spring migrant at Fairbanks on 23-24 May 1961 provided the first Interior record (Kessel and Springer 1966). Thereafter, Hudsonian Godwits were recorded annually over the last four decades of the 20th century, when earliest migrants usually arrived on a broad front in the Interior, and in immediately adjacent areas of western Alaska, in first half of May (e.g., earliest on 2 May 1995 and 2 May 1997, Bethel, McCaffery and Harwood 2000; one on 4 May 1985 followed by six+ on 10 May 1985, Fairbanks, DDG and P. D. Martin; three—a pair and a second male, 5 May 1986, near Saint Marys, lower Andreafsky River, *ibid.*; one, 7 May 1983, Fairbanks, B. A. Anderson; arrived 8 May 2008, Kanuti Lake, C. M. Harwood; one, 9 May 1976, Fairbanks, B. Kessel; male on 9 May 2000 and at least three birds on 11 May 2000 [four UAM specimens, examined],

Fairbanks, Cushman flats, T. M. Braile; one, 10 May 1982, Fairbanks, D. and A. Ronsse; seven on 10 May 1984 followed by 13 on 12 May 1984, Galena, T. O. Osborne; adult males, 10 May 1992 and 10 May 2004 [two UAM specimens, examined], Fairbanks, Cushman flats, R. W. Dickerman and J. M. Maley, respectively; at least three on 11 May and two on 12 May 1972, Fairbanks, J. H. Lee; total three on 12 May 1984, followed by total seven on 13 May and another two on 14 May 1984—all Fairbanks, DDG+; one, 13-16 May 1986, Denali NP at Horseshoe Lake, W. P. Dunn; one, 13 May 2001, Fairbanks, JMM; flocks of two and eight on 16 May 1991, in flight west over Bethel, McCaffery and Harwood 2000; one, 18 May 1977, Fairbanks, P. Wille), but movement continued well into late May (e.g., one, 22 May 1978, Fairbanks, BK; one, 23-24 May 1961, Fort Wainwright, H. K. Springer; two, 23 May 1973, and another on 27 May 1973, Fairbanks, DDG; up to five, 25-26 May 1977, Fairbanks airport, R. A. Erickson, J. P. Myers, and L. Stenzel; one, 26 May 1978, Fairbanks airport, DDG, T. G. Tobish Jr., and D. M. Troy; one, 30 May 1983, Galena, TOO) and sometimes into early June (Latest at Fairbanks: one, 5 June 1974, R. A. MacIntosh and T. T. Wetmore; and one, until 12 June 1972, Fairbanks, TTW).

“Compared to many other shorebirds, the biology of this godwit is poorly known. Indeed, known breeding areas account for only a small proportion of the estimated world population, and much of the breeding range clearly remains to be described. Those breeding areas that are known are disjunct” (Elphick and Klima 2002). Nesting habitat: Sedge meadows and muskeg at timberline, most near major river systems or coastal mudflats (south-central Alaska, see Williamson and Smith 1964; western Alaska, see McCaffery and Harwood 2000). Disjunct nesting and probable nesting areas not at all well known in the Interior, but include Kanuti River (defensive pair, 23 June 1998, and six defensive birds, 22 June 2007—D. Yokel)

and Kanuti Lake (recorded on 19 May 2008 on six points of a 20-count point [>500 m between points] circuit of the nearest 5-km² patch of tundra south/southeast of Kanuti Lake, CMH), the Koyukuk River floodplain between Galena and Huslia (M. A. Spindler *in* Elphick and Klima 2002), Iditarod River (ad female [UAM specimen examined], 24 June 1951, Iditarod Flats, C. J. Lensink); upper Yukon River (one, 11 July 1966, near Circle, White and Haugh 1969); Anvik River (one, during period 27-30 June 1977, lower Anvik River, C. M. White). Nested in western Alaska immediately adjacent to the Interior—in Andreafsky Wilderness and Yukon-Kuskokwim Delta (McCaffery and Harwood 2000)—and recorded in breeding season in other areas east of Kotzebue Sound and Norton Sound (and beyond the Interior), e.g., Selawik NWR and Kotzebue area (Elphick and Klima 2002), possibly also on Seward Peninsula and south shore of Norton Sound (Kessel and Gibson 1978, Kessel 1989). Seasonally earliest breeding activity in the Bethel area was 20 May in both 1992 and 1998, when a male performed aerial advertisement displays and a pair performed courtship chases, respectively (McCaffery and Harwood 2000). In south-central Alaska “eggs laid by mid-May” (C. S. Elphick *in* Elphick and Klima 2002). Other examples of nesting phenology included a male and three recently-fledged juveniles, 15 July 1994, Andreafsky Wilderness (McCaffery and Harwood 2000).

This species moved from nesting areas to the coast in late July-early August (e.g., flock of 100 on 9 August 1966, Y-K Delta, and total 106 birds on 11 August 1967, Anchorage—both Kessel and Gibson 1978; 150-200 on 14 August 1998, near Aropuk Lake, Y-K Delta, McCaffery and Harwood 2000) and departs in August (latest records in four areas of the Y-K Delta were 26 July, 10 August, 17 August, and 29 August—*ibid.*). Accordingly, there were few records of postbreeding-season birds within the Interior (e.g., juvenile male [UAM specimen, examined],

1 August 1957, c. 112 km northeast of Fort Yukon, L. J. Rowinski; one juvenile, 7 August 1986, with three Lesser Yellowlegs, Fairbanks, Cushman flats, DDG).

► *Aphriza virgata* (Gmelin, 1789). Surfbird. Monotypic (type locality Prince William Sound). Endemic to Alaska and Yukon Territory. Uncommon breeder in alpine tundra in the Alaska Range and the Tanana-Yukon highlands (Kessel and Gibson 1978), in the eastern Brooks Range (Senner and McCaffery 1997), and in central and southwestern Yukon Territory (Alexander et al. 2003, Nouvet et al. 2008). (Also in western, southwestern, and south-central Alaska—see Kessel and Gibson 1978, Kessel 1989, Petersen et al. 1991, Senner and McCaffery 1997.) Arrived on breeding grounds directly from seacoast in mid-May (e.g., arrived 15 May 1962, Eagle Summit, R. B. Weeden; earliest 15 May 1979, central Yukon Territory, Alexander et al. 2003; earliest 16 May 1977, in Ogilvie Mountains, YT, at 64°48'N 138°10'W, Frisch 1978; four, 19 May 1977, Eagle Summit, RBW). Very seldom recorded in Interior lowlands (e.g., one, 2 June 1969, Fairbanks, gravel parking lot/street edge, DDG; one, 28 May 1978, Fairbanks, R. E. Ambrose and R. J. Ritchie; two, 22 May 1995, 10 km west of Tok, J. Williams fide T. J. Doyle).

Nesting habitat: Areas of dry, frequently stony, alpine tundra, characterized by lichens, dwarf shrubs, mountain avens *Dryas*, and scree or rock fields (see Frisch 1978, Kessel 1989, Petersen et al. 1991, Senner and McCaffery 1997). Less commonly, moss or sedge were a habitat component (Murie 1924, Frisch 1978, Senner and McCaffery 1997). At most sites Surfbirds were located at summits and on upper slopes of steep ridges (Senner and McCaffery 1997). Young were first described for science in 1921—when a pair and one downy were found on 13 July in the Tanana-Yukon highlands at McKinley Creek, Fortymile River (at 64°15'N 143°W), by O. J. Murie (1924)—and the first nest and eggs were discovered in 1926, when an

incubating adult at nest/4 eggs was found on 28 May on a rocky ridge “1000 feet above timberline” in the Alaska Range in Denali NP by G. M. Wright (*in* Dixon 1927).

Examples of nesting phenology include nest/4 eggs, 28 May 1926, in Denali NP (above); two birds on 30 May 1978, Denali NP, Primrose Ridge (D. Haynes); incubating bird, 4 June 1974, Kilbuck Mountains above Nyac (Petersen et al. 1991); adult flushed from nest/4 eggs, 11 June 1953, Mastodon Dome, at elev. 1220 m (R. O. Skoog); adult photographed on nest, 13 June 1978, Denali NP (R. H. Armstrong photo published Kessel and Gibson 1978, facing page 46); distraction display, 14 June 1970, Flood Creek, Richardson Highway (P. Vlasak); four young hatched 14 June 1973 near Camp Denali (L. Goldstein); adult at nest/one chick, 18 June 1962, at elev. 1066 m east of Eagle Creek camp (R. B. Weeden); defensive pair c. 20 June 1983, at 914 m near Crooked Creek, Horn Mountains [at 61°45'N 158°30'W, in Kuskokwim Mountains] (T. R. Swem); probably nesting at Mount Fairplay, where one bird was seen 21 June 1995 (R. I. Frey), and at least three on 23 June 1996 (T. J. Doyle); adult male with a downy, 25 June 1952, at elev. 1220 m on Eagle Summit (Kessel 1960); adult/one young, 28 June 1978, Denali NP, upper Glacier Creek (K. Kertell+); adult/2 young [young almost adult-sized], 12 July 1977, Camp Denali (KK). An almost fully-feathered chick was found as late as 2 August 1962, Kilbuck Mountains (Petersen et al. 1991), and a lone bird judged a recent fledgling was seen 15 August 1921 in the hills between the upper Chena and Chatanika rivers (Murie 1924).

Surfbirds move from nesting grounds to seacoast without stopping, and there were few postbreeding records in the Interior (e.g., flock of 12—perhaps failed- or post-breeding adults?—4 July 1923, feeding on a high slope, head of Savage River, Alaska Range, Murie 1924; five birds on 2 July 1955 and two on 5 July 1955 in a small saddle at top of Victoria Mountain. [at 65°48'N 146°56'W], White Mountains, W. L. Libby *in* Kessel 1960). Latest record was one

Surfbird on 4 September 1985, northern foothills of Alaska Range, Gold King Creek (J. A. Curatolo).

► *Calidris pusilla* (Linnaeus, 1766). Semipalmated Sandpiper. Monotypic. Common migrant in eastern Interior and common breeder on coastal tundras of northern and western Alaska. Reported to breed in Brooks Range (Irving 1960) and in Ray Mountains (Matthews 1980). Earliest arrivals in the Interior usually in first half of May (e.g., one, 4 May 1977, Fairbanks, Smith Lake, T. G. Tobish, Jr.; two, 7 May 1980, Fairbanks airport, S. M. Murphy+; one, 8 May 1983, airport, L. Babb and S. Justice; six on 10 May 1984, Fairbanks, Cushman flats, DDG and B. A. Cooper; one on 11 May 1982, Cushman flats, B. E. Lawhead, D. and A. Ronsse), followed often, in third and fourth weeks of May, by flocks of migrants in courtship (e.g., 40+ on 19 May 1983, BEL, R. H. Day, SMM, and six in courtship on 21 May 1983, T. H. Pogson+—all Fairbanks, Cushman flats; 36+ courting birds, 24 May 1982, Cushman flats, DDG; 15 on 24 May 1984, Cushman flats, DDG; up to 40+ on 25-26 May 1978 at Fairbanks airport, DDG, TGT, and R. S. Hadley+; 125+, many courting, 26 May 1986, Fairbanks, Cushman flats, DDG), a few birds still moving through in early June (e.g., up to four, 6-10 June 1979, Fairbanks airport, DDG; one, 12 June 1995, Scottie Creek, T. J. Doyle).

Nesting habitat: Low and subarctic tundra, near water. Found nesting in river deltas in dry shrubby areas of *Salix brachycarpa* or *Betula glandulosa* and mixed sedges and grasses; variably drained upland tundra with low vegetation near small ponds, lakes, and streams; moist or wet sedge-grass or heath tundra; sandy areas along rivers; and pond-dotted sand dunes (Hicklin and Gratto-Trevor 2010 and citations therein). Reporting this species to be the most common sandpiper at Anaktuvuk—while noting that “easy confusion with least sandpipers” masked its “early May” arrival dates—Irving (1960:74-75) described aerial songs in early June,

reported nests with 4 fresh eggs on 12 June and 18 June 1949, collected downy young on 26-27 June, and collected 41 adult specimens, 20 May-24 July. Adults with two downies were reported on 9 July 1979 in the Ray Mountains [where Baird's Sandpiper was not reported] (Matthews 1980). These constitute the only references to nesting in this region.

Southbound, departing adults were recorded in the Interior as early as end June, followed by juveniles in July and August (e.g., one adult with 18 Least Sandpipers, 30 June 1993, Tok gravel pit; TJD; one adult and one juvenile [UAM specimens, examined], 8 July 1988, Twelvemile Summit, R. W. Dickerman; two adults, 14 July 1987, Fairbanks, Lathrop flats, DDG; three with four Least Sandpipers, 18 July 1993, Northway, TJD; one bird, 20 July 1995, Tok gravel pit, TJD; two adults and three juveniles on 24 July 1989, Fairbanks, Cushman flats, DDG; two adults and two juveniles on 26 July 1985 and 25+ juveniles on 3 August 1985, Cushman and Peger flats, DDG+; up to five juveniles, 30-31 July 1988, Cushman flats, DDG and J. Jolis; one adult on 3 August 1982, Cushman flats, DDG; one juvenile, 30 August 1984, Cushman flats, B. A. Anderson).

► *Calidris minutilla* (Vieillot, 1819). Least Sandpiper. Monotypic. Common migrant and breeder. Arrived in spring in interior Alaska in first half of May (e.g., one, 1 May 1980, Fairbanks, L. Babb; three on 3 May 1977, then 15 on 4 May 1977, Smith Lake, T. G. Tobish, Jr.; two on 5 May 1984, Fairbanks, Cushman flats, 12+ there on 10 May 1984, 43 there on 11 May, and 12+ on 12 May 1984—all DDG+; one, 12 May 1982, Fairbanks, D. and A. Ronsse).

Nesting habitat: Low arctic and subarctic wet sedge, mossy and grassy bogs near or above treeline near water, and muddy areas; dry tussock-heath ridges above lakes; damp tussock-heath valley bottoms; moist sedge and *Sphagnum* bogs around fresh and brackish ponds and ditches near intertidal cobble and mudflats; flat sandy coastal islands with low vegetated sand

dunes and hummocky bogs around brackish lagoons; boggy fringe between coastal lakes and surrounding band of willow *Salix* (Nebel and Cooper 2008 and citations therein). Habitat features very similar across breeding range (ibid.). In Brooks Range in Sheenjek River valley the most numerous shorebird, nesting commonly in tussock-heath tundra of the valley floor (Kessel and Schaller 1960), where in 1956 constituted first known nesting records inland in Alaska (ibid.; and see Gabrielson and Lincoln 1959). Flock of eight as late as 14 June, but egg-laying on Sheenjek apparently under way by first of June, nesting substrate damp to medium damp portions of tussock-heath tundra (“where a footstep squeezed out no excess moisture” Kessel and Schaller 1960:40). Nest cup usually in a low moss hummock or *Eriophorum* tussock, various sedges in immediate vicinity of most nests found. Six nests in Lobo Lake area each contained 4 eggs on 5 June, 15 June, 16 June, 16 June, 20 June, and 23 June 1956. Species was also common around Last Lake, where apparently nested in similar habitat. Birds had begun to congregate by 25 July, when 10, many of them juveniles, frequented the lakeshores (all Kessel and Schaller 1960). Still the most numerous ‘peep’ there in 1975, when nesting in wide floodplain just south of upper base camp and near shores of Last Lake (C. G. Batten). Described as abundant breeder in wet and moist sedge meadows in alpine tundra or adjacent to forests and woodlands on Firth River-Mancha Creek, where first courtship flights on 23 May, regularly thereafter until 19 June; one nest/3 eggs on 8 June 1979 on a small sedge hummock 6-8 cm above a soggy moss pool and under sparse cover of a *Betula nana* bush; full clutch of four eggs by 14 June, nest vacant on 30 June; species probably nesting as far upstream as headwaters of North and West forks of Mancha, since defensive birds frequently observed there (Spindler et al. 1980). In Tanana-Yukon highlands a defensive, probably nesting adult [specimen not examined] was collected 10 July 1903 near Circle (Osgood 1909), and the species was reported

to be uncommon or common in Ray Mountains in 1979, when many defensive pairs were seen and a juvenile was seen 29 July in upper Torment Creek (Matthews 1980). In the Alaska Range nested in Denali NP in 1976 (Wonder Lake vicinity, K. Kertell) and a nest/4 eggs and a nest/3 eggs were both found 28 June 1982 near Wonder Lake (K. Laing and KK). Elsewhere, in adjacent areas, a fairly common probable breeder in south-central Alaska in upper Susitna River valley, where present 9 May (1981) to 25 July (1980) and aerial courtship prominent May-July (Kessel et al. 1982); common breeder on Dempster Highway, Yukon Territory (Frisch 1982).

Probably-departing adults were 18 Least Sandpipers, with one Semipalmated, in a gravel pit east of Tok as early as 30 June 1993; 14 Leasts and a Baird's Sandpiper on 14 July 1993 on Tetlin NWR; and four Leasts and three Semipalmateds on 18 July 1993 in Northway (all T. J. Doyle). Few fall records, e.g., 35+, most juveniles, 3 August 1985, Fairbanks, Cushman flats (DDG+); species no longer present 8-9 August 1979, Ray Mountains (Matthews 1980). Extremely late was one bird, 28 September 1985, Cushman flats (DDG and R. H. Day).

► *Calidris bairdii* (Coues, 1861). Baird's Sandpiper. Monotypic. Uncommon or fairly common spring migrant in interior Alaska. Breeds in Alaska Range, Tanana-Yukon highlands, and Brooks Range. Arrived in mid-May (e.g., two on 11 May 1980, Fort Wainwright, DDG, B. E. Lawhead, and S. M. Murphy; two, 12 May 1908, upper Toklat River, Sheldon 1909; in Fairbanks area in 1984 one bird on 12 May at Moose Creek, eight on 15 May at Cushman flats, 15 on 16 May at Cushman flats, and one there on 24 May 1984—DDG, K. M. Leuschner, P. D. Martin, and M. L. Ward+; one, 14 May 1985, Fairbanks, DDG and R. H. Day; at least two on 17 May 1977, Denali NP at Horseshoe Lake, K. Kertell; 45+ on 21 May 1971 along Northway access road, DDG+; six on 24 May 1982, Cushman flats, DDG; two on 26 May 1978, Fairbanks

airport, DDG, TGT and DMT). Arrivals at Anaktuvuk Pass, Brooks Range, on 12 May 1954; 13 May 1949, 1951, and 1953; 26 May 1952; and 29 May 1950 (Irving 1960).

In 1949, 200 birds were reported at Anaktuvuk Pass 16-17 May, but by 23 May only 8-10 about; “resident’ [= nesting] birds often resort to the higher and drier parts of the tundra, even to elevation 1400 ft [427 m] above the [Anaktuvuk] valley floor” (Irving 1960:71). On 6 June 1951 a nest in mountains west of Tuluak (= Tulugak) Creek, 427 m above valley floor (J. Krog); and young just hatching in another nest, on valley floor, 24 June 1951 (R. Paneak *in* Irving 1960). In Alaska Range, adult with three downies, 17 June 1981, Little Stony Creek flats, Denali NP (N. S. Proctor).

Nesting habitat: Dry coastal as well as upland, well-drained, exposed tundra, typically the first snow-free sites available for nesting. In Alaska: at Barrow, lake margins in first week in June, then upland tundra, on dry lichen tundra with patches of bare ground in highly polygonized microhabitats or beach ridges, inland along river bluffs, avoiding wet sedge meadows (Moskoff and Montgomerie 2002 and citations therein). In Alaska Range three in alpine tundra on Primrose Ridge, Denali NP, on 4 June 1978, and a couple on 9 June along upper Thorofare River (KK); nest/4 eggs, mid-June 1982, Stony Dome, DNP (K. Laing and KK); displaying pair on flats at ‘Burgh Lake’, Denali NP, on 23 June 1985 (R. J. Gordon); 6-8 birds present in a 0.8-1.6 km stretch of upper Glacier Creek tundra, Denali NP, 28-29 June 1978, and although single birds were very noisy, nest not seen (KK). In Tanana-Yukon highlands two at 1219 m, 13 July 1982, near headwaters of Alder Creek, Yukon-Charley NP (Moldenhauer 1982).

In Brooks Range breeds in relatively moist draws of the high alpine valleys of the Sheenjok River; about five, singly and in pairs, flushed from high alpine meadows (1372 m) on 14 and 15 June 1956, in an area where large snowdrifts still covered some of the ground, one

female had a well developed egg in oviduct; a single in first half of July in an alpine valley at 1067 m near Last Lake was reluctant to leave the area, but nest not seen; at the summit of the Brooks Range above Sheenjek River in mid-July over six birds, one of which gave the broken-wing act (Kessel and Schaller 1960). Common migrant in lower Firth River valley, common breeder in alpine tundra at headwaters of Mancha Creek (Spindler et al. 1980).

Southbound adults noted as early as mid-July in Interior lowlands (e.g., two on 14 July 1987, Fairbanks Lathrop flats, DDG; one with 14 Least Sandpipers, 14 July 1993, Tetlin NWR, T. J. Doyle), but little fall migration information (e.g., one juvenile, 30-31 July 1988, Fairbanks, DDG+; one juvenile, 4 August 1989, Fairbanks, Cushman flats, DDG and PDM; flock of four on 15 August 1899 at Circle, another on 21 August near Fort Yukon (Osgood and Bishop 1900).

► *Gallinago delicata* (Ord, 1825). Wilson's Snipe. Monotypic. "One of the most widely distributed birds in Alaska" (Gabrielson and Lincoln 1959:342). Common migrant and breeder throughout the Interior, where snipe arrived in late April-early May (e.g., one, 22 April 1978, Clearwater Lake, M. Sigman; one winnowing, 24 April 1988, Chena Hot Springs, M. Kopplin; one winnowing, 27 April 1980, Fairbanks, Goldstream Valley, R. H. Meehan and D. P. Pengilly; one, 28 April 1984, Fairbanks, Univ. Alaska campus, K. M. Leuschner; flock of five in flight, 30 April 1975, Fairbanks, Creamer's Field, DDG and J. Jolis; one, 30 April 1978, Fairbanks, R. J. Ritchie; one, 1 May 1981, Fairbanks, Smith Lake, J. S. Hawkings and P. D. Martin; two, 2 May 1987, Fairbanks, Cushman flats, J. F. Kelly; two, 3 May 1985, Creamer's Field, DDG; one, 4 May 1972, Fairbanks, DDG; one winnowing, 5 May 1973, Fairbanks, DDG+; one, 6 May 1984, Galena, T. O. Osborne; single winnowing birds, 8 May 1983, Goldstream Valley and Moose Creek, T. H. Pogson, A. M. Springer).

Nesting habitat: *Eriophorum* tussock meadows, *Carex* marshes, and near flooded polygon troughs in seral birch and tall shrub habitats; nests located a few cm above the waterline on grass hummocks in open and mature shrub habitats (Spindler 1976). Breeds in sedge bogs, fens, willow *Salix* and alder *Alnus* swamps, and marshy edges of ponds, rivers, and brooks; requires soft organic soil rich in food organisms just below surface, with clumps of vegetation offering both cover and good view of approaching predators; avoids marshes with tall, dense vegetation, e.g., cattails *Typha*, reeds *Phragmites*, etc. (Tuck 1972, Mueller 1999). Nests/eggs known throughout the Interior (e.g., McGrath, Innoko River, Iditarod River, Anaktuvuk, Denali NP, Circle, Fort Yukon—all Gabrielson and Lincoln 1959). Examples of nesting phenology include nest/4 eggs, 7 June 1957, Old Crow, Yukon Territory (Irving 1960); nest/3 eggs, 10 June 1995, full clutch of 4 eggs on 12 June, Fort Yukon, Canvasback Lake (K. M. Sowl); nest/4 eggs, 16 June 1951, Minto Lakes (D. C. Hooper).

Summer presence widely remarked (e.g., species heard through June, in small numbers throughout Sheenjek River valley lowlands, Kessel and Schaller 1960; undoubtedly bred Tetlin area in 1962 (Yocom 1963a); seen as late as 2 September at Fort Yukon (Yocom 1964); earliest at Anaktuvuk on 14 May 1953, 15 May 1950, 16 May 1951, 19 May 1952, and 25 May 1954, no nests found but species thought to breed there (Irving 1960); common and widespread in 1966 and 1968 along the upper Yukon River, where winnowing had all but ceased by 5 July, and heard only occasionally until at least 1 August (White and Haugh 1969); probably nesting Denali NP, where appeared to be one of the most common nesting shorebirds, 1977 (K. Kertell); a characteristic background sound, but no nests actually seen Firth River-Mancha Creek (Spindler et al. 1980).

Wilson's Snipe was the tenth most numerous species (of 10 ranked; followed waterthrush, Bank Swallow, Yellow Warbler, Fox Sparrow, Gray-cheeked and Varied thrushes, Blackpoll and Yellow-rumped warblers, redpoll sp.) – 0.47 birds/stop – and ninth most widespread species (after waterthrush, Fox Sparrow, Yellow Warbler, Gray-cheeked Thrush, Blackpoll Warbler, Varied Thrush, redpoll sp., Yellow-rumped Warbler) – 41% of stops – detected 10-27 June 2002 on Lower Yukon River BBS (Anvik to Emmonak), C. M. Harwood+.

Fall departures less obvious than spring arrivals (when announced by winnowing males), but most snipe gone by end September (e.g., one, 27 September 1975, Fairbanks, DDG, R. S. Greenberg, and C. M. Boise; two, 29 September 1968, Fairbanks, DDG and R. S. Hadley; eight+ on 30 September 1972, Fairbanks airport, DDG). Latest records were one, 16 October 1987, Dry Lake at Mile 1376 Alaska Highway, east of Dot Lake (M. W. Britten); and one, 28 October 1982, Healy (D. R. Schmidt).

► *Phalaropus tricolor* (Vieillot, 1819). Wilson's Phalarope. Monotypic. First two Alaska records in 1962 (Kessel and Springer 1966, Pitelka 1974, Kessel and Gibson 1994). Although this species was not recorded in adjacent Yukon Territory until 1976, behavior suggesting nesting took place there in 1977 (Am. Birds 31:1161, 1977), the Yukon's first nest/eggs were discovered in 1978 (Am. Birds 32:1185, 1978), and the species has been an annual, local breeder in YT ever since (Alexander et al. 2003).

In eastern interior Alaska intermittent from third week of May to early June, recorded first in 1962 (female, 20 May, Columbia Creek flats, Taylor Highway, Kessel and Springer 1966) and erratically thereafter as far west as Fairbanks (e.g., one, 18 May 1976, Fairbanks, C. D. Allen; pair, 3 June 1979, Delta Junction, S. O. MacDonald, and another pair, also 3 June 1979, Fairbanks, Goldstream Valley, R. Morgan; pair, 30 May 1990, Fairbanks, P. D. Martin;

male, 4 June 1991, Fairbanks, B. Kessel; two, 23 May 2002, Fairbanks, J. Gilbert; flock of three [two females and one male], 1-4 June 2004, Fairbanks airport, N. R. Hajdukovich and L. H. DeCicco+; two females, 21-22 May 2008, Fairbanks, NRH, J. DeWitt+; two, 29 May 2008, Healy, C. L. McIntyre). First suggestion of nesting in Interior was a juvenile [UAM specimen, examined] with six juvenile Lesser Yellowlegs and two Least Sandpipers, 24 July 1985, Fairbanks, Peger Road ditch (DDG). An adult male observed on Yukon Flats NWR at Canvasback Lake (66°23'N 146°23'W) on 26 July 1998 (K. M. Sowl and P. Charland) antedated the first certain Alaska breeding record, a nest/3 eggs found there on 22 June 2001 (Erwin et al. 2004). That nest contained 4 eggs on 2 July, and on 11 July it was empty, and the food-carrying male was seen in the vicinity (ibid.).

Nesting habitat: Wetlands of interior North America—sparse to dense vegetation of uplands (e.g., *Poa*) and marshes (e.g., *Juncus balticus*, *Triglochin maritima*), roadside ditches (*Hordeum jubatum*) (Colwell and Jehl 1994 and citations therein). Only Alaska nest known to date on a small grassy island surrounded by reeds *Sparganium* (Erwin et al. 2004).

► *Phalaropus lobatus* (Linnaeus, 1758). Red-necked Phalarope. Monotypic. At beginning of 21st century a widespread uncommon migrant and breeder. Arrived in Interior lowlands usually in early May (e.g., one, 27 April 1978, Goldstream Valley, W. Knowles; one, 28 April 1989, Fairbanks, Creamer's Field, P. Bruce; one, 29 April 1980, Fairbanks, L Babb; one, 1 May 1981, Fairbanks, Creamer's Field, J. Stelmock and D. R. Herter; two, 1 May 1982, Fairbanks, P. D. Martin+ and 25 on 9 May 1982 at Smith Lake, DRH; two, 2 May 1986, Eielson AFB, J. F. Kelly; two on 3 May 1977, Smith Lake, T. G. Tobish, Jr.; one female, 4 May 1968, Fairbanks, DDG; two birds, 4 May 1979, Smith Lake, B. E. Lawhead and D. P. Pengilly; six on 5 May 1984, Fairbanks, Cushman flats, DDG and R. S. Hadley; three on 6 May 1973, Fairbanks,

DDG; three, 6 May 1984, Galena, T. O. Osborne; two, 13 May 1983, Smith Lake, PDM and B. A. Cooper). In the Brooks Range at Anaktuvuk (Irving 1960) earliest birds were recorded on 18 May 1951 and 1952, 19 May 1953, 24 May 1950, 30 May 1949 (40 birds), and 1 June 1954; in the Alaska Range at Denali NP three on 25 May 1977 (K. Kertell).

Nesting habitat: Circumpolar in low arctic and subarctic tundra or tundra/forest transition vegetation near freshwater lakes, pools, bogs, and marshes and amid or near small streams; also on marine or riverine islands if fresh water available (Rubega et al. 2000 and citations therein). Nests placed on mounds or mossy tussocks near water's edge, typically in vegetation types containing sedges (e.g., on Copper River Delta, majority of nests on moss hummocks with grasses Gramineae, sedges Cyperaceae, forbs, and sparse shrubs sometimes concealed in clumps of sedges or grasses or under other low vegetation; on heath-covered slopes above willow/alder shrub zones on Yukon-Kuskokwim Delta; plots with Red-necked Phalarope nests at Prudhoe Bay were characterized by high occurrence of water, low relief, and high percentage graminoid/low percentage shrub cover—*ibid.*, and see Murphy 1981). At Cape Espenberg <25 cm from shallow pond or standing water, <10 cm above water (D. Schamel, D. M. Troy *in* Rubega et al. 2000). Concealment by vegetative canopy 15–95% (*ibid.*).

Nesting phenology better known in northern, western, and southwestern Alaska than in Interior (see Gabrielson and Lincoln 1959 and citations therein). Interior examples include first nest in 1951 found 8 June and two nests/4 fresh eggs collected 22 June 1949 (Irving 1960); male on nest/4 eggs, 20 June 1978, Fairbanks, Smith Lake (L. J. Peyton); nest/4 eggs, 27 June 1982, Denali NP, near Wonder Lake (K. Laing and K. Kertell); common in lower Sheenjek River valley in many shallow ponds bordered by sedge/grass marsh; 23 birds, mostly in twos or threes, counted in vicinity of Lobo Lake in first week of June 1956, and a flock of 18 apparently-paired

birds on one pond on 8 June; copulation on 10 June; no nests or young, but the species was undoubtedly a common breeder (all Kessel and Schaller 1960); a number on 7 June 1978 at Wonder Lake, Denali NP; several kettle ponds had three or four phalaropes each, and up to 15 were at a small pond next to the Wonder Lake ranger station; species was present throughout the summer of 1977, but no nesting records (KK); earliest a pair on 4 June 1979 at Firth River-Mancha Creek, where a fairly common summer resident and possible breeder (Spindler et al. 1980).

Southward migration protracted because females depart breeding grounds early, shortly after laying (mid-June to mid-July, Reynolds 1987), followed later by males and finally juveniles. Arrival of migrants at inland stopover sites elsewhere reflects this pattern, with females arriving first, followed by males, and then juveniles (Mercier 1985, Jehl 1986). Little postbreeding information from interior Alaska, where Red-necked Phalaropes might use only the largest waterbodies as important stopover sites in late summer (e.g., large flocks on lakes of Yukon Flats, July and early August 1963, last four on Ohtig Lake on 10 August 1962—Yocom 1964). On Sheenjek River last were seven on 5 August and a flock of c. 20 on 8 August 1975 (C. G. Batten). A flock of c. 60 that arrived on 16 August 1979 were the only birds seen that year in the Ray Mountains (Matthews 1980).

Population regulation “[n]eeds study. Possibly stable, but ...[p]opulation trends from breeding areas equivocal; at least 94% decrease in breeding males from 1980 to 1993 at La Perouse Bay, southern Hudson Bay, but increased nesting densities since 1981 on long-term plots near Prudhoe Bay, Alaska...[f]ew observers currently working with this circumpolar arctic breeder, however, and even large localized population declines could be going unnoticed” (Rubega et al. 2000).

STRIGIDAE: Typical Owls

► *Bubo virginianus* (Gmelin, 1788). Great Horned Owl. Subspecies is *lagophonus* Oberholser, 1904. Conspicuous, generally uncommon resident and breeder throughout the forested Interior. No seasonal movements known.

Nesting habitat: Forests and woodlands (including deciduous, coniferous, mixed deciduous-coniferous), artificial, cliffs (see Kessel 1979a). Species does not build its own nest. Uses wider range of nest sites than any other bird in the Americas (Baumgartner 1938), most often tree nests of other species, in whatever tree is available; also uses cavities in trees and snags, cliffs, deserted buildings, and artificial platforms, and has laid eggs on the ground (Houston et al. 1998). In coniferous forest at Kluane, Yukon Territory, ‘witches broom’ (fungus-induced clumps of dense foliage in white spruce) was the most common nest site, followed by nests built by Red-tailed Hawks *Buteo jamaicensis* or Common Ravens (Rohner and Doyle 1992).

Examples of breeding phenology include copulation, 28 February 1981, Fairbanks, Sheep Creek Road (P. D. Martin); nest/3 eggs, 11 April 1924, “in mixed spruce and birch timber,” Reindeer River, southwest of Holy Cross; nest/3 eggs, 16 April 1924, stick nest of raven “on a cliff overlooking the ice-bound Yukon River...incubation showed that the three eggs had been deposited during the final days of March;” and nest/eggs, 18 April 1924, “in [a used Northern Goshawk nest] an aspen growing on a long island in the Yukon River opposite Marshall” (all Brandt 1943:417-418); eggs as early as 16 April 1862 at Fort Yukon (fide Gabrielson and Lincoln 1959); nest on witches broom/two downy young, 28 May 1977, Denali NP headquarters vicinity (K. Kertell); two young fledged 13 June 1982, Mile 3 Denali Park Road (K. Laing and

KK); young out of the nest on 18 June 1867, Fort Yukon (Dall and Bannister 1869); two recently-fledged young, 18 June 1988, Circle (J. F. Kelly).

Not recorded annually on Interior Christmas Bird Counts, but 1-3 in most years when recorded; maximum was six on 31 December 2005 at Fairbanks.

► *Surnia ulula* (Linnaeus, 1758). Northern Hawk Owl. Subspecies is *caparoch* Müller, 1776. Uncommon resident and breeder. Seasonal dispersal widely evident in October, and again in March—when birds can occur in atypical habitat (e.g., one hunting voles near seed feeders in closed aspen forest, 13-17 March 2011, Ester, J. A. Stauffer and R. LaChaussee+). Near northwestern distribution limit, last on 21 September 1898 and first on 10 April 1899, foothills of Jade Mountains (Grinnell 1900).

Nesting habitat: Nests in dead tree stubs or woodpecker holes, especially in open coniferous or mixed coniferous-deciduous forests, burned-over areas, or muskeg (Duncan and Duncan 1998). In Alaska prefers open-canopied forests (20–60% canopy cover) or forest edges (Meehan and Ritchie 1982). Fire is important in providing nest sites (snags, burned or rotted-out cavities, increased number of woodpecker cavities), increasing small-mammal habitat and open hunting habitat; storm-damaged trees also an important source of nest trees (Duncan and Duncan 1998 and citations therein).

Examples of breeding phenology include egg “ready for laying” in oviduct of collected female, 16 April 1867, Nulato (Dall and Bannister 1869:274); copulation on 23 April 1986 and laying/incubating on 28 April 1986, Galena (T. O. Osborne); male at nest/6 eggs, 5 May 1868, Nulato (loc. cit.); nest/5 eggs on 9 May 1912 on Kuskokwim-Yukon portage (Dice 1920); adult on nest/0 eggs, 26 April 1899, pair at nest/6 eggs plus three newly-hatched young, 8 May 1899, vicinity Jade Mountains (Grinnell 1900); food-carrying adult on 11 June 1977 and five fledged

young on 27 June 1977, two separate locations in Denali NP (fide K. Kertell). In North America, extreme dates for egg-laying 30 March–30 June (Duncan and Duncan 1998).

Not found annually on Interior Christmas Bird Counts. When recorded (Fairbanks), usually 1-3 birds, maxima six on 2 January 1972 and eight on 31 December 2005.

► *Strix nebulosa* Forster, 1772. Great Gray Owl. Subspecies is nominate *nebulosa*. Uncommon resident and breeder. Dispersal (probably juveniles) in autumn (e.g., one, 7 October 1972, Fairbanks, Muskox Subdivision, B. Kessel+; one, 28 October 1974, Ester Dome, BK, J. R. Schlesinger+).

Nesting habitat: Forests and woodlands (including deciduous, coniferous, mixed deciduous-coniferous). Does not build its own nest, using abandoned nests of other birds of prey and the tops of broken trees. Habitat generally extensive taiga interspersed with sphagnum bogs, muskegs, and other open spaces. Suitable nesting habitat probably limited by availability of nest structures (generally nests of other raptors) and prey (Bull and Duncan 1993 and citations therein). In interior Alaska probably partial to river valley bottoms with extensive heavy timber (DDG).

Few examples of nesting chronology, e.g., incubating birds on two Galena-area nests on 15 April 1984 (T. O. Osborne); incubating bird on old stick nest in cottonwood, 16 May 1983, Galena area (TOO); adult on nest built by Northern Goshawk *Accipiter gentilis* in aspen, 18 May 1984, Mile 1365 Alaska Highway, near Dot Lake (D. G. Roseneau+)—Great Gray Owls and goshawks alternated use of that nest for several years, until ultimately the nest tree was downed by weather (DGR, DDG+, B. A. Anderson); adult on nest, 27 May 1983, Galena (TOO); adult carrying vole to two fledged young, 12 June 1988, Bonanza Creek burn (J. F. Kelly).

Seldom recorded on Interior Christmas Bird Counts (e.g., two, 17 December 1994, Fairbanks).

► *Asio flammeus* (Pontoppidan, 1763). Short-eared Owl. Subspecies is nominate *flammeus*. Uncommon or fairly common migrant and uncommon local breeder in interior Alaska. Arrived in spring from third week of April to second week of May (e.g., one, 20 April 1977, Univ. Alaska campus at Fairbanks, R. H. Day; one, 20 April 1984, Nenana, M. Robus; two, 23 April 1978, Clearwater Lake, M. Sigman and S. O. MacDonald; one, 23 April 1980, Fairbanks, Creamer's Field, L. Shon; one, 25 April 1976, Scottie Creek, T. T. Wetmore; one, 27 April 1984, Galena, T. O. Osborne; arrived "in pairs" 30 April 1908, Toklat River, Sheldon 1909:68; three, 2 May 1970, Fairbanks, DDG; one, 2 May 1978, Fairbanks, D. B. McDonald; one, 3 May 1980, Delta Junction, DDG, P. D. Martin, and J. Jolis; earliest on 4 May 1953, Anaktuvuk, Irving 1960; one, 4 May 1982, Fairbanks, B. E. Lawhead; one, 4 May 1986, Galena, TOO; one, 7 May 1861, Fort Yukon, fide Gabrielson and Lincoln 1959; earliest on 8 May 1951 and 10 May 1950, Anaktuvuk, Irving 1960; one, 10 May 1979, Delta Junction, BEL and RHD; one, 11 May 1985, Fairbanks, Cushman flats, DDG and PDM; one, 15 May 1963, Bettles Field, Campbell 1969), but migration often protracted (e.g., 15 Short-eared Owls at 13:00 h on 31 May 1977 in Sable Pass, Denali NP, K. Kertell). Exceptionally early in spring were single birds on 27 March 1981 at Fairbanks airport (R. B. Weeden) and one on 2 April 1986 at Creamer's Field, Fairbanks (J. M. Wright, P. Bruce).

Nesting habitat: Tundra and open wetland and meadows. Nests usually located on dry sites with enough vegetation to conceal incubating female, often small knolls, ridges, or hummocks; wet areas used less frequently (Wiggins et al. 2006). In Alaska nested primarily beyond the Interior, in coastal tundra habitats, but also locally inland in open wetlands and

montane tundra. A set of eggs taken 10 June 1862 on the Porcupine River (Gabrielson and Lincoln 1959) was the first nesting record in the Interior. Species described as undoubtedly nesting in Anaktuvuk Valley (Irving 1960). One bird was resident in June 1956 at Lobo Lake, upper Sheenjek River (Kessel and Schaller 1960). In Denali NP one nest/7 eggs in late May 1977 on a hummock in a wet area and another nest/3 eggs on 31 May 1977 in a ground depression (KK). Egg dates: In Yukon Territory as early as 19 May, but completed clutches were in June (Alexander et al. 2003).

Departures not so well known as arrivals. A bird at Fort Yukon “as late as 16 August” 1962 (Yocom 1964) might have represented nesting on the nearby Yukon Flats. Most Short-eared Owls departed in September (e.g., last one, 11 September 1950, Anaktuvuk, Irving 1960; eight migrants seen during the period 7 September-18 October 1987 at Dry Lake at Mile 1376 Alaska Highway, east of Dot Lake, included a maximum of three on 27 September; one on 3 October 1987 was latest—all M. W. Britten; and see McIntyre and Ambrose 1999). Latest Interior records included one, 8 October 1981, Fairbanks, Smith Lake (D. R. Herter), one, 10 October 1978, Wickersham Dome (S. E. Senner); and one, 14 October 2010, Chena Hot Springs Road (C. M. Harwood). Extreme late: one on 5 November 1989 at Delta Agricultural Project (MWB) and one the same day at Fairbanks airport, PDM and DRH; and one, 1 December 1981, Experimental Farm, Fairbanks (S. E. Quinlan).

► *Aegolius funereus* (Linnaeus, 1758). Boreal Owl. Subspecies is *richardsoni* Bonaparte, 1838. Uncommon or fairly common resident and breeder throughout forested Interior. Resident, nonmigratory, and no regular seasonal movements known. Generally a year-round resident within a stable home range; like so many other species disperses in years when prey populations are scarce (Hayward and Hayward 1993), but late-winter starvation deaths

(March, Fairbanks) bring to people's attention many winter-resident Boreal Owls that would otherwise go unnoticed. Conspicuous only when vocalizing, at night, primarily December-January to March; not more surreptitious at non-vocal times of year, but in summer, except for noisy family groups, generally escapes human notice.

Nesting habitat: Boreal forest of black and white spruce *P. mariana* and *P. glauca*, aspen and poplar *Populus tremuloides* and *P. balsamifera*, birch *Betula papyrifera*, and balsam fir *Abies balsamea* (Bondrup-Nielsen 1978, Meehan and Ritchie 1982). Eight nests near Fairbanks were in closed canopy deciduous or mixed forest, no nests in coniferous forest (Meehan and Ritchie 1982); of five nests in natural substrates (i.e., not in nest boxes), four were in flicker holes and one in a natural tree-cavity. In Canada, six nests were all in aspen: three in living trees, three in dead snags (Bondrup-Nielsen 1978).

Clutch initiation at Anchorage 27 March to 5 May with median of 10 April (T. R. Swem *in* Hayward and Hayward 1993). At Fairbanks, chronology of one nest, in flicker hole in birch, mixed forest, elev. 221 m (DDG) proceeded from 0 eggs on 28 March 1970 to 2 eggs on 4 April and 7 April, full clutch of 3 eggs on 10, 16, 19, and 22 April 1970, 4 eggs on 25 April, then 3 eggs again on 28 April, 2 eggs/one hatchling on 1 May 1970, 1 egg/2 downies on 5 May, 3 downies on 13 May 1970. Another nest c. 6 m up in natural cavity in riparian cottonwood, Tanana River slough 53 km southeast of Fairbanks, involved adult incubating 6 eggs on 29 April 1973 (DDG+). Adult at nest box 15 April 1989, feeding young in nest box, 6 June 1989, two young in nest box on 20 June 1989, both young outside box ("fledged") on 23 June 1989—Fairbanks, G. Matschke; one young fledged from a [waterfowl] nest box on 10 June 1979, two young still in that nest box on 14 June, Fairbanks, Smith Lake (D. M. Troy and DDG).

Seldom recorded on Christmas Bird Counts, maxima two at Fairbanks on 20 December 2000 and three each on 2 January 2005 and (the following winter) on 31 December 2005.

CAPRIMULGIDAE: Goatsuckers

► *Chordeiles minor* (Forster, 1771). Common Nighthawk. Subspecies is nominate *minor*. Casual in spring, summer, and fall in eastern and central Interior (one found dead in late September or early October 1923 c. 16 km north of Allakaket, Murie 1925; one, 12 July 1958, Fairbanks, Kessel 1960; one, 14 June 1965, 27 km west of Fairbanks, E. Kemsies; one 21 August 1973, Fairbanks, M. W. Schwan; and one on 10 May 1974, Fairbanks, M. S. Boyce), but long known to nest not far east of the Alaska-Yukon boundary (e.g., it was discovered nesting in 1898 at the head of Sixtymile River by G. G. Cantwell *in* Murie 1925, and it was “met with...on numerous occasions” in late June and July 1899 between Caribou Crossing and the mouth of Tatchun River by Osgood and Bishop 1900:79), and “[i]t is thus probable that the Nighthawk will eventually be recorded as a breeding bird from that part of Alaskan territory” (Murie 1925:270).

Nesting habitat: In various parts of the range, nesting habitat includes coastal sand dunes and beaches, logged or slashburned areas of forest sites, woodland clearings, prairies and plains, sagebrush and grassland habitat, farm fields, open forests, rock outcrops, and flat gravel rooftops of city buildings (Poulin et al. 1996 and citations therein). Nests to elevation 1250 m in British Columbia (Campbell et al. 1990). A fairly common breeder in southern Yukon Territory (Alexander et al. 2003).

ALCEDINIDAE: Kingfishers

► *Megaceryle alcyon* (Linnaeus, 1758). Belted Kingfisher. Monotypic—including *caurinus* Grinnell, 1910 (type locality Montague Island, Prince William Sound). Uncommon but conspicuous migrant and local breeder, widespread in summer in interior Alaska—“from Fort Yukon to the sea” (Dall and Bannister 1869:275). Arrived in spring usually in first half of May (e.g., one, 2 May 1979, Fairbanks, B. Kessel; one, 8 May 1980, Clearwater Lake, S. O. MacDonald; one, 11 May 1986, Fairbanks, Rosie Creek, E. C. Murphy; one, 13 May 1980, Fairbanks, ECM; first on 13 May 1985, Mile 39 Chena Hot Springs Road, A. Weaver; three, 13 May 1987, Goldstream Valley, B. E. Lawhead; recorded 15 May 1921, Tanacross, O. J. Murie; one, 15 May 1970, Scottie Creek, DDG and G. E. Hall; one, 15 May 1977, Smith Lake, B. Peterson; pair, 18 May 1973 in Harding Lake area, and pair on 19 May 1973 at Yarger Lake, DDG+).

Nesting habitat: Earthen banks devoid of vegetation are preferred; burrows are generally near water, but ditches, road cuts, landfills, and sand or gravel pits, sometimes distant from water, are also acceptable; unusual nest sites include sand dunes, sawdust piles, dredge spoils, mud slides formed by beaver, a furrow in a plowed field, and holes in dead trees and stumps; selection of nest site determines the location of territories along streams (Kelly et al. 2009 and citations therein). References to nest sites on the Yukon River at Eagle (Moldenhauer 1982), at Fairbanks and on Takotna Fork of the Kuskokwim River (Gabrielson and Lincoln 1959), and on Aniak River in summer 1982 (B. A. Anderson), “[y]et, despite its wide distribution as a summer resident, actual records of eggs are few” (Gabrielson and Lincoln 1959:559), and the preponderance of references are only to presence/occurrence. Little information on nesting density, e.g., at Tuluksak River, northern Kilbuck Mountains, 2.6 ± 0.51 pairs/year were found in eight years along 48 km of major streams within the foothills to 250 m elevation; phenology

included young recorded in nests between 22 July and 12 August 1962, 6-13 July 1971, 3-26 July 1976, and on 4 July 1983; young fledged by 12 August 1962 and 9 July 1979 (Petersen et al. 1991).

Fall departures took place in late August-September (e.g., latest 26 August 1974, Tuluksak River, Petersen et al. 1991; total 20+, 31 August 1984, float trip on Clearwater/Tanana rivers, B. A. Cooper+; one on 2 September and one on 4 September 1972, Fairbanks, DDG; two, 2 September 1984, Chena Hot Springs Road, H. Haid; one, 10 September 1982, Fairbanks, Cushman flats, DDG; one, 17 September 1977, Eielson AFB, G. R. Hickman; one, 20 September 1977, Fairbanks, R. J. Ritchie; two, 21 September 1987, Ballaine Lake, L. N. Smith; one, 23 September 1968, Fairbanks, DDG).

PICIDAE: Woodpeckers

► *Sphyrapicus varius* (Linnaeus, 1766). Yellow-bellied Sapsucker. Subspecies is nominate *varius*. Rare summer visitant and breeder in eastern Interior, where first recorded in 1976 (male, 16 June, vicinity of Northway Junction, Kessel 1986). Most subsequent observations also from the upper Tanana River valley, from Scottie Creek to Northway Junction (Kessel 1986, Gibson and Kessel 1992, Erwin et al. 2004), or from the Yukon Flats (Erwin et al. 2004). Arrived in spring in early May (6-10 May, B. Kessel *in* Walters et al. 2002); departure timing unknown, but absent in winter.

This species was observed in the Northway Junction area in 1976 and 1977, and the first Alaska breeding record involved a pair at nest in that area on 26 June 1983 (Kessel 1986). (Nesting was first confirmed in Yukon Territory in 1983 as well, at Dawson City, Alexander et al. 2003.) Most subsequent nesting records also from the upper Tanana River valley (including

pair at nest at 10-Mile Hill, Tetlin NWR, on 14 June 1995, T. J. Doyle+). A female netted 19 May 1999 at Fairbanks (Erwin et al. 2004) provides the only Interior specimen record [UAM, examined]. On 30 May 2001 an active nest was discovered in Bonanza Creek Experimental Forest (at 148°19'W), west of Fairbanks and 350+ km downriver from Northway Junction (ibid.). On the upper Yukon River at least one was recorded on 18 May and 25 May 1985 at Eagle (Gibson and Kessel 1992). Now known as a fairly common breeder in southern Yukon Territory, where occurs from second or third week of May until early September (Alexander et al. 2003).

Nesting habitat: Early-successional tree species favored for both nesting and feeding – in the Interior, aspen *Populus tremuloides*, cottonwood *P. balsamifera*, and paper birch *Betula papyrifera*, and mixed-conifer forest (B. Kessel and DDG). Usually along riparian zones, especially in aspen and birch (Walters et al. 2002). In interior Alaska all nests have been situated in living paper birch.

Recent evidence that the widespread Am. Three-toed Woodpecker works birches for sap/insects in a manner similar to *Sphyrapicus* (Bailey 2008) casts doubt on a broad Interior range inferred from trees thought to have been worked by *S. varius* (Kessel 1986).

► *Picoides pubescens* (Linnaeus, 1766). Downy Woodpecker. Subspecies is *nelsoni* Oberholser, 1896 (type locality Nulato). Uncommon or rare resident and breeder in aspen *Populus* woodlands throughout the Interior. “[C]ommon from Fort Yukon to Nulato and below Nulato on the river, wherever there are groves of poplar or other non-resinous woods” (Dall and Bannister 1869:274). Nonmigratory, but autumn dispersals have resulted in occurrences in winter at Anaktuvuk (Irving 1960) and as far west as the Seward Peninsula at Nome River (Kessel 1989). The species is equally at home in urban woodlots or wilderness forests and is

readily attracted to backyard bird feeders (Jackson and Ouellet 2002), where undoubtedly most familiar to people in interior Alaska.

Nesting habitat: Generally present in open, deciduous, especially riparian, woodlands throughout its range; less abundant in coniferous forests except when associated with deciduous understory. Readily accepts orchards and wooded, human-modified habitats such as urban and suburban parks and residential areas, venturing into open areas, where it sometimes nests in cavities in fence posts and feeds on arthropods found in tall weeds in vacant lots and fencerows. Reaches highest densities in deciduous woodlands that include small trees with low canopy heights (Jackson and Ouellet 2002 and citations therein). Nest usually in a dead stub of a living or dead tree and characteristically in wood with an advanced stage of heartrot (ibid.). Egg dates in British Columbia, 2 May–15 July (Campbell et al. 1990). Little nesting information from interior Alaska (e.g., pair with young in nest, 11 June 1988, Bonanza Creek burn, J. F. Kelly; adult feeding fledgling, 22 June 1988, Chena Ridge, R. H. Day).

Maximum Christmas Bird Count totals at Fairbanks—33 on 19 December 2009 and 34 on 3 January 1999—reflect densities not seen at other seasons or elsewhere in the Interior. Indeed, not recorded annually at most other Interior CBCs. At Tok maximum CBC total was two, on 20 December 2000 and 15 December 2009; at Delta Junction CBC maximum three, on 29 December 1991; at Galena maximum four, on 20 December 2002; and at Bethel maximum was two, on 22 December 1989, 17 December 1991, and 22 December 1995.

► *Picoides villosus* (Linnaeus, 1766). Hairy Woodpecker. Subspecies is *septentrionalis* Nuttall, 1840. Uncommon or rare resident and breeder. Sedentary. Resident in forests of North America and Central America from near northern limit of boreal forest in interior Alaska and Canada to Panama, the Hairy Woodpecker has the most extensive range and most geographic

variation of any species in genus *Picoides*. Primarily nonmigratory; a permanent resident throughout its breeding range although northernmost populations display irregular and unpredictable wandering in winter, and local post-nesting short-distance movements take place in some areas (Jackson et al. 2002 and citations therein).

Nesting habitat: Primarily forest; throughout its range Hairy Woodpecker is widely distributed in regions where mature woodlands are prevalent. In British Columbia, found in all forest regions to elevation 1900 m and in a wide range of habitats, such as mature conifer forests, where it frequents edges such as beaver *Castor* ponds and meadows, clearcuts, and forest burns, open pine *Pinus ponderosa* forests, deciduous groves, and mixed woods; in winter, also found in residential areas (Campbell et al. 1990). In eastern North America nests most often placed in living trunk of a tree with fungal heartrot or underside of a stub or limb that leans from vertical; in western North America, most often in large dead stubs or in aspen *Populus* with fungal decay (all Jackson et al. 2002 and citations therein).

Sketchy information on nesting chronology included copulation 9 April 1984 and 1985, Cache Creek (M. Shields); copulation 17 April 1982, Fairbanks, Chena Ridge (A. M. Springer); pair at nest hole dug near top of roadside telephone pole, 15 May 1970, Northway access road (DDG+); nest/young, 12 m up in large aspen, 25 May 1971, Fairbanks (J. W. Willetts); hysterical defensive pair, 12 June 1988, Bonanza Creek burn, J. F. Kelly; pair with two noisy fledglings, 15-16 June 1984, Ester suet feeder (DDG and J. Jolis); nest/young, 17 June 1996, on Tok River burn was first confirmed nesting record for the upper Tanana River valley (T. J. Doyle).

As with Downy Woodpecker, maximum Christmas Bird Count totals at Fairbanks—30 on 21 December 1996 and 2 January 2005, 33 on 31 December 2005, and 37 on 27 December

2008—reflect densities not seen at other seasons or elsewhere in the Interior. CBC maxima elsewhere in the Interior include three at Tok on 4 January 1998, five at Delta Junction on 27 December 1997, and two at Galena on 19 December 2005 and 19 December 1998.

► *Picoides dorsalis* Baird, 1858. American Three-toed Woodpecker. Subspecies is *fasciatus* Baird, 1870. Uncommon or fairly common resident and breeder throughout the spruce forests of interior Alaska. Sedentary. Irruptions sporadic, localized (mainly in eastern North America). Less irruptive than Black-backed Woodpecker. Occurs in boreal and montane coniferous forests to elevation 2750 m in western North America (Leonard 2001 and citations therein). “Common from Fort Yukon to the sea, wherever there are trees” (Dall and Bannister 1869:274). Describing this bird at the northwestern periphery of its range, in Kobuk River valley, Grinnell (1900:40) wrote, “This, the only species of woodpecker detected in the Kowak [= Kobuk] region, was resident throughout the year. It could scarcely be called common, though its borings were noticed in nearly every tract of spruces visited. In the fall and winter these birds were silent and seldom seen. But after the first of March their drumming on some resonant dead tree was heard nearly every morning.” The most numerous woodpecker recorded 1999-2000 in Yukon-Charley Rivers NP (Handel et al. 2009).

The American Three-toed Woodpecker specializes on bark beetles (Scolytidae), while the Black-backed Woodpecker specializes on wood-boring beetles (Cerambycidae), so the range of the former coincides with that of spruce *Picea* forests, while that of the latter includes other coniferous forests as well, a habitat difference reflected in their different ranges [beyond Alaska]. Like the Black-backed Woodpecker, and to a lesser degree the Hairy Woodpecker, *P. dorsalis* is associated with locally abundant insect outbreaks resulting from disturbances (for example, fire). Both species of three-toed woodpeckers are irruptive, but their irruptions are not necessarily

coincident, which might reflect differences in their food preferences (Leonard 2001 and citations therein).

Nesting habitat: Mature or old-growth coniferous forests with an abundance of insect-infested snags or dying trees (ibid.). Examples of breeding chronology include nest/young, 8 June 1910, near Eagle (fide Gabrielson and Lincoln 1959); pair at nest/young, 10 June 1966, Fairbanks (B. Kessel and R. Spooner); nest/young, 10 June 1989, Fairbanks (S. Dauenhauer); nest/young, 14 June 1957, Old Crow (Irving 1960); nest/young, 23 June 1977, ‘Middle Yanert Lake’, Denali NP (K. Kertell); female feeding nearly fledged young, 24 June 1981, Denali NP, near Riley Creek campground (N. S. Proctor); nest/young, 27 June 1956, upper Sheenjek River valley (Kessel and Schaller 1960); nest/3 eggs, 28 June 1964, Ferry (H. K. Springer).

Only exceptionally patronized bird feeders (e.g., male regularly at suet and peanut butter feeders, 17 November 1979-2 February 1980, Ester, DDG), so—because of low densities, inconspicuous behavior, extensive habitat, and short day-length—not recorded annually on Interior Christmas Bird Counts, where maximum count at Fairbanks was five, on 19 December 1981 and on 28 December 2002. Elsewhere, one or two were recorded most CBC years at Tok; single birds on three Delta Junction CBCs; singles and twos on most Galena CBCs; and two on 30 December 1994 provided the only CBC record at Bethel.

► *Picoides arcticus* (Swainson, 1831). Black-backed Woodpecker. Monotypic. “One of the most enigmatic woodpeckers in North America, and likely to remain so because of its general rarity” (Dixon and Saab 2000). Throughout interior Alaska taiga generally rare resident and breeder, temporarily and locally uncommon or fairly common at recent burns, where in its specialized foraging niche it exploits outbreaks of wood-boring beetles (primarily Ceryambycidae) in dying conifers in the first two or three years after a forest fire (see Murphy

and Lehnhausen 1998). Exceptional day count was 17 birds on 31 October 1984 at Rosie Creek burn, near Ester (ibid.). This species' dependence on fire landscapes and other large-scale forest disturbances is well known and exemplified by studies in Montana, Michigan, Minnesota, Northern Rockies, Alaska, and Alberta (Dixon and Saab 2000 and citations therein).

Few Interior nest records, e.g., nest 1.2 m up in dead aspen at edge of recently cleared field, Delta Junction area, Tanana Loop Road/Extension—pair at nest 19 May-12 June 1985, 4 eggs on 22 May, female at nest on 21 and 22 May, male at nest/young on 5 June, pair at nest on 12 June (B. Augustine, J. M. Wright).

Nonmigratory, but best known in interior Alaska during autumn dispersal, reflected in annual reports of lone birds on the move, generally September-November (e.g., male, 21 August 1995, at a beetle-killed spruce in Galena, where the first local record, M. A. Spindler; male [UAM specimen, examined], 9 September 1962, Fort Wainwright, Kessel and Springer 1966; four or five birds, 22 September 1973, Quartz Lake, L. J. Rowinski; male on 23 September 1979, Ester, DDG and J. Jolis, and one the same day on Univ Alaska Fairbanks campus, D. M. Troy; one on 28 September 1979, Parks Highway near Ester, DDG; one, 15 October 1985, Goldstream Road, R. J. Ritchie+; one, 25 October 1985, Goldstream Road, S. M. Murphy; one, 29 October 1963, near Ferry, H. K. Springer; one, 31 October 1990, Tok burn, fide T. J. Doyle; one, 7-8 November 1977, Grenac Road, Fairbanks, S. E. Senner; one, 8 November-8 December 1977, Univ. Alaska campus at Fairbanks, S. O. MacDonald, E. P. Knudtson, B. E. Lawhead+, J. Loffner).

Little information at other seasons (e.g., male [specimen not examined], 22 April 1954, Kobuk River, Irving 1960; female [specimen not examined], 8 May 1932, near Windy, Dixon 1938; active nest—with two attending males—found 4 June 1994, in 1993 burn at Mile 1378.8

Alaska Highway, TJD and D. C. Chaffin; pair, 29 June 1993, near Moon Lake, TJD). Seldom recorded on an Interior Christmas Bird Count, e.g., at Fairbanks single birds on 2 January 1999, 30 December 2001, 31 December 2005, and 27 December 2008. Four birds on Tok CBC on 28 December 1991 and on 18 December 2002 might well have represented densities the results of recent burns in the Tok area.

► *Colaptes auratus* (Linnaeus, 1758). Northern Flicker. Subspecies is *luteus* Bangs, 1898—including *borealis* Ridgway, 1911 (type locality Nulato). Fairly common migrant and breeder in eastern Interior, especially in the Yukon and Tanana river drainages. “[S]een rarely at Nulato and the Indians say it breeds there” (Dall and Bannister 1869:275). Absent in winter. Arrived in spring usually in late April-early May (Earliest: one, 22 April 1980, Fairbanks, R. B. Weeden; one, 24 April 1988, Yankovich Road, A. D. McGuire; one, 26 April 1985, Fairbanks, D. Haynes; two, 30 April 1978, Smith Lake, T. G. Tobish, Jr.; two, 2 May 1977, Goldstream Valley, TGT; one, 3 May 1986, Chena Slough, J. F. Kelly, and another, 3 May 1986, west of Ester, RBW; one, 3 May 1987, Fairbanks, H. Melchior; two, 5 May 1984, single birds at Ester and Fairbanks, DDG; one, 5 May 1986, Galena, T. O. Osborne; one, 6 May 1983, Fairbanks, T. Anderson; one, 6 May 1991, Fairbanks, B. Kessel; on 7 May 1981 one at Delta Junction, R. H. Day and D. Barnard, and three separate single birds at Fairbanks, D. R. Herter, RBW, S. M. Murphy and M. L. Ward; one, 7 May 1989, Ester, DDG; one, 8 May 1982, Fairbanks, D. and A. Ronsse; one, 11 May 1984, Galena, TOO). Probably less numerous in western Interior (where nesting recorded as far west as Nulato, 23 June 1867, Dall and Bannister 1869), beyond which area the species occurred in the Kilbuck Mountains (Petersen et al. 1991), but known from just two records of occurrence as far west as the Seward Peninsula (Kessel 1989). Northern limits of nesting determined by distribution of cottonwood *Populus* groves; species occurred

sparsely throughout the spruce woods of the Sheenjek River valley floor (8 June to 19 June 1956 in the Lobo Lake area), and one was seen feeding on a treeless hillside on 10 June 1956; recorded as late as 14 July (Kessel and Schaller 1960); a common breeder in wooded habitats on Firth River/Mancha Creek, first two birds (separately) on 19 May 1979 and species seen regularly until 25 August (Spindler et al. 1980).

Nesting habitat: Preferred forest edge and open woodlands approaching savannas, but variation in tree species composition is as broad as geographic range of the species. Also found in cottonwoods in riparian woodlands, and in burned woodlands. In many northern mixed-wood boreal forests east and south of interior Alaska, flickers were particularly common in quaking aspen stands, presumably because aspen is preferred as a nesting tree (Wiebe and Moore 2008). On upper Yukon River, eggs collected at Fort Yukon in 1862 (Gabrielson and Lincoln 1959); nesting recorded in 1903 at Circle, where fairly common and apparently had been nesting in large cottonwoods on river islands (Osgood 1909); nests and young in 1907 at Fort Egbert (Gabrielson and Lincoln 1959); relatively common in 1962 at Fort Yukon, where “their drilled holes...[were] used as nesting sites by Buffleheads and goldeneyes” (Yocom 1964:34). Elsewhere, a few at Tetlin, including three on 18 July 1962 (Yocom 1963a); remains of 11 flickers found in Yukon River Peregrine Falcon aeries in summer 1966 pointed to an abundance not reflected by the observers' having seen the species only near Nation River and thrice near Circle (White and Haugh 1969). Elsewhere, a regularly breeding species in aspen groves and in black cottonwoods along the larger streams, Denali NP region (Dixon 1938), where seen first on Savage River on 24 May 1926; one almost daily during first half of May in 1926 and in 1932 (ibid.); probably the most common woodpecker [in summer] in the Denali NP headquarters area

(10 July 1977, K. Kertell); recorded during 27-30 June 1977 on Anvik River (C. M. White); nest reported along Moose Creek, Denali NP, late June 1978 (fide KK).

Examples of nesting phenology include calling male spent night of 19-20 May 1982 in unoccupied Boreal Owl nest box, joined by female on 20 May, when both departed (Ester, DDG and J. Jolis); nest 6 m up in 25-cm dbh poplar on Tall Willow-Poplar plot, Firth River/Mancha Creek, copulation on 14 June 1979, male seen entering and leaving nest on 24 June, and on 29 June female carried insects to the hole; another nest held noisy young on 1 July (Spindler et al. 1980); nest/5 eggs, 17 June 1961, Fairbanks (D. Anderson); nest/6 eggs, 24 June 1964, near Ferry (H. K. Springer); female at nest, 10 June 1968, University of Alaska campus at Fairbanks (J. W. Willetts); and pair feeding young, 16 July 1964, Hunt Fork (G. F. Staender).

Dispersal of juveniles in August led into fall migration in September (e.g., last on 6 September 1985, Fairbanks, Goldstream Road, B. E. Lawhead; one, 14 September 1962, Mile 39 Steese Highway, RBW; one, 18 September 1962, Ester, RBW; one, 29 September 1974, Steese Highway, TGT). Latest: male, 10 November 1983, Fairbanks (BK).

It seems likely that Gabrielson and Lincoln's (1959:562) reference to flicker occurrence "during fall and winter as well" misinterpreted O. J. Murie's dates, which probably bracket the periods *he spent* in those areas (and on unspecified dates during which he recorded flickers) and *do not* refer to specific sightings ("...at Nikolai and along the Delta and Savage Rivers between February 10 and October 23, 1922; along the Alatna between December 25, 1922, and May 23, 1923; and from September 1 to November 24, 1924, along the Koyukuk"). Similarly, Murie's reference to "along the Porcupine between May 1 and September 18, 1926," although possibly referring to extreme dates for sightings of flickers, probably bracket the period he spent in that region.

TYRANNIDAE: Tyrant Flycatchers

► *Contopus cooperi* (Nuttall, 1831). Olive-sided Flycatcher. Subspecies is nominate *cooperi*. Uncommon migrant and breeder throughout Interior taiga. “A regular and conspicuous summer resident of the timbered areas of the Yukon...and Kuskokwim drainages” (Gabrielson and Lincoln 1959:587). Present mid-May to late August-early September. Spring arrival included first birds on 12 May 1984, Fairbanks (DDG); 16 May 1912 “along the North Fork of the Kuskokwim near its head” (Dice 1920:182); recorded 16 May 1921, Tanacross (O. J. Murie); singing male on 16 May 1967 at Fairbanks (B. Kessel+); singing male, 16 May 1983, Fairbanks, Rosie Creek (E. C. Murphy); one, 18 May 1891, “Camp Davidson on Alaska/Yukon boundary” (fide Gabrielson and Lincoln 1959); six separate birds on 18 May 1973 along lower Taylor Highway [Tetlin Junction to Jack Wade] and one on 19 May 1973 at Yarger Lake (DDG+). During a 1994-1997 study, arrival peaks at Fairbanks were 24-26 May (11 May-8 June) for males and 1-2 June (22 May-10 June) for females (Wright 1997).

Nesting habitat: Scattered woodland/dwarf forest and coniferous forest – usually a patchy mix of coniferous woodland with wetlands and shrub openings. Of 19 Interior nests all but one were in spruce *Picea*, 15 of 19 of those in black spruce *P. mariana* (Wright 1997). In 1995-1996 mean hatching date for initial nests was 28 June (16 June-7 July, $n = 8$); mean fledging date 15 July (2-20 July, $n = 4$), with late date of 4 August (ibid.). Like Hammond's Flycatcher (q.v.), Olive-sided Flycatcher is not, in interior Alaska, a bird of montane conifer forests, in contradistinction to habitat use described for lower latitudes (e.g., see Bent 1942, Altman and Sallabanks 2000). High density suggested by 22 birds on 21 stops, 12 June 2006, Kanuti Lake BBS (C. M. Harwood).

Autumn departure from mid-August (e.g., fairly common along Richardson Highway, Paxson to Fairbanks, on 13 August 1943; six birds on 15 August 1943, Fairbanks to Livengood, and others on 17 August 1943 along Steese Highway, toward Eagle Summit—all I. N. Gabrielson; one, 16 August 1972, Ester Dome, DDG and R. S. Hadley). Latest records included one on 5 September 1971, Minto Flats (R. B. Weeden); and one on 11 September 1976, Yarger Lake (DDG and T. G. Tobish, Jr.).

► *Contopus sordidulus* Sclater, 1859. Western Wood-Pewee. Subspecies is *veliei* Coues, 1866. Uncommon migrant and breeder in eastern Interior. Arrived in spring in mid-May (e.g., one, 12 May 1922, Fairbanks, O. J. Murie; one on 12 May 1973, Mile 23 Chena Hot Springs Road; one on 17 May 1973 at Tok River; one at Yarger Lake and two at Northway on 19 May 1973; and one on 20 May 1973 at Dot Lake—all DDG+; one singing male, 21 May 1980, Fairbanks, R. B. Weeden). At height of spring song usually two to five birds heard during a 3-hr count period (B. Kessel). Maximum counts included six birds (5 June 1961, Fairbanks, H. K. Springer), at least six (15 June 1984, circumnavigation of Yarger Lake, DDG), and nine (3-hr count period, 22 June 1975, Fairbanks, T. T. Wetmore). Widely recorded in eastern Interior (e.g., Yukon-Charley and Eagle, White and Haugh 1969, Moldenhauer 1982; Fort Yukon, Yocom 1964; Tetlin, Yocom 1963a), occurring at least as far west as Denali NP (Murie 1963; 1977, K. Kertell; 1978, KK and R. W. Stallcup); one record as far west as vicinity of Galena (singing bird, 12 June 1995, MAPS site c. 8 km east of Galena, M. A. Spindler, was not recorded subsequently). North and west of Interior extralimital occurrences in northern Alaska (West and White 1966) and western Alaska (Kessel 1989).

Nesting habitat: Habitat generalist, widespread in woodlands and forests, especially at forest edge and in riparian zones; absent from dense forests. Important habitat components

apparently include large tree diameters, open understory, edge characteristics, and dead trees or trees with dead limbs (Bemis and Rising 1999). Eleven nests at Yukon Flats NWR [Canvasback Lake, 53 km southwest of Fort Yukon], 1995-1997, were all in aspens *P. tremuloides* (K. M. Sowl and M. M. Maxwell). Egg dates for 136 clutches in British Columbia ranged from 20 May to 5 August, with 50% recorded between 20 June and 8 July (Campbell et al. 1997).

Few autumn departure data (Latest: one, 19 August 1979, Ester, DDG; two on 20 August 1974, Fairbanks, TTW; and one, 6 September 1994, at fall banding station near Tok, C. Davis fide T. J. Doyle).

► *Empidonax flaviventris* (Baird and Baird, 1843). Yellow-bellied Flycatcher. Monotypic. Rare and local breeder at Eureka (65.23°N 150.18°W), northwest of Fairbanks, on Yukon River (Martin et al. 2006), and perhaps elsewhere in the eastern Interior. Earliest Alaska records included a freshly killed bird found 24 June 1966 near a Peregrine Falcon *Falco peregrinus* aerie in vicinity of Eagle and a bird netted 28 July 1966 at Coal Creek/Yukon River junction (White and Haugh 1969). This species was long ago inferred from that evidence to nest as far west as the Yukon River at Alaska-Yukon boundary (Godfrey 1986, based on White and Haugh 1969), and it was recorded in Yukon-Charley NP during 1999-2000 (Handel et al. 2009), but it seems to be the case that no actual nesting records bridge the documented Eureka ‘enclave’ and the documented nesting range in British Columbia (e.g., Yellow-bellied Flycatcher is a rare “expected breeder” in southern Yukon Territory, Alexander et al. 2003:321-322).

Nesting habitat: open montane woodland at Eureka, “primarily in the gullies wooded with deciduous trees interspersed by tundra...with few individuals occupying mixed coniferous woodland” (Martin et al. 2006:10, Fig. 1) and “thickets dominated by alder (*Alnus crispa*), willows (*Salix* spp.), and birch (*Betula* spp.)...[with] interspersed areas of open tundra” (op.

cit.:11, Fig. 2), elevations 200-600 m. In northern British Columbia jack pines *Pinus banksiana*, aspens *Populus*, or willow *Salix* swamps more than in dense spruce stands and peatlands (Campbell et al. 1997). Nests on the ground. The only Alaska nest known to date contained four eggs on 30 June 2004; the three eggs that hatched did so on 5 July and young fledged on 20 July (Martin et al. 2006).

Additional (non-nesting) reports in eastern interior Alaska (1993-1998) included one on 1 July 1984 at Mile 1265.8 Alaska Highway, near Northway Junction (R. L. Scher and J. C. Pitcher); one, 20 August 1993, Fairbanks (T. H. Pogson and J. J. Bouton); a singing male on 13 June 1994 at Mile 43 Taylor Highway (T. J. Doyle); three birds netted during 4-16 August 1994, 11 km west of Tok (TJD); one singing male on 27 June 1995, 45 km southwest of Northway, on Tetlin NWR (TJD); one on 23 August 1996 at Tok (R. C. Means); singles on 13 and 15 August 1997 at Fairbanks (Benson et al. 2000); one on 27 August 1998 at Tok (ibid.); one on 11 August 2001 at Fairbanks (Martin et al. 2006); and single birds on 21 and 31 August 2003 at Fairbanks (L. H. DeCicco).

► *Empidonax alnorum* Brewster, 1895. Alder Flycatcher. Monotypic—including *alascensis* Phillips, 1948 (type locality Kandik River). Common, widespread migrant and breeder throughout the Interior, where it is the latest spring migrant to return from a New World winter range (cf. Arctic Warbler), the Alder Flycatcher has been associated with this region since the nesting range was outlined in the original description of the species (“Nulato on the... Yukon” —Brewster 1895:163), and most 20th-century investigators commented on it as a conspicuous member of the summer avifauna (e.g., Osgood and Bishop 1900, Osgood 1909, Blackwelder 1919, Gabrielson and Lincoln 1959, Kessel and Schaller 1960, Yocom 1963a,

Yocom 1964, White and Haugh 1969, Kessel and Gibson 1978, Matthews 1980, Moldenhauer 1982).

Arriving from the east and south via the Great Plains (see Lowther 1999), it reached interior Alaska in late May-early June. Earliest in spring included singing male, 20 May 1982, Mile 287 Parks Highway, south of Nenana (B. A. Anderson); singing male, 25 May 1970, Fairbanks (Kessel and Gibson 1978); singing male, 25 May 1980, Fairbanks (B. Kessel); one, 31 May 1977, Denali NP (fide K. Kertell); one, 31 May 1983, Galena (C. W. Blair); first recorded, and common, 3 June 1985, Northway (DDG+); one singing male, 4 June 1979, Goldstream Creek, Fairbanks (DDG); one, 4 June 1981, Fairbanks (F. C. Dean); first heard, 10 June 1989, Fairbanks (T. H. Pogson).

Nesting habitat: Shrub thickets and stands of young deciduous trees, usually close to water (elev. to 1300 m [British Columbia], Campbell et al. 1997). The species was “most numerous in areas subject to taiga influence” (Kessel and Gibson 1978:58), and it became less numerous beyond the Interior, near the western edge of the taiga (e.g., see Kessel 1989 on Seward Peninsula, Petersen et al. 1991 in Kilbuck and Ahklun mountains). Breeding densities in the Tanana River valley (late 1970s) were greatest (9.6-10.5 territories/ha) in tall shrub thickets, although there were a few territories in habitats that did not attain tall shrub height; 56% of birds observed were at tree heights, whereas 37% were below 2.5 m, half in medium and half in low shrubs (Spindler and Kessel 1980).

Breeding density is suggested by c. 70 birds (a singing bird every 100 yds [91 m] on 4-mi [6.4 km] walk along Yukon River bank), Eagle Village to Eagle, 25 June 1966 (White and Haugh 1969); and by 77 birds (in 3-hr count period, mostly singing males), 15 June 1976, Fairbanks (BK). At turn of the 21st century BBS in southwestern Interior, Alder Flycatcher was

the eighth most numerous and widespread species (of 10 ranked; followed Northern Waterthrush, Fox Sparrow, Bank Swallow, Gray-cheeked Thrush, Yellow Warbler, Blackpoll Warbler, Varied Thrush)—0.75 birds/stop, 43% of stops, Lower Kuskokwim River BBS (Aniak to Napaskiak), 8-25 June 2001, C. M. Harwood+. Of eight common or abundant passerines, this species (and American Robin) did “not appear to have declined” in numbers in the last two decades of the 20th century (Kessel and Gibson 1994:9).

Fall departures took place in second half of August (Latest: two, 31 August 1984, Clearwater-Tanana rivers, B. A. Cooper+; one, 3 September 1961, Sanctuary River, Denali NP, H. K. Springer and W. T. Van Velzen; one juvenile, netted 9 September 1993, Tok, T. J. Doyle; and one netted, 11 September 1994, Tok, TJD). Notes: one banded 28 May 1993 at Cedar Point Biological Station, Nebraska, was recaptured 7 August 1993 at Fairbanks (Pogson 1994b).

► *Empidonax minimus* (Baird and Baird, 1843). Least Flycatcher. Monotypic. Late in 20th century a casual visitant in late spring and summer in interior Alaska. First records were singing males in the Tanana River valley in the Fairbanks area on 4-5 June 1986 (Fairbanks, K. L. Wilson+) and 22-26 June 1986 (Ester, B. A. Cooper+). The species was recorded erratically thereafter (Gibson and Kessel 1992), e.g., singing males on 19-20 June 1987 at Fairbanks (ibid.), on 16 June 1989 on the Delta River at Big Delta (J. Walters), and on 11-12 June 1991 at Fairbanks (DDG and R. W. Dickerman). In Yukon River valley recorded once at Yukon-Charley Rivers NP (Handel et al. 2009).

Species is included here as a possible addition in the near future to the nesting avifauna of the Interior because it was recently assessed as an “uncommon to rare” breeder in southern Yukon Territory (Alexander et al. 2003:325). Nesting habitat: Mid-successional and mature deciduous and mixed woods, often near openings (Tarof and Briskie 2008).

► *Empidonax hammondii* (Xántus de Vesey, 1858). Hammond's Flycatcher. Monotypic. Fairly common migrant and breeder in eastern Interior. Arrived quite early in spring, in late April-early May, e.g., three singing males on 23 April 1988, two in Ester area and one at Muskox Trail, College (P. D. Martin, DDG, B. Kessel); one, 25 April 1983, Fairbanks (PDM); separate single birds, 27 April 1989, Fairbanks and Ester (P. J. Deviche, J. Jolis); one, 28 April 1956, and three, 28 April 1960, Fairbanks (Kessel and Gibson 1978); one, 28 April 1980, Ester (DDG and S. O. MacDonald); one, 28 April 1991, Fairbanks (BK); one, 29 April 1979, Fairbanks (R. B. Weeden); at least five, 30 April 1984, Univ. of Alaska Fairbanks campus (K. M. Leuschner); on 2 May 1981 one each at Shaw Creek and at Ester (both R. H. Meehan), and three recorded at Fairbanks (RBW); one, 3 May 1978, Chena Hot Springs Road (P. Bente); and on 3 May 1986 two at Ester (B. A. Cooper) and one on Nenana River, below Rex (RBW).

Occurred in the Yukon and Tanana river drainages from Eagle (Moldenhauer 1982), Yukon-Charley Rivers NP (Handel et al. 2009), Woodchopper (White and Haugh 1969), Circle (ibid.; J. F. Kelly), and Fort Yukon (Yocom 1964) to Ruby and Galena (BK, DDG, and T. O. Osborne), and from Tetlin Lake (Yocom 1963a) to Fairbanks (Kessel and Gibson 1978) and, probably, to Tanana. Also reported from the Kantishna River drainage (four or five singing birds, 18 May 1983, Caribou Creek, Kantishna Hills, Denali NP; one singing bird, 4 June 1983, at El Dorado Creek, Kantishna Hills; two on 18-19 June 1983 at Caribou Creek; and two singing, 24-30 June 1983, at Glacier Creek, Kantishna Hills (all K. Kertell). Western limits of nesting range not well known, so far as known delimited by narrow band of birch-aspen-spruce habitat on the south-facing slopes lining R bank of the Yukon River at least as far downriver as Galena (singing male, 29 May 1982, Ruby; and six birds recorded from Ruby to Galena, 30 May 1982—all BK, DDG, and TOO).

Nesting habitat: In interior Alaska “relatively open woods formed by the tall, deciduous trees of poplar (*Populus tremuloides* or *P. balsamifera*) or white birch (*Betula papyrifera*); conifers are apparently not an environmental requirement” (Kessel 1960:482); generally at low elevations (< 500 m?); birds were often partial to south-facing slopes. Spindler and Kessel (1980) recorded this species only on deciduous forest plots – where preference was tall, well-developed deciduous forests. While utilizing a distinctly different habitat from the montane, coniferous forests in which this species nests east and south of Alaska (see Bent 1942, Sedgwick 1994), interior Alaska birds do not differ genetically from conspecifics examined farther south (Johnson and Marten 1991). Numbers that suggest nesting density included 18 birds in 3.5-hr count period, mostly singing males, 16 May 1973, Fairbanks (BK). Examples of nesting phenology include one ‘rebuilding old nest’, 5 May 1979, and ‘nest looks completed’, 11 May 1979, Ester (DDG); pair feeding three fledglings, 30 June 1987, in birch behind Univ. Alaska Museum, and begging juvenile on 13 July 1987, Ester (both DDG).

Most fall migration took place during second half of August. Latest records included one, 1 September 1975, Harding Lake (DDG); one, 6 September 1961, Fairbanks (BK); one, 9 September 1979, Ester (R. S. Hadley); in 1985 two on 4 September and one on 7 September in Ester (DDG), one on 9 September in Goldstream Valley (B. E. Lawhead), two on 12 September in Ester (RSH); and one netted, 16 September 1994, Tok (T. J. Doyle).

► *Sayornis saya* (Bonaparte, 1825). Say's Phoebe. Subspecies is *yukonensis* Bishop, 1900 (type locality Glacier, White Pass). Uncommon migrant and uncommon or fairly common breeder throughout the Interior, primarily in hills and mountains. Occurred usually from mid-May to early September. Earliest in spring included one, 2 May 1975, Fairbanks (M. A. Spindler; DDG, and G. V. Byrd); one, 5 May 1984, Fairbanks (DDG and R. S. Hadley+); and

two, 7 May 1972, Mile 98.5 Steese Highway (S. F. MacLean and D. W. Norton). Spring migration commonly continued to third and fourth weeks of May (e.g., 30-35 birds, 12 May 1969, Miles 495-515 Alaska Highway [British Columbia], DDG; one, 18-19 May 1973, Mount Fairplay, DDG+; two along Northway access, 20 May 1971, one on Taylor Highway on 21 May 1971, one near Northway airport on 22 May 1971, and one at Mile 6 Taylor Highway on 23 May 1971—all DDG+; “many” on 19 May 1977, Eagle Summit, R. B. Weeden; one on 23 May 1973 at Fairbanks, DDG and B. Kessel; one at Eielson AFB, one at Salcha River, and one along Slana-Tok cutoff, all 17 May 1974; one at Northway airport, 19 May 1974, DDG+; one, 30 May 1969, Fairbanks dog mushers’ field, DDG, G. E. Hall, and RSH). Nesting range extends well beyond the Interior, into northern foothills of Brooks Range (Cade and White 1973), to the Seward Peninsula (Kessel 1989), to the Kilbuck and Ahklun mountain region (Petersen et al. 1991), and to the Bering Sea coast, at Goodnews Bay (UAM specimens, examined).

Nesting habitat: Alpine cliffs, rocky riparian bluffs, bridges, and human outbuildings or other structures. In interior Alaska Say’s Phoebe does not avoid watercourses (cf. Schukman and Wolf 1998); indeed, greatest numbers were found on the major rivers (e.g., 35 birds, July 1951, Yukon River between Dawson City [Yukon Territory], and Circle, T. J. Cade; and [beyond the Interior] one to three pairs on each of about 20 cliffs, summer 1967, along c. 200 km of Colville River [Etiwuk to Anaktuvuk rivers], Cade and White 1973). Nests, young, or apparent territorial fidelity during the nesting season reported from the upper Yukon River (Osgood 1909, White and Haugh 1969; TJC), including Circle (newly-hatched young in nest under the eaves of a roadhouse near Circle on 1 July 1915, Blackwelder 1919); from the Tanana-Yukon highlands (White Mountains—Blackwelder 1919; Mile 82 Steese Highway, RBW; Mile 95 Steese Highway, T. T. Wetmore; Eagle Creek, Steese Highway, RBW+); and from the Alaska Range (at

least as far west as Denali NP, where three nests/incubating birds, 16 June 1981, Camp Denali, N. S. Proctor).

Fall migration hardly noted (e.g., one, 16 August 1972, Ester Dome, DDG and RSH; hatching-year female [Univ. Washington Burke Museum specimen, examined], 30 August 1963, Ferry, H. K. Springer. Latest: two on 6 September 1970, central Alaska Range, P. Vlasak).

LANIIDAE: Shrikes

► *Lanius excubitor* Linnaeus, 1758. Northern Shrike. Subspecies is *borealis* Vieillot, 1808—including *invictus* Grinnell, 1910 (type locality Kobuk River). Uncommon resident, breeder, and migrant throughout the Interior. “[W]inters over much of its breeding range, from the lower Kuskokwim, and Fairbanks south” (Gabrielson and Lincoln 1959:708). Seasonal movements were evident as early as March (possibly birds that had wintered within Alaska: e.g., one, 5 March 1968, Goldstream Valley, Fairbanks, DDG; one, 12 March 1983, after redpolls at feeder, Fairbanks, R. E. Ambrose; and two, 17 March 1983, one in song from sprucetop, both hunting redpolls about seed-feeders, Ester, DDG; arrival at Kobuk on 22 March 1899, Grinnell 1900; one, 30 March 1975, Fairbanks, DDG), but spring arrivals often later, in April and early May (e.g., arrived Nulato on 26 April 1868, Dall and Bannister 1869). Earliest specimen taken at Anaktuvuk Pass on 29 April 1951; earliest shrikes there in other years were 8 May 1949, 9 May 1950, and 9 May 1952 (Irving 1960).

Nesting habitat: Tall shrub thickets and scattered spruce woodlands. Nests throughout taiga and taiga-tundra ecotone of Alaska and Canada, wherever suitable trees or shrubs ≥ 1 m high occur in association with open landscapes, and in willow *Salix*, alder *Alnus*, and poplar *Populus* stands extending beyond spruce line into tundra zone. In northern Alaska preferred

shrub within a dense thicket where available (33 of 60 cases), but also nested at edge of thickets or in sparse stands (18 of 40 cases) and in isolated shrubs (9 of 40 cases—Cade and Swem 1995). Avoided dense coniferous forest, preferring forest edge at its elevational and latitudinal limits. Egg dates 5 May-25 June (Cade and Atkinson 2002).

Examples that demonstrate nesting phenology include four nests found in Denali NP in 1913, the first on 13 May (Murie 1946); a nest 2.4 m up in white spruce on 20 May 1978, Denali NP (fide K. Kertell); nest 12 m up in 14-m white spruce, three young (estimated to be 10 days old) in nest on 23 May 1992, Chena Hot Springs Road, Fairbanks area (T. R. Swem); nest/1 egg and 4 young, 10 June 1977, Denali NP (KK); empty nest 2.7 m up in willow, 11 June 1951, Anaktuvuk (Irving 1960); nest 2.4 m up in fork of 4.6-m willow had four naked nestlings and two upset parents, headwaters of Sheenjek River, 15 miles up valley from last spruce, 16 June 1975 (C. G. Batten); five juveniles, 21 June 1977, Denali NP (KK); nest/4 eggs, 25 June 1977, 1.2 m up in willow along willow-lined creek bordered by alpine tundra, Denali NP (E. R. Hutson); first fledgling, 30 June 1956, upper Sheenjek north of Last Lake (Kessel and Schaller 1960).

First-year birds sometimes seen in small groups (possibly siblings) and adults observed in proximity to ≥ 1 first-year birds (possibly families), but no regular flocking (T. J. Cade).

Postbreeding dispersal of adults and young in August (e.g., none seen prior to 6 August and 8 August 1979, when up to two birds, Ray Mountains, Matthews 1980). Fall movement evident in September-October (e.g., two, 12 September 1969, Fairbanks airport, DDG and G. E. Hall; latest on 28 September 1950, Anaktuvuk, Irving 1960; last, 26 October 1898, Kobuk River, Grinnell 1900; one, 3 November 1987, hunting chickadees, Fairbanks area, B. E. Lawhead), but

‘departure’ per se difficult to determine since the species winters in the Interior in low densities (e.g., one, 6 January 1921 on the Toklat River, O. J. Murie).

In winter recorded less than annually on Interior Christmas Bird Counts, and usually singly (e.g., one, 20 December 2008, Delta Junction); maximum counts were totals of four on 27 December 2008 and five on 30 December 1978—both Fairbanks.

CORVIDAE: Crows and Jays

► *Perisoreus canadensis* (Linnaeus, 1766). Gray Jay. Subspecies is *pacificus* Gmelin, 1788 (type locality Norton Sound; in addition to which nominate *canadensis* has been referred to the northeasternmost Interior—Phillips 1986). Uncommon resident and breeder, practically ubiquitous in coniferous and mixed coniferous-deciduous forests.

Nesting habitat: Coniferous and mixed coniferous-deciduous forests. Nest always in a living conifer (*Picea glauca* or *P. mariana*). Thirty Alaska nest sites ranged in height from 1.3 to 16.8 m, but two-thirds of those ranged from 1.8 to 3.0 m, with an average of 2.48 ± 0.44 m (B. Kessel and DDG). Nests usually placed near the tree's trunk on a horizontal branch, and it was not unusual to find them placed on small branches *between* the vertical trunks of two, sometimes among three, spindly and closely adjacent spruce trees (A. M. Courtright, L. J. Peyton). Egg dates about 8 March to about 24 June. Nest/4 half-fledged young, 20 April 1867, Nulato, Dall and Bannister 1869; large feathered young in nest on 20 April 1980, Fairbanks, R. B. Weeden; earliest fledged juveniles usually early May. In fourth quarter of 20th century, breeding densities on seven species-present 10-ha census plots, in both coniferous and mixed forests, were 0.5 to 1.0 territories/10 ha (Spindler and Kessel 1978, Kessel 1998; S. O. MacDonald).

Geographic variability of local abundances was evident from BBS numbers. Mean numbers on 50-stop routes conducted at least four years ranged from <1 to 19-25 birds, which seemed more a function of habitat quality than of location per se (BK). Postbreeding dispersal of juveniles began as early as the first week of June and continued through November. A less conspicuous movement occurred in spring, apparently among one-year-old birds and other nonbreeders that had not yet secured territories, e.g., occurrences in April, May, or early June in northern Alaska (e.g., three separate, basic-plumaged birds, 4-5 May 1964, Colville River drainage, West and White 1966; one, 25 May 1976, Happy Valley camp, Dalton Highway, Hohenberger et al. 1994), in western Alaska (one, 5 June 1880, Cape Romanzof, Nelson 1887; one, 24 May 1989, Kotzebue, fide W. R. Uhl; one, 10 June and 18 June 1996, Cape Nome, J. L. Dunn and G. H. Rosenberg+), and in south-central and southeastern Alaska, where birds from incursions of the previous fall departed by early June (e.g., still present May 1970, east of Cordova, Isleib and Kessel 1973; last seen, 9 May 1970, Juneau, R. J. Gordon, and 17 May 1970, Glacier Bay NM, D. K. Wik).

Gray Jays wintered throughout the breeding range, which extended to approximately 68°N, and beyond to towns and villages such as Anaktuvuk Village (Irving 1960). Winter numbers on Fairbanks Christmas Bird Counts 1980-2010 (n=21 years) averaged 70, minimum 29 (29 December 1979) and maxima 115 (30 December 2001), 126 (30 December 2000), and 135 (28 December 2002).

► *Pica hudsonia* (Sabine, 1823). Black-billed Magpie. Monotypic. Resident and breeder as far north as the Alaska Range (e.g., adults feeding six fully-fledged young, 19 June 1981, Igloo Creek, Denali NP, N. S. Proctor), and, east of interior Alaska, in southern Yukon Territory (Alexander et al. 2003). In 20th century known in the Interior north of Alaska Range

foothills only as a rare and local winter visitant. In eastern Interior usually arrived in fall in September (Earliest: one, 25 August 1995, 11 km west of Tok, T. J. Doyle; one, 28 August 1979, Ester, DDG; arrived in Tok on 3 September 1993, 4 September 1992, 6 September 1990, 6 September 1991, 17 September 1994, all TJD; one, 9 September 1977, Chena Ridge, R. H. Day; one, 18 September 1980, Ester, S. O. MacDonald; one, 5 October 1969, Ester, DDG and SOM; one, 25 October 1965, Univ. Alaska campus at Fairbanks, DDG; one, 25 October 1987, Galena, D. Patrick fide T. O. Osborne; and one, 4 November 1981, Fairbanks, P. Shields), at which time individual magpies located and remained close to a reliable food source for the coming winter (e.g., sled-dog yards, municipal landfills, even tray-feeders that offered, e.g., unshelled peanuts).

On Fairbanks Christmas Bird Counts the species was recorded almost annually from 1973 to turn of the century, usually singly, but occasionally in totals up to four; numbers increased at beginning of 21st century, when recorded annually 2001-2010, usually three to nine birds, maximum 17 magpies on 2 January 2005. On Delta Junction CBCs recorded annually from 1991 on, usually 4-19 birds, maxima 25 on 5 January 2008 and 27 on 20 December 2008. At Tok, where recorded annually from 1989, maximum CBC total was nine (19 December 1993 and 31 December 1994). In late winter these birds retreated, presumably to the Alaska Range (Latest: flock of five, 3 March 1984, Birch Hill, Fairbanks, S. M. Murphy and B. E. Lawhead+; at Tok one on 9 March 1995, 18 March 1993, 25 March 1996, and 29 March 1994—all TJD; one, 16 March 1975, Richardson Highway near Salcha, DDG and J. Jolis; one, 17 March 1985, Richardson Highway at Shaw Creek, P. J. Bente; last record on 21 March 1924, Nenana, Brandt 1943; one, still present 22 March 1981, Ester, R. S. Hadley; and one, 1 April 1977. Ester, L. Shon).

At and just beyond the perimeter of the western Interior (i.e., beyond the Alaska Range and the Kuskokwim Mountains) status perhaps similar. Species was recorded on the Tuluksak (annually), Kisaralik (nesting), and Kanektok (nesting) rivers (Petersen et al. 1991), but (in Kilbuck and Ahklun Mountain Region) “[w]e are uncertain as to the status of this species, possibly because of its seasonal altitudinal movements” (op. cit.:99). In their discussion of the Iliamna Lake area, Williamson and Peyton (1962:41) described magpies as birds that “move to mountain valleys near timberline during the breeding season and to lowlands during the fall and winter.” A specimen was collected at “Mission” on the lower Yukon River in midwinter 1880 (Nelson 1887:163), one was recorded at Flat for two winters in the early 1900s (Gabrielson and Lincoln 1959), and a specimen [not examined] was taken 12 February 1908 at Bethel (op. cit.), where the species was recorded annually on CBCs in the 1990s and early 2000s, usually one or two birds, but four on 30 December 1994 and seven on 30 December 1993.

The winter status described above closely resembles this species’ status in southeastern Alaska (see Gabrielson and Lincoln 1959, Heintz and Piston 2009), where it occurs in winter on the mainland and adjacent islands from September to April, reaching that area from adjacent Canada via the trans-Coast Mountain river valleys.

At beginning of 21st century first reported breeding in the Fairbanks area in very small numbers (e.g., trio of just-fledged siblings, 4 August 2001, Fairbanks dump, DDG).

► *Corvus corax* Linnaeus, 1758. Common Raven. Subspecies is *principalis* Ridgway, 1887 (type locality Saint Michael). “Geographically and ecologically one of the most widespread naturally occurring birds in the world” (Boarman and Heinrich 1999). In interior Alaska ubiquitous, generally uncommon resident and breeder; “but appears to prefer the vicinity of man, being much more common near the Indian villages and trading posts than in the

unpeopled wilderness” (Dall and Bannister 1869:285). Ravens utilize a broad range of habitats: boreal, conifer, and deciduous forests; tundra; isolated settlements, towns, and cities; agricultural fields; and the highest mountains; they prefer heavily contoured landscapes (e.g., cliffs), which provide thermals for long-distance foraging; and also areas with cliffs, trees, or human structures necessary for nesting (Boarman and Heinrich 1999).

Nesting habitat: Riparian and upland cliffs, tall trees. Formerly retreated in spring from proximity of human activity for nesting, but, increasingly, at beginning of 21st century, small numbers nested in close proximity to human communities in interior Alaska (e.g., in *Populus* at edge of Creamer’s Field, Fairbanks), even utilizing artifacts in the midst of human activity (e.g., nesting on superstructure of tower in Alaska Railroad yard, Fairbanks, 2010, DDG). Nesting activity from March. “They lay very early, about April 20th, and the young are hatched some time before open water (Dall and Bannister 1869:285). Eleven nest sites on upper Yukon River in 1968 included fledging of young in the first week of June (White and Haugh 1969); nests contained downy young on 16-17 May 1981, upper Susitna River, Kessel et al. 1982; pair at nest/2 young, 3 June 1996, 26.5 km west of Birch Creek village, Yukon Flats NWR, 21 m up in a white spruce, K. M. Sowl; active nests noted on the Tanana River on 25 May 1921, the Robertson River on 30 May 1921, the Yukon River on 29 May 1926, at Rampart on 31 May 1926, at Fort Hamlin on 1 June 1926, and a family on beach along the Porcupine River on 16 June 1926—all O. J. Murie; species probably breeds Anaktuvuk Pass area (Irving 1960). Not abundant on the Sheenjek May-July 1956 (Kessel and Schaller 1960).

In winter active in the coldest weather, when ravens with heads frosted from their own breath are a familiar sight in downtown Fairbanks. Locally common in winter about human communities (e.g., Fairbanks, where maximum Christmas Bird Count totals have been 2500 on

20 December 2000 and 2000 birds on 27 December 2003). Cold-tolerance of ravens is related to intensified metabolism, generating continual high heat production, not to impressive physiological or insulative adaptations for minimizing heat loss (Schwan and Williams 1978). In Asia this species has been recorded at elevations as high as 5000 m in Tibet and 6350 m on Mount Everest (Madge and Burn 1999), and raven footprints at 5200 m on the West Buttress of Mount McKinley in July 1968 (Edwards 1972) point to occurrence at substantial elevation in Alaska as well, at least at intervals and by individual birds.

ALAUDIDAE: Larks

► *Eremophila alpestris* (Linnaeus, 1758). Horned Lark. Subspecies is *arctica* Oberholser, 1902 (type locality Fort Reliance, Yukon River, Yukon Territory). Fairly common migrant and fairly common breeder in the mountain systems of interior Alaska, with fewer birds migrating through the lowlands than the uplands. Appeared to migrate primarily within the alpine habitats of the high country, weather permitting. In the lowlands, early migrants usually appeared during the fourth week of April (Earliest: eight, 15 April 1960, Salcha, B. N. Canady; three, 17 April 1988, Tok, ABR 1988; five, 25 April 1984, Galena, T. O. Osborne), followed by the main movement from the last few days of April through mid-May (Latest migrants: three, 19 May 1958, Fairbanks, B. Kessel; 30 at Northway airport, six along Northway road, 12+ along Taylor Highway, and 25-40 at Mount Fairplay, all 18-19 May 1974, DDG+; flock of six, 21 May 1971, Milepost 2 Taylor Highway, DDG+). (A male collected 3 April 1879 at Fort Reliance [13 km downstream from Dawson City], Yukon Territory [Nelson 1887], was probably a bird returning north with Snow Buntings.)

Nesting habitat: Dry, sparse dwarf shrub mat, adjacent to or intermixed with a relatively high proportion of bare soil and gravel substrate and often associated with block-fields; habitat generally drier and at higher elevations than habitat of most American Pipits. In upper Yukon River valley, “[d]rier summits and ridges above timberline” (Blackwelder 1919:62). Breeding birds tended to feed at patches vegetated with dwarf shrub mat or sedge/grass (greatest prey densities were found in heath and wet sedge, Mount Watana alpine, upper Susitna River basin, south-central Alaska, Cooper 1984). Egg dates about 20 May-8 July (BK and DDG).

In the Interior, Horned Larks were on territory by the second week of May (at least eight singing males, 6 May 1995, Eagle Summit, DDG; 8 May 1961, Mount Fairplay, R. B. Weeden). Egg-laying did not begin, however, until the fourth week of May (Earliest: 20-21 May 1953, based on young out of nest on 13 June, BK; 21 May 1953, based on adults carrying food on 4 June, BK; at least by 21 May 1979, based on a 4-egg clutch found on 24 May, D. B. McDonald; at least by 23 May 1961, based on 4 nestlings found on 8 June, I. R. Schreiber—all Eagle Summit, Steese Highway; adult feeding two fledglings, 18 June 1981, ridge above Camp Denali, N. S. Proctor).

The species began to move to lower elevations by mid-August (Earliest: five birds, 17 August 1959, and twelve, 20 August 1960, Fairbanks, H. K. Springer; six, 19 August 1988, Tok, ABR 1989). Migration continued through most of September (e.g., 63 birds in four flocks, 3 September 1960, Fairbanks, HKS; 40-60+ birds/day, 9-21 September 1978, and 10-15 birds/day through 24 September 1978, Delta Junction. C. M. Boise), but was essentially over before the end of the month (Latest: four birds, 9 October 1973, Tanana, T. Sniffen; one, 10 October 1920, above timberline on North Fork, Chena River, O. J. Murie).

HIRUNDINIDAE: Swallows

► *Tachycineta bicolor* (Vieillot, 1807). Tree Swallow. Monotypic. Fairly common migrant and breeder throughout the forested Interior. Arrived in spring in late April-early May, from 29 April to 3 May in 12 of 16 years at Fairbanks (Earliest: one, 20 April 1987, R. S. Hadley; four, 25 April 1977, D. Kurhajec; recorded 26 April 1983, A. D. McGuire; two, 29 April 1979, Fairbanks, D. M. Troy; one, 29 April 1988, Tok, ABR 1988; two on 1 May 1987, Fairbanks, B. A. Anderson; one, 2 May 1972, Fairbanks, DDG; flock of 31, 3 May 1980, Clearwater Lake, DDG, P. D. Martin, and J. Jolis). Primarily a bird of forested regions, Tree Swallows occurred in a variety of open habitats, from natural forest openings and cutover areas to open meadow and shrub habitats and unvegetated substrates. They were often associated with open freshwater habitats, either lacustrine or fluvial, but they also occurred far from such wetlands. They tended to concentrate about human habitations, especially where forests were lacking, apparently because of available nesting sites and the protection provided by various artificial structures in lieu of trees (B. Kessel and DDG).

Nesting habitat: Under natural conditions, nest sites usually cavities in either dead or living tree trunks or branches, e.g., old woodpecker holes or natural cavities in either deciduous or coniferous trees. Mature balsam poplars, with their dead branches and rotted limb axils, are commonly used, as are dead snags and stumps of any tree species. They are opportunists and use a wide variety of other sites, especially cavities in buildings, including old cabins, mining dredges, and canneries, in nest boxes, and in fence posts and utility poles. Nesting at more unusual sites was sometimes attempted, especially beyond timberline, where they often used pipe openings (e.g., a horizontal pipe on a road-grader at Bettles, even though the equipment was used

between the laying of the third and fourth eggs, G. and V. Staender). Egg dates about 25 May through 16 July (BK and DDG).

Fall departure began soon after fledging of young and peaked during the last two weeks of July, e.g., "large flocks" of Tree and Bank swallows, 16-19 July 1962, Tetlin Lake, Yocom 1963a; flock of more than 250 Tree Swallows, 29 July 1971, Fairbanks, T. H. and F. G. Hering). Exceptionally late departures included one on 20 September 1978, Tok (S. O. MacDonald); one on 24 September 1969, Fairbanks (J. W. Willetts); and one on 9 October 1966, 8 km north of Healy (D. Eisfeld).

► *Tachycineta thalassina* (Swainson, 1827). Violet-green Swallow. Subspecies is nominate *thalassina*. Fairly common migrant and breeder throughout the Interior, arriving from last week of April to second week of May (Earliest arrivals included 24 April 1991, Fairbanks, J. Chumbley; one, 25 April 1988, Tok, ABR 1988; 26 April 1961, Fairbanks, B. Kessel; 27 April 1974, Fairbanks, J. Egan; two, 28 April 1979, Fairbanks, R. H. Day, R. B. Weeden; and, all on 29 April 1989, two at Fairbanks, P. J. Deviche; five and eight+ birds about two nesting sites along Richardson Highway east of Fairbanks, DDG and J. Jolis; c. 10 at North Pole, M. Ross; and two at Dot Lake and one at Tok, DDG and JJ), from 4 May to 10 May in 20 of 34 years (61%) at Fairbanks (e.g., flock of 35 on 4 May 1983, DDG and RHD). Spring movement continued through May. Species nested as far north and west as the southern slopes of the Brooks Range from the very headwaters of the major drainages (Sheenjok River, Kessel and Schaller 1960; upper Hunt Fork and Loon Lake, G. and V. Staender+; Bettles, Irving 1960; Walker Lake, Dean and Chesemore 1974).

During spring counts in 1988 and 1989 at Tok (ABR 1988, 1990), almost three times as many Tree Swallows as Violet-greens were identified. Local abundance varied considerably,

however, apparently reflecting availability of nesting habitat, and relative abundances of the two species shifted over the years. At Fairbanks from 1951 to 1962, Violet-greens were more numerous than Trees, but in 1963 there was an increase in the number of Trees to about equal in numbers. Numbers remained thus through 1968, after which Tree Swallows began again to predominate. By 1972 most swallows in the bird houses at Fairbanks were Trees. Violet-green Swallows increased somewhat in 1975, but were no more numerous than Trees, and they were outnumbered by Trees again in 1976-1978. In 1979, however, even though Violet-green migration began early and continued normally through May, something severely affected Tree Swallow migration, and no Tree Swallow was seen in Fairbanks from 1-18 May. Apparently as a result, Violet-greens were more numerous than Trees in 1979, but numbers were equal again in 1980 and continued thus through 1989. A major reversal occurred in 1990, however, when 80% of breeding *Tachycineta* in Fairbanks were again Violet-green Swallows (random survey 19 June and 1-4 July 1990, BK).

Nesting habitat: Nested colonially as well as in discrete pairs, under natural conditions in crevices in rocky cliff faces, often in small colonies, some of which reached 10-20 pairs – in the mountains, along rivers, and along highways (e.g., in rocky road cuts along Richardson Highway where close to Tanana River). Less frequently used the same types of sites as the Tree Swallow, such as nest boxes and pipe openings and holes in trees, dead snags, poles and posts, and buildings. One nest at Fairbanks was placed 60 cm back into the end of a 7.5-cm diameter horizontal pipe (27 May 1960, BK). Another Fairbanks nest was in an attic, with access through a clothes dryer-exhaust vent (to enter, the adults, with a flick of the beak, flipped open the suspended aluminum flapper that closed the vent and darted inside—DDG). “Abundant along the Yukon and locally in the mountains farther west. Normally it nests among the cliffs in

chinks in the rocks, but it was also seen going in and out of the Bank Swallow's burrows in the silt terraces along the river and was also using old mud nests of the Cliff Swallows”

(Blackwelder 1919:63). Egg dates 21 May to about 20 July (BK and DDG).

Like other swallows, Violet-greens departed on fall migration only a few days after fledging young, many by 20 July. Postbreeding flocks of 20-30 feeding birds were recorded almost anywhere in the breeding range during the last third of July (e.g., 22 July 1975, Yukon River bridge, Dalton Highway, H. K. Springer; 26 July 1974, Fairbanks, T. T. Wetmore). Latest: 11 August 1915, upper Yukon River (Blackwelder 1919); recorded 19 August 1987, Tok (B. A. Cooper).

► *Riparia riparia* (Linnaeus, 1758). Bank Swallow. Subspecies is nominate *riparia*. Common migrant and common or abundant breeder throughout the Interior, arriving in mid- to late May (Earliest: one, 13 May 1967, Moody, H. K. Springer; recorded, 13 May 1980, Fairbanks, B. Kessel; one, 13 May 1988, Tok, ABR 1988, and at least five, 14 May 1988, Fort Wainwright, J. F. Kelly). First sightings at Fairbanks were usually between 17 and 24 May (21 of 27 years). Arrived upper Toklat River in 1908 on 18 May (Sheldon 1909).

Nesting habitat: Vertical dirt banks, with a preference for fresh-cut faces when available—cutbanks along rivers and windblown lakes, road cuts, excavations for building construction, gravel mining operations, including gravel pits and dredge tailings, in sand dunes, and where dirt had slumped at the tops of rock cliffs (BK and DDG). Greatest densities were near water, reflecting the fact that water erosion produces many of the nesting banks and the fact that their food resources are more abundant in wetlands. Waterbodies were not a nesting habitat requirement, however (BK). Many colony sites were abandoned after four to seven years unless new faces were formed. Bank heights varied, from 0.75 m to over 30 m (BK), as did colony

size, which at some sites exceeded 1000 birds (700 burrows, all apparently occupied, in 1867, “Nuklukahyét” [junction of Yukon and Tanana rivers], Dall and Bannister 1869:280; 500+, Yukon River at Eagle, 1966, White and Haugh 1969; and 1000 birds at Eagle, 1989, DDG and R. W. Dickerman).

Bank Swallow was the third most numerous and widespread species (of 10 ranked; followed Northern Waterthrush and Fox Sparrow), 1.53 birds/stop detected 8-25 June 2001, on Lower Kuskokwim River BBS (Aniak to Napaskiak), C. M. Harwood+. It was the second most numerous species (of 10, followed Northern Waterthrush) – 2.48 birds/stop, but did not rank in top 10 species in % of stops detected – 10-27 June 2002 on Lower Yukon River BBS (Anvik to Emmonak), CMH+.

In some years activity at colonies continued through mid-August (e.g., eight birds at colony, 18 August 1973, Fairbanks, BK; pair with three large nestlings, 18 August 1978, south of Fairbanks, Hickman 1979; two birds about colony bank, 21 August 1977, ‘Riverside’, upper Tanana River valley, M. A. Spindler), but fall migration was normally under way by end July (e.g., flock of 125+, 3 August 1985, Fairbanks airport, DDG+), after which time numbers dropped sharply. Species was normally rare after mid-August, when most late broods had fledged and when most birds from western Alaska had transited the Interior, after which only stragglers were seen by the end of August (Normal latest: one, 20 August 1971, Fairbanks, B. B. DeWolfe). Exceptionally late: one, 22 September 1982, 24 km north of Koyukuk (T. O. Osborne); and two, 30 September 1978, Clearwater Lake (P. G. Mickelson+).

► *Petrochelidon pyrrhonota* (Vieillot, 1817). Cliff Swallow. Subspecies is nominate *pyrrhonota*. Common migrant and breeder throughout the Interior, arriving in spring, with erratic interannual timing, in first three weeks of May (Earliest: one, 1 May 1987, Fairbanks,

M. Matsuki; three, 2 May 1978, Fairbanks, S. E. Quinlan; one, 3 May 1976, Fairbanks, B. Kessel; two arrived 10 May 1868, most not until 16 May, Nulato, Dall and Bannister 1869; one, 10 May 1988, Tok, ABR 1988; recorded 10 May 1988, Univ. Alaska campus at Fairbanks, R. B. Weeden; arrived about 14 May 1867, Nulato, Dall and Bannister 1869; six to eight birds, 14 May 1970, Chisana River bridge, DDG+; first on 14 May 1984, 15 May 1985, and 19 May 1986, all Fairbanks, RBW; in 1979 none at Fairbanks until 25 May, when arrived in substantial numbers, BK+). At Fairbanks arrivals clustered at 11-15 May (15 of 33 years); arrivals 10-16 May over eight years at Galena (T.O. Osborne) and at Nulato (Dall and Bannister 1869) were similar. Colonies were established on buildings at the University of Alaska campus, Fairbanks, as long ago as 22 June 1928 (B. Gasser), and long known to have nested at Flat and Iditarod, in Kuskokwim River valley, and at Holy Cross, on the Yukon (O. J. Murie+ *in* Gabrielson and Lincoln 1959)

Nesting habitat: Cliff faces and man-made structures, in colonies of varied size, elevations to over 1200 m, at and beyond timberline (e.g., 50 nests on south-facing bluff near Lobo Lake, Sheenjek River, Kessel and Schaller 1960). Colonies of just two or three pairs not uncommon. Maximum colony size in Interior was 230 nests, 17 June 1976, Gardiner Creek bridge, Alaska Highway (Kessel and Gibson 1978). (Larger colonies are known in adjacent south-central Alaska, e.g., 425+ nests, 3 July 1983, Clearwater Creek bridge, Denali Highway, P. D. Arneson; and 750 nests, plus another 75 on nearby buildings, 18 June 1995, Maclaren River bridge, Denali Highway, BK; and in adjacent western Alaska, e.g., 500 nests, July 1979, Kisaralik River canyon walls, Petersen et al. 1991.) Recorded by Dall and Bannister (1869) at Nulato and Fort Yukon; Dice (1920) found colonies at Rampart 21 July 1911 and at Takotna on 22 July 1912; and Blackwelder (1919) found a colony at the mouth of Thanksgiving Creek, on

the Yukon. In Tanana 53 nests on one building and others in the vicinity, summer 1967 (M. L. Bee).

In Ray Mountains a colony of 64 nests under a shallow rock overhang on vertical face of a tor in Spooky Valley; birds still present on 8 August 1979, but numbers greatly reduced and activity near the nesting area almost nonexistent (Matthews 1980). Eggs by 11 June in Denali NP (Sheldon 1909); five colonies in Denali NP, 9 June 1977—30-50 nests on cliff on west side of lower Toklat River, 10-15 nests five or six miles downstream from the bridge, and three colonies on cliffs of Stony Creek, one with c. 100 pairs (K. Kertell). Egg dates 1-2 June through 26 July (BK and DDG).

In the Interior, numbers generally increased with proliferation of artificial nesting sites provided by human construction, e.g., buildings, mining dredges, and bridges (Kessel and Gibson 1994), but without such construction species was at least uncommon to the very limit of range in western Alaska—'abundant' on Anvik River, where majority of small rocky outcrops on entire river had colonies of six-50 nests, 27-30 June 1977 (C. M. White); common in Kilbuck-Ahklun Mountains (Petersen et al. 1991); two colonies of three and seven nests, 1963, Kolomak River (Kessel et al. 1964); colony of up to 14 nests, 1966-1968, Kolomak River-Askinuk Mountains (Holmes and Black 1973); 11 colonies of 10-58 nests, Seward Peninsula (Kessel 1989)—and northern Alaska—colony at 68°35'N on Kuparuk River, in 1908 or 1909 (Irving 1960).

Departed on fall migration as soon as the young fledged; the only obvious postbreeding aggregations were "swarms" in the immediate vicinity of colonies at the height of fledging. Those birds quickly disappeared, leaving only birds still tending nests remaining in those areas. Thus fall migration begins shortly after mid-July (e.g., bulk of colony of 97 nests vacated by 25

July 1988, Eielson AFB, J. F. Kelly). In the Interior, Cliff Swallows became rare after the first week of August, and most had departed by mid-August (e.g., at University of Alaska at Fairbanks in 1984 departure 29-31 July, 25± still present on 2 August; in 1985 'swarmed' 23-25 July, most departed 27-28 July, on 30th still 20 birds left; in 1986 departed 30-31 July 1986, 50 left on 1 August; and in 1987 departed 28 July, only four adults still feeding young at nests by 30 July—all R. B. Weeden. No birds remained in Northway area on 31 July 1962, Yocom 1963a; but common at Fort Yukon until mid-August 1962, Yocom 1964). Latest records included birds flocking to leave, 8 August 1984, Galena (TOO); departed second week of August 1974, Tanana, T. Sniffen; last were a few on 14 August 1962, Fort Yukon (Yocom 1964); 28 August 1911, Porcupine River at Alaska-Yukon border (Williams 1925); four, 8 September 1978, north of Dot Lake (BK); one, 14 September 1977, Delta Junction (S. O. MacDonald and M. A. Spindler); three, 15 September 1987, Tok (ABR 1988); and one, 21 September 1980, North Pole (P. Schuler).

► *Hirundo rustica* Linnaeus, 1758. Barn Swallow. Subspecies is *erythrogaster* Boddaert, 1783. Casual spring migrant in the Interior in May-June during second half of 20th century; nested recently at eastern perimeter (see beyond)—recorded spring 1950, Fairbanks (T. J. Cade); one, 24 May 1964, Tetlin Lake (K. B. Schneider); one, 8 May 1966, Dot Lake (R. B. Weeden); two, 8 May 1970, Fairbanks (P. Vlasak); one in June 1974, Nyac (D. N. Weir); one with pair of Tree Swallows, 14 May 1976, Fairbanks (S. Dubois); one, 8 June 1977, Toklat Ranger Station and Eielson Visitor Center, Denali NP (K. Kertell); one, 10 June 1978, near Toklat Ranger Station (M. and S. Tollefson); one, 16 May 1984, Galena (T. O. Osborne); pair feeding four fledglings, 30 July 1985, Scottie Creek (M. E. Isleib); and one with Tree Swallows, 13 May 2007, Fairbanks (L. H. DeCicco).

Barn Swallows underwent “a substantial population reduction...in central, southwestern, and western Alaska sometime after the mid-1920s” (Kessel and Gibson 1978:62), but only sketchy information exists on their former status in the Interior. Dall and Bannister (1869:279) reported it (under the name *Hirundo horreorum*) to be “extremely abundant; nesting in the eaves of the buildings in and about the fort” at Nulato, where, the first few having reached there “the previous morning,” the species arrived in numbers, with Tree and Cliff swallows, about 14 May 1867. (A specimen collected 19 May 1867 at Nulato [loc. cit.] was not at USNM in 2011, but see Appendix I for specimens taken subsequently at Hotham Inlet and at Saint Michael, in western Alaska.)

The species is included here for the possibility of a population-level breeding range expansion into the Interior from southern Yukon Territory (Alexander et al. 2003), where it is an uncommon breeder as far west as Haines Junction and Kluane Lake (Hoefs 1973; MEI). And, indeed, it has nested once recently in the Interior, right at the international boundary, in 1985 (see Scottie Creek, above).

Nesting habitat: Various habitats up to elev. 3000 m, including agricultural areas, cities, and suburbs, and along highways; usually includes open areas (fields, meadows) for foraging and nest site to include a vertical or horizontal substrate, often enclosed, underneath some type of roof or ceiling, and a body of water that provides mud for nest-building. The mud nest is either fastened to a vertical wall underneath a horizontal overhang, often near juncture of wall and ceiling, or built on top of a horizontal ledge or other substrate underneath an overhang (Brown and Brown 1999).

PARIDAE: Chickadees

► *Poecile atricapillus* (Linnaeus, 1766). Black-capped Chickadee. Subspecies is *turneri* Ridgway, 1884 (type locality Saint Michael). Fairly common or uncommon resident and breeder throughout the Alaska taiga (Kessel and Gibson 1978), beyond which its range extends north into tall shrub thickets in the Brooks Range and west into tall shrub thickets in western Alaska (Kotzebue Sound, Norton Sound, lower Kuskokwim River) and in southwestern Alaska (head of Bristol Bay, south coast of Alaska Peninsula and Shumagin Islands, and Unimak Island, Aleutians). Essentially sedentary.

Nesting habitat: Deciduous forests and woodlands. In the Tanana River valley, Black-capped Chickadees showed the greatest affinity of any passerine for deciduous habitats (combined deciduous tree importance 61%) and showed an avoidance of spruce (Spindler and Kessel 1980). They also did not use spruce in Yukon Territory (Frisch 1987). Generally in the Tanana River valley (Spindler and Kessel 1980), they were found in relatively heavy-canopied deciduous forests of large trees; they were somewhat more numerous in paper birch forests than in aspen—60% of observed activity was in birch trees and 20% each in aspen and poplar/cottonwood trees—where they favored spatially homogeneous forests (ibid.). Egg dates about 8 May-7 June at Fairbanks (B. Kessel and DDG). In seasonally early years in the Interior, nest-building begins at the end of April (Earliest: digging hole 13 April 1993; gathering moss 28 April and adding lining of dog hair 2 May 1995; lining nest with puppy fur 2 May 1991, all Fairbanks, BK). Late nesters (probably yearlings or renesting attempts) might still be building after mid-May (Latest: carrying nest material into cavity, 17 May 1960, 17 May 1961, 18 May 1989, all Fairbanks, BK). Egg-laying usually peaks in mid-May, with peak hatching during the first week of June (Earliest hatch: 27 May 1995 and 29 May 1998, Fairbanks, BK). Fledging most years is during mid-June (Earliest: 10 June 1990, 10 June 1995, 12 June 1991, 13 June

1976, all Fairbanks, BK). Late broods might not fledge until the fourth week of June, even later in seasonally late years.

A 10-ha census plot in upland paper birch forest in the upper Tanana River valley held 1.0 territories in 1977 (Spindler and Kessel 1978), and a riparian cottonwood forest adjacent to the upper Susitna River [south-central Alaska] supported 1.8 territories in 1981 and 2.0 territories in 1982 (Kessel 1998). Those densities were comparable to those reported from several temperate areas east and south of Alaska (see Foote et al. 2010). Numbers on a standardized 40-stop roadside count at Fairbanks during May-June 1976-1985 were usually 2-6 birds/count (B. Kessel). High average counts on standardized 50-stop BBS routes in Alaska were 6-10 birds; the average over six years on a route near Fairbanks was six birds, and over two years near Dillingham [southwestern Alaska] was seven. Egg dates: about 8 May-7 June at Fairbanks (BK).

Over 60,000 Canadian banding records collected from 1921 to 1995 showed that 90% of recaptured birds show no movement (Brewer et al. 2000). Long-distance movements did take place, however, generally by young birds during a period of post-fledgling dispersal. In addition, large movements occurred irregularly every 2+ years; those events are best termed “irruptions” rather than true migration (Foote et al. 2010 and citations therein). Few adults were involved in those irruptions (Bagg 1969, Smith 1991).

Interior Christmas Bird Count totals at Fairbanks between 1982 and 2010 varied from 128 to 1177; at Galena between 1982 and 2010 from two to 83; at Denali NP between 1993 and 2010 from two to 32; and at Delta Junction between 1993 and 2010 from six to 52 birds. At Bethel the species was not recorded annually, 1989-2010; in years when recorded numbers varied from seven to 81 birds.

► *Poecile hudsonicus* (Forster, 1772). Boreal Chickadee. Subspecies is nominate *hudsonicus*—including both *evura* Coues, 1884 (type locality Nulato—Phillips 1986:81) and *stoneyi* Ridgway, 1887 (type locality Kobuk River). Uncommon or fairly common resident and breeder throughout the taiga of interior Alaska, occurring north to the limit of spruce in the upper valleys of major drainages on the south slope of the Brooks Range (e.g., Walker Lake at headwaters of the Kobuk River, upper John River near Anaktuvuk Pass, upper Dietrich River, and upper Sheenjek River to north of Last Lake). Sedentary.

Nesting habitat: Showed a strong affinity for coniferous trees and was rarely found far from them. During the breeding season it occurred mostly in closed or open coniferous forests and woodlands, especially those of white spruce, and in mixed deciduous-coniferous forests with a substantial spruce component. ‘Spruce Importance Values’ in upper Tanana River valley habitats (Spindler and Kessel 1980) were exceeded only by those of White-winged Crossbills and Townsend's Warblers, and substrates used by Boreal Chickadees were 80% white spruce, 9% aspen, 5% willow, and 4% black spruce. At other seasons Boreal Chickadees increased use of deciduous habitats, including tall and medium shrubs, especially willows and alders. In winter, about food-rich sites, such as artificial feeders, they might frequent primarily deciduous forests, but at least a few spruce trees remained a habitat requirement (B. Kessel). Most egg-laying takes place during the last half of May, peak hatch is about 5-15 June, and most broods fledge in late June-early July; egg dates about 3 May to mid-July (BK and DDG). Species is discreet when nesting, so examples of breeding phenology are few, but include nests under construction in old woodpecker holes by 15 May 1899, upper Kobuk River (Grinnell 1900); one food-carrying adult, 6 June 1984, Wiseman (DDG); pair feeding young in nest cavity, 13 June 1977, upper Tanana River valley (M. A. Spindler); pair feeding young in nest, in hollow

top of a leaning 15-cm dbh black spruce snag, 17 June 1981, upper Susitna River (Kessel et al. 1982); and, at what must be limit of acceptable habitat, a pair nested 1.5 m up in natural cavity in willow *Salix*—in tall shrub thickets beyond timberline—in a draw above upper Dietrich River valley, below Atigun Pass, male feeding female at nest, eggs in nest, 8 June 1984 (DDG).

Breeding densities on species-present 10-ha census plots in both the upper Tanana Valley (Spindler and Kessel 1978) and upper Susitna River basin (Kessel 1998) were 1-2 territories/10 ha—in white spruce forests, in mixed white spruce-paper birch forests, and in a black spruce dwarf forest. Numbers in the better habitats on 50-stop BBS routes in interior Alaska averaged 3.5-4.5 birds, about half the numbers of Black-capped Chickadees found in these habitats on Alaska BBS routes. Numbers appeared to be relatively stable from year to year at Fairbanks, but changes in population levels were difficult to discern; numbers declined somewhat over the winter, however, probably from mortality (Fairbanks feeder counts, J. M. Wright).

On November feeder counts at Fairbanks (JMW) from 1986 through 1997, the average number of birds varied from 1.8 to 3.3 individuals per feeder. Numbers recorded on Fairbanks Christmas Bird Counts showed greater variability, with numbers between 1982 and 2010 ranging from 55 to 298 birds, close to 50% of them counted at feeders. (Some of this variability could be attributed to differences in the number of census participants and in the weather, however, as severe cold, or wind, suppressed activity levels of both the chickadees and the observers.)

Although apparently sedentary in Alaska, irregular irruptive fall movements have been observed south of the breeding range in eastern North America, where they have taken place in different areas in different years (Ficken et al. 1996)—perhaps a reflection of years of local, unusually high reproductive success. In New York state over a period of 30 years, Boreal Chickadees irrupted every 2-3 years, and every 6-8 years there was a major irruption (Yunick

1984). This species' no more than casual occurrence, in fall and winter, on the mainland of southeastern Alaska (BK and DDG), might reflect related movement.

► *Poecile cinctus* (Boddaert, 1783). Gray-headed Chickadee. Subspecies is *lathamii* Stephens, 1817 (type locality Norton Sound). At beginning of 21st century status in interior Alaska not at all well understood. Perhaps rare resident and breeder in western and northwestern Interior; in eastern Interior known with certainty only as a casual visitant in fall and winter. At least formerly, the Gray-headed Chickadee was a common resident in adjacent western Alaska in the Noatak and Kobuk river valleys (see McLenegan 1889, Grinnell 1900, Hines 1963), and east of that region it was found in the northwestern and northern Interior in the Brooks Range (e.g., Alatna River, Murie 1928), but no recent information; farther east, it has been found to nest locally, where there are riparian cottonwoods large enough to provide nesting substrate, in the upper reaches of montane drainages on the *north* slope of the Brooks Range (e.g., Canning River, R. Ditttrick; Firth River, M. A. Spindler).

In the nonbreeding season, this species has been recorded on the lower Yukon River (Nulato—Turner 1886, Nelson 1887, Gabrielson and Lincoln 1959; Kaltag—one, 12 September 1985, and two, 1 October 1985, M. L. Ward; Russian Mission—one Museum of Vert. Zoology specimen [examined], 19 October 1894, C. S. Hall), on the Norton Sound coast (two California Acad. Sci. specimens [examined], 15 March 1882, Saint Michael, collector unknown), and on the lower Kuskokwim River (Bethel—one with Boreal Chickadees, 7 September 1996, B. J. McCaffery).

In the western Interior, information is sketchy and the bird's status remains unclear. Here again, most records are from the nonbreeding season (Galena—two, 22 December 1983, T. O. Osborne; Koyukuk River—recorded Peter Cleaver Lake, 30 March 1983 and two Univ. Alaska

Museum specimens [examined], 23 March 1984, TOO; Beaver Mountains—one U.S. National Museum specimen [examined], 6 April 1924, Dishna River, Murie 1928, Brandt 1943), but there is one record in late summer from Denali NP (one MVZ specimen [examined], 25 July 1926, Savage River, J. S. Dixon), and the species was reported in fall on the Toklat River (one, 17 September 1981, Toklat River at 64°N, M. L. Ward). Since the species is apparently sedentary, like its congeners in Alaska, many of those records probably reflected not-distant nesting populations.

In the eastern Interior the species has been recorded in fall and winter as a casual or very rare visitant (e.g., McManus and Twelvemile creeks—two USNM specimens [examined], February 1921, Murie 1928. Fairbanks area—one, 14 September 1995, R. H. Day; one, 3 October 1993, P. D. Martin; one, 25 October 1974-21 March 1975, L. J. Peyton, B. Kessel+; one, 10 January-8 April 1968, BK+. Taylor Highway—one, 12 February 1968, 16 km south of Chicken, H. K. Springer. Upper Tanana River drainage—two, 10 March 1968, Tok, HKS). It was recorded once in late summer on the upper Yukon River at Eagle (one USNM specimen [examined], 31 August 1903, W. H. Osgood), but reports of occurrence in midsummer on the Steese Highway (one, 9 July 1967, along Twelvemile Creek, R. J. Gordon), in the eastern Alaska Range (Hailman and Haftorn 1995), and in the Wrangell Mountains (Sage 1975) remained uncorroborated by specimen or photograph.

Species favors tree-height vegetation, especially during the breeding season, and occurred mostly in scattered woodlands of spruce or small patches of open-canopied spruce forests, forests that often also included an admixture of deciduous trees. These open stands of trees in the taiga were interspersed with deciduous shrubs, usually willows or dwarf birch, and in riparian

situations these shrubs might form dense medium-height or tall stands along the watercourse. This associated deciduous shrubbery was an important foraging substrate throughout the year.

Little breeding information available from Alaska. A female (MVZ specimen, examined) with a fully formed egg in oviduct was collected 8 May 1899 on the Kobuk River (Grinnell 1900). In northeasternmost Alaska, on Firth River at Mancha Creek, an adult was seen carrying food on 5 June 1979 and two fledglings being fed by an adult were observed on 15 June 1979 (M. A. Spindler). At the headwaters of the Marsh Fork of the Canning River, adults were seen feeding nestlings on 18 June 1997 in a cavity 1.5m up in a live 18-cm dbh cottonwood with partially decayed heartwood (R. Dittick+). These few observations indicate a seasonal chronology closely similar to those of the Black-capped and Boreal chickadees in the Interior.

For recent discussion of status in adjacent Yukon Territory, where it is also not well known, see Alexander et al. (2003:526).

SITTIDAE: Nuthatches

► *Sitta canadensis* Linnaeus, 1766. Red-breasted Nuthatch. Monotypic. Rare visitant at any season in the eastern Interior, where a rare breeder in the Tanana River valley (after 1994); known much less regularly elsewhere in the Interior. Rare and erratic fall migrant in interior Alaska until autumn 1983, when the species became nearly annual. First successful overwintering took place in 1991-1992 (Fairbanks, K. R. Whitten), and, following a major influx of nuthatches in fall 1992, when reported from seven sites about Fairbanks, another nuthatch overwintered in 1992-1993 (A. M. and M. I. Springer). None was recorded after early October 1993 until a major influx in autumn 1994, which began in early August (Earliest: 6 August, Tok, T. J. Doyle; 9 August, Fairbanks, F. M. Chauvin) and brought nuthatches to at least 20 different

sites about Fairbanks during that fall and early winter. There were at least 10 instances of overwintering in winter 1994-1995, when an unparalleled 23 nuthatches were recorded on the Fairbanks Christmas Bird Count on 17 December 1994.

Nesting habitat: Elsewhere (beyond Alaska), typically mature and diverse stands of coniferous forest, especially where spruce, fir, pine, hemlock, larch, and cedar are present, and less frequently in pure stands of pine and hemlock; also bred in mixed woodland when strong coniferous component was associated with deciduous trees such as aspen, oak, and poplar, rarely in pure aspen woodlands up to 160 km from nearest conifer forests; frequently occurred over wide range of forest types from pure coniferous to mixed stands with significant deciduous component (Ghalambor and Martin 1999 and citations therein). Nesting in the Interior was first documented in summer 1995 in the Fairbanks area (two begging fledglings, 18 June, P. J. Deviche; family of four at bird bath, 11 July, G. L. Lake; juvenile captured, 26 July, B. E. and D. H. Lawhead; trapped female with refeathering brood patch, 10 August, L. J. Peyton). Although dispersal was evident in these Interior-nesting birds by mid-August, members of local families sometimes formed cohesive groups and remained together at least into early winter (group of six, October 1995, about feeder near Fairbanks, KRW). In resident populations, such as those about Fairbanks, it is likely that surviving family members remained together about food resources throughout the winter, until territorial behavior developed in early spring. A population established itself at Fairbanks after the 1994 irruption, and although local numbers declined in succeeding years (J. M. Wright), breeding pairs were present each summer thereafter.

The irruptive nature of Red-breasted Nuthatch populations is well known (e.g., see Bock and Lepthien 1976). Nuthatch irruptions in Alaska were characterized by periodic autumnal increases in abundance, beginning in mid-August, followed by a decrease in numbers during the

winter (Kessel and Gibson 1978). Irruptions were usually asynchronous in different regions of Alaska, but irregular occurrences of one or two individuals at sites in the Interior (and in western and southwestern Alaska—*ibid.*) often were concurrent with irruption years in south-central and/or southeastern Alaska. It was unclear, however, how many of these occurrences were the result of periodic irruptions or of what appear to be near-annual postbreeding dispersal between mid-August and mid-October, mostly of young birds.

It was thought that mortality increased with severity of winter cold, however, which alone might account for the failure of this bird to have established truly viable populations in the taiga forests of the Interior. A cold snap to -51°C in early December 1994 at Tok certainly contributed to mortality (T. J. Doyle). Interior Christmas Bird Count totals have included one nuthatch at Galena on 19 December 1997; two at Denali NP on 28 December 1997 and one on 28 December 2002; single birds at Tok on 27 December 1994, 18 December 2006, 5 January 2008, 20 December 2008, and 20 December 2009 at Delta Junction; and four birds each on 16 December 2004, 14 December 2007, and 15 December 2009, two on 14 December 2008. A maximum count of 23 nuthatches at Fairbanks on 17 December 1994 was followed thereafter by annual records, in totals of up to seven.

CERTHIIDAE: Creepers

► *Certhia americana* Bonaparte, 1838. Brown Creeper. Subspecies is *alascensis* Webster, 1986 (type locality Fairbanks). Not well known in interior Alaska (see Hejl et al. 2002), where a rare resident and breeder. Only one report prior to 1960 (21 October 1907, Toklat River, Dixon 1938), but species was subsequently found to be resident locally and in small numbers in the Tanana River valley (primarily Fairbanks vicinity—see Van Velzen 1963,

Kessel and Springer 1966; also one singing bird, 23 May 1987, in large spruce along Clearwater Creek, just south of Tok, D. R. Herter). Few records from elsewhere (e.g., one visited peanut butter and suet feeder on tree, 28 September 1985, Kaltag, M. L. Ward).

Nesting habitat: Large-bole trees and closed-canopy forests, conditions most often provided by old growth or mature forests. In Alaska creepers favored coniferous forests, Sitka spruce-western hemlock in coastal forests and white spruce forests elsewhere, but also used mature and old growth mixed coniferous-deciduous forests and forests of large cottonwoods (B. Kessel and DDG). Plot censuses of breeding densities in upper Tanana valley (Spindler and Kessel 1978) revealed 1-2 territories or prs/10 ha, but too few territories (only 2.5, where 53% of birds observed were in white spruce and 40% in paper birch) to allow adequate definition of habitat (Spindler and Kessel 1980). On most BBS routes average was <0.67 birds/route. Four birds seen 11 June 1988 at Bonanza Creek burn included an adult carrying food to a nest located under a loose strip of bark about 5.5 m up a dead spruce (J. F. Kelly); a family group, 2 July 1985, Rosie Creek burn, W. A. Lehnhausen; family group of 6-8 birds, 6 July 1986, near Fairbanks, D. H. Lawhead; family, 14 August 1977, near Tetlin Junction, upper Tanana River valley, BK and M. A. Spindler; families comprising at least three birds, 27 August, and three birds, 23 September 1964, Bonanza Creek, Kessel and Springer 1966. Egg dates c. 8 May-8 July [in southeastern and south-central Alaska].

Conditions seemed to be marginal for the existence of this species in the Interior. The effect of severe winter weather at Fairbanks included one creeper's roosting during winter 1987-1988 in house eaves, where two roosted in 1988-1989 until the birds disappeared in late January (D. R. Klein) following two weeks of daily low temperatures of -50° to -55°F and highs of -40° to -44°F; elsewhere in the Fairbanks area, creepers had been present continuously since winter

1982-1983, but the cold apparently killed them and none was seen there for the next three years (B. E. and D. H. Lawhead).

Seasonal movements evident in September-early October, with birds inconspicuous and noted only infrequently after the first week of November (e.g., two, 25 November 1988, roosting under house eaves on Chena Ridge, Fairbanks, R. Johnson+) or in midwinter (e.g., recorded erratically on Fairbanks Christmas Bird Counts from 1983, usually single birds, but three on 21 December 1985, two on 19 December 1987, and five on 17 December 1988). Activity became more conspicuous again in mid-March (e.g., pair, 13 March 1986, in white spruce forest at elev. 900+ m, Delta River west of Rainbow Mountain, Alaska Range, J. R. Rose and C. B. Johnson; one, 17 March 1982, Bonanza Creek Experimental Forest, W. A. Lehnhausen+; individuals reported 18 March 1978 at two sites in Fairbanks area, P. D. Martin, MAS; pair, 24 March 1974, Bonanza Creek, G. F. Searing).

CINCLIDAE: Dippers

► *Cinclus mexicanus* Swainson, 1827. American Dipper. Subspecies is *unicolor* Bonaparte, 1827. Uncommon resident and breeder on suitable fluvial waters in the Alaska Range, throughout the Interior, and in the Brooks Range (including its northern foothills to 69°40'N at Sadlerochit Spring). Generally found below timberline, but sometimes above (Frisch 1982). Seasonal movements evident in fall, especially from higher elevations, when dippers began to appear in coastal lowlands [southeastern Alaska] in late August, and winter populations were well established at lower elevations by October-November; in spring birds returned by mid-April to waters they had not occupied the previous winter (B. Kessel and DDG).

Nesting habitat: Fast-flowing mountain streams (Kingery 1996)—rapidly moving fluvial waters that are relatively narrow and shallow and that flow over an irregular, unvegetated substrate that produces riffles or rapids...with hard surfaces immediately adjacent to water for perching and for nest sites, and with a vertical component, usually a riverbank, waterfall, or bridge that most frequently provides nest substrate (BK). In winter, when ice ledges form along creek banks, this substrate is used in the same manner as streamside rock and gravel surfaces for perching or feeding. Dippers frequent as well the airspace under shelf ice, where they feed or seek cover (Murie 1946, Bakus 1959). If forced by ice in winter to depart breeding territories, they move to portions of streams or rivers where complete ice cover is prevented by temperatures or currents, or to one of the many Interior hot springs. Availability of suitable nest sites appears to limit populations and is probably the principal limiting factor (Kingery 1996). Egg dates probably late April to early June (BK and DDG). An indication of density [Tuluksak River drainage, lower Kuskokwim River] was provided by Petersen et al. (1991:102): “At least 10 nest locations were occupied...more or less annually along 48 km of major streams.”

REGULIDAE: Kinglets

► *Regulus satrapa* Lichtenstein, 1823. Golden-crowned Kinglet. Subspecies is *amoenus* van Rossem, 1945. In eastern interior Alaska a rare fall migrant, primarily in September (e.g., one, 10 September 1998, Fairbanks, J. Williams; one, 14 September 1995, Tok, R. Papish; one, 26 September 1996, near Tok, T. J. Doyle, one, 24 September 1997, Fairbanks; one, 30 September 1997, near Tok, H. K. Timm,), and casual in spring and summer (one, 16 May 1993, Fairbanks, P. J. Deviche; one, 10 July 1971, Fairbanks, F. M. Chauvin).

This species is included here as a potential addition to the nesting avifauna of interior Alaska, either from the east—it is a “rare to locally fairly common” probable breeder in southern Yukon Territory, where food-carrying adults have been recorded 12 July-8 August (Alexander et al. 2003:379)—or from the south—it is an uncommon or rare resident in spruce forests in the Bristol Bay area of southwestern Alaska (Dillingham and southern portions of Lake Aleknagik; Brooks River, Katmai NP—all B. Kessel and DDG) and perhaps also in the mature white spruce forests of the Susitna River valley, in south-central Alaska (where scattered spring, summer, and fall sightings suggest residency of at least a few birds: one each, 24 April 1981, mouth of Tsusena Creek, upper Susitna River, K. C. Cooper; and 12 June 1982, Susitna River, near Chase, north of Talkeetna, S. O. MacDonald; two, 4 October 1980, Gold Creek, “Susitna River Station,” B. E. Lawhead). Egg dates elsewhere in Alaska are from end of April through third week of June (BK and DDG).

► *Regulus calendula* (Linnaeus, 1766). Ruby-crowned Kinglet. Subspecies is nominate *calendula*. Fairly common migrant and breeder throughout Interior taiga, though less numerous at the periphery, either elevationally or coastally, in western and southwestern Alaska. Arrived in the Interior in spring from mid-April to May (Earliest—all Fairbanks: one singing, 13 April 1980, T. G. Tobish, Jr., and L. J. Oakley; male, 14 April 1973, C. Kron, and two, 14 April 1990, F. A. Burris; one, 15 April 1952, P. E. K. Shepherd; one, 18 April 1988, S. L. Kennedy. Latest first arrivals on 6 May in phenologically late years of 1959, 1966, 1972, and 1982), between 20 April and 30 April in 24 (58%) of 41 years (B. Kessel). In 1908 arrived on upper Toklat River on 29 April (Sheldon 1909).

Nesting habitat: Coniferous forests that were relatively open, with high spatial heterogeneity (BK). In Tanana River valley (Spindler and Kessel 1980) species showed strong

selection for spruce habitats, either black or white spruce. In general favored more open forests of lesser stature than any of the other coniferous forest birds, including Gray Jay, and favored forests with high tree heterogeneity. Territories on almost all mixed deciduous-coniferous forest and scattered woodland and dwarf forest plots and on all coniferous forest plots, except the two densest white spruce plots. Sixty-two percent of Ruby-crowned Kinglets were seen in spruces (48% of those in white spruce) and 38% in deciduous trees (33% in paper birch). Egg dates about 8 May to probably 20 June (BK and DDG).

Breeding densities in good habitat were 3-4 territories/10 ha (Spindler and Kessel 1978, Kessel 1998). Greatest densities were 4.2 territories/10 ha in an open-canopied white spruce forest and 4.0 territories/10 ha in a black spruce dwarf forest in the upper Susitna River basin, south-central Alaska, in 1981 (Kessel 1998). In Mancha Creek valley in the eastern Brooks Range (at 68.7° N), a 10-ha plot in open white spruce forest supported 0.6 territories in 1979 (Spindler et al. 1980). The mean number of Ruby-crowned Kinglets recorded on a standardized 40-stop roadside count at Fairbanks at the height of spring song (6-25 May) 1976-1985 was 14.1 ± 6.6 birds. Numbers recorded on the 50-stop Breeding Bird Surveys were 10-12 birds in the Interior.

Fall migration began in mid-August, and significant movement was evident in the Interior by third week of that month, peak late August to mid-September (BK). Uncommon or rare until end September, and rare through October (e.g., one, 5 October 1987, Dry Lake at Mile 1376 Alaska Highway, east of Dot Lake, M. W. Britten; one, 12 October 1974, Harding Lake, DDG, T. T. Wetmore, and J. L. Trapp; one, 15 October 1983, Fairbanks, R. B. Weeden; one, 21 October 1984, Fairbanks, G. Matschke+; one, 23 October 1982, Goldstream Valley, B. E. Lawhead; three, 27 October 1973, Bonanza Creek, G. F. Searing. Extreme late at Fairbanks:

one, 31 October 1977, Fort Wainwright, D. Allen; three, 28 and 29 October, and one until 4 November 1989, L. and D. Moilanen; one, 4 November 1978, TGT; one, 5 November 1986, M. I. Springer; one, 5 November 1987 and another 9 November 1987, A. E. Stone).

PHYLLOSCOPIDAE: Leaf-Warblers

► *Phylloscopus borealis* (Blasius, 1858). Arctic Warbler. Subspecies is *kennicotti* Baird, 1869 (type locality Saint Michael). Fairly common breeder in shrubby uplands of the western and central Brooks Range, east to about 149°W in the Nulato Hills and the Kuskokwim Mountains, and beyond to Denali NP; rare migrant in Interior lowlands (B. Kessel and DDG). Usually the very last migrants to reach interior Alaska in spring (Earliest: 28 May 1955, Denali NP, Murie 1956; singing bird, 3 June 1979, Firth-Mancha Creek, Spindler et al. 1980), Arctic Warblers usually did not arrive until the first or even second week of June. They often arrived en masse, an indication that weather was a major factor in the interannual variability of arrival timing from Asia. In spring 1993, for example, only one Arctic Warbler had been recorded on the Seward Peninsula road system by 7 June, but on 8th “thousands” were migrating along “40 miles” of road (Proctor 1994); and in Denali NP the first arrival that year was on 8 June, and on 9 June 10 birds were counted at Igloo Creek (Pogson 1994a). A singing male recorded as far east as the upper Cheslina River (24 June 1994 and again on 16 July 1994, T. J. Doyle and R. Means) suggested the possibility of breeding nearly to Yukon Territory, where occurrence remains unconfirmed (Alexander et al. 2003). Once in spring at low elevation in eastern Interior (adult male netted, 9 June 1996, Fairbanks, A.-M. Barber).

Nesting habitat: Minimal structural habitat requirements are (1) a dense layer of shrubbery in the 0-1 m profile and (2) canopy coverage of medium-height shrubs averaging

about 14% (Kessel 1998). Vegetation used in Alaska mostly deciduous, primarily dwarf shrub birch or willow. Where these basic requirements are fulfilled also commonly includes open, scattered, taller vegetation. Tall shrubs, which, at the edge of tundra, are often restricted to creeks and draws, not only add to the density of lower level vegetation profiles, but they also provide additional cover and feeding substrates, and higher observation posts and song perches. Scattered spruce trees in tundra-taiga ecotones also are used frequently for observation and song perches and for feeding, males often singing from the apex of a tall, sentinel spruce (BK). Nest on top of tussock, on relatively flat ground, and around willow stems; egg dates 17 June to 17 July (Sharbaugh et al. 2007; see also Lowther and Sharbaugh 2008).

Breeding densities in the upper Susitna River basin [south-central Alaska] on two 10-ha census plots in 1981 and 1982 varied from 4.8 to 5.0 territories, respectively, in medium-height dwarf birch shrub, and 3.6 to 3.0 territories, respectively, in low-medium willow shrub (Kessel 1998). Other indications of breeding density include Murie's (1956) report of five singing males within an area "about 200 yards in diameter," or roughly 19.2 males/10 ha, at Igloo Creek, Denali NP, on 20 June 1955; and Irving's (1960) estimate of 20 pairs "resident along one mile" of Contact Creek near Anaktuvuk Pass, or 12.5 pr/km, 19-23 June 1951. In 1989 there were at least 12 singing males on 28 June along 2 km of the Fielding Lake access road, Alaska Range (BK).

Fall departure was under way primarily in second and third weeks of August, with eastern Interior records concentrated between 10 and 17 August (Earliest: adult netted, 10 August 1996, Tok, T. J. Doyle) followed by a scattering of records through 27 August (see Benson et al. 2000; also Murie 1956). Latest was one netted on 19 September 1994 at Fairbanks (A.-M. Barber and L. Webster). Species was not known at low elevation in the eastern Interior

before 1963, when a hatching-year male was netted on 28 August in the Fairbanks area (White and Brooks 1964).

TURDIDAE: Thrushes

► *Oenanthe oenanthe* (Linnaeus, 1758). Northern Wheatear. Subspecies is nominate *oenanthe*. Fairly common migrant and breeder in upland and alpine areas, throughout the mountains and highlands of the Interior, where rock fields are juxtaposed with tundra (see Kessel and Gibson 1978). In spring arrived—from wintering areas in sub-Saharan Africa—in mid-May (Earliest: male, 13 May 1961, Fairbanks, H. K. Springer; female, 13 May 1967, Fairbanks, R. B. Weeden+; five, 13 May 1983, summit of Ester Dome, R. H. Day). The period of peak migration was variable, usually between 20 May and 28 May, with some birds still moving during the first week of June. Dall and Bannister (1869) reported several large flocks at Nulato on 23-24 May 1868.

Nesting habitat: Block-fields juxtaposed with dwarf shrub mat tundra at higher elevations (usually above 600 m) in the Alaska Range, the Tanana-Yukon highlands, and the Brooks Range. Nest on the ground, in some type of rock rubble, whether on a steep slope, on a cliff face, or on more horizontal substrates. Most nests are placed under a rock, often a flat slab but sometimes in a crevice between rocks; the nest is often sited 16-20 cm back from the rock entrance, near the end of a rock-lined tunnel. One nest in Denali NP was under a turf overhang (fide B. Kessel). Nest-building began in late May (e.g., 26 May 1974, Denali NP, D. L. Schamel) and early egg-laying during the first few days of June (Earliest: 1 or 2 June for about 2-day-old nestlings on 21 June 1941 at Denali NP, Murie 1946).

Blackwelder (1919:64) wrote from the upper Yukon River that this species “has the same habitat as the Pipit and, like it, flits from rock to rock on the mossy slopes above timber-line. Young just learning to fly, 15 July [1915]. Not seen in flocks.” Other early reports include two adults and several young at Seward Creek, near Eagle, on 7 August 1903 (Osgood 1909) and several pairs with young about Kechumstuk on 10, 13, and 14 July 1921 (O. J. Murie *in* Gabrielson and Lincoln 1959). Breeding or probable breeding, based on nests, territorial behavior, food-carrying adults, or bob-tailed young reported from Anaktuvuk Pass, where specimens were taken from 21 May to 31 July (Irving 1960), upper Atigun River (BK and DDG), upper Sheenjek River (Kessel and Schaller 1960), and Tanana-Yukon highlands and the Alaska Range (see Gabrielson and Lincoln 1959+; nest/2 young near Eielson Visitor Center, Denali NP, 2 July 1977, K. Kertell). Species was common in Ray Mountains study area in 1979; first fledglings on 9 July, only females and juveniles seen after 24 July; one female near summit of Mount Tozi (elev. 1682 m), highest point in the Ray Mountains (all Matthews 1980). A male with four begging young was seen 13 July 1982 in the fellfields near headwaters of Alder Creek, Yukon-Charley Rivers NP (Moldenhauer 1982).

Postbreeding dispersal merges into migration, which is under way by the end of July (e.g., one juvenile, 28 July 1984, Lake Minchumina, S. Hills). Main fall movement takes place from the second week of August (e.g., one, 11 August 2004, Fairbanks, L. H. DeCicco; one 12 August 1983, Mile 18 Old Nenana Highway, G. M. Selinger; three on 16 August 1972, summit of Ester Dome, DDG and R. S. Hadley; one, 20 August 1982, Ester, DDG) through the last days of that month (e.g., one, 1 September 1979, Eagle Creek, R. B. Weeden). Latest were two single birds, 25 September 1952, Denali NP (BK) and one, 9 October 1924, Koyukuk River, near Bettles (O. J. Murie).

► *Sialia currucoides* (Bechstein, 1798). Mountain Bluebird. Monotypic. Rare migrant and breeder in eastern Interior, where known as far west as Fairbanks area (Gabrielson and Lincoln 1959, Kessel and Springer 1966). Arrived in spring as early as mid-April (Earliest: male, 12 April 1983, Fairbanks, D. R. Herter+; one, 15 April 1991, Fairbanks, E. Mayo; one, 17 April 1993, Northway, C. Gardner fide T. J. Doyle; flock of four males, 18 April 1984, Fairbanks, DDG, P. D. Martin, and S. M. Murphy; two, 18 April 1992, Fairbanks, R. Kemnitz; one, 19 April 1978, Gerstle River Bridge, R. E. Ambrose; recorded 21 April 1921, Fortymile River, O. J. Murie; male, 23 April 1980, Mile 1327 Alaska Highway, L. Goldstein; one, 23 April 1988, Tok, ABR 1988; eight to 10 birds, 23 April 2005, Bolio Lake, L. H. DeCicco; two males and a female, 24 April 2004, Bolio Lake, LHD; male, 25 April 1985, Univ Alaska Fairbanks campus, B. A. Cooper; recorded 3 May 1921, Tanacross, and 9 May 1922, [Big] Delta—both OJM).

Nesting habitat: Prairie-forest ecotones with groves of trees, short grasses, and few shrubs; savannas; recently burned areas; clear cuts; edges of alpine tundra; sagebrush flats and valleys at elevations up to 3800 m; readily attracted to nest boxes that face away from roads -- along roadsides, on ranches and farms with pastures (see Bent 1949, Power and Lombardo 1996). Egg dates 19 May-24 June (B. Kessel and DDG).

Nesting recorded in eastern interior Alaska on the Porcupine River (nest with three nearly-fledged young in a small cliff crevice at 66°59'N 142°41'W on 1 July 1983, Ritchie and Ambrose 1992), on the Yukon River (pair with fledged young at 65°06'N 141°28'W in 1984, and bluebirds were found as prey items in Peregrine Falcon aeries upriver from Circle in 1985 and 1986, *ibid.*; possibly at Eagle, White and Haugh 1969), and in the upper Tanana River valley (Chisana River, Kessel and Gibson 1978) and downriver at least as far as Tok (three+ birds, 30

July 1995, along River Road, which runs through the 1990 Tok River burn, R. Papish fide TJD) and Delta Junction (at least four and probably six pairs nested in boxes put out in the Delta Agricultural Project, summer 1989, J. M. Wright; a bird was seen entering a Cliff Swallow nest in the Delta Agricultural Project on 4 June 1994, TJD and D. C. Chaffin; and food-carrying male at flicker-dug cavity in fire-killed tree, 18 June 2006, Bolio Lake, P. W. Sykes, Jr.). Nested at intervals as far west as Fairbanks area (e.g., pair with six fledged young, 29 June 1984, Rosie Creek burn, near Ester, W. A. Lehnhausen; male, 24 May 1985, Elliott Highway, Snowshoe Creek burn [1983], R. G. Hunter).

Few records of postbreeding aggregations (e.g., a flock of 43—11 adults and 32 immatures—at swathed hayfield, Delta Junction area, 10 July 1988, J. F. Kelly). Autumn departure in August-September of northernmost birds (Power and Lombardo 1996) suggested by departures in other areas, e.g., in south-central Alaska (flock of 15 on 21 August 1925, McCarthy, OJM) and in Yukon Territory (flock of 20, 15-20 August 1948, Burwash Landing, Drury 1953), but few autumn records from interior Alaska (e.g., at least eight birds, 7 or 8 September 1985, Delta Agricultural Project, fide JMW; one, 18 September 1988, Tok, B. A. Anderson; two, 27 September 2004, Fairbanks, LHD; four birds, 5 October 1983, west of Scottie Creek along Alaska Highway, M. E. Isleib and K. Graham) or nearby (e.g., flocks of three, and four or five, 15 October 1982, between Koidern and Burwash Landing, Yukon Territory, MEI).

► *Myadestes townsendi* (Audubon, 1838). Townsend's Solitaire. Subspecies is nominate *townsendi*. Uncommon or rare migrant and breeder in the eastern Interior, where recorded as early as end April (Earliest: one, 27 April 1960, Fairbanks, B. Kessel; and one, 28 April 1963, Denali NP, L. Goldstein). Spring migration peaked in first half of May, and many birds were on their breeding territories by the second week of May (10 May 1976, Central, J. Morgan), but

some migration continued until early June (Latest migrant: one, 4 June 1994, Alaska Highway between Tetlin and Northway junctions, T. J. Doyle; one just arrived, 4 June 1965, Kluane Lake, Yukon Territory, R. B. Weeden). Best known in subalpine areas and along the major rivers. The first Alaska nests were described from the Porcupine River in 1980 and from the Tanana River in 1981 (Ritchie et al. 1982).

Nesting habitat: Non- or sparsely forested areas with a prominent vertical component (riverine cliffs, canyon walls, rocky ridges and outcrops, tors, or steep vegetated slopes with dwarf or low shrubs); often with tall shrubs or scattered trees nearby. Southerly exposures (perhaps because of insolation and early spring snowmelt). Thus solitaires were attracted to the dry, south-facing bluffs in the Interior's major river valleys—bluffs that supported a locally unique flora including shrubs of juniper (*Juniperus communis*) and sagebrush (*Artemisia alaskana* and *A. frigida*). Egg dates at least 19 May-third week of July (BK and DDG). Solitaires were numerous in some areas (e.g., eight singing males on cliffs along c. 30 km – or almost one/4 km – of upper Porcupine River, in June 1983; along the Yukon River the species was found as prey remains in four Peregrine Falcon aeries in 1985 and in three in 1986—all Ritchie and Ambrose 1992). Highest density reported was from the Porcupine River (above), but density appeared to be almost as high in Denali NP, where pairs were present along many of the major alpine/subalpine drainages (e.g., near Eielson Visitor Center, Igloo Creek, Stony Creek, Sanctuary River, Savage River, Tattler Creek, above Triple Lake, Wolverine Creek—K. Kertell+). Elsewhere, dry, south-facing slopes of isolated mountains (e.g., Donnelly Dome, Mount Fairplay) also supported solitaires.

Fall migration was under way by the beginning of September, but many birds remained in subalpine habitats until forced out by snow in mid-month (Earliest: three, 1 September 1969,

summit of Ester Dome, G. E. Hall and DDG+; and one, 2 September 1975, Sanctuary River, Denali NP, W. P. Neily. Latest: one, 16 September 1972, Wood River southwest of Fairbanks, L. J. Peyton; one 13 September 1975, Ester Dome, DDG, G. V. Byrd, GEH, T. T. Wetmore, and P. D. Martin; one, 13 September 1987, summit of Ester Dome, DDG; and one, 22 September 1973, Mineral Lake, Slana-Tok Cutoff, I. T. Stoutrobin).

Casual in winter (Fairbanks: one each, 20 December 1976-4 March 1977, F. G. Hering+; one, 1 December 1992-23 February 1993, D. M Triplehorn, C. Smithhisler; and a second-year bird that was inferred to have probably overwintered locally, 8 March-13 April 1984, B. Mickelson, P. D. Martin, DDG+).

► *Catharus minimus* (Lafresnaye, 1848). Gray-cheeked Thrush. Subspecies is *aliciae* Baird, 1858. Uncommon or fairly common migrant and breeder throughout the Interior, arriving in spring during the third week of May. In 26 of 34 years (76%) at Fairbanks Gray-cheeked Thrush arrived 15-22 May (Earliest: one, 12 May 1970, S. O. MacDonald; one, 12 May 1975, M. A. Spindler; one, 14 May 1970, between Delta Junction and Cathedral Bluffs, DDG; two, 14 May 1993, T. H. Pogson. Latest arrival: one, 27 May 1967, and four, 3 May 1964, both B. Kessel).

“A thrush with the peculiar wiry buzzing note of the Veery was heard rather frequently along the flood plains of the Yukon River and Birch Creek, from 10 June to 15 August [1915]” (Blackwelder 1919:63). Nesting habitat: Nested in ecotone between taiga and tundra, most often in bog, alpine, or riparian habitats; requirements were (1) dense cover at the low shrub level and (2) a relatively high density of at least medium-height shrubs (Kessel 1998). Maximum breeding density was nine territories on a 10-ha plot in open white spruce forest near the headwaters of the Firth River in the eastern Brooks Range (Spindler et al. 1980). Densities up to about four

territories/10 ha were recorded in the Tanana River valley (Spindler and Kessel 1978) and in the upper Susitna River basin (BK). High counts on 50-stop BBS counts in Alaska were 3-5-yr averages of 45-56 birds/count, mostly in subalpine areas of the southern foothills of the Alaska Range. Egg dates 29 May to mid-July.

Gray-checked Thrush was the fourth most numerous and widespread species (of 10 ranked; followed Northern Waterthrush, Fox Sparrow, Bank Swallow) – 1.26 birds/stop, 70% of stops -- detected 8-25 June 2001 on Lower Kuskokwim River BBS (Aniak to Napaskiak), C. M. Harwood+; and it was the fifth most numerous (following waterthrush, Bank Swallow, Yellow Warbler, Fox Sparrow) and fourth most widespread (after waterthrush, Fox Sparrow, Yellow Warbler) – 1.21 birds/stop, 64% of stops – detected 10-27 June 2002 on Lower Yukon River BBS (Anvik to Emmonak), CMH+.

Autumn departure took place usually by 12-17 September (Latest: one banded, 26 September 1992, Fairbanks, T. H. Pogson; and one seen, 29 September 1975, Fairbanks, G. Mayo).

► *Catharus ustulatus* (Nuttall, 1840). Swainson's Thrush. Subspecies is *incanus* Godfrey, 1952 (type locality Lapie River at Canol Road, Yukon Territory). Fairly common to common migrant and breeder. Swainson's Thrush arrived in the Interior in spring during 12-20 May in 75% of years (n=40), 13-17 May in more than 50% of years. Earliest at Fairbanks included birds on 3 May and 4 May 1984 (R. S. Hadley and DDG, respectively)—but not again until 14 May 1984, 7 May 1989 (B. E. Lawhead), 9 May 1980 (P. D. Martin), 10 May 1981 (T. H. Pogson), and 11 May 1975 (B. Kessel). Latest first arrivals at Fairbanks were in 1964 (two on 25 May and six on 26 May, BK) and in 1967 (one on 26 May and three on 27 May, BK). In most years, migration peaked about 20-30 May (e.g., common along Richardson and Alaska

highways, many seen at close range, 17-19 May 1974, Fairbanks to Northway, DDG+). In 1915 “[v]ery common along the Yukon in June, but much less so in the mountains in July. Last heard 9 August” (Blackwelder 1919:63).

Nesting habitat: A forest bird, favoring forests with deep canopies, high percent canopy coverage, and a relatively open horizontal profile below 1.5 m (Kessel 1998). Such habitat characteristics were best provided in the Interior by mixed deciduous-coniferous forests, although this thrush nested in all forest habitats, from pure coniferous to pure deciduous. Egg dates 30 May-14 July; layings after mid-June probably renesting attempts.

Highest densities were all in forests of mixed white spruce-paper birch, where up to 8-11 territories/10 ha were recorded (11 territories/10 ha, upper Tanana River valley in 1976, Spindler and Kessel 1978); high counts on 50-stop BBS counts were 93-159 in eastern Interior (Circle, Chena River, Birch Lake). On a standardized 40-stop roadside count at Fairbanks during late May and June 1976-1983, the mean number of Swainson's Thrushes was 61.3 ± 5.0 birds, with annual variations of less than 15% (BK). During those years, this species was the second most numerous passerine in the Fairbanks area (after Alder Flycatcher), and although population levels appeared to begin to drop in 1984, it was the most numerous of 43 species recorded on Circle BBS in 1986-1988 (14-20 June, J. F. Kelly). Declines were dramatic after 1989; numbers dropped by at least 40% but appeared to stabilize by 1994, when the species' relative abundance had dropped from 'abundant' to 'common', and it had become only the third most abundant passerine at Fairbanks (BK). Swainson's Thrush was one of six common or abundant Interior passerines, and one of two forest species (see Yellow-rumped Warbler), whose numbers declined in interior Alaska in the last decades of the 20th century: down at least 33% after 1989

(Kessel and Gibson 1994). But high density early in 21st century suggested by 133 birds on 49 stops, 12 June 2006, Kanuti Lake BBS, C. M. Harwood.

Fall movement began at the end of July (e.g., eight adult and four immatures netted on 30 July 1961, Fairbanks, W. T. Van Velzen) and usually peaked 12-22 August. Numbers dropped sharply after the end of August, with the species rare thereafter through mid-September (Latest: one, 26 September 1970, BK; one each banded, 3 October and 7 October 1992, T. H. Pogson; one, 10 October 1966, R. B. Weeden; and one, 20-21 October 1975, F. G. Hering, BK, and DDG).

► *Catharus guttatus* (Pallas, 1811). Hermit Thrush. Subspecies is *euborius* Oberholser, 1956 (type locality Yukon River at Lewes River, Yukon Territory). Uncommon migrant and breeder in the eastern Interior, usually arriving in late April or early May. In 32 of 40 years (80%) at Fairbanks it arrived 29 April-9 May, 43% of years 2-5 May (Earliest: 23 April 1984, Fairbanks, B. A. Cooper; 26 April 1970, Milepost 39 Elliott Highway, and 26 April 1991, Fairbanks, both D. G. Roseneau; one, 29 April 1988, Tok, ABR 1988; singer, 29 April 2010, Ester, DDG). In most years the breeding population was well established by mid-May, but in the late springs of 1954 and 1964 the first migrants did not reach Fairbanks until 17 May (B. Kessel). Nesting range not well understood north of about 65.5° N and west of about 150.5°W (BK and DDG).

Nesting habitat: The two primary habitat requirements appeared to be high canopy coverage, either shrub or tree, and spatial heterogeneity in that coverage (Kessel 1998). Such heterogeneity could be the result of (1) shrub patchiness; (2) habitat edges, such as those between forests and meadows, in bogs, those formed from clearcutting, blowdowns, cuts for roads and powerlines, etc.; or (3) a variation of this edge effect on steep slopes, where a rapid drop in

elevation resulted in a horizontal patchiness in canopy layers or where rocky terracing caused similar canopy patchiness. In the Interior, where this species was almost entirely a forest bird, these conditions were best provided by deciduous habitats, especially by forests of aspen and paper birch, or at higher elevations by alder thickets, and it occurred mostly in mature, relatively dense deciduous forests, especially aspen forests (Spindler and Kessel 1980), but also in mixed and spruce forests and on recovering burn sites (ibid.; S. O. MacDonald). Breeding densities included three pairs/10 ha on each of two post-burn plots, about 8 and 25 years old, in vicinity of Delta Agricultural Project, in the upper Tanana River valley (SOM), and in the upper Susitna River basin 6.1 territories/10 ha on a mature paper birch forest plot (Kessel 1998). It also nested on ledges or in cracks of rock faces of terraces in steep, forested, river-canyon walls (DDG, BK). Egg dates about 20 May-6 August.

First fall movement became evident in early August, as birds began moving away from nesting habitats (e.g., 5-7 August, several years, at Fairbanks, BK). In the Tanana River valley exodus peaked from about 20 August through 8-12 September, after which Hermit Thrushes were rare through the third week of September (Latest: one, 28 September 1994, Tok, T. J. Doyle; three, 29 September 1992, Fairbanks, BK; and one, 30 September 1968, Fairbanks, R. B. Weeden).

► *Turdus migratorius* Linnaeus, 1766. American Robin. Subspecies is nominate *migratorius*. Common migrant and breeder throughout the forested Interior, and beyond into areas with substantial tall shrub cover. One of the earliest forest passerines to arrive in spring, in early years by mid-April (Earliest at Fairbanks: 14 April 1976, 15 April 1966, 16 April 1977, 17 April 1984), in late years not until early May (1 May 1953 and 1965, 2 May 1964, 4 May 1970 and 1972, and 9 May 1954); in 68% of years (28/41 yr), first migrants arrived at Fairbanks

between 19 and 28 April, 34% of years 25-28 April, and 22% of years 19-21 April (all B. Kessel and DDG+). Except when clearly associated with migration, Fairbanks records prior to mid-April likely birds that had overwintered locally, as very small numbers did, less than annually (e.g., Fairbanks Christmas Bird Count maxima of five on 19 December 1987, 21 December 1996, and 2 January 2005; of eight on 19 December 1992). Migration continued through the first third of May (e.g., migrating flocks, 11 and 12 May 1961, 11 May 1974 and 1988, 12 May 1992, Fairbanks). Of eight common or abundant passerines, this species (and Alder Flycatcher) did “not appear to have declined” in numbers in the last two decades of the 20th century (Kessel and Gibson 1994:9).

Nesting habitat: The two primary requirements were a vertical component for nesting and shelter and open areas for feeding. The vertical component was usually provided by trees or tall shrubs, although in tundra areas where tall shrub habitat is absent, sometimes used medium shrub habitat (see Kessel 1979a). Cliffs and block-fields, as well as analogous artificial structures, such as buildings and bridges, can also provide a vertical habitat component. On dry, south-facing slopes, quaking aspen forests were favored. Such forests characteristically have an open understory, lacking mid-story vegetation, and often have an extensive dwarf/low shrub cover of berry-producing plants upon which robins fed. In contrast, forests of paper birch or spruce lack that open understory and correspondingly supported fewer breeding robins. Towns and farm country, with buildings, trees and shrubs, and lawns or fields, also fulfilled the breeding requirements of many robins, especially in the eastern Interior.

Breeding densities varied widely, apparently due largely to structural characteristics of habitats. In the upper Tanana River valley, densities on species-present census plots ranged from

0.2 to 6.5 territories/10 ha, with highest densities (4.9 and 6.5 territories/10 ha) in forests of nearly pure quaking aspen (Spindler and Kessel 1978).

The mean number of robins enumerated on a standardized 40-stop roadside count at Fairbanks 8-29 May 1976-1985 was 34.6 ± 3.8 birds, with little annual variation (BK). The robin was the fourth most numerous passerine during these years, but by 1987-1991 it had become the second most numerous (after Alder Flycatcher) because of population declines in the previously more numerous Swainson's Thrush and White-crowned Sparrow. In good habitat, numbers on the 50-stop BBS counts averaged 50-56 birds (e.g., Northway).

Nest-building began 7-10 May (Earliest: 5 May 1977 and 6 May 1991, Fairbanks) and continued through 19-26 May (BK+). Early egg-laying began by mid-May (Earliest: at least by 7 May 1983, based on completed five-egg clutch on 11 May, Fairbanks, S. O. MacDonald; at least one egg, 8 May 1960, Fairbanks, A. M. Crawford) and peaked during the next two weeks. The main hatch peaked during the first half of June (Earliest: half shell of hatched egg, 19 May 1991, Fairbanks, BK; at least by 23 May 1983 for 11 May nest above), and fledging usually began 9-10 June (Earliest, all Fairbanks: 5 June 1971, BK; 5 June 1980, M. Mouton; 5 June 1983, for 11 May nest above) and peaked 13-19 June. Re-nesting after failure was frequent after 1 June and might have continued into early July, but distinguishing between such re-nesting and a second brood would require marked birds.

Fall migration was under way by late July, becoming increasingly conspicuous during the first two weeks of August. It peaked from the last week of August through the first 10 days of September. Robins were uncommon by the last week of September and were rare in October and early November. The number of late fall occurrences varied considerably from year to year, and in over 50% of years stragglers occurred regularly in October (e.g., latest, one, 19 October

1972, and one, 30 October 1965, both Fairbanks, DDG), irregularly into November. Has overwintered at Fairbanks (see above).

► *Ixoreus naevius* (Gmelin, 1789). Varied Thrush. Subspecies is *meruloides* Swainson, 1832. Uncommon or fairly common migrant and breeder throughout most forested areas of interior Alaska. At Fairbanks usually arrived in second half of April (Earliest: 10 April 1960, Chatanika River, J. Henzler; 10 April 1982, near Fairbanks, R. Dunbar; 14 April 1963, Fairbanks, F. G. Hering; 16 April 1980, Fairbanks, S. R. Johnson), from 19 April to 27 April in 14 of 18 years (78%). Migration usually peaked during the first two weeks of May, with some movement continuing into the fourth week of that month. Varied Thrushes were often recorded in the upper Tanana River valley (Northway-Tok area) 7-10 days before they arrived at Fairbanks.

Nesting habitat: Favored heavily shaded habitats, either tall shrub thickets or forests, whether composed of deciduous, coniferous, or mixed vegetation. Species nested from valley bottoms to timberline where these habitats occurred. Nested in tree- or shrub-height spruce or in tall deciduous shrubs of willow or alder, sometimes cottonwood. Breeding densities usually ranged from 2.0 to 3.5 territories/10 ha (Spindler and Kessel 1978, Spindler et al. 1980, Kessel 1998). Most Interior BBS counts were of 20-25 birds. During 10-27 June 2002 it was the sixth most numerous and widespread species (of 10; followed waterthrush, Bank Swallow, Yellow Warbler, Fox Sparrow, Gray-cheeked Thrush) – 0.82 birds/stop, 51% of stops – on Lower Yukon River BBS (Anvik to Emmonak), C. M. Harwood+; and during 8-25 June 2001 it was the seventh most numerous and widespread species (of 10 ranked; followed Northern Waterthrush, Fox Sparrow, Bank Swallow, Gray-cheeked Thrush, Yellow Warbler, Blackpoll Warbler) – 0.78 birds/stop, 55% of stops – on Lower Kuskokwim River BBS (Aniak to Napaskiak), CMH+.

Laying began as early as 6-11 May (based on dates of nestlings and fledglings—see beyond), and in most years it was well under way by the third week of May. Earliest clutches hatched during the fourth week of May (e.g., adult carrying food, 23 May 1989, Tok, T. H. Pogson; nest with five 3-4-day-old nestlings, 27 May 1983, Galena, T. O. Osborne; about five 2-day-old nestlings, 31 May 1980, Fairbanks, S. M. Murphy) and chicks would have fledged by 5-7 June (first actually observed, 16 June 1977, near Northway Junction, M. A. Spindler). Peak hatching usually the first week of June, peak fledging the third week of June.

Fall migration was proceeding by the third week of August (Earliest: one with a mixed flock of migrant passerines, 7 August 1993, Fairbanks, B. Kessel; migrating, 16 August 1970, Alaska Range foothills, P. Vlasak), and movement continued to be strong in September, often peaking during the first half of that month. Thereafter, it was rare in October (Latest at Fairbanks: one, 11-20 November 1965, F. G. Hering; one, 29-30 November 1953, F. Glaser; and one survived, feeding on chokecherries and mountain ash berries, until 25 January 1993, P. A. Cotter+).

STURNIDAE: Starlings

► *Sturnus vulgaris* Linnaeus, 1758. European Starling. Subspecies is nominate *vulgaris*. Rare migrant and summer visitant in the eastern Interior, first recorded in 1960 (4 May—Kessel 1960), usually arrived thereafter in April (Earliest: one, 7 April 1994, Tok, T. J. Doyle; one, 11 April 1987, Fairbanks, J. F. Kelly; one, 21 April 1981, Delta Agricultural Project, L. Spears; one, 27 April 1978, George Lake Lodge, Mile 1385 Alaska Highway, Kessel 1979b; and one, 29 April 1978 at Delta Junction (ibid.), but in some years not until mid-May (e.g., first one, 14 May

1971, G. E. Hall; three, 17 May 1976, J. C. Wingfield; one, 24 May 1973, B. Kessel--all in agricultural areas near Fairbanks).

A rare (or intermittent) breeder (e.g., pair carrying nesting materials on 14 May 1968, subsequently raised young in barn nest, Fairbanks, DDG, J. W. Willetts, and BK; pair nest-building in cavity in burned spruce, 31 May 1969, near Big Delta, DDG, GEH, and R. S. Hadley; feeding young in hole in telephone pole, 17 June 1976, Dot Lake, BK; species breeding 8 July 1975 at Eagle, C. M. White and T. J. Cade, where one bird was seen 29 June 1981, L. L. Hood; pair nesting, 18 June 1982, in building at Fort Egbert, Eagle, R. R. Moldenhauer). The earliest, ‘pioneer’ starlings in interior Alaska were probably first-year males (which usually do not breed, Kessel 1979b), the age and sex of two early specimens (UAM specimen [examined], 13 June 1967, Beaver, J. N. Eisenhart; and UAM specimen [examined], found dead and desiccated 20 June 1967, Denali NP, D. W. Norton).

Nesting habitat: Nest sites in interior Alaska “were typical of those used by Starlings elsewhere (see Kessel 1957): an old Common Flicker (*Colaptes auratus*) hole near the top of an 8-m stub of balsam poplar (*Populus balsamifera*); a burned-out knothole 6 m up in a fire-killed paper birch (*Betula papyrifera*), a bird nest-box; and under the upturned lip of metal barn roofing” (Kessel 1979b:438).

Early maximum day counts included flocks of 16 (28-29 September 1976, Delta Junction, T. G. Tobish, Jr., and E. P. Knudtson) and 17 (11-24 September 1977, Delta Junction, S. O. MacDonald and BK) and flock of up to 26 (nonbreeders), during 14 June-8 July 1978, Fairbanks (Kessel 1979b). But numbers exploded in late 1970s, and peak numbers in 1978 were 200-250 starlings with c. 2000 Rusty Blackbirds on 12 September at Delta Junction (ibid.).

Postbreeding flock dispersal merged imperceptibly into fall migration during September—after the main molt period in the population. In the Tanana River valley, small bands of 6-12 starlings became noticeable in some years during the second and third weeks of September, and most birds departed during the last half of that month (e.g., in agricultural areas at Delta Junction in 1977, four to six starlings were recorded 8-10 September, and numbers had increased to 17 birds 11-20 September, SOM and BK; and, in the peak year of 1978, there were 150-250 birds, with 2000 Rusty Blackbirds, 9-12 September, a "lot" of starlings on 17 September, but only 12 by 26 September, Kessel 1979b; C. M. Boise, others). Elsewhere, three were seen with a flock of 35 Rusty Blackbirds on 2 September 1962 at Fort Yukon (Yocom 1963b) and one was seen on 18 September 1963 near Ferry (H. K. Springer).

Starlings were recorded only erratically in the Tanana River valley as late as October (e.g., seven, 10 October 1989, Fairbanks, P. D. Martin; four, 28 October 1977, Northway, M. A. Spindler; one at Fort Wainwright dump, 22 October 1961, and two there on 23-24 and 28-29 October 1961, Kessel and Springer 1966), and few remained through November (e.g., one, 25 November 1969, Fairbanks, W. Walker; 13 birds through November 1978, Fairbanks, *ibid.*) or even into December, when recorded on just three Fairbanks Christmas Bird Counts between 1965 and 2010 (10 starlings on 30 December 1978, one on 19 December 1982, and five on 17 December 1988). Eight of 13 starlings at the Fairbanks city dump at the end of November 1978 (above) survived to early February 1979, when they (and three Rusty Blackbirds) disappeared after a week of mean temperatures of -40°F (*ibid.*). (Failure of starlings to survive periods of extreme cold had been noted at Fraser Lake, central British Columbia, where three birds succumbed on 17 January 1954 after three days of cold that reached -36°F—Myres 1958). Starlings were not known with certainty to have survived an entire winter in the Interior (see

Kessel and Gibson 1994; though a possible exception was one seen at the Fairbanks dump on 11 March 1988, much earlier than migrants were known and thus possibly a bird that had overwintered in the relatively mild winter of 1987-1988).

MOTACILLIDAE: Wagtails and Pipits

► *Anthus rubescens* (Tunstall, 1771). American Pipit. Subspecies is *pacificus* Todd, 1935 (type locality Red Pass, 6000 ft, British Columbia). Common migrant and breeder. Arrived in spring in late April-early May (Earliest: one, 22 April 1962, Fairbanks, H. K. Springer; one, 23 April 1988, and two, 23 April 1989—Tok, ABR 1988, 1990; one, 25 April 1971, Fairbanks, M. H. Dick; two, 25 April 1983, Fairbanks, D. R. Herter and D. M. Troy; 25 April 1985 and 1994, Tok, T. J. Doyle; one, 27 April 1984, Galena, T. O. Osborne; flock of seven, 28 April 1988, Fairbanks, R. Rovaneck; flocks of three and 19 birds, 2 May 1989, Fairbanks, DDG), but late migrants often still on the move after mid-May (e.g., ‘very common’, 17-19 May 1974, Fairbanks to Northway to Taylor Highway; and flock of 15, 21 May 1971, along Northway access road—both DDG+). They reached Fairbanks between 27 April and 2 May in 11 of 30 years. The main movement ended in the Tanana valley by 18-20 May, but a few stragglers continued moving through the lowlands throughout the month (Latest: three, 31 May 1978 and one each, 1 June 1973 and 2 June 1964—all Fairbanks, B. Kessel). First arrivals in the Brooks Range included earliest at Anaktuvuk on 4 May 1951, 10 May 1949 and 1950, 13 May 1953, 14 May 1952, and 25 May 1954 (Irving 1960). In 1949 migration there peaked on 19 May, when 500 were seen (ibid.).

Nesting habitat: Alpine tundra. Xeric dwarf shrub mat, usually where intermixed with varying amounts of bare ground and block-field habitat. Pairs foraged primarily in dwarf shrub

mat, but also in more-moist habitats if available nearby, e.g., in short sedge/grass meadow, along shorelines of ponds and creeks, or on river alluvia. Egg dates: usually c. 26 May-5 July; extremes 11-12 May and 9 August (BK and DDG). “[B]y far the most abundant alpine birds in the mountains surrounding the Sheenjek Valley...most numerous between 3500 and 4000 ft, where they seemed to prefer the steep alpine slopes interspersed with patches of talus (summer 1956—Kessel and Schaller 1960). “Present everywhere on the mossy slopes above timber-line [White Mountains, summer 1915]. Seen at Fort Yukon on the Flats 17 August” (Blackwelder 1919:63).

Postbreeding families and small flocks began to arrive in nonbreeding habitats by mid-July or early August (e.g., 20 pipits, 6-7 August 1983, Lake Minchumina, S. Hills; one, 9 August 1990, Tok, T. J. Doyle). Differentiating late-summer flocks from early fall migrants often problematic, since postbreeding dispersal and early migratory movement were indistinguishable, but the main fall movement began about 18-20 August (Earliest at Fairbanks: one, 13 August 1993, DDG, and 15 the next day, BK; seven, 14 August 1976, J. C. Wingfield; two, 14 August 1981, BK) and continued through most of September. It usually peaked from end August through the first two weeks of September. October stragglers were reported in about 25% of years (Latest: one, 13 October 1978, Fairbanks, D. D. Roby; singles, 19 October 1966, W. R. Tilton, and 19 October 1970, DDG—both Fairbanks; one, 21 October 1922, Denali NP, Murie 1946; 27 October 1965, Fairbanks, R. Byrom; 1 November 1972, Fairbanks, A. M. Springer).

BOMBYCILLIDAE: Waxwings

► *Bombycilla garrulus* (Linnaeus, 1758). Bohemian Waxwing. Subspecies is *pallidiceps* Reichenow, 1908 (type locality Shesly River, British Columbia). Fairly common migrant and breeder throughout the taiga of interior Alaska (Kessel and Gibson 1978). Rare and local winter visitant in the central Tanana River valley (see Kessel 1967). Winter residents at Fairbanks began dispersing between the first week of March and early April, depending on weather conditions and the supply of fruits remaining both at their wintering sites and in surrounding areas. Distinguishing flocks of dispersing winter visitants from arriving spring migrants was often problematic in the Fairbanks area, but migrants usually began to arrive in the eastern Interior by mid-April. In the Fairbanks area, annual arrival varied (1960s-1980s) from 13 to 26 April (Earliest: 13 waxwings on 13 April 1974, G. F. Searing; two on 13 April 1982, C. Eslef; 15 on 14 April 1966, B. Kessel; 30-60 birds on 15 April 1973, Wickersham Dome, M. W. Schwan; one on 16 April, numbers building to 20 by 19 April 1980, F. G. Hering; 300 on 16 April 1984, F. Severance). Similarly, in the Tok area, migrant flocks were recorded beginning 14 April (Earliest: flocks on 14 and 20 April 1978, J. M. Van Hyning; four on 18 April 1990, T. J. Doyle). Flocks were present in many years until mid-May, after which time birds were usually seen in pairs (Latest flocks: 12 birds on 22 May 1953, Minto Lakes; four flocks of three to eight birds on 21 May 1985, flocks of four and eight birds on 25 May 1981, and a flying flock of five birds on 7 June 1993—all Fairbanks, BK; 12+, 16 June 1984, Moon Lake, DDG). Flocks after about 20 May might have been late migrants or nonbreeders, but even in 1985, when small flocks were still present on 21 May, only pairs were seen on 25 May.

Nesting habitat: Requirements were tree-height vegetation and spatial heterogeneity. Bohemian Waxwings had seasonal affinities for open water, fleshy fruits, and at least some spruce. Habitat requirements were best provided by forests, scattered woodlands, and dwarf

forests that include some tree-height growth. Greatest densities were in boggy, black spruce dwarf forest habitat and in riparian cottonwoods or willows with some nearby spruce. Usually nested in spruce, but some nests on branches of paper birch. Nested late compared to many other species, with egg-laying typically commencing in mid-June; timing of nesting appeared to be cued to ripening of fruits in summer (Witmer 2002).

The vagaries of environmental conditions and the availability of food, especially fruits, in the taiga, combined with seasonal nomadism and migrations (and few data) to confound a clear understanding of nesting chronologies. In early years, nesting began before mid-May (e.g., nest-building reported in several years 10-13 May, copulation on 13 May 1976, and egg-laying 10-13 May 1984—based on barely-fledged young on 11 June—BK and DDG). In other years, nesting began a week or two later (e.g., laying began in one Fairbanks nest on 15 May [1978, W. C. Fields], in another on 21 May [1958, BK]). Fledging from earliest nests began by 11-13 June, but late June-early July seemed to be the more usual time of fledging. Some chicks from re-nesting attempts did not fledge until the end of July or later.

Where and when breeding populations are of sufficient size, postbreeding flocks are numerous and large, by the end of July and during August and September, as families congregate about sources of ripening fruit. Distinguishing postbreeding flocks from early fall migrants was not feasible, but main migratory movement began in October. Mid-October seemed to be the beginning of population changes in the Fairbanks area, a time when flocks were moving through the area and appeared for short periods at new feeding sites. Such flock movements continued through November and into early or mid-December, by which time most remaining birds were in flocks about plantings of chokecherry trees in downtown Fairbanks and on the University of

Alaska campus. In fall, winter, and early spring, waxwings focused on food sources in towns and agricultural areas where plantings of fruit-bearing trees provided food.

Latest sightings from beyond the Fairbanks area, where exotic fruit-bearing trees are absent, were in November (e.g., small flock, 5 November 1979, Tuluksak River, Petersen et al. 1991; one, 24 November 1985, Saint Marys, B. J. McCaffery; last seen, 26 November 1974, Tanana, T. Sniffen), by which time snow usually had covered low-growing berry-producing plants. At least a few waxwings overwintered annually at Fairbanks, in some years more than 200-300 birds (Maxima: 477 on 3 January 1998, 441 on 29 December 2007, 347 on 28 December 2002, and 318 on 27 December 2008—Fairbanks Christmas Bird Counts).

CALCARIIDAE: Longspurs and Snow Buntings

► *Calcarius lapponicus* (Linnaeus, 1758). Lapland Longspur. Subspecies is *alascensis* Ridgway, 1898 (type locality Saint Paul Island, Pribilof Islands). Common or abundant migrant and an uncommon breeder in alpine tundra. Generally arrived in numbers in the eastern Interior five days (Delta Junction) to a week (Tok) earlier than at Fairbanks. Early flocks were predominantly males, and later flocks had increasingly larger proportions of females. Reaching the Interior, these flocks fanned out both westward and northward. In northwestern North America, Lapland Longspurs migrate north and west on a broad front, but judging from the differences in coastal and interior migration times and numbers, the major migration route from the main wintering grounds, in the northern Great Plains, is east and north of the Rocky Mountains, bringing flocks into Alaska via the Yukon and Tanana river valleys (Irving 1961, West et al. 1968) and thence through the Interior and on to northern and western Alaska.

Except for occasional early males, arrivals were delayed until at least small patches of ground were snow-free. In the eastern Interior, where occasional males might arrive during the first few days of April in association with flocks of Snow Buntings (e.g., 2 April 1979, Tok, R. Skarie; 4 April 1968, Ferry, H. K. Springer; 4 April 1970, Fairbanks, F. C. Dean; two, 5 April 1988, Tok, ABR 1988; male with 250 Snow Buntings, 7 April 1968, Fairbanks, DDG), the vanguard of the main population usually arrived 20-25 April, the main passage usually 5-15 May (e.g., flock of 1500+, Delta Junction, 4 May 1975, DDG and J. Jolis), and then numbers dropped quickly until only a few migrants were left by 20 May (Latest: male and female, 26 May 1986, Fairbanks, Cushman flats, DDG). Environmental conditions along interior migration routes caused some annual variations in arrival times and peaks and in total numbers observed. Arrivals in the Brooks Range at Anaktuvuk included 29 April 1951, 1 May 1949, 4 May 1953, 9 May 1952, 13 May 1954, and 15 May 1948 (Irving 1960).

In an unusually big passage year, large numbers had arrived at Fairbanks by 3 May 1971; but in the unusually cold spring of 1964, hundreds were still about Fairbanks through the end of May, and a flock of 12 was still present on 2 June (B. Kessel). Numbers moving through the valley lowlands varied with conditions in the high country, through which these birds migrated when feasible. In several years, unusually large numbers were recorded in the Tanana River valley lowlands (e.g., 6000+ on 17 May 1986 at Delta Agricultural Project, J. F. Kelly; an estimated 10,000 at the Fairbanks Experimental Farm fields on 18 May 1952 and 12 May 1971—both BK; and some 20,000-50,000 birds on the Delta Agricultural Project on 8 May 1977, A. E. Good).

Nesting habitat: Alpine tundra. Species favored mesic dwarf shrub meadow; in poorly drained areas, it was associated with drier hummocks and ridges. (See Seastedt and MacLean

1979, Wright 1979, Burgess 1984, Garner and Reynolds 1986, Kessel 1989.) Nest placed on the ground, usually in a depression and often in the side of a hummock or tussock; also in clumps of sedge or grass and at the base of dwarf shrubs. Usually concealed from above by overhanging vegetation or a lip of sod or rock.

Over the species' North American range, no relation between start of egg-laying and latitude, in mainland Alaska/western Canadian populations, start of laying is later by 1.0 day for each degree farther north (Hussell 1972, Hussell and Montgomerie 2002). In Tanana-Yukon highlands laying probably began as early as late May. Young began leaving nests in mid-June, and fledglings became common in most of the Alaska breeding range during the last third of June. Flocks of juveniles had formed by mid-July and many shifted from drier areas to more-productive feeding areas, such as riparian and littoral sites or to lowland sites.

Flocks increased in size and number as the season progressed, with numbers peaking in mid-August, and fall migration was under way by mid- to late August, when some flocks moved through lowland habitats (Earliest: 20 and 21 August 1974, Fairbanks, S. O. MacDonald, T. T. Wetmore). Migration peaked in mid-September, but continued through that month and regularly into early October (Latest: 22 birds on 12 October and five on 14 October 1988, Tok, ABR 1989; two, 29 October 1989, Delta Junction, M. W. Britten and C. L. McIntyre; five, 3-4 November 1982, Delta Agricultural Project, D. R. Herter and J. S. Hawkings).

► *Calcarius pictus* (Swainson, 1831). Smith's Longspur. Monotypic—including *roweorum* Kemsies, 1961 (type locality Anaktuvuk). Fairly common migrant and breeder in the Brooks Range as far west as Anaktuvuk Pass, and uncommon or rare farther west, to the headwaters of the Noatak River (Kessel and Gibson 1978). Rare local breeder in the Tanana-Yukon highlands, e.g., "Same habitat [in White Mountains, summer 1915] as the Horned Lark.

Not common” (Blackwelder 1919:62); five on 15 July 1921, Kechumstuk Mountain (O. J. Murie); male on 9 July 1961 and female on 16 July 1962, Mount Fairplay (R. B. Weeden); three probably breeding pairs, late June-early July 1971, Boundary (D. L. Johnson); perhaps Yukon-Charley Rivers NP, 1999-2000 (see Handel et al. 2009). Smith’s Longspurs apparently migrate near or above treeline, because they remain quite unknown in the lowlands. Species arrived in Alaska during the last 10 days of May (Earliest: 17 May 1975, Sagavanirktok River at edge of Brooks Range northern foothills, D. D. Roby; 22 May 1953, Anaktuvuk Pass, Irving 1960; 22 May 1969, Mount Fairplay, G. E. Hall; pair, 24 May 1974, Mount Fairplay, R. J. Gordon). Recorded in Denali NP (male, 8 June 1983, near Eielson Visitor Center, M. J. Cartusciello).

Nesting habitat: Subalpine. Favored mesic to moist dwarf shrub meadow habitats, usually on the floor of wide alpine valleys and often on the flats around lacustrine waters (whereas Lapland Longspur nested at higher elevations and in somewhat drier dwarf shrub meadow—e.g., see Kessel and Schaller 1960). Egg dates 2-14 June. Peak hatching was during the last week of June, and peak nest departure during the first week of July (Kessel and Schaller 1960).

Little information on autumn departure. Many individuals were still on the breeding grounds in the Brooks Range in mid-August, but main departure would seem to take place during the third week of August (e.g., 25 August 1972, Canning River foothills, P. Valkenburg; one, 25 August 1979, Firth-Mancha Creek, S. O. MacDonald. Latest: three, 20 September 1977, Mount Fairplay, M. A. Spindler).

► *Plectrophenax nivalis* (Linnaeus, 1758). Snow Bunting. Subspecies is nominate *nivalis*. Common migrant throughout the Interior, nesting in Alaska Range, Tanana-Yukon highlands, and Brooks Range. Spring migrants reached interior Alaska from the Great Plains,

the main body of spring migrants arriving and departing the Interior via the upper Yukon and Tanana river valleys. (It seems likely, as well, that some north-bound spring migrants along the Richardson and Parks highways in March followed those highways *through* the Alaska Range from south-central Alaska into the Interior.) Males arrived on breeding grounds 3–6 weeks before females and 6–8 weeks before nesting; first-year males arrived later than older males; early arrival of males probably related to competition over high-quality or limited nest sites (Lyon and Montgomerie 1995 and citations therein).

Often locally and briefly numerous in spring, concentrated by weather conditions or attracted to circumscribed feeding sites, such as melt edges along roads or on south-facing slopes. First arrivals usually reached Fairbanks between 9 March and 18 March, in some years not until 22-23 March. Earliest were two singles on 4 March 1972 (D. G. Roseneau, A. M. Springer) and 12+ birds on 6 March 1973 (E. B. Navin). Peak movement began the first week of April in seasonally early years or the second week in later years and continued for up to two weeks; numbers of migrants dropped sharply after 22-26 April. A few birds continued to straggle through the lowlands as late as mid-May, including a group of 500 on 10 May 1970 (Latest: five, 12 May, Northway, D. R. Klein, and one, 16 May, Fairbanks, G. C. West, both in seasonally late 1964; two, 14 May 1992, another late season, Delta Junction, R. W. Dickerman). In the Tanana River valley, most individual flocks ranged in size from 15 to 50 birds, but those often coalesced into groups of several hundred to thousands at good feeding sites, such as agricultural fields, e.g., at Fairbanks, 1500 on 20 April 1959, 2000+ on 14 April 1961, and another 5000 on 19 April 1961, and 1000 on 8 and 20 April 1968 (all B. Kessel).

Outside the nesting season and when snow covered the high country, Snow Buntings occurred in the lowlands—in open meadows and grasslands, along open flats and alluvia of

major river systems, and about farmlands, garbage dumps and other nonvegetated sites of human disturbance; when flushed from such feeding sites, flocks often landed for brief periods in trees and tall shrubs, even entering deciduous woods and feeding in the snow shadows at the base of trees. They fed at feeders all around Fairbanks in the second week of April 1972, including one bird that remained at a feeder for 10 days (H. K. Springer). A late flock of 500 foraged on the remaining ice covering a large pond at Fairbanks on 10 May 1970 (BK).

Nesting habitat: Cliff and block-field habitat, where juxtaposed with dry, low and sparsely vegetated dwarf shrub mat. This habitat usually occurred above 600 m in the Brooks Range and above 1220 m south of the Yukon River, where it was also used by rosy-finches (BK and DDG). Egg dates (in northern and western Alaska) usually mid-May-early July, but with extremes of c. 11 May and early August.

Fall migration through the Interior usually began in mid- to late September, when birds first reached the Interior lowlands (Earliest: 1 September 1969, Fairbanks, M. Perrone; one 14 September 1985, Kaltag, M. L. Ward), although both postbreeding flocks and migrants utilized the alpine in fall as well, as seen by birds showing up in such habitats as long as weather permitted, at least until mid-October (e.g., 75 birds, 14 October 1964, Eagle Summit, R. B. Weeden). Snow Buntings were common to fairly common migrants in the Tanana valley during the first half of October. They became rare by the end of the month, although a few stragglers were still moving through into the third week of November (Latest: 30 birds, 20 November 1965, Fairbanks, F. G. Hering; one, 25 November 1985, and another, 10 December 1985, Fairbanks, S. E. Quinlan, C. Van Zant-King; one, 12 December 1978, Tok, R. Skarie; and two, 18 December 1972, Fairbanks, RBW).

Winter flocks, presumably reaching upriver from the Bering coast, were recorded at intervals in the western Interior (e.g., 20 on 2 January 1986, 80 on 29 December 1987, and 53 on 22 December 2000—all Galena Christmas Bird Counts), but individuals, or small groups, were seldom confirmed in winter as far inland as the Tanana River valley.

PARULIDAE: Wood-Warblers

► *Oreothlypis peregrina* (Wilson, 1811). Tennessee Warbler. Monotypic. In the eastern Interior intermittent or casual in spring, summer, and fall, e.g., singing male, 26 June 1968, Birch Lake northwest of Big Delta (C. S. Robbins); immature, 6 September 1970, Fairbanks (Kessel and Gibson 1978); two singing males, 17 June 1982, Eagle (R. R. Moldenhauer); singing male, 3 June 1986, Fairbanks (K. L. Wilson); singing male, 7 July 1986, Fairbanks (R. B. Weeden); hatching-year male, 10 August 1992, Fairbanks (Benson et al. 2000); singing male, 24 June 1995, near Delta Junction, and adult male, 30 June 1995, Scottie Creek (ibid.); and singing male (UAM specimen, examined), 23 June 1996, Mile 87 Taylor Highway (ibid.). While they suggest possible breeding, singing males in June and hatching-year birds in August-September do not provide solid evidence of nesting in interior Alaska, where that activity has not to date been documented.

Tennessee Warbler is included here as a potential addition in the near future to the breeding avifauna of the Interior because it is an uncommon breeder across southern Yukon Territory (Alexander et al. 2003), where as long ago as 1948 the species “nested in the vicinity of *Salix glauca* And *Salix myrtilifolia* bushes on the margin between the aspen groves and willow muskeg at Pine creek [= Haines Junction]. They were missed near Burwash Landing” (Drury 1953:126). Nesting habitat: Boreal zone in deciduous, mixed, and coniferous forests to 450 m

elevation; associated with open areas that include grasses, dense shrubs, and scattered clumps of young deciduous trees (Rimmer and Mcfarland 1998).

► *Oreothlypis celata* (Say, 1823). Orange-crowned Warbler. Subspecies is nominate *celata*. Common or fairly common migrant and breeder throughout the taiga of interior Alaska. Arrived in spring with more interannual variability in timing than any other passerine, but the first birds usually arrived during 4-14 May (16/19 years). Earliest included one, 30 April 1980, Fairbanks (R. S. Hadley); one, 1 May 1978, Central (J. Morgan); one, 1 May 1994, Fairbanks (T. H. Pogson). Latest first arrivals were 16 May 1973 and 1982, both Fairbanks (B. Kessel), and 18 May 1992, Fairbanks (THP). Breeding populations were usually established by 17-20 May, but not until a week later in late years (BK).

Nesting habitat: Orange-crowned Warblers used a variety of habitats, ranging from medium and tall shrub thickets to deciduous forests, especially aspen forests. In tundra areas it used medium shrub thicket almost exclusively, but in the Interior it also used tall shrub thicket and deciduous and mixed forest habitats (Spindler and Kessel 1980). In Interior forests, most numerous in open, park-like stands of aspen. Densities up to 7.9 and 9.6 territories/10 ha were recorded on two Tanana River valley study plots in 1977 (Spindler and Kessel 1978); secondarily, deciduous (aspen) forests, where two plots supported 5.1 and 5.5 territories/10 ha (ibid.). Egg dates were last days of May to about 12 July (BK and DDG); first egg usually laid 2-3 days after nest completed (Sogge et al. 2010). The Orange-crowned Warbler was one of six common or abundant Interior passerines – and one of four shrub thicket birds (see Yellow Warbler, Fox Sparrow, White-crowned Sparrow) – whose numbers declined in the last decades of the 20th century: down 45% from 1980 to 1985, and they continued to decline thereafter, dropping 59% between 1987 and 1992 (Kessel and Gibson 1994).

In interior Alaska the main fall movement took place from early August (earliest reported: 31 July 1979, John River, S. Hills) to mid-September, and it was generally well under way at Fairbanks by the second week of August. The species became less numerous in second half of September. Late birds included one, 27 September 1975, Fairbanks (DDG), and the species was only casual after mid-October (latest, one each at Fairbanks on 20 October 1972, BK, M. S. Boyce, M. H. Dick; and on 22 October 1980, H. K. Springer).

► *Dendroica petechia* (Linnaeus, 1766). Yellow Warbler. Subspecies is *banksi* Browning, 1994 (type locality Old Crow Village, Yukon Territory). Common migrant and breeder throughout the Interior lowlands. Arrived in spring at Fairbanks during 15-25 May in 75% of years (Earliest: singing male, 2 May 1989, DDG; singing male, 5 May 1981, R. B. Weeden; singing male, 6 May 1980, DDG; one, 7 May 1971, D. J. Snarski. Latest first arrivals: 28 May 1967 and 29 May 1964, Fairbanks, B. Kessel). Yellow Warblers were often the latest wood-warblers to reach Alaska in spring. Arrival patterns varied among years, doubtless affected by weather conditions along their extended migration routes. Often a few early birds arrived before the main vanguard, but almost as often the earliest were large numbers that arrived abruptly. Except in extremely late years, breeding populations were well established by 1 June.

Nesting habitat: Open and treeless; deciduous tall shrub thickets were favored. Yellow Warblers seemed to prefer willow habitats where available, but they also commonly used alders; generally avoided coniferous vegetation, except at edges adjacent to deciduous shrubs. Breeding densities in good habitat in the upper Tanana River valley were 10-16 territories/10 ha (Spindler and Kessel 1978). The mean number enumerated there on a standardized 40-stop roadside count during June 1976-1985 was 27.9 ± 5.9 birds, with annual variations of 30-35% not unusual; extremes were 37.5 ± 8.9 birds in 1981 and 19.7 ± 4.5 birds in 1983, a 42% drop over 2 years (BK).

Main egg-laying period began in early June (Extreme early: nest-building, 23 May 1958; and first egg of 4-egg clutch, 26 May 1971—both Fairbanks, fide BK) and continued to mid-June. Hatching usually began in mid-June (clutches hatched 16 June 1961, 1964, and 1971, Tanana valley, fide BK) and fledging, 26-27 June.

In the western Interior Yellow Warblers were the fifth most numerous and widespread species (of 10 ranked; followed Northern Waterthrush, Fox Sparrow, Bank Swallow, Gray-cheeked Thrush) -- 1.26 birds/stop, 59% of stops -- detected 8-25 June 2001 on Lower Kuskokwim River BBS (Aniak to Napaskiak), C. M. Harwood+; and they were the third most numerous and widespread (of 10 ranked; followed Northern Waterthrush and Bank Swallow) -- 2.02 birds/stop, 73% of stops -- detected 10-27 June 2002 on Lower Yukon River BBS (Anvik to Emmonak), CMH+. This species was one of six widespread and numerous passerines -- and one of four shrub thicket birds (see Orange-crowned Warbler, Fox Sparrow, White-crowned Sparrow) -- whose numbers declined in the Interior in the last decades of the 20th century: Yellow Warbler numbers fell more than 30% between 1977 and 1985, oscillated a few years, and then crashed another 45% in 1991-1992 (Kessel and Gibson 1994).

At Fairbanks fall migratory movement started in late July (two moving through open forest, 17 July 1974, BK; began 23 July 1961, and 25 birds netted, 30 July 1960, H. K. Springer), peaked during the last two weeks of August (major movements, 15 August 1974, T. T. Wetmore, and 20 August 1974, F. G. Hering; 28 August 1976, 27 August 1977, 31 August 1970, all FGH; and 3 and 19 August 1980, BK and FGH) and fell off during the first third of September. In most years, only stragglers occurred thereafter, but in 1959 Yellow Warblers were regular until 13 September (J. S. Weske); in 1964 there was a "loose migration" east of Ferry on 13 September (H. K. Springer); and in 1982 about 25 birds moved through a Fairbanks yard on

10 September and up to three were seen there several times 5-9 October (FGH). Latest (all Fairbanks area) were one on 26 September 1973 (R. S. Hadley); one, 1 October 1977 (FGH); one, 8 October 1983 (D. R. Herter); and one hatching-year bird, 16 October 1982 (L. Goldstein).

► *Dendroica coronata* (Linnaeus, 1766). Yellow-rumped Warbler. Subspecies is *hooveri* McGregor, 1899. Common and widely distributed migrant and breeder in the Interior. Spring migrants reached Fairbanks between 23 April and 4 May in 76% (29/38) of years (Earliest: singing male, 17 April 1978, T. O. Osborne; male, 17 April 1981, M. A. Spindler; two males, 20 April 1991, DDG). Migration continued through May (still moving 23 May 1969, and population still increasing 26 May 1983, B. Kessel; 12 new arrivals on 28 May 1992 and 1-6 June 1993, T. H. Pogson), the latest arrivals apparently first-year birds.

Nesting habitat: Almost entirely forest; species used all types, but favored those with relatively high canopy coverages (Spindler and Kessel 1980, Kessel 1998). Most numerous in deciduous and mixed deciduous-coniferous forests and favored the deciduous components of mixed forests; it apparently required some understory vegetation in the tall shrub layer (3.5-3.9 m), but otherwise a relatively open understory (Kessel 1998).

“Rather common in the spruce woods along Beaver Creek in July and August [1915]. Last seen 14 August” (Blackwelder 1919:63). Breeding densities in good habitat in the upper Tanana River valley were 6-7 territories/10 ha (Spindler and Kessel 1978; S. O. MacDonald), in the upper Susitna River valley up to 9.8 territories/10 ha (Kessel 1998). At Fairbanks, the mean number of Yellow-rumped Warblers on a standardized 40-stop roadside count during the middle two weeks of May 1976-1985 was 30.1 ± 3.2 , range 26.8 ± 5.85 in 1983 to 35.5 ± 6.4 in 1984. Numbers dropped 87%, however, between 1989, a year of relatively high populations, and the low year of 1993 (BK). Egg dates 13-14 May to 11 July (BK and DDG).

In the western Interior, Yellow-rumped Warbler was not ranked among the 10 most numerous species (Northern Waterthrush, Fox Sparrow, Bank Swallow, Gray-cheeked Thrush, Yellow Warbler, Blackpoll Warbler, Varied Thrush, Alder Flycatcher, redpoll sp., Wilson's Warbler), though, recorded on 43% of stops, it was the 10th most frequently *detected*, 8-25 June 2001 on Lower Kuskokwim River BBS (Aniak to Napaskiak), C. M. Harwood+. It was the eighth most numerous species (after waterthrush, Bank Swallow, Yellow Warbler, Fox Sparrow, Gray-cheeked Thrush, Varied Thrush, Blackpoll Warbler) – 0.72 birds/stop – and eighth most widespread – 42% of stops (after waterthrush, Fox Sparrow, Yellow Warbler, Gray-cheeked Thrush, Blackpoll Warbler, Varied Thrush, redpoll sp.) -- detected 10-27 June 2002 on Lower Yukon River BBS (Anvik to Emmonak), CMH+. It was one of six common or abundant Interior passerines, and one of two forest species (see Swainson's Thrush), whose numbers declined in the last decades of the 20th century: down 75% since 1989 (Kessel and Gibson 1994).

Fall movement was apparent by late July-early August (Earliest: 20 July 1984, Galena, TOO; 22 July 1993, Fairbanks, THP, and 26 July 1986, Fairbanks, BK), when many young birds were still in heavy prebasic molt. Migration peaked from mid-August through early September, during which time Yellow-rumped Warblers could be locally ubiquitous. Numbers dropped rapidly thereafter, and the species was usually rare by mid-September (e.g., one, 28 September 1969, Fairbanks, DDG; one, 29 September 1972, Fairbanks, BK, one, 1 October 1983, Fairbanks, R. B. Weeden) and very rare by the second week of October (Latest: one, 31 October 1987, F. J. Adams; one, 2 November 1981, S. M. Mulé; and one, 12 November 1991, DDG—all Fairbanks).

► *Dendroica townsendi* (Townsend, 1837). Townsend's Warbler. Monotypic. Fairly common migrant and breeder in old growth forests in eastern Interior—where not known until

1961 (White and Brooks 1964, Kessel and Springer 1966). Spring migrants in Tanana River valley arrived in early years at the very beginning of May (Earliest: 1 May 1979, Northway Junction, M. A. Spindler; 1 May 1980, Fairbanks, R. G. Clarke; 2 May 1977, Fairbanks, C. M. Boise; and 2 May 1979, Fairbanks, F. C. Dean, R. B. Weeden), but in 64% of years earliest migrants were recorded during 13-22 May (18-22 May in 10 years, 9-11 May in six).

Nesting habitat: Mature white spruce *Picea glauca* with mixed understory. Townsend's Warbler was most numerous in stands of large white spruce growing on the south-facing slopes along the Tanana River from the Alaska-Canada border to just east of Nenana. A component of deciduous growth might have enhanced the habitat for this species, at least where present it was often used for foraging and song perches. In species-present subplots in the upper Tanana River valley, paper birch had an Importance Value of 17%, and 30% of activity was in this substrate—60% in white spruce (Spindler and Kessel 1980). A mixed upland paper birch-white spruce plot, about a third of which was only 60 years post-burn, supported 5 territories/10 ha. Habitat at Bonanza Creek, west of Fairbanks, also included a substantial percentage of old paper birch trees. Densities included 27-40 singing males/3.5 hr, 10-13 June 1965-76, Bonanza Creek, Fairbanks (Kessel and Gibson 1978), but nesting information meager—a female gathering nesting materials at Fairbanks on 27 May 1967 (B. Kessel), the first fledglings in the Tetlin-Northway area on 8 July 1977 (MAS), and fledglings at Fairbanks on 17 July 1968 (J. W. Willetts).

Commenting on the limited range of Townsend's Warbler in interior Alaska and on his experience with them in the Fairbanks area, Pogson (Arctic Warbler 1:15, 1994) wrote that on 50 miles of BBS conducted since 1992 along the Steese Highway north of Cleary Summit he heard only a single singing bird and that the species had been reported from Eagle, where recorded in

white spruce forest at Kathul Mountain (Moldenhauer 1982) . Although not known farther downstream, Townsend's Warbler was common during June 1999 and 2000 on the Yukon-Charley Rivers NP (0.064 birds/ha, Handel et al. 2009). Species did not seem to breed in the Tok area, and it was unknown as a breeder in Denali NP or on Yukon Flats NWR. The species was found only in the central Tanana River valley and in areas of the upper Yukon River valley. It is also of local breeding distribution in central and southern Yukon Territory, but has been known there since end of 19th century (Alexander et al. 2003).

Fall movement was evident by the end of July (Earliest: 27 July 1992, Fairbanks, DDG; 30 July 1993, Fairbanks, BK; 31 July 1979, John River, S. Hills; 1 August 1979 and 1 August 1987, Fairbanks, BK) and peaked during the last half of August (Latest at Fairbanks: two juveniles, 7 September 1983, K. M. Leuschner; one, 9 September 1967, BK; one, 16 September 1985, T. H. Pogson).

► *Dendroica striata* (Forster, 1772). Blackpoll Warbler. Monotypic—including *lucida* Burleigh and Peters, 1948 (type locality Nushagak). Uncommon spring migrant and breeder and fairly common fall migrant in interior Alaska. Earliest spring arrivals in the Tanana River valley were recorded 12-15 May in 17% of years (Earliest: 12 May 1953, Fairbanks, B. Kessel; 12 May 1963, Fairbanks, R. Lee; lone male, 15 May 1970, Northway, DDG+), but not until 17-25 May in 75% of years (n=40). Movement continued for about two weeks (later birds apparently yearlings, Eliason 1986) (Latest: passage male, 4 June 1982, Fairbanks, BK). Birds are not much later in western Interior (“arriving about” 15 May, Nulato, Dall and Bannister 1869) and even beyond (Earliest: 16 May [yr], Bethel, Gabrielson and Lincoln 1959; 20 May 1980, Ambler, D. K. Wik).

Nesting habitat: Deciduous habitats, either forest or tall shrub, although the species also occurred in mixed deciduous-coniferous forests and in shrublands with scattered spruce. Except for some deciduous forests, especially bottomland cottonwoods--which usually contained a substantial shrub understory—this warbler was essentially a bird of treeline taiga-tundra ecotones, either in alpine (or coastal tundra) situations, or of tall shrub bogs. In tundra areas it often became a riparian species, because tundra shrubs grow taller in riparian situations than elsewhere. Use of deciduous habitats in contrast to coniferous forests used in eastern North America (see Bent 1953, Morse 1979, Sabo 1980, Eliason 1986).

Blackpoll Warbler was the sixth most numerous and widespread species (of 10 ranked; followed Northern Waterthrush, Fox Sparrow, Bank Swallow, Gray-cheeked Thrush, Yellow Warbler) -- 1.10 birds/stop, 77% of stops – detected 8-25 June 2001 on Lower Kuskokwim River BBS (Aniak to Napaskiak), C. M. Harwood+; and the seventh most numerous species species (of 10; followed waterthrush, Bank Swallow, Yellow Warbler, Fox Sparrow, Gray-cheeked Thrush, Varied Thrush) – 0.73 birds/stop – and fifth most widespread (55% of stops; after waterthrush, Fox Sparrow, Yellow Warbler, Gray-cheeked Thrush) – detected 10-27 June 2002 on Lower Yukon River BBS (Anvik to Emmonak), CMH+.

Few density data available. At Fairbanks a 10-ha alder-willow tall shrub plot in 1975 supported 3.0 territories (Spindler and Kessel 1978). Just beyond the Interior, in upper Susitna River basin, densities were highest in deciduous forests, where on a 10-ha mature cottonwood forest plot there were 4.4 territories in 1981 and 2.5 territories in 1982; on a 10-ha mature paper birch forest plot there were 3.9 territories in 1981 and 3.0 in 1982; and on a 10-ha white spruce scattered woodland plot there were 2.0 territories in 1982 (Kessel 1998). Egg dates usually 9-28 June (extremes 2 June and 10 July).

Fall migration was well under way by the second week of August (Earliest: one, 30 July 1993 and 1 August 1979, Fairbanks, BK; and 2 August 1985, Ester, DDG). Blackpoll Warblers were rare after 1 September and very rare after 10 September (Latest: one each, 17 September 1969, Fairbanks, J. W. Willetts; 18 September 1875, Fort Yukon, Turner 1886; and 26 September 1981, Fairbanks, BK). Extreme late was one hatching-year bird, 25 October 1989, Fairbanks (R. B. Weeden and DDG).

► *Parkesia noveboracensis* (Gmelin, 1789). Northern Waterthrush. Monotypic. Common migrant and breeder throughout interior Alaska. First spring migrants at Fairbanks arrived 13-20 May in 83% (35/42) of years (Earliest: 9 May 1975, Kessel and Gibson 1978; 12 May 1956, B. Kessel), although in about 10% of years they did not arrive until the fourth week of May (Latest first arrival: 26 May 1964, an extremely late and cold spring). Except in late years, breeding numbers had arrived by about 24 May (e.g., singing everywhere, Deadman Lake, and common in Northway area, 19-20 May 1973, DDG+; and common, Eielson AFB to Northway, 17-19 May 1974, DDG+).

Nesting habitat: Three primary habitat requisites were (1) a canopy height of at least 2.5 m (tall shrub), (2) dense vegetation below 1.1 m (low shrub), and (3) some standing fresh water, either fluvial or lacustrine (BK). This habitat was used whether or not there was a tree canopy. Thus the species occurs in tall shrubs in moist areas along streams, sloughs, lake margins, and marshes, and also in scattered woodland and dwarf forest habitat and in forests—especially in cottonwood forests, where there is often a dense understory of low shrubs and tall forbs, such as ferns and umbellifers. It frequently occurred in drier shrub and forest habitats during migration.

The following counts, mostly of singing males, provide an indication of local abundances: 60 birds along 41 km of the Ruby-Long road, 26-29 May 1982 (BK and DDG), 54 birds along 72 km of the Takotna road system, 7-10 June 1974 (BK); and a high count of 36 birds on a 40-stop, 3.5-hr roadside count near Fairbanks, 29 May 1975 (BK). Densities on a square 10-ha cottonwood forest plot along the Susitna River at Sherman were 6.1 territories in 1981 and 2.3 territories in 1982 (Kessel 1998). Egg dates from last days of May to about 8 July (BK and DDG). Northern Waterthrush was the most numerous and widespread species (of 10 ranked) -- 2.51 birds/stop, 95% of stops -- detected 8-25 June 2001 on Lower Kuskokwim River BBS (Aniak to Napaskiak), C. M. Harwood+. It was also the most numerous and widespread species (of 10 ranked) -- 2.59 birds/stop, 92% of stops -- detected 10-27 June 2002 on Lower Yukon River BBS (Anvik to Emmonak), CMH+.

Fall migration took place throughout August (Earliest migrant: one, 29 July 1971, Fairbanks, BK), and the species was rare in the first third of September (Latest: one, 13 September 1975, Fairbanks, R. Peterson; one, 16 September 1959, Chatanika, Kessel and Gibson 1978; and one unhealthy bird, 25 September 1973, Mineral Lake, *ibid.*).

► *Geothlypis trichas* (Linnaeus, 1766). Common Yellowthroat. Subspecies probably *campicola* Behle and Aldrich, 1947—including *yukonicola* Godfrey, 1950 (type locality Jarvis River at Alaska Highway, Yukon Territory). Casual or intermittent in summer and fall in eastern Interior (e.g., male, 16 June 1973, Harding Lake, G. E. Hall and DDG+; female, 24 July 1988, Fairbanks, R. S. Hadley; singing male, 24 June 1993, Tok Cutoff 1 km east of Bartell Creek, T. J. Doyle; one, 5 September 2010, Healy Lake, N. R. Hajdukovich). Species is included here as a potential addition in the near future to the breeding avifauna of interior Alaska because it is a common and widespread breeder throughout southern Yukon Territory (Alexander et al. 2003).

Nesting habitat: Thick vegetation in wide range of habitats from wetlands to prairie (Guzy and Ritchison 1999).

► *Wilsonia pusilla* (Wilson, 1811). Wilson's Warbler. Subspecies is *pileolata* Pallas, 1811 (type locality Kodiak Island). Fairly common or common migrant and breeder throughout the Interior. Earliest spring migrants at Fairbanks arrived during 8-18 May in 76% (31/41) of years (Earliest: singing male, 7 May 1972, B. Kessel), but in 10% of years they did not arrive until the fourth week of May (Latest first arrival: 26 May 1964, F. C. Dean, BK, and R. I. Schreiber). Migration usually peaked during the last half of May, with a few birds still moving in early June (e.g., 3 June 1978 and 4 June 1982, BK).

Nesting habitat: Medium shrubs where densities are positively correlated with the density of vegetation in the low shrub stratum (0.6-1.1 m). Thickets of alder or willow seemed to provide the best habitats, and the species tended to be most numerous in ecotonal areas between forest and tundra. In the upper Susitna River basin, mean low shrub density profile on species-present subplots was $73.7 \pm 27.1\%$, with 63% of the subplots over 70% and 35% over 94% (BK). While favoring open habitats, Wilson's Warblers used as well tall shrub and forest, especially those with dense low shrubs/forbs. Breeding densities of up to 8.8-9.4 territories/10 ha were found in the upper Susitna River basin in 1981, although numbers on the same plots were only 2.7-4.0 territories/10 ha in the environmentally late season of 1982 (BK). Egg dates 30 May-6 July (BK and DDG).

Wilson's Warbler was the 10th most numerous and widespread species (of 10 ranked; followed Northern Waterthrush, Fox Sparrow, Bank Swallow, Gray-cheeked Thrush, Yellow Warbler, Blackpoll Warbler, Varied Thrush, Alder Flycatcher, redpoll) -- 0.73 birds/stop, 49% of stops -- detected 8-25 June 2001 on Lower Kuskokwim River BBS (Aniak to Napaskiak), C. M.

Harwood+. It was not ranked among the 10 most numerous species, but was 10th most widespread (of 10; after waterthrush, Fox Sparrow, Yellow Warbler, Gray-cheeked Thrush, Blackpoll Warbler, Varied Thrush, redpoll sp., Yellow-rumped Warbler, Wilson's Snipe) – 27% of stops – 10-27 June 2002, Lower Yukon River BBS (Anvik to Emmonak), CMH+.

Both postbreeding dispersal and fall migration began as soon as family groups broke up and young left natal territories, i.e., by the second week of August (Earliest: one, 6 August 1986; at least three, 7 August 1993 and 8 August 1990; and one, 9 August 1985; all away from breeding habitat, at Fairbanks, BK). In the Interior main fall migration extended over more than six weeks, from mid-August through September. It peaked from the fourth week of August to mid-September, after which the species was uncommon or rare until the end of the month. In about 25% of years, a few individuals remained into October (Latest: one each, 23 October 1984, BK; 24 October 1974, F. G. Hering; and 27 October 1991, L. Moilanen, all Fairbanks; and one, 25 October 1995, in a building near Tanacross, fide T. J. Doyle).

EMBERIZIDAE: Emberizids

► *Spizella arborea* (Wilson, 1810). American Tree Sparrow. Subspecies is *ochracea* Brewster, 1882. Common migrant and breeder throughout the Interior, reaching there from the east via the Canadian prairie provinces (West and Peyton 1972). Over years, spring arrival varied by as much as a month (e.g., Earliest at Fairbanks on 10 April 1984 and 11 May 1962), but in 34 of 38 years arrival was spread from 23 April to 7 May (all B. Kessel and DDG). In most years main spring movement was completed in the Tanana River valley by 13-15 May, but some movement continued through the third week of May (e.g., several feeding in birch forest, 20-21 May 1982, Fairbanks, BK). In 1908 arrived upper Toklat River on 26 April (Sheldon

1909), in 1977 first in Denali NP on 26 April (B. Truesdell). Earliest dates at Anaktuvuk, Brooks Range, were 8 May 1951, 11 May 1950, 13 May 1949, 14 May 1948 and 1953, and 20 May 1952 (Irving 1960).

Nesting habitat: Low shrub thickets. Avoids forest and tall shrub canopies, but tolerates open medium shrub thicket and scattered woodlands with canopies (Kessel 1998). Breeding densities varied widely and generally were greater at tundra sites than in taiga. Densities in two taiga plots in low-medium willow shrub bog in the Tanana River valley reached 4.7 and 5.0 territories/10 ha (Spindler and Kessel 1978). By comparison, high densities of 15 territories/10 ha were recorded on a low-medium willow shrub plot in a tundra drainage of the upper Susitna River basin (Kessel 1998). Less favorable habitats supported fewer birds, and, over the years at Fairbanks, low shrub habitats, such as cleared fields or boggy areas with lowered water tables, grew into medium or tall shrub habitats with concurrent loss of breeding tree sparrows (BK). Egg dates c. 15 May-4 August. Earliest clutch initiation c. 20 May 1971, Fairbanks (J. W. Willetts), based on 5-egg clutch that hatched on 4 June; and 20 May 1978, one egg, Denali NP (K. Kertell). Extreme early 15 May 1980, Fairbanks (B. A. Anderson), based on five "pretty well feathered young" with emerging primaries on 4 June. Peak laying 28 May-9 June, peak hatching 13-20 June, and peak nest departures 22-30 June (all BK and DDG).

Postbreeding flocks of juveniles have begun to form by mid-July, as young become independent, and these flocks become increasingly conspicuous in low shrub tundra areas during August. Flocks of 40-50 juveniles were common in Denali NP on 2-4 August 1975 (BK), and flocks of 50-100 had gathered at Galena by 6 August 1988 (T. O. Osborne). Fall migration was under way by the fourth week of August (earliest migrant, one in birch forest, 20 August 1987, Fairbanks, BK), peaked during the middle two weeks of September, and continued into October.

(e.g., in 1907 at Toklat River the “last sparrow to leave in fall, late in September”—Sheldon 1909:69; latest at Anaktuvuk was 12 September 1950, Irving 1960). Tree sparrows were uncommon by early October and rare after mid-October (Latest: one, 1 November 1965, Fairbanks, Kessel 1967; one, 5 November 1973, Fairbanks, BK; one, 5 November 1984, Fairbanks, B. A. Tiplady; one, 15 November 1981, Fairbanks, S. R. Meyers; recorded 15 November 1982, Delta Junction, D. R. Herter). In tundra areas of the upper Susitna River basin, birds left gradually, without forming postbreeding flocks, during 20-25 August 1981, and few were seen thereafter—last on 4 October 1980 and 6 October 1981 (Kessel et al. 1982).

Casual in winter in the Tanana River valley since the advent of seed-feeders about human habitation. e.g., one and probably two, winter 1960-1961, Fairbanks (Weeden and Weeden 1961); one, 1980-1981, Fairbanks (G. C. West); at least four, 1982-1983, Fairbanks (DDG+); one, 1987-1988, Harding Lake (A. G. Faught); one each, 19 December 1992 and 3 January 1997 (Fairbanks Christmas Bird Counts); one, 1994-1995, Fairbanks (C. Van Zant-King); and a lone bird on 31 March 1986 at Tok (S. Robinson and C. Thorsud) had probably overwintered. Notes: A bird banded 18 September 1993 at Creamer’s Field, Fairbanks, was killed by a cat one month later, on 17 October 1993, in Calgary, Alberta (Pogson 1994b).

► *Spizella passerina* (Bechstein, 1798). Chipping Sparrow. Subspecies is *arizonae* Coues, 1872—including *boreophila* Oberholser, 1955. Uncommon migrant and breeder in the eastern Interior as far west as Eagle and Delta Junction/Big Delta, rare west to Fort Yukon and Fairbanks (Kessel 1960, Kessel and Springer 1966, Kessel and Gibson 1978); known nesting as far west as Fairbanks. Usually arrived in mid-May (Earliest: one on 4 May and three on 11 May 1974, Fairbanks, G. F. Searing; singing male, 19 May 1973, Yarger Lake, DDG+; three, 19 May 1980, Fairbanks, B. Kessel; singing male, 22 May 1971, Yarger Lake, DDG) and usually

well-established by the last week of May (e.g., separate singing males at Fairbanks on 5 June 1969, G. E. Hall; and on 7 June 1969, DDG).

Nesting habitat: Scattered woodland and dwarf forest, especially when some coniferous trees or shrubs are present. Species often nested in openings in or at the edge of forest or tall shrub thicket habitats (willows, alders, conifers), such as along roads and lake shores, in cutover areas, or at subalpine sites. Similar human-altered habitats used about human habitation. The prime habitat requisites seemed to be open areas, where birds fed on the ground or in grasses and forbs, and nearby tall shrubs or trees for protection when not feeding (Allaire and Fisher 1975, Hebrard 1978). The few reported Alaska nests were 0.15-1.8 m up deciduous or coniferous trees or shrubs (Haftorn 1959, Kessel 1960, Kessel and Springer 1966). Data on Alaska breeding chronologies are few because of the species' limited distribution and relative scarcity. Initiation of egg-laying for early broods in the Tanana River drainage began 1-2 June, judging from an adult carrying food for nestlings on 11 June 1973 (Fairbanks, T. T. Wetmore), an adult feeding three nestlings on 26 June 1977 (Harding Lake, DDG), and a female feeding one large nestling on 26 June 1983 (Yarger Lake, DDG). These early young could have left the nest by 27 June. Peak laying apparently took place during the first two or three weeks of June, with peak fledging during the first half of July. Egg-laying continued until at least mid-July (latest, two clutches, 22 July 1964, Tetlin Lakes, D. Davies; and nest/1 egg, also 22 July 1964, near Chicken, Kessel and Springer 1966; bob-tailed fledglings, 31 July 1966, Big Delta, H. K. Springer). Layings after the third week of June were probably re-nesting attempts.

Fall movement was under way by late July-early August and continued at least through the third week of September (Latest: one, 5 September 1982, Salcha River, S. M. Murphy; one, 18 September 1988, and seven, 22 September 1987, Tok, ABR 1987, 1989).

► *Spizella breweri* Cassin, 1856. Brewer's Sparrow. Subspecies is *taverneri* Swarth and Brooks, 1925 (type locality Spruce Mountain, 10 miles east of Atlin, British Columbia). Rare and local breeder in the mountains of easternmost interior and south-central Alaska, where discovered in 1992 (Nutzotin Mountains, Gold Hill—singing male, 22 June 1992, J. J. Bouton; adult with one fledged young, 17 July 1993, D. W. Sonneborn, T. J. Doyle, and P. D. Martin; and at least six singing males, 18-19 June 1994, TJD; and Mentasta Mountains, above Cheslina River [at 62°39'N 142°44'W], one singing male, 24 June 1994, TJD and R. C. Means) and studied from 1993 to 1995 at Gold Hill and in the upper Cheslina River (Doyle 1997).

Nesting habitat: Low shrub thickets at upper edge of subalpine zone on southeast-facing slopes at elevations of 1300-1500 m. This bird is now understood to be a locally common breeding bird in the Coast and Saint Elias mountains in adjacent southwestern Yukon Territory (Alexander et al. 2003). No arrival/departure information.

► *Passerculus sandwichensis* (Gmelin, 1789). Savannah Sparrow. Subspecies is nominate *sandwichensis* (type locality Unalaska Island, Aleutian Islands)—including *anthinus* Bonaparte, 1853 (type locality Kodiak Island)—following Rising 2007. Common migrant and breeder in appropriate habitat throughout the Interior. Earliest spring migrants usually arrived between 1 May and 9 May (e.g., one, 1 May 1975, Fairbanks, DDG and G. E. Hall; one singing male, 4 May 1985, Fairbanks airport, DDG and P. D. Martin; two singing males, 5 May 1989, Creamer's Field, DDG), and main spring influx usually reached Fairbanks in mid-May.

Nesting habitat: Open habitats, especially those with a sedge-grass ground cover and a high spatial heterogeneity of low shrubs. “Commonly associated with Pipits on the mountains 25 miles west of Circle about the middle of July [1915]. At this season it is always above timber-line” (Blackwelder 1919:63). Maximum breeding densities in prime habitat – in south-

central and western Alaska – exceeded 12 territories/10 ha (12.3 territories/10 ha in the upper Susitna River basin (Kessel 1998) and 12.7 territories/10 ha at mouth of Arctic River, Seward Peninsula (Wright 1979). On the eastern Copper River Delta densities varied from about 4.0 to 8.1 territories/10 ha (Mickelson et al. 1980); maximum densities in coastal northern Alaska, on the other hand, were only 0.5 birds/10 ha (Gill et al. 1985, Garner and Reynolds 1987).

Densities in the upper Susitna River basin showed a positive linear correlation with sedge-grass, both in percent ground cover and in the density of its vertical profile below 0.4 m (Kessel 1998). At least some low-height (over 0.4 m high) vegetation, usually low shrubs, was important, primarily for observation and song perches. Where low shrubs were absent, habitats with relatively stiff herbaceous growth over 0.4 m in height sometimes served the same function, especially *Leymus* beach grass in coastal areas, tall forbs and fences, and even rocks and rock outcrops in alpine areas.

In tundra regions, Savannah Sparrows were most numerous in riparian areas, apparently because the protective slopes and stream banks allow the growth of low shrubs. The importance of this physiography was highlighted by Bee (1958:204-205): "At Kaolak [River] (July 21, 1951) on a windy day the greater number of savannah sparrows were in protected valleys of willows along the creeks and not on the open tundra where they are normally found. In a two mile course along one creek there were 80 birds, whereas on the open tundra there were, in four miles, only 13 birds." Ground moisture per se did not appear to be a habitat requirement, although it provided conditions for the growth of sedge and grass ground cover and improves levels of food production. Egg dates 8 May-28 July (B. Kessel and DDG).

Fall migration had begun by late July and was heaviest during the first third of August. The species was uncommon after mid-August and rare after mid-September. There were

post-September occurrences in 8 of 24 years at Fairbanks, e.g., Very late: one, 5 October 1972, H. K. Springer; one, 20 October 1986, J. M. Wright+. Latest: one, 17 November 1987, I. Jacobs). Once in winter – a bird that survived in a snow-free area near a building heat pipe at Fort Wainwright, Fairbanks, from 6 December 1976 to at least 24 February 1977 (C. D. Allen, G. V. Byrd, and DDG).

► *Passerella iliaca* (Merrem, 1786). Fox Sparrow. Subspecies is *zaboria* Oberholser, 1946 (type locality Circle). Common migrant and breeder throughout the Interior. Arrived via the Yukon and Tanana river valleys from interior Canada, reaching Fairbanks from 27 April to 5 May in 23 of 34 years (Earliest: one each on 22 April 1984, P. D. Martin; 25 April 1980, DDG; and 26 April 1971, I. W. Ailes); arrived in April in 32% of years. On upper Toklat River arrived 4 May 1908 (Sheldon 1909). The main breeding population was usually established within a few days after the earliest arrivals, although through-migration was evident in many areas for an ensuing 10-12 days. Birds reached western Alaska by the first week of May – Earliest: 29 April 1944, Mountain Village, H. C. Kyllingstad; 29 April 1980, Ambler, D. K. Wik; but not northern Alaska until the last 7-10 days of May – Earliest: specimens collected 20 May 1938 and 21 May 1942, Barrow, Bailey 1948; four seen, 21 May 1974, Colville River Delta, J. W. Helmericks); a movement at Umiat in 1948 included a single bird on 30 May, 12 on 31 May, and 50 on 1 June (Kessel and Cade 1958).

Nesting habitat: Medium shrub thicket was primary component. In species-present census plots in the upper Tanana River valley, usual breeding densities were 3-4 territories/10 ha (Spindler and Kessel 1978; S. O. MacDonald); maximum density was 5.9 territories/10 ha on a 1.6 ha tall shrub plot at Northway (Spindler and Kessel 1978). Elsewhere, densities on species-present 10-ha plots in the upper Susitna River Basin ranged from 1.0 to 4.6 territories/

10 ha (Kessel 1998). The mean number of Fox Sparrows on a standardized 40-stop roadside count at Fairbanks during the last 3.5 weeks of May 1976-1984 was 31.4 ± 5.5 birds, with a 40% difference between extremes but no more than 27% between consecutive years (all B. Kessel).

South of the Brooks Range, the Fox Sparrow has a lengthy breeding season, with egg-laying continuing for more than two months. Peak laying took place over a two-week period beginning about a week after earliest laying, i.e., peak laying began in the third week of May. Peak of fledging was during the second and third weeks of June. In years when species arrives by late April, egg-laying begins during the second week of May (e.g., 7 May 1978, Northway, R. H. Day; about 11 May 1984, Fairbanks, DDG; about 12 May 1971, Fairbanks, J. W. Willetts, and 12 May 1977, Northway, M. A. Spindler; and 13 May 1976, Fairbanks, J. C. Wingfield).

Fox Sparrows were the second most numerous and widespread species (of 10 ranked; followed Northern Waterthrush) -- 1.56 birds/stop, 86% of stops -- detected 8-25 June 2001 on Lower Kuskokwim River BBS (Aniak to Napaskiak), C. M. Harwood+; and the fourth most numerous (of 10 ranked; followed Northern Waterthrush, Bank Swallow, Yellow Warbler) and second most widespread (after waterthrush) -- 1.42 birds/stop, 81% of stops -- detected 10-27 June 2002 on Lower Yukon River BBS (Anvik to Emmonak), CMH+. This species was one of six common or abundant Interior passerines -- one of four shrub thicket birds (see Orange-crowned and Yellow warblers, White-crowned Sparrow) -- whose numbers declined in the last decades of the 20th century: down steadily after 1982, with a total loss of 77% by 1991 and 1992 (Kessel and Gibson 1994:9).

Fall migration was under way by early August. In the Tanana River valley, whence most data, migration peaked from the middle of August through the first few days of September; the species became less numerous during September, uncommon by mid-September and rare from

late September through the first week of October (Latest: one each at Fairbanks, 24 October 1971, F. G. Hering; 9 November 1969, F. C. Dean; 7-10 November 1973, F. G. and T. A. Hering; 10 November and 2 December 1988, F. Severance). At Fairbanks, one overwintered in 1982-1983 (19 December 1982-4 March 1983, J. T. Klingel), one survived at least until 2 December 1988 (F. Severance), and another overwintered in 1991-1992 (A. R. Crane).

► *Melospiza melodia* (Wilson, 1810). Song Sparrow. Subspecies is *merrilli* Brewster, 1896—including (following Patten and Pruett 2009) *inexpectata* Riley, 1911 (type locality 3 mi east of Moose Lake, British Columbia), the name that had been applied to the nesting birds of the mainland of southeastern Alaska (Gibson and Kessel 1997), where common. One Interior record to date: one, 9-15 November 1994, Tok, 6 mi/9 km east, at seed feeder (T. J. Doyle and R. Skarie).

This species is included as a potential addition to the breeding avifauna of interior Alaska because it is a local breeder in southern Yukon Territory (Arcese et al. 2002), where up to three singing males were recorded at a single wetland (in 1998, Alexander et al. 2003). Nesting habitat: A wide range of forest, shrub, and riparian habitats. All but one subspecies group occupy a characteristic niche consisting of shrubs on moist ground along streams, sloughs, marsh, or coastline, and all races occupy a wide range of habitats, e.g., stream-side vegetation to salt marsh, as available (Arcese et al. 2002 and citations therein).

► *Melospiza lincolnii* (Audubon, 1834). Lincoln's Sparrow. Subspecies is nominate *lincolnii*. Fairly common migrant and breeder throughout the Interior; numbers decrease toward the western edge of the taiga in western and southwestern Alaska, e.g., it is rare at the base of the Seward Peninsula (Kessel 1989) and along the Tuluksak River (Petersen et al. 1991). The species is also less frequent at higher elevations, e.g., rare in the southern foothills of the Brooks

Range (two, 24 May 1977, Walker Lake, W. Dade; one each, 14 and 20 July 1972, 21 km northwest of Takahula Lake, H. E. Kingery; one, 19 July 1977, Fish Creek on Dalton Highway at Arctic Circle, B. Kessel and DDG). Usually arrived in spring during the first week of May (Earliest: 1 May 1977, Fairbanks, C. M. Boise and J. R. Rose; 2 May 1978, Delta Junction, S. O. MacDonald; 3 May 1975, Fairbanks, M. A. Spindler), but, weather dependent, arrivals varied as much as two weeks among years. At Fairbanks species arrived 3-12 May in 21 of 23 years, 3-8 May in 12 of 23 years. Migrants were recorded at Fairbanks as late as 21 May and 25 May (BK), and arrivals were later at higher elevations (e.g., first on 24 May 1977, Walker Lake, W. Dade), but the main breeding population was established by mid-May.

Nesting habitat: Primarily patchy low shrub thickets, often with some medium shrubs intermixed. The essential components appeared to be (1) dense vegetation in the 0-1.1 m layer, (2) some medium-height vegetation, which not only increases the density of the vertical profile in the 0-1.1 m layer but also provides observation and singing perches, (3) a ground cover of grasses or sedges, and (4) an open habitat with essentially no canopy from trees or tall shrubs. Showed an affinity for high substrate-moisture and occurred most frequently in bogs or marshes; often at edges between various-height shrub thickets and wet meadow or grass meadow habitats or along shorelines of lacustrine or fluvial waters (see Spindler 1976).

Densities in the Interior reached 8-9 territories/10 ha in the Tanana River valley (Spindler and Kessel 1978, 1980). Thirteen and 16 birds were counted on two standard 50-stop BBS roadside counts through varied habitats at Fairbanks in June 1968 (C. S. Robbins). On a similar 40-stop roadside count route, repeated 3-5 times during each breeding season 1975-1985 at Fairbanks (BK), yearly counts averaged 11.7 ± 2.8 birds (range of yearly averages, 6.6 ± 1.7 to 14.8 ± 1.0 birds). Egg dates mid-May to mid-July (BK and DDG); egg dates in Yukon Territory

were 6 June-5 July, nests containing eggs and young on 14 and 20 June, newly fledged young 29 June-5 July, and food-carrying adults 22 June-24 July (Alexander et al. 2003). Fall movement apparently began by the end of July (banding by T. H. Pogson at Alaska Bird Observatory), and peaked during the last three weeks of August. The species became uncommon by early September and rare after mid-September (Latest: "last seen," 9 October 1974, Tanana, T. Sniffen; and at Fairbanks, two, 15 October 1961, W. T. Van Velzen; one with two tree sparrows and a junco, 17 October 1982, P. D. Martin and D. M. Troy). One overwintering record (one, 29 October 2006-3 March 2007, Ester, DDG).

► *Zonotrichia leucophrys* (Forster, 1772). White-crowned Sparrow. Subspecies is *gambelii* Nuttall, 1840. "One of the commonest and most widespread summer residents of interior Alaska" (Kessel 1967:316). "This is the most common bird along Yukon canyon and in the mountains west of Circle. It became scarce about 10 July [1915], and was last seen on 8 August. It probably migrates early" (Blackwelder 1919:63). Spring migrants from the two continental-interior routes entered interior Alaska via the Yukon and Tanana rivers. The first males arrived in the upper Tanana River valley in late April-early May. In 80% of years (30 of 37 years) arrived between 30 April and 9 May, 24% (9/37 yr) on 1-2 May (Earliest: one, 24 April 1994, Fairbanks, P. J. Deviche; one, 27 April 1952, southern Tanana-Yukon highlands, D. R. Klein; one, 27 April 1980, Fairbanks, W. A. Lehnhausen and S. E. Quinlan; and eight, Delta Junction, DDG, and two, Fairbanks, B. E. Lawhead—all on 29 April 1989). Males continued to arrive for 2-3 weeks, and females arrived 11-12 days after the males (King et al. 1965, DeWolfe 1968), so migratory movement was still detectable at Fairbanks as late as the fourth week of May. In 1908 arrived on upper Toklat River on 3 May (Sheldon 1909).

Nesting habitat: Three essential elements of habitat throughout its range in western North America are shrubbery, grass, and bare ground, in a patchy format (DeWolfe 1968). Studies in Alaska showed this species to be an obligate low shrub bird, requiring habitat with a high coverage of dense low shrubs (Kessel 1998). Breeding densities in prime habitat in the Tanana River valley reach 9-11 pairs/10 ha (Spindler and Kessel 1978; S. O. MacDonald). Densities ranged from 2.5 to 6.1 pairs/10 ha in species-present census plots in the upper Susitna River basin in 1981 (Kessel 1998), reached 3.1 pairs/10 ha at Mancha Creek in the eastern Brooks Range in 1979 (Spindler et al. 1980) and 3.0 to 4.5 pairs/10 ha in habitats recovering from fires on the Kenai Peninsula in 1978-1979 (Quinlan 1979). On a standardized 40-stop roadside count at Fairbanks, where the White-crowned Sparrow was the third most numerous passerine—after Alder Flycatcher and Swainson's Thrush—the mean number recorded during the last half of May 1976-1985 was 40.0 ± 10.9 birds, frequently with a 30% annual fluctuation (BK).

The White-crowned Sparrow at Fairbanks has been the subject of much research on its breeding biology and physiology (e.g., King et al. 1965, DeWolfe 1967, Morton et al. 1969, Wingfield and Farner 1979, King and Hubbard 1981). These studies, supplemented by the observations of B. Kessel and DDG and by records in the Alaska Nest Record Scheme, provide a relatively complete picture of breeding season chronologies of this species in this region. Early laying usually began during the last 10 days of May (Earliest egg at Fairbanks: 14 May 1976, J. C. Wingfield; 18 May 1966, F. G. Hering). Those clutches hatched 4-13 June (earliest 29-30 May) and the young left the nest 12-21 June (earliest 6-8 June). Initiation of clutches for first nesting attempts continued in the population through the first 5-7 days of June. Renesting after failed early attempts extended egg-laying through June. White-crowned Sparrows at Fairbanks became photorefractory after the third week of June (Wingfield and Farner 1979), so laying

ceased about 1 July. The last date for eggs in the nest was 17 July (Yocom 1963a), the same as the last date for nestlings (ANRS); but it appears that eggs hatching after 1 July in the Interior fail to produce fledglings. The White-crowned Sparrow was one of six common or abundant Interior passerines -- one of four shrub thicket birds (see Orange-crowned and Yellow warblers, Fox Sparrow) -- whose numbers declined in the last decades of the 20th century: down over 50% since 1977, including a 52% drop from 1990 to 1992 (Kessel and Gibson 1994).

During July at Fairbanks, the young became independent, adults and young underwent complete molts, and, after mid-July, flocks of immatures became conspicuous, and some local population shifting was evident. Flocks of 40-70 immatures had formed by the last week of July. It was difficult to differentiate local movements of postbreeding flocks from the beginning of fall migration, but migration was apparently underway at Fairbanks by late July. Heaviest movement there took place during the last third of August and the first few days of September (BK). Numbers then dropped sharply, and White-crowned Sparrows became uncommon until the third week of September, and then rare through the first week of October. They became less frequent thereafter, with a few remaining until the end of October (e.g., occurred into late October in 13/34 years [38%] at Fairbanks) and fewer still into November (6/34 yr at Fairbanks; Latest: one, 11 November 1981, C. M. Boise; immature, 7-26 November 1977, D. M. Troy; adult, 26 November 1987, Harding Lake, A. G. Faught and DDG). Most November birds were immatures or unhealthy birds that survived locally with varying success, depending on weather and available feeding stations.

Casual in winter, at which season known only at Fairbanks, where the species successfully overwintered in 6 of 34 years (recorded on Christmas Bird Counts on 31 December

1966, 19 December 1982, 15 December 1984, 2 January 2000, 30 December 2000) and survived into December or January in another three years (BK).

► *Zonotrichia atricapilla* (Gmelin, 1789). Golden-crowned Sparrow. Monotypic (type locality Prince William Sound—including *coronata* Pallas, 1811 (type locality Kodiak Island). Generally uncommon migrant in the major river valleys of the Interior; breeds in the Alaska Range, probably in the Tanana-Yukon highlands (Ray Mountains, Matthews 1980), and on south slope of Brooks Range. Arrived in spring in late April-early May (Earliest: one, 22 April 1975, Manley Hot Springs, L. Goldstein; one, 28 April 1989, Fairbanks, S. Bishop and R. H. Bishop; recorded 30 April 1924, Fairbanks, fide Gabrielson and Lincoln 1959; one, 1 May 1988, Fairbanks, R. B. Weeden; one, 5 May 1983, Fairbanks, Miller Hill, D. R. Herter; one, 7-8 May 1975, Ester, R. S. Hadley). Usually passed through the lowlands of the Tanana River valley during the first three weeks of May, when, at Fairbanks, it occurred mostly as singles, sometimes in twos and threes; no migration peak was evident (e.g., one, 17 May 1974, on road edge 65 mi southeast of Fairbanks; two, including one in song, 18 May 1974, Fortymile Roadhouse; one on 18 May 1974 at Yarger Lake; and three with large flock of White-crowned and American Tree sparrows, 19 May 1974, Fortymile Roadhouse (all DDG+). Earliest in spring on upper Kobuk River was 23 May 1899 (Grinnell 1900).

Nesting habitat: Low shrub thicket where the shrubbery is adjacent to open habitats, most often dwarf shrub mat or wet meadows. Hence occurs mainly in areas of either patchy shrubs or strips of shrubs such as along stream or pond margins and forest edges. Also, when available, it uses habitats with some medium-height shrub overstory, but that is not a requirement; and in tundra areas, it extends as far into open areas as scattered low shrubs occurred (often overlapping Savannah Sparrow habitat). Near northern breeding limits in Alaska (Brooks Range) found only

in riparian willow and tundra willow thickets near watercourses (Manuwal 1978). On Seward Peninsula, typically found in areas of low shrub thickets of willow and birch *Betula* adjacent to meadow openings of cotton-grass *Eriophorum*, sedge *Carex*, crowberry *Empetrum*, Labrador tea *Ledum*, and *Vaccinium* (Kessel 1989). Most numerous in low and medium shrub thickets, less so in tall shrub thickets, not present in shrub meadow and shrub mat habitats; characteristically the last shrub bird found as one climbs upward onto tundra (ibid.). In undisturbed riparian woodlands in Kilbuck Mountains, territorial individuals more abundant above tree line than below (Petersen et al. 1991). Egg-laying late May–late June (Kessel 1989, Petersen et al. 1991); egg dates on Seward Peninsula 28 May–22 June (Kessel 1989).

Fall departure took place from late August to mid-September (last in fall on upper Kobuk River 21 August 1898, Grinnell 1900; earliest in fall at Fairbanks, two juveniles, 28 August 1977, DDG); most birds departed by the end of September, but stragglers occurred throughout October (Latest: adult, 24 October 1975, Fairbanks, D. J. Snarski; immature at feeder, 29-30 October 1983, Ester, DDG). Casual in winter, when single birds have survived at Fairbanks feeders (e.g., immature, 28 November 1982-12 January 1983, R. H. Armstrong; and one survived at least until the Christmas Bird Count on 28 December 2002).

► *Junco hyemalis* (Linnaeus, 1758). Dark-eyed Junco. Subspecies is nominate *hyemalis*. Common migrant and breeder throughout interior Alaska. “Common in the spruce and birch timber everywhere” (summer 1915, White Mountains and upper Yukon drainage—Blackwelder 1919:63). One of the earliest forest passerines to reach the Interior in spring, juncos arrived at Fairbanks in second half of April (between 17 and 28 April in 25 of 36 years), when winter snow had only begun to melt (Earliest: 11 April 1980 and 12 April 1984, B. Kessel and DDG+), or the beginning of May (e.g., in seven of 36 years arrived 1-2 May). In years when juncos arrived at

Fairbanks a few here and a few there, rather than in a major wave of migrants, it was difficult to discern if the first birds seen were arriving migrants or the movements of individuals that had overwintered locally.

Nesting habitat: Juncos select tree or tall shrub habitats for breeding, with a primary preference for mixed deciduous-coniferous forest and a secondary preference for coniferous forest, but they occur in a wide range of habitats, including some that have only widely scattered trees or tall shrubs (e.g., scattered woodland and dwarf forest). In forests, they favor those with an open low shrub layer (i.e., below 1.1 m), a stratum in which a third of their activity occurred (Spindler and Kessel 1980, Kessel 1998). Nesting began in early May, when birds at Fairbanks were seen carrying nest materials on 1 May 1980, 5 May 1984, 7 May 1971, and 8 May 1960 (BK). Egg-laying primarily 14-25 May (Earliest: 10 May 1973 and 12 May 1991, back-dating from fledglings), with hatching 29 May-11 June, and nest departures 8-23 June (Earliest: 4 June 1973, I. W. Ailes; and 6 June 1991, P. J. Deviche). Ultimately, those young began forming juvenile flocks from end June to mid-July.

Breeding densities in prime habitat in the Tanana River valley reached 8 pairs/10 ha (Spindler and Kessel 1978; S. O. MacDonald). On a standardized 40-stop roadside count at Fairbanks, the mean number recorded 8-27 May 1978-1985 was 27.9 ± 8.4 birds; annual means varied from 15.8 ± 3.4 birds (1976) to 43.8 ± 6.7 birds (1983), and varied over 50% between some years – up 56% between 1976 and 1977; down 52% between 1983 and 1984 (all BK).

Flocks of hatching-year birds, largely in first-basic plumage, became evident at Fairbanks by late July (e.g., moving flocks through tree canopy, 17 July 1974 and 26 July 1986, BK; 30 birds, 23 July 1982, and 150 birds, 23 July 1987, at feeders, F. G. Hering). On the other hand, at least some adults of each sex remain in the vicinity of their summer territories throughout August

and even into mid-September (banded local adults still present 7 September 1990 and 16 and 17 September 1991, PJD). Occasionally males were heard singing in September (one, 24 August and 1 September 1975, BK; one, 2 September 1991, PJD).

Fall migration began in late August and continued through October. At Fairbanks, whence most data, fall migration was signaled by a major population shift in late August-early September, a time when banded local breeders disappeared from their nesting territories and when many previously unbanded adults began to arrive in the area (PJD). Peak movement at Fairbanks took place from late August through September and included through-migrants from the rest of the Interior as well as from western and northwestern Alaska. Juncos were uncommon by October (e.g., one, 19 October 1987, Galena, T. O. Osborne) and generally rare by November (although in some years still locally common, e.g., flocks of 30+ on 4 November 1982 about barns in the Delta Agricultural Project, D. R. Herter and J. S. Hawkings). Most individuals remaining in the Tanana River valley in November are potentially overwintering birds (see Kessel 1967), and winter 1982-1983 proved to be exceptional in overwintering numbers at Fairbanks, where almost annual (15 of 21 years, 1968-1989), recorded on Christmas Bird Counts in totals of one to seven birds; on the 19 December 1982 CBC an exceptional 28 were counted (including nine together at feeders, Ester, DDG). In most overwintering years juncos were found scattered throughout the Fairbanks area in small numbers, never just a single, isolated individual.

Successful overwintering in interior Alaska was constrained by the severity of the weather and by the availability of food, most especially at bird feeders, near effective shelter. Wintering juncos are unknown in the taiga of interior Alaska beyond the food and shelter

provided by human communities, where juncos were reported roosting under steps and porches near feeders, taking advantage of overhead cover and perhaps heat leakage from buildings.

The status in interior Alaska of subspecies *cismontanus* Dwight, 1918 (type locality Sumas, British Columbia), regarded as intermediate between nominate *hyemalis* and subspecies *oreganus* Townsend, 1837, has not been determined (see Gibson and Kessel 1997).

ICTERIDAE: Blackbirds

► *Agelaius phoeniceus* (Linnaeus, 1766). Red-winged Blackbird. Subspecies is *arctolegus* Oberholser, 1907. Uncommon or rare migrant and local breeder in the eastern Interior. Most numerous and best known in the upper Tanana River drainage, where occurred irregularly as far west as Fairbanks. Peripheral pairs or small groups in June or July suggested at least occasional breeding at Wonder Lake, in Denali NP, and on the Yukon Flats at Ohtig Lake. Single males were rare spring migrants and summer visitants throughout the eastern Interior, occurring mostly from mid-May to mid-June, but sometimes later (e.g., 17 July 1976 and 2 July 1989 in the Fairbanks area—B. Kessel; and see Kessel 1966).

Second-year and older males are the earliest migrants and the first to arrive on the nesting marshes; males are also more likely than females to occur beyond the breeding range. In the Tanana River valley, the first males arrived about a week before the first females (McGuire 1986), in early May, as winter ice melts at pond margins (Earliest: one male, 1 May 1978, Northway, DDG and R. H. Day; one male, 7 May 1977, Fairbanks, C. Stricks; one male, 10 May 1981, Northway, McGuire 1986), but often not until mid-month (e.g., single males on 18 May 1973, at Chicken, DDG, and at Fairbanks, L. G. Swartz; 4-6 singing males and one female, 19 May 1973, Northway airport pond, DDG+; 4-5 singing males, 18-19 May 1974, Northway airport pond and one along access road, DDG+; c. 15 singing males, 20-23 May 1971, Northway

airport 20-23 May 1971, DDG; 5-10 males at Midway Lake, plus one more at Northway airport, 31 May 1969, DDG, R. S. Hadley, and G. E. Hall; small numbers of paired birds, 3 June 1985, Northway area, DDG+).

Nesting habitat: Wet meadows, usually in habitat complexes of wet meadows and ponds or sloughs. In the Tanana River valley (McGuire 1986), birds were usually associated with cattail (*Typha latifolia*) or bullrush (*Scirpus validus*). In the upper Tanana River valley near Northway, McGuire (op. cit.) found Red-winged Blackbirds on only 7 of 43 waterbodies examined. The two largest lakes supported an average of 2 territories/10 ha of lake area; and on the seven waterbodies, McGuire located over 30 nests/year. The species is polygynous. Most males at Northway had two females, but harem size on 39 territories ranged from one to five females (McGuire 1983). Both sexes are philopatric, but returning females might settle on different territories in subsequent years (Nero 1956).

In McGuire's (1983, 1986) two-year study at Northway, egg-laying began 6-8 days after females arrived on the marshes. First eggs were laid on 20 May 1981 and 23 May 1982 and laying continued into the third week of June; median dates 29 May 1981 and 2 June 1982; 90% of clutches both years were initiated by 9 June. First hatching on 1 June 1981 and 6 June 1982, with most hatching 9-20 June. First nestlings fledged on 16 June 1981 and 20 June 1982. Egg size and clutch size were larger at Northway and nestling growth more rapid than in more southern populations (ibid.).

Farther down the Tanana drainage, up to three singing males and three or four females, including an agitated pair, 19 June 1988, at Eielson AFB, but none present there on 16 July (J. F. Kelly); a pair defended a nest/4 eggs in cattails (*Typha latifolia*) on the edge of a pond, 1 June

1990, 16 km northwest of Fairbanks, where a pair was seen in late June 1990 and again in 1991 (Ritchie and Ambrose 1992).

No information on postbreeding departure. Like other species nesting no farther west than the eastern Interior, Red-winged Blackbirds departed unnoticed, probably in September (e.g., male, 2 September 1987, Fairbanks, C. H. Curby).

► *Euphagus carolinus* (Müller, 1776). Rusty Blackbird. Monotypic. Fairly common migrant and breeder, arriving in eastern interior Alaska in April (Earliest: up to two birds, 7-9 April 1952, Fairbanks, Kessel and Gibson 1978; two, 12 April 1990, Fairbanks, R. S. Hadley; one at Tok and one at Tanacross, 14 April 1978, J. M. Van Hyning; male, 17 April 1984, Fairbanks, D. G. Roseneau; three, 17 April 1988, and one, 17 April 1989, Tok, ABR 1988 and 1990). Movement peaked during the first week of May and continued through the second week of that month. Uncommon at taiga perimeter in southwestern and western Alaska and in the upper river valleys on the south slope of the Brooks Range, and uncommon or rare in tall shrubs beyond treeline (e.g., Selawik, Kotzebue Sound, Hudson 1957; Kuzitrin River, Seward Peninsula, Kessel 1989; Kolomak River, Yukon-Kuskokwim Delta, Kessel et al. 1964; Chignik River, Alaska Peninsula, Narver 1970).

Nesting habitat: Open, non-forested habitats near water, especially tall shrub thickets, but also scattered woodland and dwarf forest habitats, either deciduous or coniferous. Along streams and rivers and at associated sloughs and wetlands; about the margins of taiga ponds, beaver ponds, lakes, and adjacent marshes (B. Kessel and DDG). One nest at Tetlin was only 15 cm above water on a sedge clump (BK and DDG) and one near Northway was built in cattails (McGuire 1983). In the upper Tanana River valley during the breeding season, canopy-cover at 30 species-present sites averaged $17 \pm 28\%$ and spatial heterogeneity of shrubs was high (Spindler

and Kessel 1980). Breeding densities there averaged about 1 territory/10 ha (ibid.), but reached 3+ territories/10 ha at some sites (Spindler and Kessel 1978). Indicators of abundance in peripheral areas included, on the Seward Peninsula, 13 birds along 18 km of the Pilgrim River on 6 July 1971 and 13 birds on a 10-km transect at McCarthys Marsh on 16 July 1973 (Kessel 1989); elsewhere in western Alaska, 10-20 pairs along 48 km of major streams in the Tuluksak River area (Petersen et al. 1991). In a 2006-2008 study in the Interior, 78% of nests were placed in shrubs and 15% in conifers, most of the former in willows *Salix* (Matsuoka et al. 2010).

Nesting began in mid-May, with peak laying during the last third of May (Earliest eggs: 12 May 1978, based on two families of barely-fledged young on 9 June 1978, Fairbanks, L. J. Peyton; at least by 16 May 1971, based on a clutch of six eggs on 21 May 1971, Northway, DDG). Early clutches usually hatched during the first few days of June (at Fairbanks--1 June 1976, 3 June 1975, 4 June 1980), with peak hatching during the middle third of June and peak fledging in the last third of June (Earliest fledglings: 9 June 1978, above; 12 June 1971, Fairbanks, J. W. Willetts; 15 June 1977, Northway, M. A. Spindler). Latest eggs were four on 28 June 1964 at Tetlin (Alaska Nest Record Scheme), from which earliest fledgings could have been 11 July; and latest observation of recently fledged young was 11 July 1975 at Arctic Village (BK).

Postbreeding flocks form as soon as young birds become independent (e.g., many aggregations, 10 July 1972, Fairbanks, T. T. Wetmore). Fall migration evident by late July-early August (e.g., flock of 31 birds, 22 July 1977, Sukakpak Mountain, Dalton Highway, BK and DDG; flock of 20 moved through, 26 July 1975, upper Sheenjek River, C. G. Batten). Migration gradually increased after mid-August and peaked from end August through third week of September—fourth week in upper Tanana River valley (Delta Junction, Healy Lake, Scottie

Creek). Numbers dropped off sharply thereafter, with occasional small flocks and individuals through October (e.g., one, 10 October 1969, Fairbanks, DDG).

Rare after October. In about 20% of years a few survived to midwinter about artificial feeding sites in Fairbanks, at least until the first period of extreme cold, usually between late November and mid-December (e.g., on Fairbanks Christmas Bird Counts recorded twice: one on 16 December 1972 and four birds on 30 December 1978). Latest: one, 22 January 1970, Fairbanks (J. E. Palmes); three, 27 January 1979, Fairbanks (BK); one, 1 February 1964, near Nenana (Kessel 1967).

► *Molothrus ater* (Boddaert, 1783). Brown-headed Cowbird. Subspecies is *artemisiae* Grinnell, 1909. Casual in spring and summer in interior Alaska (e.g., probably juvenile, 2 August 1973, Denali NP, G. Monson; juvenile, c. 14 July 1976, Kantishna, B. F. King+; male, 29 May 1978, McKinley Village, fide K Kertell; male, 23 May 1979, Tok, R. Skarie and L. Cook; adult male, 14-16 August 1979, Minto, J. L. Trapp and R. J. King; juvenile, 25-27 August 1979, Dry Creek 142 mi east-southeast of Fairbanks, F. Burris; male, 29 May 1982, Northway, A. D. McGuire; adult male observed on back of moose *Alces*, 4 June 1983, Chena Hot Springs, D. Oellibrandt and J. DeRuyte; female, 22 May 1985, Eagle, R. R. Moldenhauer; adult female, 26 May 1994, Tok, R. Schulz; juvenile, 22 August 2001, Mile 169.3 Richardson Highway, DDG; juvenile, week of 29 August 2007, Camp Denali, C. L. McIntyre).

Species is included here as a potential addition in the near future to the breeding avifauna of the Interior because it has probably bred recently, at least intermittently, in southeastern and south-central Alaska (see Kessel and Gibson 1978), and it is rare or uncommon in southern Yukon Territory (see Hoefs 1973, Frisch 1982; male and two females together on highway edge, 17 May 1982, Champagne, DDG and S. O. MacDonald), where there have been several breeding

records (Alexander et al. 2003). Nesting habitat: Cowbirds prefer habitats with low or scattered trees amid grassland vegetation—woodland edges, brushy thickets, prairies, fields, pastures, orchards, residential areas. Breeding habitats as indicated by parasitized nests show preference for wood/field ecotones rather than either extensive woods or extensive field or prairie areas (Lowther 1993).

FRINGILLIDAE: Fringilline and Cardueline Finches

► *Leucosticte tephrocotis* (Swainson, 1832). Gray-crowned Rosy-Finch. Subspecies nesting in the Alaska Range is *littoralis* Baird, 1869 (type locality Sitka, and Port Simpson, British Columbia); the subspecies in the Tanana-Yukon highlands (probably) and in the Brooks Range is nominate *tephrocotis*—including subspecies *irvingi* Feinstein, 1958 (type locality Anaktuvuk Pass). Rosy-finches arrived in spring in April or May (e.g., two flocks totaling 65 birds, 13 April 1980, Miles 220-230 Richardson Highway, R. B. Weeden; recorded in April 1932 at 2286 m on Mount McKinley, Dixon 1938; arrived 3 May 1908, upper Toklat River, where “common in spring migration...usually high above timberline in pairs”—Sheldon 1909:69).

Uncommon or fairly common breeder in the Alaska Range (Sheldon 1909, Gabrielson and Lincoln 1959), in the Tanana-Yukon highlands (“Abundant in July [1915] on barren dry slopes of the White Mountains above timber-line. None seen elsewhere”—Blackwelder 1919:62; see also Gabrielson and Lincoln 1959), and in the eastern and central Brooks Range (Irving 1960, Kessel and Schaller 1960, Kessel and Gibson 1978).

Nesting habitat: No quantitative descriptions of habitat preferences, but generally alpine areas, usually near snow fields or glaciers, talus, rock piles, and cliffs, typically at or above timberline. Extensive information available on nesting phenology for subspecies nesting (and

resident) at sea level in Alaska (*L. t. griseonucha* and *L. t. umbrina*), but none for the two montane subspecies involved here (see Macdougall-Shackleton et al. 2000).

Fall departures took place in September-October, when uncommon or fairly common migrant on high ground (domes and summits) in Tanana-Yukon valley (e.g., flock of 100±, 20 September 1967, Eagle Summit, R. B. Weeden; at least seven, 25 September 2010, Murphy Dome, J. J. Withrow; flock of eight, 26 September 1969, summit of Ester Dome, DDG and R. S. Hadley; three together, 5 October 2010, Ester Dome, DDG and S. C. Heinl; one, 10 October 2009, Murphy Dome, JJW). Generally avoided the valley bottoms (on passage often moves only low enough to escape complete snow cover during storms—Warren 1910), where known from weather-influenced occurrences of single migrants—in Fairbanks area, e.g., irregularly in very late autumn or winter (one, end November-18 December 1975, Fairbanks—where attracted to bales of hay in an open pickup truck parked daily on University of Alaska campus—C. M. Boyce, R. S. Hadley, and DDG; up to eight birds, 8-10 October 1981, Univ. Alaska experimental farm, B. A. Cooper, D. R. Herter; male, 5-8 November 1984, Ester feeder, P. D. Martin; one, 9 November 1987, Yankovich Road, K. Parker; one, 12-20 November 1987, UAF campus, RBW, B. A. Anderson+—probably same bird a male still there on 20 January 1988, R. Rovanssek—and again on 8-9 February 1988 by RBW and R. H. Day; followed by a female on 12 February 1988 at summit of Ester Dome, C. P. McRoy) and once in spring (one forced down by seasonally late snowstorm, 17 May 1992, near Fox [UAM specimen, examined], R. W. Dickerman).

► *Pinicola enucleator* (Linnaeus, 1758). Pine Grosbeak. Subspecies is *leucura* Müller, 1776—including *alascensis* Ridgway, 1898 (type locality Nushagak). Uncommon or fairly common resident and breeder throughout Interior taiga in white spruce *Picea glauca* or white

spruce/paper birch *Betula papyrifera* forests. Nesting habitat: Open coniferous forest (Adkisson 1999). In interior Alaska nested most frequently in spruce, but deciduous trees and shrubs also were used. Average height of eight Alaska nests was 3.0 m±1.6 m, range 1.0-4.1 m. Nesting densities in apparently optimal taiga habitats reached 0.5-1.0 pairs/10 ha (Spindler 1976, Quinlan 1979). Egg dates about 24 May-30 July (B. Kessel and DDG).

The species was resident throughout its Interior breeding range, but seasonal movements were evident. Sheldon (1909:69) wrote that, on upper Toklat River, “migrated in flocks through October [1907]; last seen November 7.” Birds moved into the Fairbanks area and to feeding stations during the first three weeks of October (Earliest: first flocks at feeders on 21 September 1977, 23 September 1975, and 24 September 1976, Fairbanks, F. G. Hering). In some winters fairly common at seed-feeders in Fairbanks and vicinity (e.g., Christmas Bird Count totals of 150 on 30 December 1978, 179 on 15 December 1984, 210 on 29 December 1991, 184 on 17 December 1994, 214 on 30 December 2001, 197 on 30 December 2006). Average CBC total 1984-1993 at Fairbanks was 101, maximum 210 (above). In years preceding the late-20th-century proliferation of sunflower-seed feeders, winter aggregations about Fairbanks food sources included up to 100 at standing oat *Avena* shocks throughout winter 1949-1950 (Cade 1952), flock of 250-300+ that fed for weeks on pigweed *Chenopodium* seeds before heavy snowfall blanketed the exposed tips of the plants, through 20 January 1968 (BK, DDG+), and flock of 150 at an oat haypile on 17 November 1975 (M. Murray).

Winter flocks departed during late March-early April (Earliest: substantial drop in numbers at feeder 22 March 1981, F. Severance, and 23 March 1988, K. W. Philip. Latest: 25 birds still at feeder, 9 April 1971, F. G. Hering, and many, mostly in flocks about Fairbanks, 15 April 1971, BK).

► *Carpodacus purpureus* (Gmelin, 1789). Purple Finch. Subspecies is nominate *purpureus*. Casual visitant in interior Alaska (male, 14 June 1987, Denali NP, Gibson and Kessel 1992; and juvenile, 22 August 1989, Mile 118 Slana-Tok Cutoff, R. S. Hadley). More frequently recorded, from fall to spring, along Pacific coast of south-central and southeast Alaska, where rare/annual (Checklist of Alaska Birds, 17th ed., 2011). This species is included as a possible addition in the near future to the nesting avifauna of interior Alaska because it is a widespread and fairly common bird in southern Yukon Territory, where there have been several breeding records (Alexander et al. 2003).

Nesting habitat: Breeds primarily in moist or cool coniferous forests. Also frequently found breeding in mixed coniferous-deciduous forest, edges of bogs, and riparian corridors, in deciduous forests, orchards, ornamental plantations, pastures and lawns with scattered conifers and shrubs, hedgerows, and developed areas (Wootton 1996)

► *Loxia leucoptera* Gmelin, 1789. White-winged Crossbill. Subspecies is nominate *leucoptera*. Common or abundant, to absent. Nomadic throughout the Interior, where local presence, numbers, and nesting status dependent on maturity of local spruce *Picea* cone crop. Thus in any area a locally numerous breeding resident for a time, then absent. Wanders nomadically within boreal forests in search of conifer cone crops; large movements within nesting range often in late October and November, coinciding with declines in seed availability (Benkman 1992). Irruptions beyond the nesting range considered an amplification of the more frequent within-nesting range movements in search of food; usually travels in flocks (ibid.). Movement at altitude suggested by sighting of an adult male in flight at 4330 m on West Buttress Route, Mount McKinley, on 26 June 1978 (P. and G. Pederson, fide K. Kertell).

Nesting habitat: Closed boreal conifer forests, in interior Alaska wherever there were large crops of spruce (*Picea mariana*, *P. glauca*) or tamarack (*Larix laricina*) cones. Critical factor influencing breeding was conifer seed availability, not detailed characteristics of habitat (Benkman 1990, 1992). In Interior Alaska nested in spruce.

Deviche (1997) concluded that breeding at Fairbanks was restricted to spring and early summer, but nesting-related behavior spanned at least February-September. See, e.g., "many" birds, very heavy cone crop, 19 February 1983, Galena (T. O. Osborne); male in full song, 10 February 1988, Univ. of Alaska campus, and song and courtship flights, Ester, 12 March 1988 (DDG); two adult females and two adult males [Univ. Alaska Museum specimens—examined] in breeding condition on 28 February 1993 and 13 March 1993, respectively, Fairbanks (P. J. Deviche); flock of 25 gathering nesting materials on 2 March 1958, Fairbanks (A. Johnson); hundreds of adults, many of which were singing males and calling females, some carrying nesting materials, on 9 March 1979, when well over 1000 birds were estimated present within a 50-km² circle, Firth River-Mancha Creek (M. A. Spindler); two separate females carrying nesting materials on 19 March 1993, Fairbanks (PJD, S. Cooper); pair in "butterfly" courtship flight on 2 April 1984, Fairbanks (DDG); pair with one fledgling on 7 April 1993, Fairbanks (PJD); adult male "singing strongly" on 20 April 1978, Fairbanks (DDG); adult female UAM with two eggs in oviduct on 23 April 1952, Fairbanks (D. R. Klein); pair "feeding a juvenile" on 28 April 1984, Fairbanks (A. Tiplady and J. L. Sease); calling bob-tailed fledgling on 12 May 1993, Fairbanks (DDG); also streaked immature female UAM (examined) on 12 May 1993, Fairbanks (C. T. Seaton); a stubby-tailed fledgling UAM (examined) found dead 14 May 1988, Fairbanks (B. Kessel); two fledglings on 19 May 1973 (F. C. Dean); "many," including a full-tailed fledgling begging from adult, 7 June 1984, Wiseman (DDG); 11 birds, including at least

two juveniles, on 10 June 1984, Fairbanks (BK); 41 in three flocks on 17 June 1984, Fairbanks (BK); 22 birds, including flock of 15, on 21 June 1981, Fairbanks (BK); flock of 35, "much flying/singing," 4 July 1984, Fairbanks (BK); "feeding young" on 8 July 1972, Fairbanks (T. T. Wetmore); flock "singing strongly" on 15 July 1972, Fairbanks (BK); adult male [UAM specimen—examined] in breeding condition on 28 July 1963, Ferry (H. K. Springer); pair feeding three fledglings on 28 July 1987, Fairbanks (DDG); pair with one juvenile on 29 July 1972, Fairbanks (TTW); adult male [UAM specimen—examined] in breeding condition, adult female [UAM specimen—examined] with incubation patch, and immature female [UAM specimen—examined], all 4 August 1963 at Ferry (HKS); pair feeding three fledglings on 27 August 1987, Fairbanks (DDG); 500-1000 birds, 30 August 1981, Fairbanks (J. M. Wright); 10 birds, including male feeding begging juvenile, 10 September 1983, Fairbanks (DDG); nest with three 8-day-old nestlings, 17 September 1972, Fairbanks (W. E. Berry).

Often multi-brooded on large spruce cone crops; single-brooded when foraging on tamarack (Benkman 1992).

► *Acanthis flammea* (Linnaeus, 1758). Common Redpoll. Subspecies is nominate *flammea*—including *holboellii* Brehm, 1831. Uncommon to common resident and breeder within and at the edge of interior Alaska taiga; seasonal movements in September-October and again in March-April. Redpolls occurred throughout the year in open and semi-open areas with shrubby deciduous vegetation, avoided dense forest; in winter occurred in open woodland, particularly birch, alder, and willow, as well as in weeds, at field edges, and in towns and villages. Nesting habitat largely open woodland and scrub, on dry, rocky, or damp substrates; level or steeply sloped; on tundra and above timberline where shrubby deciduous and sometimes coniferous vegetation occurs in hollows and sheltered places. Nested to at least 1350 m.

Irruptions of Common and Hoary redpolls not considered nomadic wandering (Hochachka et al. 1999), but trans- and intercontinental movements that occur with low fidelity to specific breeding and wintering areas (Knox and Lowther 2000a, 2000b). A redpoll (sp.) banded in Michigan was recovered in eastern Russia, movements between Alaska nesting areas and wintering sites in eastern North America have been recorded (Troy 1983), and a Common Redpoll banded in winter in Belgium was recovered two winters later in China (Knox and Lowther 2000a). On the other hand, a first-winter Hoary Redpoll banded in March 1981 at Ester was collected at the banding site in January 1985, when an adult male (DDG). Egg dates late May to mid-June or later, but laying recorded as early as April (e.g., pair at nest/first of 4 eggs, 12 April 1988, T. H. Pogson, and first egg in another nest laid 21 April 1988—both Univ. Alaska campus at Fairbanks, T. H. Pogson, DDG) and as late as July; birds were itinerant between broods, e.g., in Fennoscandia reported to nest in numbers in south in early spring and then move north in June and July for second nesting (see Knox and Lowther 2000a and citations therein).

In the western Interior, redpolls (sp.) were the ninth most numerous and widespread birds (of 10 ranked; followed Northern Waterthrush, Fox Sparrow, Bank Swallow, Gray-cheeked Thrush, Yellow Warbler, Blackpoll Warbler, Varied Thrush, Alder Flycatcher) -- 0.74 birds/stop, 58% of stops -- detected 8-25 June 2001 on Lower Kuskokwim River BBS (Aniak to Napaskiak), C. M. Harwood+; and ninth most numerous (of 10; after waterthrush, Bank Swallow, Yellow Warbler, Fox Sparrow, Gray-cheeked and Varied thrushes, Blackpoll and Yellow-rumped warblers) and seventh most widespread (after waterthrush, Fox Sparrow, Yellow Warbler, Gray-cheeked Thrush, Blackpoll Warbler, Varied Thrush) – 0.58 birds/stop and 44% of stops – detected 10-27 June 2002, Lower Yukon River BBS (Anvik to Emmonak), CMH+.

► *Acanthis hornemanni* (Holböll, 1843). Hoary Redpoll. Subspecies is *exilipes* Coues, 1862. Interannually peripatetic: Locally common to absent in winter in interior Alaska taiga, based on a biennial irruption population cycle (see Knox and Lowther 2000a, 2000b). In winters when present, Hoary Redpolls arrived characteristically in late September-early October, probably from nesting areas in northern and western Alaska, and, following conspicuous *zugunruhe* during March and early April (e.g., 150+ Hoary Redpolls, 5 April 1978, Univ. of Alaska campus at Fairbanks, DDG and J. Jolis), departed by late April-early May. Not present in summer. Because of the concentrated availability and abundance of food in large human communities, species almost certainly more numerous – when present – about Fairbanks and environs than in the Interior at large (e.g., maximum Fairbanks Christmas Bird Count total was 1029 Hoary Redpolls on 23 December 1973). At that time of year, limited daylight, as well as redpoll activity before and after civil twilight (when unseen redpolls are commonly heard in flight overhead), usually resulted in a large number of Common and/or Hoary redpolls identified as 'redpoll (sp.)', so redpoll *totals* (i.e., Common Redpolls, Hoary Redpolls, and redpoll sp.) on Fairbanks CBCs more illustrative of wintering abundance (Maxima were 3239 on 18 December 1993, 3931 on 30 December 2001, 4877 on 28 December 2002, 5080 on 19 December 2009, 5210 on 29 December 1991, 6241 on 27 December 2008, 6337 on 30 December 2006, 7164 on 3 January 1998, and 8257 on 2 January 2005). Nothing approaching such concentrated winter abundance ever reported from the Interior taiga at large. In some springs following winters of abundance scattered pairs of Hoary Redpolls nested in early May at Fairbanks, before departing. Irregular very early nestings of Common Redpolls also noted at Fairbanks, as well as in Canada (Knox and Lowther 2000a). Nesting habitat: see Common Redpoll.

Demonstrating the propensity of these birds to wander, one netted in March 1964 at Fairbanks (Kessel and Springer 1966; UAM specimen, examined) provides the only Alaska record of nominate *hornemanni*, which subspecies nests in the eastern Canadian arctic, on Ellesmere and Baffin islands, and in northern Greenland (AOU 1957).

► *Spinus pinus* (Wilson, 1810). Pine Siskin. Subspecies is nominate *pinus*. Erratic visitant in eastern interior Alaska, where a rare summer and fall visitant, very rare breeder, and casual winter visitant (Kessel and Gibson 1978). Has nested, but interannual status not clear. First Interior report, in May 1952, was followed by scattered reports at all seasons (Kessel and Springer 1966, Kessel and Gibson 1978). Throughout the species' range generally an inhabitant of coniferous or mixed coniferous-deciduous forests. Known in many areas as an unpredictable winter visitant, it is an irruptive species, abundant in a given locality one year and often absent the next (Dawson 1997).

Nesting habitat: Primarily open coniferous forests. Also breeds in ornamental conifers in parks, cemeteries, and the like, and in mixed coniferous-deciduous and even deciduous tree associations; forages in trees, shrubs, and grassy areas (ibid.), in interior Alaska to include mature white spruce *Picea glauca* forests, mixed forests, and (for foraging) alder *Alnus*. Reproductive schedule and attachment to a particular breeding area appear to be less rigidly fixed than in many other songbirds, and in some cases, members of an irruptive population linger on a favorable wintering ground long enough to breed; the opportunistic nature of the species and its partial indifference to constraints of time and space make it an intriguing subject (ibid.). First intimation of Interior nesting was a male and a female, both in breeding condition, netted 13 July 1963 at Fairbanks with a flock of 23 juvenile redpolls; another adult male (“a dried food mass, often seen in finches that feed their young by regurgitation, was on the bill”) was netted

with a flock of 12 redpolls 10 days later (White and Brooks 1964:308). Breeding was confirmed by just-fledged young on 13 August and 20 August 1972, at Fairbanks (Kessel and Gibson 1978).

In irruptions siskins have reached the Brooks Range (Chandler Lake, Bee 1958) and northern Alaska (Nuvagapak Point, Cooper Island, Point Barrow—Gabrielson and Lincoln 1959, Kessel and Gibson 1978), westernmost Alaska at Saint Lawrence Island (Sealy et al. 1971, Lehman 2005), and the western Aleutian Islands (Gibson and Byrd 2007). Breeding and wintering in the Interior in 1972-1973 occurred concurrently with unusually large irruptions in south-central and southeastern Alaska (Kessel and Gibson 1978). Seldom recorded in winter in the Interior (e.g., flock of eight, 4 February 1973, Fairbanks, H. K. Springer; two on 28 November 1982 and one on 1 December 1982, Ester area, T. H. Pogson).

In the especially good cone-crop year of 1948 in adjacent Yukon Territory, Drury (1953:126) described siskins as “abundant in all the spruce woods along the highway from Champagne to the Duke River and in the valleys of the creeks that flow into Kluane Lake from the north,” and, although regarded today as “common in southern Yukon” Territory “as far west as Beaver Creek” (Alexander et al. 2003:505), its occurrence would seem to be erratic there as well.

DISCUSSION

“The characteristic summer birds of the spruce forests are the Hudsonian Chickadee, the Ruby-crowned Kinglet, the Robin, the Slate-colored Junco, and the Alaskan Jay. Inhabitants of the alpine zone were the Ptarmigan, Longspurs, Wheatears, Gray-crowned Rosy Finches, Pipits, and Duck Hawks. During the short summer season the wilderness of the [Yukon] Flats is well stocked with birds. While drifting down Beaver and Birch Creeks we were frequently attended

by solitary Loons...which now and then broke the general stillness with their weird and almost human cries. Several companies of Brown Cranes were seen stalking along the gravel bars, and hundreds of Geese were congregating in flocks preparatory to their southward flight. Large Horned Owls were so numerous along the willow-lined banks of Birch Creek that in one day we saw six of them in broad daylight. Probably the most common birds in the Flats are the various species of Ducks and Phalaropes which breed in countless numbers in the many scattered ponds and bayous.”

—Eliot Blackwelder (1919:58-59)

THE ONE HUNDRED species discussed in this report (90 nesting—plus 10 potential additions to the nesting avifauna) constitute 40% of the 245+ species known to occur, or to have occurred, naturally in interior Alaska, and the ranges of not a few of them extend beyond the Interior, with the reach of the taiga, into northwestern, western, and southwestern Alaska, beyond the geographic scope of this report. Of those 245+, a number of regularly-occurring waterbirds and shorebirds are non-nesting through-migrants in the Interior, some of them only in spring (e.g., Ruddy Turnstone *Arenaria interpres*, Dunlin *Calidris alpina*, White-rumped Sandpiper *C. fuscicollis*, Buff-breasted Sandpiper *Tryngites subruficollis*, Long-billed Dowitcher *Limnodromus scolopaceus*), some primarily in fall (Sanderling *Calidris alba*, Western Sandpiper *Calidris mauri*), and some in both spring and fall (Snow Goose *Chen caerulescens*, Black-bellied Plover *Pluvialis squatarola*, Pectoral Sandpiper *Calidris melanotos*, Glaucous Gull *Larus hyperboreus*), while species known only from extralimital occurrences make up a long list (e.g., Fork-tailed Storm-Petrel *Oceanodroma furcata* to Black Guillemot *Cepphus grylle* and Cedar Waxwing *Bombocilla cedrorum* to Evening Grosbeak *Coccothraustes vespertinus*).

Movements north and west from areas east of the Rocky Mountains, through northeastern British Columbia and across Yukon Territory into the Interior of Alaska, are characteristic of most arriving migrants in spring. Exceptions are some shorebird species arriving overland from the Alaska Pacific coast (e.g., Hudsonian Godwit, Wandering Tattler, Surf-bird). But for most groups the Alaska Range has long provided an effective boundary, and there is no population-level example of important trans-Alaska Range movement of any passerine (except possibly Snow Bunting) from south-central Alaska to the Interior. In another category entirely are Northern Wheatear and Arctic Warbler, which arrive each spring directly from Asia. What is and is not known about the distribution of interior Alaska's birds provokes a number of interesting questions.

EAST-WEST: Boreal-zone nesting species that reach their northwestern limits of range in the Interior but whose ranges do not extend to the limits of the taiga—despite no (perceived) habitat limitations—remain of particular interest. The failure of species such as Yellow-bellied Sapsucker, Western Wood-Pewee, Hammond's Flycatcher, Mountain Bluebird, and Chipping Sparrow to occupy apparently suitable habitat as far west as available might reflect the dynamics of an ebb and flow of northwestern limits of continental range of the species—as influenced by factors elsewhere in the range, beyond interior Alaska—rather than ecological limitations imposed by conditions in the Alaska Interior itself. (No explanation for the drastic early-20th century contraction of range of the Barn Swallow has ever been proffered; and it seems not unreasonable to point to potential problems in the tropical winter range for the late-20th century reduction in the numbers of Swainson's Thrush, and others.) Some taxa with very limited Interior ranges (e.g., Black-billed Magpie, Townsend's Warbler, Brewer's Sparrow) or (perhaps for lack of information) apparently enigmatic distributions (e.g., Hudsonian Godwit, Yellow-

bellied Flycatcher, Gray-headed Chickadee) warrant study as well. It is of interest that, perhaps in response to climate change, the Black-billed Magpie has only in recent years begun to exploit a year-round range in the Interior. Perhaps there are enclaves of Townsend's Warblers and Brewer's Sparrows that extend those species' ranges farther west than currently understood.

GODWITS: Still not well understood as an Alaska breeding bird, the Hudsonian Godwit has a discontinuous nesting range over a vast area of North American taiga—perhaps one of the reasons that Gabrielson and Lincoln (1959:407) wrote long ago, with what proved to be unwarranted pessimism, “it is not probable that it will be found again in the Territory.”

WEST-EAST: Just two nesting species reach interior Alaska from the west. The eastern limit of the breeding range of Northern Wheatear, reaching Alaska (and northwesternmost Canada) each spring all the way from sub-Saharan Africa, might be the result of the constraints of time/distance from winter range, while that of Arctic Warbler, reaching this region (but not farther east) each spring from southeast Asia, might be determined instead by eastern extent of suitable nesting habitat. Until or unless wheatears (nominate *oenanthe*) and Arctic Warblers develop New World winter ranges, their North American nesting ranges have probably expanded as far as possible. And to date there have been few records of either species in the temperate zone of western North America (e.g., see Hamilton et al. 2007).

WINTER: There are profound seasonal differences in abundance and species composition in the avifauna of the interior Alaska taiga, as most species depart entirely for the winter. Behavioral and physiological responses allow winter-resident species to sustain themselves through the long subarctic winter each year. Of the species that make up the annual summer avifauna, those that depart for winter (132 species of 27 families) include 27 of 28 ducks, geese, and swans (Anatidae); 3/3 loons (Gaviidae); 2/2 grebes (Podicipedidae); 1/1 osprey

(Pandionidae); 8/9 hawks and eagles (Accipitridae); 3/4 falcons (Falconidae); 2/2 rails and coots (Rallidae); 1/1 crane (Gruidae); 29/29 shorebirds (Charadriidae and Scolopacidae); 5/5 gulls and terns (Laridae); 2/2 jaegers (Stercorariidae); 1/5 owls (Strigidae), 1/1 kingfisher (Alcedinidae); 2/6 woodpeckers (Picidae); 6/6 tyrant flycatchers (Tyrannidae); 1/1 lark (Alaudidae); 4/4 swallows (Hirundinidae); 2/2 kinglets (Regulidae); 1/1 leaf-warbler (Phylloscopidae); 8/8 thrushes (Turdidae); 1/1 starling (Sturnidae); 1/1 pipit (Motacillidae); 3/3 calcariids (Calcariidae); 7/7 wood-warblers (Parulidae); 9/9 emberizids (Emberizidae); 2/2 blackbirds (Icteridae); and 1/6 finches (Fringillidae).

Those that occur annually in winter (32+ species of 13 families) include 6 of 6 grouse (Phasianidae), 1/28 ducks, geese, and swans (Anatidae), 1/9 hawks and eagles (Accipitridae), 1/4 falcons (Falconidae), 4/5 owls (Strigidae), 4/6 woodpeckers (Picidae), 1/1 shrike (Laniidae), 3/3 corvids (Corvidae), 3/3 chickadees (Paridae), 1/1 nuthatch (Sittidae), 1/1 creeper (Certhiidae), 1/1 dipper (Cinclidae), and 5/6 finches (Fringillidae). Mallards are distributed very locally in the Interior in winter, either on spring-fed waters that remain open naturally (e.g., Clearwater River) or, at Fairbanks, on waters that are kept open by thermal pollution from the city power plant (Chena River). In a somewhat different category are the small numbers of Bohemian Waxwings (Bombycillidae) and Dark-eyed Juncos (Emberizidae) that overwinter in Fairbanks. Neither species can be construed to be a natural winter resident of the taiga, as they occur at that season only within sizable human communities, exemplified by Fairbanks, where an extensive human-altered landscape, with plantings of exotic, berry- and fruit-bearing ornamentals and a wide array of birdseed feeders, sustains small numbers of each, respectively, through most winters. Elsewhere, to the east, a maximum count of six juncos was recorded on Christmas Bird Counts at Delta Junction, in December 1997, and of 10 at Whitehorse, Yukon Territory, in December

2009. One waxwing at Delta Junction in December 2001 might represent the only winter record of a waxwing *between* the cities of Fairbanks and Whitehorse (where maximum count was 248 in December 2007). Individuals of other passerine species with no winter home at these latitudes have managed to overwinter only with the support of the artificial resources provided by human communities (e.g., Townsend's Solitaire, American Robin, American Tree Sparrow, Fox Sparrow, Lincoln's Sparrow, White-crowned Sparrow, Golden-crowned Sparrow). There is no respite for birds wintering under the extreme conditions of interior Alaska (see Climate), and few individual birds—and no *populations*—of species not adapted to live under such conditions survive the season.

FIRE: Lightning-sparked wildfires are a commonplace result of the often daily thunderstorms in a hot and dry summertime Interior, when dozens of fires, involving many hundreds of thousands of acres of forest, can be burning in many random, unconnected areas at the same time. When not a direct threat to human constructs they are commonly monitored but allowed to burn (e.g., see Anchorage Daily News, 9 July 2009: “70 Forest Fires Burning in Alaska; Minto Flats [125,000 acres] is Largest”).

At all seasons, recently burned forests are of particular importance to Black-backed, American Three-toed, Hairy, and Downy woodpeckers as well as to Northern Hawk and Great Gray owls, as they provide, immediately following a burn and for a few years thereafter, an abundance of prey (insects, cricetid rodents—the single largest family of mammals in Alaska, MacDonald and Cook 2009), as well as nest sites. For the same reasons, burns are important in summer to Lesser Yellowlegs, Northern Flicker, Brown Creeper, Mountain Bluebird, Hermit Thrush, European Starling, and probably others as well, as studies of birds that move into burned areas soon after fire have shown (see Quinlan 1979, Murphy and Lehnhausen 1998).

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APPENDIX I

DATA FOR SELECTED AVIAN SPECIMENS

Institutions cited are (MVZ) Museum of Vertebrate Zoology, University of California Berkeley; (UAM) University of Alaska Museum, Fairbanks; and (USNM) U.S. National Museum of Natural History, Smithsonian Institution, Washington, D.C.

► *Charadrius vociferus vociferus* {2}: The only Interior specimens are UAM 3613, downy ♀, 11 June 1977, Fairbanks, Smith Lake, B. Kessel; and UAM 5859, ad ♀, Fairbanks, Peger Road, R. W. Dickerman.

► *Tringa melanoleuca* {2+}: UAM 2932, HY unsexed, 9 August 1956, Denali NP, A. Murie; and UAM 4264, HY ♂, 25 August 1982, Fairbanks, Cushman flats, DDG.

► *Tringa incana* {3+}: USNM 287703, downy, 9 July 1922, and USNM 287014, ad ♂, 16 July 1922—both Jennie Creek, off Savage River, Alaska Range, O. J. Murie; and UAM 856, ad ♂, 14 June 1956, headwaters of Coleen River, Brooks Range, G. B. Schaller.

► *Bartramia longicauda* {6}: UAM 358, ♂, 20 May 1952, Jarvis Creek, vicinity Donnelly Dome, C. J. Lensink; UAM 857, ad ♀, 16 July 1956, Sheenjek River at Old Women Creek, G. B. Schaller; UAM 2019, ♀, 24 May 1962, Richardson Highway, southeast of Donnelly Dome, coll.; UAM 3178, ad ♀, 25 May 1971, Fairbanks, Experimental Farm, B. Kessel; UAM 3808, downy ♂, 17 July 1980, Healy area, Usibelli, Gold Run Pass Road, C. Elliot; and UAM 5673, ♀, 20 May 1989, Fairbanks, Mayos' hayfield, D. Chauvin.

► *Limosa haemastica* {14}: UAM 200, ad ♀, 24 June 1951, Iditarod River, at 63°10'N 158°30'W, C. J. Lensink; UAM 1067, HY ♂, 1 August 1957, Fort Yukon area, at 67°22'N 143°48'W, L. J. Rowinski; UAM 2549, ad ♀, 23 May 1973, Fairbanks airport, DDG; UAM 6005, ad ♂, 10 May 1992, Fairbanks, Cushman flats, R. W. Dickerman; UAM 8258, ad ♂, and UAM 8259, ad ♀--both 23 May 1997, Fairbanks, Lathrop flats, DDG and K. Winker; UAM 8804, ad ♀, 31 May 1997, Fairbanks, Lathrop flats, T. M. Boucher; UAM 10466, ad ♂, 9 May 2000, Fairbanks, T. M. Braile; UAM 10467, ad ♂, UAM 10468, ad ♂, and UAM 11194, ad ♀—three collected together on 11 May 2000, Fairbanks, Cushman flats, TMB; UAM 13554, ad ♀, 13 May 2001, Fairbanks, Cushman flats, J. M. Maley; UAM 20060, ad ♂, 10 May 2004,

Fairbanks, Cushman flats, JMM; UAM 22169, and ad ♂, 29 May 2005, Dalton Highway north of ‘Finger Mountain’, C. Barger.

► *Aphriza virgata* {3+}: It is likely that no **HOLOTYPE** exists of *Tringa virgata* Gmelin (Syst. Nat. 1[2]:674, 1789—based on the “Streaked Sandpiper” of Latham, Gen. Syn. Bds. 3[1]:180, 1785: “Sandwich Sound” = Prince William Sound). Interior specimens include UAM 765, ad ♂, and UAM 766, downy ♀—25 June 1952, Eagle Summit, B. Kessel; and UAM 5505, downy ♂, 8 July 1988, Eagle Summit, R. W. Dickerman.

► *Calidris pusilla* {+}: Midsummer Interior occurrence at elevation is documented by UAM 5506, ad ♂, and UAM 5507, HY ♀—both 8 July 1988, Twelvemile Summit, R. W. Dickerman.

► *Phalaropus tricolor* {2}: The only Interior specimens are UAM 5249, HY ♂, 24 July 1985, Fairbanks, Peger Road, DDG; and UAM 5645, ad ♂, 4 June 1991, Fairbanks, Peger Road, B. Kessel.

► *Megaceryle alcyon* {1+}: The **HOLOTYPE** of synonym *Ceryle alcyon caurina* Grinnell (Univ. Calif. Publ. Zool. 5:388, 1910) is MVZ 1233, ad ♂, 12 July 1908, Graveyard Point, Montague Island, Prince William Sound, E. Heller.

► *Sphyrapicus varius varius* {1}: The only Interior specimen is UAM 9048, ♀, 19 May 1999, Fairbanks, A.-M. Benson.

► *Picoides pubescens nelsoni* {+}: The **HOLOTYPE** of *Dryobates pubescens nelsoni* Oberholser (Proc. USNM 18:549, 1896) is USNM 75654, ad ♂, January 1878, Nulato, E. W. Nelson.

► *Picoides dorsalis fasciatus* {3+}: In his (brief) description of *Picoides tridactylus alascensis* Nelson (Auk 1:165, 1884: Alaska and British America = “Nulato, Alaska”—Cory 1919)—the name by which *P. dorsalis fasciatus* Baird, 1870 was known until recently (see Gibson and Kessel 1997, Banks et al. 2003)—Nelson (loc. cit.) made only broad reference to locality (“*Hab.* Alaska and northern British America”), a characteristic of many nineteenth-century descriptions, and he did not name a type specimen. Filling that gap many years later, Deignan (1961) designated as **SYNTYPES** three specimens (USNM 78614, USNM 78615, and USNM 78621) that had been collected (for E. W. Nelson by L. N. McQuesten) on the Yukon River at Fort Reliance. That locality was situated in westernmost Canada (at 139°29’W),

however, so the type locality of the three-toed woodpecker subspecies Nelson named for Alaska was fixed, many years after its published description, as Yukon Territory.

► *Colaptes auratus luteus* {+}: The **HOLOTYPE** of synonym *Colaptes auratus borealis* Ridgway (Proc. Biol. Soc. Washington 24:31, 1911) is USNM 49922, ad ♂, 23 June 1867, Nulato, W. H. Dall.

► *Empidonax flaviventris* {6}: UAM 3078, ad ♀, 28 July 1966, Coal Creek at Yukon River, C. M. White; UAM 6373, HY ♀ 20 August 1993, Fairbanks, T. H. Pogson and J. J. Bouton; UAM 6576, ad ♂, 13 June 1994, Mile 43 Taylor Highway, T. J. Doyle; UAM 6579, HY ♂, 8 August 1994, Tok, TJD; UAM 7427, HY ♀, 13 August 1997, Fairbanks, A.-M. Barber; and UAM 21262, ad ♀, 19 June 2005, Eureka, P. R. Martin.

► *Empidonax alnorum* {3+}: The **HOLOTYPE** of synonym *Empidonax traillii alasensis* Phillips (Auk 65:509, 1948) is USNM 187242, ad ♂, Charlie Creek/Yukon River (= Kandik River), 21 June 1903, W. H. Osgood. Documented late-fall migrants include UAM 1867, HY unsexed, 3 September 1961, Denali NP, Sanctuary River, W. T. VanVelzen; and UAM 6144, HY ♂, 11 September 1992, Fairbanks, Creamer's Field, T. H. Pogson.

► *Empidonax minimus* {1}: The only Interior specimen is UAM 5335, ad ♂, 26 June 1986, Ester, DDG.

► *Empidonax hammondii* {7+}: Upper Yukon River specimens include UAM 5472, ad ♂, UAM 5473, ad ♀, and UAM 5474, ad ♂--three collected 28 June 1988, Eagle, DDG and R. W. Dickerman. Western limit of range is documented by UAM 4211, ad ♂, 29 May 1982, Yukon River, R bank 10 mi/16 km downriver from Ruby, at 64°44'N 155°52'W; and UAM 4214, ad ♂, 30 May 1982, Yukon River, R bank above Fish Island, at 64°39'N 156°33'W—both DDG and B. Kessel. Late-fall migrants are documented by UAM 5256, HY ♂, 4 September 1985, Ester, DDG; and UAM 6998, HY ♀, 17 September 1996, Tok, 7 mi/11.2 km west, T. J. Doyle.

► *Sayornis saya yukonensis* {+}: The **HOLOTYPE** of *Sayornis saya yukonensis* Bishop (Auk 17:115, 1900) is USNM 165223, ad ♂, 8 June 1899, Glacier, White Pass, W. H. Osgood. Specimens of distributional interest—here the Bering Sea coast—cited in text include UAM 20122, HY ♂, UAM 26027, HY ♀, and UAM 26488, ad ♀—all 15 July 2004, Goodnews Bay at Beluga Hill (59°06'N 161°45'4W), J. M. Maley.

► *Lanius excubitor borealis* {+}: The **HOLOTYPE** of synonym *Lanius excubitor invictus* Grinnell (Pac. Coast Avif. 1:54, 1900) is MVZ 36916, SY ♂, 15 April 1899, Kowak (= Kobuk) River, J. Grinnell.

► *Perisoreus canadensis pacificus* {+}: It is likely that no **TYPE** exists of *Corvus pacificus* Gmelin (Syst. Nat. 1[1]:372, 1788: “in insulis aris australis” = Norton Sound—AOU 1957:368); the **HOLOTYPE** of synonym *Perisoreus canadensis fumifrons* Ridgway (Proc. USNM 3:5, 1880) is USNM 46024, ad unsexed, 28 August 1866, Saint Michael, C. Pease.

► *Eremophila alpestris arctica* {+}: The **HOLOTYPE** of *Otocoris alpestris arctica* Oberholser (Proc. USNM 24:806 [in key], 816) is USNM 78565, ad ♂, 7 May 1879, Fort Reliance, Yukon Territory (see *Picoides dorsalis fasciatus*, above).

► *Hirundo rustica erythrogaster* {3+}: USNM 100394, ad unsexed (alcohol), no date 1884, Hotham Inlet, S. B. McLenegan; USNM B45080, 4-egg set, 20 June 1915, Saint Michael, F. S. Hersey; and USNM B45079, 4-egg set, 28 June 1915, Saint Michael, F. S. Hersey.

► *Poecile atricapillus turneri* {+}: The **HOLOTYPE** of *Parus atricapillus turneri* Ridgway (Proc. Biol. Soc. Washington 2:89, 1884) is USNM 70826, ad ♂, 1 May 1876, Saint Michael, L. M. Turner.

► *Poecile hudsonicus hudsonicus* {7+}: The **SYNTYPES** (4) of synonym *Parus hudsonicus evura* Coues (Key N. Am. Birds, 2nd ed.:267, 1884; and see Phillips, Known Birds of North and Middle America, Part I:80-82, 1986) are USNM 49945, unsexed, 10 February 1867, Nulato, E. Smith; USNM 54471, unsexed, 28 April 1867, Nulato, W. H. Dall; USNM 54469, ♀, 2 March 1868, Nulato, WHD; and USNM 70831, unsexed, 20 March 1876, Nulato, L. M. Turner. The **SYNTYPES** (3) of synonym *Parus stoneyi* Ridgway (Manual N. Am. Birds:591, 1887) are USNM 110316, ♂, no date, Camp Retreat; USNM 110317, unsexed, no date, Camp Retreat; and USNM 110318, unsexed, 6 September 1885, Fort Cosmos—all Putnam or Kowak river (= Kobuk River), G. M. Stoney.

► *Poecile cinctus lathamii* {14}: It is likely that no **TYPE** exists of *Parus Lathamii* Stephens (*in* Shaw, Gen. Zool., Vol. X, Pt. I:44, 1817), and the confusing nomenclatural history of this bird includes Hellmayr’s (1934:77) footnote regarding synonym *Poecila cincta alascensis* Pražák (Orn. Jahrb. 6:92, 1895: “Alaska and Ochotsk”): “No type exists. The author, who was insane, probably never examined a specimen himself, and based his account solely on the figure in Turner’s ‘Contributions to the Natural History of Alaska’, the locality ‘Ochotsk’ being in all

probability fictitious. Saint Michael, Norton Sound, Alaska (ex Turner), may be accepted as terra typica.”

Interior specimens include USNM 55416, ♀, 20 December 1867, Nulato, W. H. Dall; USNM 70217, unsexed, 15 March 1875, Nulato, E. W. Nelson; USNM 70828, ad ♂, and USNM 70829, ad ♂—both 8 March 1876, Nulato, L. M. Turner; USNM 75431, ad ♂, March 1878, Nulato, EWN; USNM 187731, ♀, 28 August 1903, mountains near Eagle, W. H. Osgood; USNM 187732, ♀, 31 August 1903, mountains near Eagle, WHO; USNM 286599, ♀, 16 February 1921, Twelvemile Creek, tributary of Birch Creek, O. J. Murie; USNM 286605, ♀, 20 February 1921, McManus Creek, tributary of Chatanika River, OJM; USNM 287659, unsexed, 24 February 1923, Alatna River, OJM; USNM 287660, ♂, 24 February 1923, Alatna River, OJM; USNM 298355, ♀, 6 April 1924, Beaver Mountains, Dishna River, OJM; and UAM 5000, ad ♂, and UAM 5001, ad ♀, two collected together 23 March 1984, Koyukuk River, Peter Cleaver Lake—both T. O. Osborne.

► *Certhia americana alascensis* {8}: The **HOLOTYPE** of *Certhia americana alascensis* Webster (in A. R. Phillips, *The Known Birds of North and Middle America*, Part I:199, 1986) is USNM 600023 (formerly UAM 1889), HY ♂, 28 September 1961, Fairbanks, Fort Wainwright, W. T. VanVelzen. **PARATYPES** (2) are UAM 1890, HY ♀, 30 September 1961, Fairbanks, Fort Wainwright, WTV; and UAM 1888, HY ♀, 2 October 1961, Fairbanks, Fort Wainwright, WTV. All other Fairbanks-area specimens are topotypes: UAM 3083, HY ♀, Fairbanks, University of Alaska campus, B. Kessel; UAM 3960, unsexed, 13 October 1979, Fairbanks, M. Robus; UAM 5157, ♂, 11 March 1985, College, E. C. Murphy; UAM 14104, HY unsexed, [23 September 2001], Fairbanks, D. Adams; and UAM 19283, HY ♀, 21 October 2002, Ester, M. Gallagher.

► *Regulus satrapa amoena* {6}: UAM 6767, HY ♀, 14 September 1995, Tok, R. Papish; UAM 6982, HY ♂, 26 September 1996, Tok, 11 mi. W, T. J. Doyle; UAM 7355, HY ♂, 24 September 1997, Fairbanks, Univ Alaska campus, coll unk; UAM 8835, HY ♂, 30 September 1997, Tok, 7 mi/11 km west, H. K. Timm; UAM 8375, HY ♂?, 10 September 1998, Fairbanks, J. Williams; and UAM 22036, ♂, 12 November 2004, Fairbanks, D. W. Shaw.

► *Phylloscopus borealis kennicotti* {8+}: The **HOLOTYPE** of *Phyllopusneuste Kennicotti* Baird (Trans. Chicago Acad. Sci. 1:313, pl. 30, fig. 2, 1869) is USNM 45909, ad unsexed, 16 August 1866, Saint Michael, C. Pease. Interior specimens include UAM 2419, ♂, 28 August 1963, Fairbanks, C. M. White; UAM 2762, ad ♂, 8 June 1974, Takotna, 6 mi/9.6 km northwest

of East Fork Independence Creek, B. Kessel; UAM 3198, HY unsexed, 21 August 1974, Fairbanks, BK; UAM 6571, HY unsexed, 15 August 1994, Fairbanks, T. H. Pogson; UAM 6570, ♀?, 19 September 1994, Fairbanks, A.-M. Barber and L. Webster; UAM 6940, ad ♂, 9 June 1996, Fairbanks, AMB; and UAM 6992, HY ♂, 21 August 1996, Tok, T. J. Doyle.

▶ *Sialia currucoides* {1}: UAM 5011, ad ♂, 18 April 1984, Fairbanks, Sheep Creek Road, DDG.

▶ *Sturnus vulgaris* {3}: UAM 3068, ad ♂, 13 June 1967, Beaver, J. N. Eisenhart; and UAM 3070, [♂], found dead and desiccated 20 June 1967, Camp Denali, D. W. Norton; and UAM 3648, SY ♀, 1 October 1977, Big Delta, Shaw Creek dairy, J. J. Zimmerli.

▶ *Calcarius pictus* {+}: The **HOLOTYPE** of synonym *Calcarius pictus roweorum* Kemsies (Canad. Field-Nat. 75:148, 1961) is USNM 435538, ad ♂, 4 June 1949, Anaktuvuk Pass, T. Brown.

▶ *Oreothlypis peregrina* {2}: The only Interior specimens are UAM 6141, HY ♂, 10 August 1992, Fairbanks, T. H. Pogson; and UAM 6955, ad ♂, 23 June 1996, Mile 87.2 Taylor Highway, north of Chicken, at 64°07'N 141°33'W, T. J. Doyle.

▶ *Dendroica townsendi* {+}: The first Interior specimen was UAM 2415, HY ♂, 29 August 1963, Fairbanks, W. S. Brooks.

▶ *Dendroica striata* {+}: The **HOLOTYPE** of synonym *Dendroica striata lurida* Burleigh and Peters (Proc. Biol. Soc. Washington 61:119, 1948) is USNM 231288, ad ♂, 13 June 1911, Nushagak, G. D. Hanna.

▶ *Spizella passerina arizonae* {5}: UAM 1068, ad ♂, 27 May 1958, University of Alaska campus at College, B. Kessel; UAM 1696, [ad ♂], 29 June 1960, Tetlin Lake area, south end Island Lake, D. E. McKnight; UAM 2221, ad ♂, and UAM 2222, ad ♀—both 11 June 1964, northeast shore Tetlin Lake; BK; and UAM 2223, ad ♂, 12 June 1964, Tetlin Lake area, southwest shore Island Lake, BK.

▶ *Spizella breweri taverneri* {2}: The only Interior specimens are UAM 6669, ad ♂, 25 June 1995, and UAM 6670, ad ♂, 26 June 1995—both Nutzotin Mountains, Gold Hill, T. J. Doyle and G. H. Rosenberg.

▶ *Passerella iliaca zaboria* {+}: The **HOLOTYPE** of *Passerella iliaca zaboria* Oberholser (J. Washington Acad. Sci. 36:388, 1946) is USNM 187118, ad ♂, 4 July 1903, Circle, N. Hollister.

► *Melospiza melodia merrilli* {1}: UAM 6584, ♀, 15 November 1994, 6 mi/9 km E of Tok, T. J. Doyle.

► *Agelaius phoeniceus arctolegus* {5}: UAM 2383, ad ♂, 10 June 1964, Tetlin area, northwest shore Gasoline Lake, at 63°06'N 142°34'W, B. Kessel; UAM 2387, ad ♀, 18 June 1964, southeast shore Tetlin Lake, K. B. Schneider; UAM 2385, ad ♂, and UAM 2386, ad ♀—both 17 July 1964, George Lake, 35 mi/56 km east of Big Delta, L. G. Swartz; and UAM 22032, ad ♂, 25 May 2005, Fairbanks, Goldstream Valley, D. W. Shaw and J. M. Maley.

► *Molothrus ater artemisiae* {1}: UAM 7047, ad ♀, 26 May 1994, Tok, R. Schulz.

► *Leucosticte tephrocotis tephrocotis* {11+}: The **HOLOTYPE** of synonym *Leucosticte tephrocotis irvingi* Feinstein (Proc. Biol. Soc. Washington 71:11, 1958) is USNM 435409, ad ♂, 29 June 1949, Anaktuvuk Pass, T. Brower. Interior specimens of nominate *tephrocotis* include UAM 6023, ad ♂, 17 May 1992, Fox, 5 km east-southeast, R. W. Dickerman; UAM 27635, ♀, 23 September 2001, Fairbanks, Chena Ridge (window kill), coll unk; UAM 26371, ♀, 10 October 2009, Murphy Dome area, J. J. Withrow; and UAM 27284, HY ♀, UAM 27285, HY ♀, UAM 27286, HY ♀, UAM 27287, HY ♂, UAM 27288, ad ♂, UAM 27289, HY ♀, and UAM 27290, HY ♂—seven collected 25 September 2010, Murphy Dome, JJW.

► *Acanthis flammea "holboellii"* {3}: This enigmatic taxon—a 'siskin-billed' Common Redpoll—is known in the Interior from UAM 2388, SY ♂, 13 April 1964, Fairbanks, H. K. Springer; UAM 2457, SY ♂, 27 January 1965, Fairbanks, HKS; and UAM 2453, SY ♂, 22 May 1965, Big Delta, HKS.

► *Acanthis hornemanni exilipes* {+}: UAM 5110 (ad ♂, 5 January 1985, Ester, DDG) remains one of few known-age AHY examples of this taxon; the bird had been banded, at the collecting locality, on 1 March 1981, SY unsexed.

► *Acanthis hornemanni hornemanni* {1}: The only Alaska record is UAM 2389, ad ♀, 28 March 1964, Fairbanks, H. K. Springer.

► *Spinus pinus pinus* {10}: UAM 2422, ♂, and UAM 2423, ♀—both 13 July 1963, Fairbanks, C. M. White; UAM 2424, ♂, 22 July 1963, Fairbanks, CMW; UAM 2885, ad unsexed, UAM 2886, HY ♀, UAM 2971, ad ♀, UAM 2972, HY ♂, and UAM 2973, HY ♀—five collected 20 August 1973, College, B. Kessel; UAM 5936, HY ♂, 5 September 1991, University of Alaska campus, Fairbanks, P. J. Deviche; and UAM 6348, ♂, 18 April 1993, PJD.

GAZETTEER

Interior, Alaska Range, and Brooks Range localities in boldface

Ahklun Mountains: *mountains*, 80 mi/129 km × 30 mi/48 km, from 59°45'N 160°W (NE) to 58°52'N 161°40'W (SW); elevations 1000-3000 ft/300-900 m.

Alaska Highway: *highway*, from Dawson Creek, British Columbia, N and W 1390 miles/2237 km to Delta Junction (64°02'N 145°44'W), Alaska; elevations to 4250 ft/1295 m, at Summit Lake, BC.

Alaska Range: *mountain range*, demarcates most of boundary between the Interior and S-C Alaska; forms 650 mi/1046 km arc from (SE) White River (62°N 141°W), Yukon Territory, to (SW) Iliamna Lake (59°45'N 156°W), Alaska; elevations to 20,320 ft/6193 m.

Alatna River: *stream*, flows SE 145 mi/233 km to Koyukuk River; 66°34'N 152°37'W.

Alder Creek: *stream*, flows SE 15 mi/24 km to O'Brien Creek, 31 mi/50 km SW of Eagle; 64°21'N 141°24'W.

Allakaket: *village*, on S bank of Koyukuk River, SW of its junction with Alatna River; 66°34'N 152°38'W.

Ambler: *village*, on Ambler River; W Alaska.

American Summit: *summit*, 17 mi/27 km S of Eagle, at Mile 143 Taylor Highway.

Anaktuvuk/Anaktuvuk Pass/Anaktuvuk Village: *mountain pass/village*, in central Brooks Range; 68°08'N 151°45'W.

Anaktuvuk River: *stream*, flows N from Brooks Range to Colville River; N Alaska.

Anchorage: *city*, Alaska's largest; S-C Alaska.

Andreafsky River: *stream*, heads at 63°07'N 161°46'W, flows SW 120 mi/193 km to Yukon River; W Alaska.

Andreafsky Wilderness: *preserve*, comprises 1,300,000 acres/5260 km² in the National Wilderness Preservation System administered within the Yukon Delta National Wildlife Refuge.

Aniak: *village*, on S bank of Kuskokwim River; 61°34'N 159°31'W.

Aniak River: *stream*, heads at 60°21'N 159°13'W, flows N 95 mi/152 km to Kuskokwim River.

Anvik: *village*, on R bank of Yukon River at mouth of Anvik River; 62°39'N 160°12'W.

Anvik River: *stream*, heads at 63°39'N 160°08'W, flows SE 140 mi/225 km to Yukon River.

Arctic River: *stream*, on Seward Peninsula; W Alaska.

Arctic Village: *village*, on E fork, Chandalar River, Brooks Range; 68°08'N 145°32'W.

Aropuk Lake: *lake*, on Yukon-Kuskokwim Delta; W Alaska.

Askinuk Mountains: *mountains*, extend E from Cape Romanzof; W Alaska.

Atigun Pass: *mountain pass*, at Mile 244 Dalton Highway; Brooks Range; elevation 4800 ft/1463 m.

Atigun River: *stream*, flows N from Brooks Range to Sagavanirktok River; N Alaska.

Atlin: *community*, on Atlin Lake; British Columbia.

Ballaine Lake: *lake*, W Fairbanks; 64°52'N 147°47'W.

Barrow/Point Barrow: *town/point of land*, northernmost point of North America; N Alaska.

Bartell Creek: *stream*, in Mentasta Mountains; 62°55'N 143°34'W.

Beaver: *village*, on N bank of Yukon River, 60 mi/96 km sw of Fort Yukon; 66°21'N 147°23'W.

Beaver Creek: *stream*, heads at 65°25'N 146°59'W, flows NW 180 mi/289 km to Beaver Creek Slough, Yukon River, 9 mi/14 km SW of village of Beaver. [Also a community (in Alexander et al. 2003) at Mile 1190 Alaska Highway, just E of international boundary (141°W), in Yukon Territory.]

Beaver Mountains: *mountains*, extend NW-SE 14 mi/22 km between Tolstoi Creek and Takotna River, in Kuskokwim Mountains, 40 mi/64 km west of McGrath. Elevations to 3500 ft/1066 m; 62°54'N 156°58'W.

Bethel: *town*, on Kuskokwim River 90 mi/144 km SW of Aniak; W Alaska.

Bettles: *village*, on W bank of Koyukuk River 1 mi/1.6 km SW of junction with John River, Kanuti Flats; 66°54'N 151°41'W.

Bettles Field: *village*, 5 mi/8 km from Bettles, began as late-WWII airfield; 66°55'N 151°30'W.

Big Creek: *stream*, flows NE 11 mi/17 km to Teklanika River; 63°42'N 149°34'W.

Big Delta: *village*, at junction of Delta and Tanana rivers, 73 mi/117 km SE of Fairbanks; 64°09'N 145°50'W.

Birch Creek Village: *village*, on R bank of Lower Mouth Birch Creek, 26 mi/41 km SW of Fort Yukon; 66°15'N 145°48'W.

Birch Hill: *hill*, NE Fairbanks, elevation 1050 ft/320 m; 64°51'N 147°38'W.

Birch Lake: *lake*, 1.7 mi/2.7km across, 28 mi/45 km NW of Big Delta; 64°20'N 147°10'W.

Black Rapids: *rapids*, in Delta River, 36 mi/57 km S of Delta Junction; 63°31'N 145°51'W.

Bolio Lake: *lake*, 1.5 mi/2.4 km long, between Delta River and Richardson Highway, 10 mi/16 km SW of Delta Junction; 63°53'N 145°51'W.

Bonanza Creek: *stream*, flows SW 11 mi/17 km to Tanana River, 18 mi/28 km NE of Nenana; 64°39'N 148°30'W.

Boundary: *settlement*, 50 mi/80 km S of Eagle on N bank of Walker Fork; 64°04'N 141°06'W.

Brooks Range: *mountain range*, demarcates boundary between the Interior and N Alaska and part of boundary between the Interior and W Alaska; 600 mi/965 km from Canada to Chukchi Sea, from 69°N 141°W (E) to 68°N 163°W (W); elevations of 4000-9000 ft/1219-2743 m.

Burwash Landing: *community*, on Kluane Lake; Yukon Territory.

Cache Creek: *stream*, flows SE 6 mi/9.6 km to Goldstream Creek, 17 mi/27 km W of Fairbanks; 64°50'N 148°17'W.

Calico Creek: *stream*, flows NW 6 mi/9.6 km to Teklanika River, 26 mi/41 km SW of Healy; 63°35'N 149°32'W.

Camp Denali: *lodge*, just N of Denali NP near end of Denali Park Road; elevation 2200 ft/670 m; 63.51°N 150.89°W.

Canning River: *stream*, flows N to Camden Bay; N Alaska.

Canol Road: *highway*, from Johnson's Crossing, Mile 808.9 Alaska Highway, N 286 mi/460 km to Northwest Territories border on Tsichu River; Yukon Territory.

Canvasback Lake: *lake*, 2 mi/3.2 km long, 33 mi/53 km SW of Fort Yukon; 66°23'N 146°22'W.

Cape Espenberg: *point of land*, forming N extremity of Seward Peninsula; W Alaska.

Cape Nome: *cape*, E of Nome, Seward Peninsula; W Alaska.

Cape Romanzof: *cape*, forms W extremity of Yukon-Kuskokwim Delta; W Alaska.

Caribou Creek: *stream*, in Kantishna Hills, flows W and N 16 mi/25 km to Bearpaw River, 15 mi/24 km N of Wonder Lake, Denali NP; 63°42'N 150°27'W.

Caribou Crossing: *community*, on South Klondike Highway, 66 mi/106 km N of Skagway, Alaska; Yukon Territory. [= Carcross]

Cathedral Bluffs: *bluffs*, extend 1.2 mi/1.9 km on N bank of Tanana River, at Cathedral Rapids, 12 mi/19 km W of Tanacross; 63°23'N 143°44'W.

Central: *village*, 28 mi/45 km SW of Circle; 65°34'N 144°48'W.

Champagne: *settlement*, between Whitehorse and Haines Junction at Historical Milepost 974.6 Alaska Highway; Yukon Territory.

Chandler Lake: *lake*, 5 mi/8 km long, at head of Chandler River, 26 mi/41 km W of Anaktuvuk Pass, Brooks Range; 68°14'N 152°42'W.

Charley Creek: *stream*, heads in Canada at 65°48'N 140°20'W, flows SW 82 mi/131 km to Yukon River 9 mi/14 km NE of its junction with Charley River; 65°22'N 142°30'W. [= Kandik River]

Chatanika: *settlement*, 20 mi/32 km NE of Fairbanks; 65°06'N 147°28'W.

Chatanika River: *stream*, flows SW 128 mi/205 km to Tolovana River, 48 mi/77 km NW of Fairbanks.

Chena Hot Springs: *locality*, 56 mi/90 km ENE of Fairbanks via Chena Hot Springs Road; 80 mi/128 km W of Eagle; 65°03'N 146°03'W.

Chena Ridge: *mountain*, trends SW 7.5 mi/12 km between Cripple Creek and Chena River, 6 mi/9 km W of Fairbanks; 64°48'N 148°00'W.

Chena River: *stream*, flows SW 100 mi/160 km to Tanana River, 6.5 mi/10 km SW of Fairbanks; 64°47'N 147°54'W.

Chena Slough: *stream*, distributary, flows NW 13 mi/20 km to Chena River, 7 mi/11 km E of Fairbanks; 64°50'N 147°29'W.

Cheslina River: *stream*, flows NE 27 mi/43 km to Nabesna River, 30 mi/48 km SW of Northway Junction; 62°46'N 142°10'W.

Chicken: *village*, at Mile 66 Taylor Highway, 58 mi/93 km SW of Eagle; 64°04'N 141°56'W.

Chignik River: *stream*, on Alaska Peninsula; SW Alaska.

Chisana River: *stream*, flows NE and NW 110 mi/177 km, joins Nabesna River to form Tanana River, 3 mi/4.8 km NW of Northway Junction; 63°02'N 141°51'W.

Circle: *village*, on L bank of Yukon River, 130 mi/209 km NE of Fairbanks; 65°49'N 144°03'W.

Clearwater Creek: *stream*, flows SE 12 mi/19 km to Tok River, 14 mi/22 km S of Tok; 63°09'N 143°12'W; another referred to, in S-C Alaska, crosses Denali Highway at Mile 56, flows SW 40 mi/64 km to Susitna River.

Clearwater Lake: *lake*, 1.5 mi/2.4 km long, 1 mi/1.6 km SW of junction of Tanana River and Clearwater River and 9 mi/14 km ESE of Big Delta; 64°05'N 145°35'W.

Clearwater River: *stream*, flows NW 23 mi/37 km to Tanana River, 9 mi/14 km ESE of Big Delta; 64°06'N 145°34'W. Also known as Delta-Clearwater River and Clearwater Creek.

Cleary Summit: *pass*, 16 mi/25 km NE of Fairbanks, elevation 2233 ft/680 m; 65°02'N 147°26'W.

Coal Creek: *stream*, heads at 65°09'N 143°39'W, flows NE 24 mi/38 km to Yukon River, 10 mi/16 km W of junction of Charley and Yukon rivers; 65°21'N 143°07'W.

Coast Mountains: *mountain range*, separates the mainland of SE Alaska from British Columbia.

College: *town*, 3 mi/4.8 km W of Fairbanks, at Mile 467.1 Alaska Railroad; now NW Fairbanks; 64°51'N 147°48'W.

Columbia Creek: *stream*, flows SE 9 mi/14 km to O'Brien Creek, 26 mi/41 km S of Eagle; 64°26'N 141°21'W.

Colville River/Delta: *river/delta*, on Beaufort Sea coast; N Alaska.

Contact Creek: *stream*, flows SE 9 mi/14 km to John River at Anaktuvuk Pass; 68°09'N 151°44'W.

Cooper Island: *barrier island*, in Beaufort Sea, 23 mi/37 km NE of Barrow; N Alaska.

Copper Mountain: *peak*, in Denali NP, 3.5 mi/5.6 km S of Eielson Visitor Center; 63°23'N 150°10'W. [= Mount Eielson]

Copper River Delta: *delta*, on Gulf of Alaska; S-C Alaska.

Cordova: *town*, on Orca Inlet, Prince William Sound; S-C Alaska.

Creamer's Field: *agricultural fields*, formerly Creamer's Dairy, now Creamer's Field Migratory Waterfowl Refuge; 1800 acres/7.2 km², managed by Alaska Dept. Fish and Game; N Fairbanks.

Crooked Creek: *stream*, flows SE 30 mi/48 km to Kuskokwim River SW of village of Crooked Creek, 33 mi/53 km WNW of Sleetmute; 61°52'N 158°08'W.

Cushman flats: *impoundment*, the result of construction of flood-control dike on R bank of Tanana River by U.S. Army Corps of Engineers following the 1967 Fairbanks flood; S Fairbanks.

Dalton Highway: *highway*, from Elliott Highway junction N 414 mi/666 km to Deadhorse, N Alaska; elevations to 4800 ft/1463 m, at Atigun Pass.

Dawson City: *town*, on upper Yukon River; Yukon Territory.

Deadman Lake: *lake*, 1.4 mi/2.2 km long, between Alaska Highway and Chisana River, 11 mi/17 km SE of Northway Junction; 62°53'N 141°33'W.

Delta Agricultural Project: *agricultural fields*, in vicinity of Delta Junction, elevation 1180 ft/359 m, 64°02'N 145°44'W; 112,000+ acres/453 km² developed for farming—primarily barley, but also oats, wheat, forage, pasture, grass seed, canola, potatoes, and field peas--since the late 1970s; north of the Alaska Highway via Sawmill Creek Road, Clearwater Road, Nistler Road, Jack Warren Road, and Tanana Loop Road/Extension.

Delta Junction: *town*, on R bank of Delta River at junction of Alaska and Richardson highways, 8.5 mi/13.6 km SE of Big Delta; 64°02'N 145°44'W.

Delta River: *stream*, heads at Tangle Lakes, S-C Alaska, flows N 80 mi/128 km to Tanana River at Big Delta; 64°09'N 145°51'W.

Dempster Highway: *highway*, from Klondike Highway, just E of Dawson City, N 456 mi/733 km to Inuvik; Yukon Territory and Northwest Territories.

Denali National Park (NP): *National Park*, comprises 3030 mi²/7847 km² on N slope of Alaska Range; extends SW 115 mi/185 km from Nenana River, E of Denali/Mount McKinley, to Mount Russell; 63°20'N 150°20'W. Formerly Mount McKinley National Park.

Desper Creek: *stream*, flows S and W 20 mi/32 km to Scottie Creek, W of Alaska Highway, 31 mi/49.8 km SE of Northway Junction; 62°40'N 141°10'W.

Dietrich River: *stream*, flows S 35 mi/56 km to join Bettles River to form Middle Fork Koyukuk River, 35 mi/56 km WNW of Chandalar; 67°38'N 149°45'W.

Dishna River: *stream*, heads in Kuskokwim Mountains at 62°32'N 157°31', flows N 60 mi/96 km to Innoko River 68 mi/109 km NW of McGrath; 63°36'N 157°17'W.

Donnelly Dome: *mountain*, W of Richardson Highway, 18 mi/28 km S of Delta Junction, elevation 3910 ft/1191 m; 63°47'N 145°47'W.

Dot Lake: *lake*, 1500 ft/457 m long E of Alaska Highway at Dot Lake village, 40 mi/64 km NW of Tok; 63°39'N 144°04'W.

Eagle: *village*, on L bank of Yukon River at mouth of Mission Creek, 6 mi/9.6 km W of Alaska-Canada boundary; 64°47'N 141°12'W.

Eagle Creek: *stream*, flows SW 3 mi/4.8 km, joins Ptarmigan Creek to form Birch Creek, 50 mi/80 km SW of Circle; 65°26'N 145°31'W.

Eagle Summit: *pass*, between Mastodon Dome and Porcupine Dome, 45 mi/72 km SW of Circle; elevation 3624 ft/1104 m; 65°29'N 145°25'W.

Eielson AFB: *U.S. Air Force Base*, 26 mi/41.8 km SE of Fairbanks; entrance at Mile 341 Richardson Highway.

El Dorado Creek: *stream*, in Kantishna Hills, flows NE 5.5 mi/8.8 km to Moose Creek, 3.5 mi/5.6 km NNW of Wonder Lake, Denali NP; 63°31'N 150°58'W.

Elliott Highway: *highway*, from junction with Steese Highway, at Fox (64°57'N 147°37'W), NW 152 mi/244 km to Manley Hot Springs (65°08'N 149°22'W).

Emmonak: *village*, on Yukon-Kuskokwim Delta; W Alaska.

Ester: *village*, 2.5 mi/4.0 km SE of Ester Dome and 8.5 mi/13.6 km W of Fairbanks; 64°50'N 148°01'W.

Ester Dome: *mountain*, 9.5 mi/15.2 km NW of Fairbanks, elevation 2350 ft/716 m; 64°52'N 148°03'W.

Etivluk River: *stream*, flows NE 56 mi/90 km to Colville River; N Alaska.

Eureka: *locality*, site of mining camp, at junction of Pioneer and Eureka creeks, 3 mi/4.8 km S of Eureka Dome and 23 mi/37 km S of Rampart; 65°11'N 150°13'W.

Experimental Farm: *farm*, comprises 260 acres of cropland and 50 acres of forest (total 1.25 km²) for research and demonstration projects as part of the University of Alaska Agricultural & Forestry Experiment Station; includes the Fairbanks Experimental Farm, offices, laboratories, and greenhouses; on West Tanana Drive, University of Alaska Fairbanks campus; W Fairbanks.

Fairbanks: *city*, on Chena River, elevation 434 ft/132 m; 64°50'N 147°43'W.

Ferry: *village*, at Mile 371.2 Alaska Railroad, at Nenana River, 39 mi/62 km S of Nenana; 64°01'N 149°07'W.

Fielding Lake: *lake*, 4 mi/6.4 km long, drains N to Phelan Creek, 10 mi/16 km N of Paxson, Alaska Range; 63°10'N 145°41'W.

Firth River: *stream*, heads at E end of Davidson Mountains, Brooks Range, flows NE 125 mi/201 km across Alaska-Canada boundary to Beaufort Sea, Yukon Territory.

Fish Creek: *stream*, flows W 60 mi/95 km to South Fork Koyukuk River, 20 mi/32 km S of Bettles; crosses Dalton Highway at Arctic Circle, 60 mi/95 km S of Coldfoot; 66°33'N 150°48'W.

Flat: *settlement*, on Otter Creek, 7 mi/11 km E of junction with Iditarod River, 59 mi/94 km NE of Holy Cross; 62°27'N 158°00'W.

Flood Creek: *stream*, flows SW 3 mi/4.8 km to Delta River, crosses Richardson Highway 30 mi/48 km NW of Paxson, Alaska Range; 63°26'N 145°48'W.

Flume Creek: *stream*, flows NE 13 mi/20 km to Seventymile River, 40 mi/64 km NW of Eagle; 64°59'N 142°27'W.

Fort Egbert: *fort*, established at "Eagle City Camp" [= Eagle] by U.S. Army Signal Corps in 1900; abandoned in 1911.

Fort Hamlin: *locality*, on L bank of Yukon River, N of Hamlin Creek, 40 mi/64 km NE of Rampart; 65°53'N 149°13'W.

Fort Reliance: *fort*, on Yukon River 8.0 mi/13 km downriver from Dawson City; Yukon Territory.

Fort Wainwright: *U.S. Army Base*, E Fairbanks.

Fortymile River: *stream*, flows NE 60 mi/96 km into Canada to Yukon River, 32 mi/51 km SE of Eagle; 64°26'N 140°32'W.

Fortymile Roadhouse: *roadhouse* (defunct), at Tetlin Junction, Mile 0 Taylor Highway, at Mile 1302 Alaska Highway; 63°00'N 141°48'W.

Fort Yukon: *village*, on R bank of Yukon River at its junction with Porcupine River; 66°34'N 145°16'W.

Fox: *settlement*, on R bank of Fox Creek as it enters Goldstream Valley, 10 mi/16 km NE of Fairbanks; 64°57'N 147°37'W.

Galena: *village*, on R bank of Yukon River, 35 mi/56 km E of Nulato; 64°44'N 156°56'W.

Gardiner Creek: *stream*, flows S 38 mi/61 km to Chisana River, 17 mi/27 km SE of Northway Junction; 62°49'N 141°31'W.

George Lake Lodge: *roadhouse* (defunct), S of Tanana River at Mile 1385 Alaska Highway; named for Lake George, 6.2 mi/9.9 km long, N of Tanana River 38 mi/61 km SE of Delta Junction; 63°47'N 144°31'W.

Gerstle River: *stream*, flows N 40 mi/64 km to Tanana River, 25 mi/40 km SE of Big Delta; 64°03'N 145°08'W.

Gisasa River: *stream*, flows NE 70 mi/112 km to Koyukuk River, 38 mi/61 km SW of Roundabout Mountain; 65°16'N 157°40'W.

Glacier: *locality*, on Skagway River at E end of Warm Pass Valley, 9 mi/14 km NE of Skagway; SE Alaska.

Glacier Bay NM: *National Monument* [now National Park], comprises 3600 mi²/9323 km², 40 mi/64 km NW of Juneau; SE Alaska.

Glacier Creek: *stream*, in Denali NP, 30 mi/77 km NE of Denali; 63°24'N 150°24'W.

Gold Hill: *mountain*, in Nutzotin Mountains, between Chathenda and Chavolda creeks, 10 mi/16 km NE of Euchre Mountain; elevation 5815 ft/1772 m; 62°06'N 141°54'W.

Gold King Creek: *stream*, flows N 29 mi/46 km to Bonnifield Creek, 37 mi/59 km SW of Fairbanks; 64°20'N 148°01'W.

Gold Run: *stream*, flows SW 1.5 mi/2.4 km to Healy Creek, 8 mi/12 km NE of Healy; 63°53'N 148°42'W.

Goldstream Creek/Road/Valley: *stream*, heads at junction of Gilmore and Pedro creeks, flows W 70 mi/112 km to Chatanika River, 37 mi/59 km NW of Fairbanks; 64°59'N 148°54'W; *road* connects Sheep Creek Road and Steese Highway, N Fairbanks,

Goodnews Bay: *bay*, 30 mi/48 km N of Cape Newenham, W Alaska.

Grenac Road: *road*, off Farmers Loop Road, N Fairbanks.

Haines Junction: *community*, at Historical Mile 1016 Alaska Highway; Yukon Territory.

Happy Valley Camp: *camp*, at Mile 334.2 Dalton Highway; N Alaska.

Harding Lake: *lake*, 2.3 mi/3.7 km across, 4 mi/6.4 km SE of junction of Salcha and Tanana rivers and 38 mi/61 km NW of Big Delta; 64°25'N 146°50'W.

Healy: *village*, at Mile 358.1 Alaska Railroad, on Nenana River, W of mouth of Healy Creek, 9 mi/14 km N of community of McKinley Park; 63°51'N 148°58'W.

Healy Lake: *lake*, 6 mi/9.6 km long, in course of Healy River, 29 mi/46 km E of Delta Junction; 63°49'N 144°44'W.

Highway Pass: *pass*, in Denali NP, 6 mi/9.6 km NE of Eielson Visitor Center; elevation 3800 ft/1158 m; 63°28'N 150°09'W.

Holy Cross: *village*, on W bank of Walker Slough, off Yukon River, 34 mi/54.7 km SE of Anvik; 62°12'N 159°46'W.

Horn Mountains: *mountains*, in Kuskokwim Mountains, 32 mi/51.4 km NE of Aniak; elevation 3600 ft/1097 m; 61°45'N 158°31'W.

Horseshoe Lake: *lake*, 0.2 mi/0.32 km long, 8 mi/12.8 km S of Healy; 63°44'N 148°54'W.

Hotham Inlet: *bay*, 50 mi/80 km × 8 mi/12 km between Selawik Lake to SE and Kotzebue Sound to NW; W Alaska.

Hunt Fork: *stream*, formed by junction of Kevuk and Agiak creeks, flows SE 11.5 mi/18.5 km to John River, 65 mi/104.6 km NW of Wiseman; 67°44'N 152°25'W.

Iditarod/Iditarod Flats: *locality*, on E bank of Iditarod River, 7 mi/11.2 km NW of Flat and 52 mi/83.6 km S of Holikachuck; 62°32'N 158°05'W.

Iditarod River: *stream*, heads at 61°47'N 158°56'W, flows NE and W 325 mi/523 km to Innoko River, 66 mi/106 km NE of Holy Cross; 63°02'N 158°46'W.

Igloo Creek: *stream*, flows NE 10 mi/16 km to Teklanika River, 24 mi/38 km SW of Healy; 63°38'N 149°34'W.

Iliamna Lake: *lake*, SW end of Alaska Range; 59°45'N 156°W; SW Alaska.

Innoko River: *stream*, heads at 63°09'N 156°02'W, flows NE and SW 500 mi/804 km to Yukon River, 1.5 m/2.4 km E of Holy Cross; 62°12'N 159°43'W.

Jack Wade: *locality*, on Wade Creek, 46 mi/74 km S of Eagle; 64°09'N 141°27'W.

Jade Mountains: *mountains*, at SE end of Baird Mountains, Brooks Range, extend NW-SE 11 mi/17 km × 4 mi/6.4 km, 33 mi/53 km NW of Shungnak; elevations to 3350 ft/1021 m; 67°14'N 158°03'W.

Jarvis River: *stream*, crosses Alaska Highway at Mile 1003.5, between Haines Junction and Boutillier Summit; Yukon Territory.

John River: *stream*, flows S 125 mi/201 km from Anaktuvuk Pass to Koyukuk River, 1 mi/1.6 km NE of Bettles; 66°55'N 151°39'W.

Junjik River: *stream*, flows SE 65 mi/104 km to East Fork Chandalar River, 6 mi/9.6 km N of Arctic Village; 68°13'N 145°28'W.

Kaltag: *village*, on R bank of Yukon River, 33 mi/53 km SW of Nulato; 64°20'N 158°43'W.

Kanektok River: *stream*, flows SW 75 mi/120 km to Kuskokwim Bay; W Alaska.

Kantishna Hills: *ridge*, extends 50 mi/80 km from McKinley River, Alaska Range; elevations 1000-4987 ft/304-1520 m; 64°05'N 150°00'W (NE end), 63°27'N 151°10'W (SW end).

Kantishna River: *stream*, heads at junction of Birch Creek and McKinley River, flows N 108 mi/173 km to Tanana River, 32 mi/51 km NW of Nenana; 64°46'N 149°58'W.

Kanuti Kilolitna River: *stream*, heads in Ray Mountains, flows W and NE 60 mi/96 km to Kanuti River, 30 mi/48 km SE of Allakaket; 66°12'N 152°02'W.

Kanuti Lake: *lake*, 1 mi/1.6 km long, 37 mi/59 km SE of Allakaket; 66°10'N 151°45'W.

Kanuti River: *stream*, flows W 175 mi/281 km to Koyukuk River, 13 mi/20.9 km SW of Allakaket; 66°27'N 153°00'W.

Kaolak River: *stream*, flows NE 60 mi/96 km, joins Avalik River to form Kuk River, 37 mi/59 km SE of Wainwright; N Alaska.

Kathul Mountain: *mountain*, 1.5 mi/2.4 km N of Yukon River and 15 mi/24 km NE of junction of Charley and Yukon rivers; elevation 3122 ft/951 m; 65°21'N 142°16'W.

Kechumstuk: *locality*, along Kechumstuk Creek, 1 mi/1.6 km W of Mosquito Fork, 70 mi/112 km SW of Eagle; 64°01'N 142°33'W.

Kilbuck Mountains: *mountains*, in group 95 mi/152 km × 25 mi/40 km, trend NE-SW, bounded on S by Kwithluk and Canyon creeks, on E by Kipchuk River, on N and W by Kuskokwim River lowlands; elevations 3000-4000 ft/914-1219 m; 61°20'N 159°50'W (N end), 60°25'N 161°00'W (S end).

Kisaralik River: *stream*, flows NW 100 mi/160 km to Kuskokwim Slough, 20 mi/32 km NE of Bethel; W Alaska.

Kluane Lake: *lake*, 43 mi/70 km long, 154 mi²/400 km²; Yukon Territory.

Kobuk River: *stream*, flows W 280 mi/450 km to Hotham Inlet, 25 mi/40 km SE of Kotzebue; W Alaska.

Kodiak Island: Alaska's largest island, 100 mi/160 km × 60 mi/96 km, in Gulf of Alaska; S-C Alaska.

Koidern: *locality*, at Mile 1130.6 Alaska Highway, near junction of Koidern and White rivers; Yukon Territory.

Kolomak River: *stream*, flows SW 15 mi/24 km to Kokechik River, 12 mi/19 km SE of Cape Romanzof, Yukon-Kuskokwim Delt; W Alaska.

Kotzebue: *town*, on NW shore of Baldwin Peninsula; W Alaska.

Kotzebue Sound: *bay*, 80 mi/128 km × 30 mi/48 km N of Seward Peninsula; W Alaska.

Koyukuk: *village*, on R bank of Yukon River, W of Koyukuk Island and 16 mi/25 km NE of Nulato; 64°53'N 157°42'W.

Koyukuk River: *stream*, heads at its Middle Fork and North Fork, flows SW 425 mi/683 km to Yukon River, 22 mi/35 km NE of Nulato; 64°55'N 157°32'W.

Kuparuk River: *stream*, flows N 200 mi/321 km to Gwydyr Bay, 8 mi/12 km SE of Beechey Point; N Alaska.

Kuskokwim Mountains: *mountain range*, 430 mi/692 km × 50 mi/80 km, extends NE-SW between Canyon Creek and Chikuminuk Lake on S and Tanana River on N; bounded on SE by Kantishna River, North Fork Kuskokwim River, Kuskokwim River, Holitna River, and Kogruluk River, and on NW by Kaiyuh Mountains at Sulatna Crossing, Innoko River, Dishna River, Iditarod River, Russian Mountains, and Kilbuck Mountains; elevations 1000-4500 ft/304-1371 m; 64°45'N 151°30'W (NE end), 60°10'N 159°40'W (SW end).

Kuskokwim River: *stream*, heads at confluence of its East and North forks, flows SW 500 mi/804 km to Kuskokwim Bay; 60°05'N 162°25'W.

Kutuk River: *stream*, heads at 67°53'N 153°49'W, flows SW 30 mi/48 km to Alatna River, 24 mi/38 km S of Survey Pass, Brooks Range; 67°31'N 153°58'W.

Lake Minchumina: *lake*, 9 mi/14.4 km long, 66 mi/106 km NNW of Denali/Mount McKinley; 63°53'N 152°14'W.

Lathrop flats: *impoundment*, the result of construction of flood-control dike N of Tanana River by U.S. Army Corps of Engineers following the 1967 Fairbanks flood; S Fairbanks.

Little Brushman: *peak*, 3 mi/4.8 km SE of Brushman Mountain and 44 mi/70 km NE of Arctic Village, Brooks Range; elevation 3810 ft/1161 m; 68°25'N 144°00'W.

Little Stony Creek: *stream*, heads N of Gravel Mountain, flows N 4.5 mi/7.2 km to Stony Creek, 2 mi/3.2 km N of Stony Hill and 11.5 mi/18.5 km NE of head of McKinley River; 63°29'N 150°15'W.

Livengood: *village*, on Livengood Creek, at Mile 66 Elliott Highway, 50 mi/80 km NW of Fairbanks; 65°31'N 148°32'W.

Long: *settlement*, on L bank of Long Creek, 23 mi/37 km S of Ruby; 64°24'N 155°30'W.

Loon Lake: *lake*, 1.5 mi/2.4 km long, in course of Loon Creek, 13 mi/20 km N of Sillyasheen Mountain and 76 mi/122 km NW of Wiseman; 67°57'N 152°37'W.

Manley Hot Springs: *village*, on Hot Springs Slough, 54 mi/86 km NE of the Bitzshini Mountains; 65°00'N 150°38'W.

McCarthy: *settlement*, near Kennicott Glacier, Wrangell Mountains; S-C Alaska.

Maclaren River: *stream*, flows SW 55 mi/88 km to Susitna River; S-C Alaska.

Mancha Creek: *stream*, flows SE 30 mi/48 km across Alaska-Canada boundary to Firth River in Yukon Territory; 68°40'N 140°57'W.

Mansfield Lake: *lake*, 3 mi/4.8 km long, N of Mansfield Village, 7 mi/11 km N of Tanacross; 63°30'N 143°25'W.

Marshall: *village*, on E bank of Poltes Slough, N of Arbor Island, on R bank of Yukon River; W Alaska.

Marsh Fork Canning River: *stream*, heads N of Mount Weller, in the Sadlerochit Mountains, flows N 28 mi/45 km to Camden Bay; N Alaska.

Mastodon Dome: *mountain*, 46 mi/74 km SW of Circle; elevation 4418 ft/1346 m; 65°25'N 145°20'W.

McCarthy's Marsh: *basin*, 25 mi/40 km long at junction of Pardon and Fish rivers, S of Bendeleben Mountains, Seward Peninsula; W Alaska.

McGrath: *town*, on L bank of Kuskokwim River opposite junction of Takotna River; 62°57'N 155°35'W.

McKinley Bar: *bar*, in headwaters of McKinley River, Denali NP, extends W 18 mi/28 km from Muldrow Glacier terminus to Eagle Gorge; 63°25'N 150°50'W.

McKinley Creek: *stream*, flows N 8 mi/12 km to Middle Fork Fortymile River, 58 mi/93 km SW of Eagle; 64°23'N 142°53'W.

McKinley River: *stream*, heads at Muldrow Glacier terminus, flows NW 58 mi/93 km, joins Birch Creek to form Kantishna River, 23 mi/37 km E of village of Lake Minchumina; 63°52'N 151°33'W.

McKinley Village: *lodge*, at Mile 231 Parks Highway, 6 mi/9.6 km S of entrance to Denali NP.

McManus Creek: *stream*, flows SW 14 mi/22 km, joins Smith Creek to form Chatanika River, 76 mi/122 km SW of Circle; 65°17'N 146°20'W.

Mentasta Mountains: *mountain range*, 40 mi/64 km × 25 mi/40 km, bounded by Slana River on W, Jack Creek on S, Nabesna River on E, and Station and Tuck creeks on N; elevations 4000-7000 ft; 1219-2133 m; 62°30'N 142°40' (SE end) , 62°50'N 143°35'W (NW end)

Midway Lake: *lake*, 3.4 mi/5.4 km long, S of Mile 1289.5 Alaska Highway, 22 mi/35 km E of Tok; 63°13'N 142°17'W.

Miller Creek: *stream*, heads at Canwell Glacier terminus, flows W 3 mi/4.8 km to Delta River, crossing Richardson Highway (at Mile 217) 25 mi/40 km NW of Paxson; 63°22'N 145°45'W.

Miller Hill: *hill*, W of University of Alaska Fairbanks campus; W Fairbanks.

Mineral Lake: *lake*, 1.2 mi/1.9 km across, in course of Station Creek, in Mentasta Mountains, 29 mi/46 km S of Tok; 62°56'N 143°22'W.

Minto: *village*, on E bank of Tanana River, 44 mi/70 km W of Fairbanks; 64°53'N 149°11'W.

Minto Lakes: *lakes*, near mouth of Goldstream Creek, 34 mi/54 km NW of Fairbanks; 64°53'N 148°49'W.

Montague Island: *island*, in Prince William Sound, 76 mi/122 km E of Seward; S-C Alaska.

Moody: *locality*, at Mile 353.2 Alaska Railroad, 4 mi/6.4 km S of Healy; 63°47'N 148°56'W.

Moon Lake: *lake*, 0.9 mi/1.44 km long, between (Mile 1331.9) Alaska Highway and Tanana River, 6 mi/9.6 km W of Tanacross; 63°23'N 143°23'W.

Moose Creek: *locality*, along Richardson Highway, 20 mi/32 km SE of Fairbanks; 62°42'N 147°08'W.

Moose Creek: *stream*, heads in Denali NP, flows W and N 50 mi/80 km to Bearpaw River, 18 mi/28 km E of Chilchukabena Lake; 63°53'N 150°54'W.

Mount Fairplay: *mountain*, at head of Logging Cabin Creek, 34 mi/54 km NE of Tok; elevation 5541 ft/1688 m; 63°40'N 142°13'W.

Mount McKinley, or Denali: *mountain*, highest elevation on North American continent, comprises South Peak 20,320 ft/6193 m, and North Peak 19,470/5934 m; in Denali National Park; 63°04'N 151°00'W.

Mount Tozi: *peak*, highest point in Ray Mountains, 25 mi/40 km NW of Rampart and 48 mi/77 km NE of Tanana; elevation 5519 ft/1682 m; 65°41'N 150°57'W.

Mount Watana: *mountain*, 24 mi/38 km NW junction of Oshetna and Susitna rivers; elevation 6255 ft/1906 m; S-C Alaska.

Mountain Village: *village*, on N bank of Yukon River, 52 mi/83 km SE of Kwiguk; W Alaska.

Muldrow Glacier: *glacier*, trends NE 30 mi/48 km, in Denali NP; 63°24'N 150°33'W.

Murphy Dome: *mountain*, 20 mi/32 km NW of Fairbanks; elevation 2930 ft/893 m; 64°57'N 148°21'W.

Muskox Trail: *road*, in Muskox Subdivision, NW Fairbanks.

Napaskiak: *village*, on L bank of Kuskokwim River, 6 mi/9.6 km S of Bethel; W Alaska.

Nation River: *stream*, heads in Yukon Territory at 65°35'N 140°23'W, flows SW 50 mi/80 km to Yukon River, 32 mi/51 km NW of Eagle; 65°12'N 141°43'W.

Nenana: *town*, at Mile 411.7 Alaska Railroad, on L bank of Tanana River, E of mouth of Nenana River, 45 mi/72 km SW of Fairbanks; 64°34'N 149°05'W.

Nikolai: *village*, at junction of South Fork of Kuskokwim and Little Tonzina rivers, 46 mi/74 km E of McGrath; 62°58'N 154°09'W.

Noatak River: *stream*, heads on Mount Igikpak, in Schwatka Mountains, at 67°25'N 154°53'W, flows SW 425 mi/683 km to Kotzebue Sound at mouth of Hotham Inlet; W Alaska.

Nome River: *stream*, heads 4.5 mi/7.2 km W of Salmon Lake, flows S 40 mi/64 km to Norton Sound, 4 mi/6.4 km SE of Nome; W Alaska.

North Pole: *town*, at Mile 347.7 Richardson Highway, 12 mi/19 km SE of Fairbanks; 64°45'N 147°21'W.

Northway: *village*, on E bank of Nabesna Slough, 5.5 mi/8.8 km SW of Northway Junction; 62°58'N 141°56'W.

Northway Junction: *locality*, at Mile 1264 Alaska Highway, 5.5 mi/8.8 km NE of Northway; 63°01'N 141°48'W.

Norton Sound: *gulf*, extends E off Bering Sea, between Seward Peninsula on N and Yukon Delta on S; W Alaska.

Nulato: *village*, on R bank of Yukon River, 25 mi/40 km W of Galena; 64°43'N 158°06'W.

Nulato Hills: *mountains*, in group 300 mi/482 km × 80 mi/128 km, bounded on S and E by Yukon River, on N by lowlands of Selawik River and Selawik Lake, and on W by Norton Bay and Norton Sound; form part of boundary between the Interior and W Alaska; 66°15'N 159°00'W (N end), 62°00'N 163°00'W (S end).

Nushagak: *locality*, at Nushagak Point, on E shore of Nushagak Bay, 6 mi/9.6 km S of Dillingham; SW Alaska.

Nutzotin Mountains: *mountain range*, 70 mi/112 km × 25 mi/40 km, between Nabesna River at NW end and White River, Yukon Territory, at SE end; bounded on SW by Copper, Notch, and Geohenda creeks; elevations 5000-8000 ft/1524-2438 m; 61°50'N 140°50'W.

Nuvagapak Point: *point of land*, on SW shore of Beaufort Lagoon, 20 mi/32 km NW of Demarcation Point; N Alaska.

Nyac: *village*, on R bank of Tuluksak River, 40 mi/64 km SW of Aniak; 61°00'N 159°56'W.

Ohtig Lake: *lake*, 3 mi/4.8 km long, 5 mi/8 km S of Chalkyitsik; 66°35'N 143°44'W.

Old Crow/River/Village/Mountains: *stream* heads at E end of Davidson Mountains, flows SE 175 mi/281 km across Alaska-Canada boundary to Porcupine River, in Yukon Territory; 67°34'N 139°50'W.

Old Nenana Highway: *highway*, from Ester, at Mile 351.2 Parks Highway, W 18 mi/28.9 km to Mile 342.5 Parks Highway.

Parks Highway: *highway*, from Anchorage N 362 mi/582 km to Fairbanks; elevations to 2400 ft/731 m, at Broad Pass.

Paxson: *locality*, on Richardson Highway, 3 mi/4.8 km SE of Summit Lake and 62 mi/99 km N of Gulkana; S-C Alaska.

Peger Road: *road*, to sewage treatment plant, Lathrop flats, Cushman flats; S Fairbanks.

Peter Cleaver Lake: *lake*, 6 mi/9.6 km N of junction of Louie Creek and Koyukuk River and 5 mi/8 km NW of Roundabout Mountain; 65°34'N 156°48'W.

Pilgrim River: *stream*, heads in Salmon Lake, SE of Kigluaik Mountains, Seward Peninsula; W Alaska.

Porcupine River: *stream*, heads in Yukon Territory at 65°28'N 139°32'W, flows W 460 mi/740 km to Yukon River 2 mi/3.2 km NW of Fort Yukon; 66°34'N 145°19'W.

Primrose Ridge: *ridge*, extends 5 mi/8 km from Sanctuary River to Savage River, 14 mi/22 km W of village of McKinley Park; 63°45'N 149°24'W.

Prince William Sound: *gulf*, 70 mi/112 km wide, extends 30 mi/48 km N off Gulf of Alaska; S-C Alaska.

Prudhoe Bay: *bay*, 9.6 mi/15 km across, between Heald Point and Point McIntyre, on Beaufort Sea coast; N Alaska.

Quartz Lake: *lake*, 2 mi/3.2 km across, 4 mi/6.4 km N of Big Delta; 64°13'N 145°49'W.

Rainbow Mountain: *peak*, 20 mi/32 km NW of Paxson; elevation 6700 ft/2042 m; 63°18'N 145°37'W.

Rampart: *village*, on S bank of Yukon River, 61 mi/98 km ENE of Tanana; 65°30'N 150°10'W.

Ray Mountains: *mountain range*, extends W 75 mi/120 km from Yukon River N of Tozitna River; elevations 2500-5500 ft/762-1676 m; 65°43'N 151°15'W.

Reindeer River: *stream*, heads at 62°15'N 158°28'W, flows SW 65 mi/104 km to Paimiut Slough, 11 mi/17 km SE of Holy Cross; 62°08'N 159°27'W.

Rex: *railroad station*, on Alaska Railroad 48 mi/77 km SW of Nenana; 64°14'N 149°15'W.

Richardson Highway: *highway*, from Valdez (61°07'N 146°16'W), S-C Alaska, N 366 mi/589 km to Fairbanks (64°50'N 147°43'W).

Riley Creek: *stream*, flows NE 22 mi/35 km to Nenana River, 10 mi/16 km S of Healy; 63°43'N 148°53'W.

Robertson River: *stream*, heads at terminus of Robertson Glacier, flows NE 33 mi/53 km to Tanana River, 16 mi/25 km W of Tanacross; 63°30'N 143°47'W.

Rosie Creek: *stream*, flows SW 4.5 mi/7.2 km to Tanana River, 12 mi/19 km SW of Fairbanks; 64°44'N 148°05'W.

Ruby: *village*, on L bank of Yukon River, S of junction with Melozitna River; 64°45'N 155°30'W.

Russian Mission: *village*, on R bank of Yukon River 25 mi/40 km SE of Marshall; W Alaska.

Sable Pass: *pass*, 1 mi/1.6 km W of Cathedral Mountain, 2 mi/3.2 km SE of Sable Mountain, and 30 mi/48 km SW of Healy; elevation 3880 ft/1182 m; 63°33'N 149°40'W.

Sadlerochit Spring: *spring*, on W bank of Sadlerochit River, 12 mi/19 km E of Mount Weller and 25 mi/40 km N of Mount Michelson, Brooks Range; N Alaska.

Sagavanirktok River: *stream*, heads between Endicott and Philip Smith mountains at 68°10'N 149°04'W, flows N 180 mi/289 km to Beaufort Sea; N Alaska.

Saint Elias Mountains: *mountain range*, 300 mi/482 km × 90 mi/144 km, extends NW along Alaska-Canada boundary from Cross Sound, Icy Strait, and Lynn Canal, in SE Alaska, to Bering Glacier, Tana Glacier, Tana River, Chitistone River, and White River on NW; S-C Alaska and Yukon Territory.

Saint Lawrence Island: *island*, 95 mi/152 km × 25 mi/40 km in Bering Sea, 130 mi/209 km SW of Nome; W Alaska.

Saint Marys, or Andreafsky: *village*, on N bank of Andreafsky River, 3.5 mi/5.6 km NE of Pitkas Point and 37 mi/59 km W of Marshall, Yukon-Kuskokwim Delta; W Alaska.

Saint Michael: *village*, on E coast of Saint Michael Island, in Norton Sound, 43 mi/69 km SW of Unalakleet; W Alaska.

Salcha: *settlement*, at Mile 322 Richardson Highway, between Harding Lake and Eielson AFB.

Salcha River: *stream*, heads at 65°05'N 143°55'W, flows SW 125 mi/201 km to Tanana River, 33 mi/53 km SE of Fairbanks; 64°28'N 146°59'W.

Salmon River: *stream*, heads in Kilbuck Mountains and flows NE 40 mi/64 km to Aniak River 37 mi/59 km SE of Aniak; 61°04'N 159°11'W.

Sanctuary River: *stream*, flows N 26 mi/41 km to Teklanika River, 18 mi/28 km SW of Healy; 63°49'N 149°31'W.

Savage River: *stream*, flows NW 27 mi/43 km to Teklanika River, 17 mi/27 km NW of Healy; 63°55'N 149°30'W.

Scottie Creek: *stream*, flows SW across Alaska-Yukon boundary 50 mi/80 km to Chisana River; 62°41'N 141°16'W; Mile 1223.4 Alaska Highway.

Selawik NWR: *National Wildlife Refuge*, comprises 2,150,000 acres/8700 km², extends from headwaters of the Selawik River to Kotzebue Sound; W Alaska.

Selawik River: *stream*, heads in Zane Hills, flows W 140 mi/225 km to Selawik Lake, 8 mi/12 km NW of Selawik; W Alaska.

Seward Creek: *stream*, flows E 8 mi/12 km to Mission Creek, 10 mi/16 km SW of Eagle; 64°45'N 141°31'W.

Seward Peninsula: *peninsula*, extends W 200 mi/321 km from a line between heads of Eschscholtz Bay and Norton Bay; bounded on S by Norton Sound, on N by Chukchi Sea, and on W by Bering Strait; W Alaska.

Shaw Creek: *stream*, heads at 64°29'N 145°05'W, flows SW 40 mi/64 km to Tanana River, 11 mi/17 km NW of Big Delta; 64°15'N 146°06'W.

Sheenjek River: *stream*, heads at 69°00'N 144°00'W, flows S 200 mi/321 km to Porcupine River, 23 mi/37 km NE of Fort Yukon; 66°44'N 144°34'W.

Sheep Creek Road: *road*, from Parks Highway to Murphy Dome Road and Goldstream Road; W and NW Fairbanks.

Sherman: *station*, Mile 258.3 Alaska Railroad; S-C Alaska.

Sitka: *town*, on W coast of Baranof Island, 95 mi/152 km SW of Juneau; SE Alaska.

Sixtymile River: *stream*, heads on Divide Mountain, flows E across Alaska-Canada boundary 85 mi/136 km to Yukon River; Yukon Territory.

Slana-Tok Cutoff: *highway*, from Tok (63°20'N 142°59'W) SW 125 mi/201 km to Gakona Junction (62°18'N 145°18'W), in S-C Alaska.

Smith Lake: *lake*, 0.3 mi/0.48 km across, on University of Alaska Fairbanks campus, 4.5 mi/7.2 km NW of Fairbanks; 64°52'N 147°52'W.

Snowshoe Creek: *stream*, flows SE 6 mi/9.6 km to Washington Creek, 20 mi/32 km NW of Fairbanks; 65°08'N 147°55'W.

Spooky Valley: *valley*, in Ray Mountains, extends 4.5 mi/7.2 km across headwaters of Kobuk Creek, 9 mi/14 km WNW of Mount Tozi and 45 mi/72 km NNE of Tanana; 65°43'N 151°16'W.

Steese Highway: *highway*, from Fairbanks (64°52'N 147°52'W) NE 161 mi/259 km to Circle (65°49'N 144°03'W), on Yukon River; elevations to 3624 ft/1104 m, at Eagle Summit.

Stony Creek: *stream*, in Denali NP, flows N 25 mi/40 km to Clearwater Fork 5 mi/8.0 km S of that stream's junction with Toklat River; 63°44'N 150°19'W.

Stony Dome: *peak*, in Denali NP, 3.5 mi/5.6 km NE of Eielson Visitor Center; elevation 4700 ft/1432 m; 63°27'N 150°12'W.

Sukakpak Mountain: *mountain*, S of junction of Dietrich, Bettles, and Middle Fork Koyukuk rivers, 39 mi/62 km WNW of Chandalar; elevation 4200 ft/1280 m; 67°36'N 149°45'W.

Susitna River: *stream*, heads at Susitna Glacier, in Alaska Range; flows SW 260 mi/418 km to Cook Inlet, 24 mi/38 km W of Anchorage; S-C Alaska.

Takahula Lake: *lake*, 1 mi/1.6 km across, in Alatna River valley, 25 mi/40 km NE of Walker Lake, Brooks Range; 67°21'N 153°40'W.

Takotna: *village*, on N bank of Takotna River, 14 mi/22 km W of McGrath; 62°59'N 156°04'W.

Takotna River: *stream*, heads at confluence of Little Waldren Fork and Moore Creek, 62°32'N 156°47'W, flows NE 120 mi/193 km to Kuskokwim River and N of McGrath; 62°58'N 155°36'W.

Tanacross: *village*, on Tanana River, 12 mi/19 km NW of Tok; 63°23'N 143°21'W.

Tanana: *village*, near junction of Tanana and Yukon rivers; 65°10'N 152°04'W.

Tanana Loop Road/Extension: *road*, part of road network in Delta Agricultural Project that connects Big Delta E and S with Mile 1414.8 Alaska Highway, E of Delta Junction.

Tanana River: *stream*, formed by confluence of Chisana and Nabesna rivers at Northway Junction, flows NW 440 mi/708 km to Yukon River, 3.5 mi/5.6 km E of Tanana; 65°09'N 151°57'W.

Tanana-Yukon highlands: *mountains*, extend SE 225 mi/362 km from Minto Flats to Alaska-Canada boundary, N of Tanana River; 65°00'N 149°00'W (W end), 64°00'N 141°00'W (E end); elevations to 6594 ft/2010 m.

Tatchun River: *stream*, flows into Frenchman Lake, NE of Carmacks (62°06'N 136°19'W); Yukon Territory.

Tattler Creek: *stream*, Denali NP local name.

Taylor Highway: *highway*, from Tetlin Junction (63°00'N 141°48'W), at Mile 1302 Alaska Highway, 12 mi/19 km E of Tok, N 160 mi/257 km to Eagle (64°47'N 141°12'W), on the Yukon River.

Teklanika River: *stream*, heads at Cantwell Glacier, in Alaska Range, flows N 90 mi/144 km to Nenana River, 10 mi/16 km SW of Nenana; 64°28'N 149°19'W.

Tetlin: *village*, on Tetlin River, 4.5 mi/7.2 km E of Tetlin Lake and 20 mi/32 km SE of Tok; 63°08'N 142°31'W.

Tetlin Junction: *junction*, Mile 0 Taylor Highway at Mile 1302 Alaska Highway; 63°00'N 141°48'W.

Tetlin Lake: *lake*, 8 mi/12.8 km long, in course of Tetlin River, 16 mi/25 km S of Tok; 63°05'N 142°45'W.

Tetlin NWR: *National Wildlife Refuge*, comprises 932,000 acres/3771 km² of extensive wetlands and thousands of water bodies bounded on N by the Alaska Highway; the SW corner includes a portion of the Mentasta Mountains; elevations from 1650 ft/502 m to 8040 ft/2450 m.

Thanksgiving Creek: *stream*, flows NE 16 mi/25 km to Yukon River, 30 mi/48 km SSE of Circle; 65°25'N 143°37'W.

Thorofare River: *stream*, in Denali NP, flows W 16 mi/25 km from Sunset Glacier terminus to McKinley River, 6 mi/9.6 km SW of Wonder Lake; 63°25'N 150°42'W.

Tiinkdhul Lake: *lake*, 2.5 mi/4.0 km across, 17 mi/27 km SE of Chalkyitsik; 66°34'N 143°10'W.

Togiak River: *stream*, heads at Togiak Lake, flows SW 48 mi/77 km to Togiak Bay; SW Alaska.

Tok: *town*, at junction of Alaska and Glenn highways, 5 mi/8 km SW of junction of Tok and Tanana rivers and 12 mi/19 km SE of Tanacross; 63°20'N 142°59'W.

Tok River: *stream*, heads at glacier terminus, flows NE 60 mi/96 km to Tanana River, 5 mi/8 km E of Tok; 63°22'N 142°50'W.

Toklat River: *stream*, flows NW 85 mi/136 km to Kantishna River 50 mi/80 km E of the Bitzshtini Mountains; 64°27'N 150°18'W.

Torment Creek: *stream*, heads in Ray Mountains, flows NE 19 mi/30 km to Kanuti Kilolitna River, 50 mi/80 km NW of Rampart and 62 mi/99 km NE of Tanana; 65°59'N 151°14'W.

Tozitna River: *stream*, heads in Ray Mountains, flows W and S, between Ray Mountains and Rampart Mountains, 83 mi/133 km to Yukon River, 10 mi/16 km WSW of Tanana; 65°08'N 152°25'W.

Triple Lakes: *lakes*, extend NW-SE 1.5 mi/2.4 km, 1 mi/1.6 km W of Yanert and 13 mi/20 km S of Healy; 63°40'N 148°52'W.

Tulugak Creek: *stream*, flows NW 5 mi/8 km N of Tulugak Lake to Anaktuvuk opposite Makaktuk Lake, 13 mi/20 km NE of Anaktuvuk Pass; 68°17'N 151°29'W.

Tuluksak River: *stream*, heads at 61°11'N 159°55'W, and flows S and NW 90 mi/144 km to Kuskokwim River S of Tuluksak, 48 mi/77 km SE of Russian Mission; 61°06'N 160°58'W.

Twelvemile Creek: *stream*, flows E 8 mi/12 km to Birch Creek, 56 mi/90 km SW of Circle; 65°23'N 145°43'W.

Twelvemile Summit: *pass*, 10 mi/16 km SW of Pinnell Mountain and 62 mi/99 km SW of Circle, along the Steese Highway; elevation 3000 ft/914 m; 65°24'N 145°58'W.

Umiat: *village*, on N bank of Colville River, 75 mi/120 km S of Harrison Bay; N Alaska.

Unakserak River: *stream*, heads at Kutuk Pass, flows 25 mi/40 km SW to Alatna River, 21 mi/33 km S of Survey Pass, Brooks Range; 67°33'N 154°08'W.

Unalakleet: *village*, on Norton Sound, N of mouth of Unalakleet River; W Alaska.

Unalaska Island: *island*, 20 mi/32 km long, one of Fox Islands, E Aleutian Islands; SW Alaska.

Victoria Mountain: *mountain*, 50 mi/80 km ENE of Livengood and 80 mi/128 km W of Circle; elevation 4588 ft/1398 m; 65°47'N 146°56'W.

Walker Lake: *lake*, in Brooks Range, head of Kobuk River, W Alaska; 67°00'N 154°30'W.

White Mountains: *mountains*, trend ENE 70 mi/112 km, bounded on SW and NW by Beaver Creek and on NE by Preacher Creek, 60 mi/96 km W of Circle; elevations to 5000 ft/1524 m; 65°24'N 147°30' (SW end), 65°49'N 145°33'W (NE end).

White Pass: *pass*, on Alaska-Canada boundary, 12 mi/19 km NW of Skagway; SE Alaska.

Wickersham Dome: *mountain*, 27 mi/43 km NW of Fairbanks; elevation 3207 ft/977 m; 65°13'N 148°04'W.

Windy: *locality*, at junction of Bain Creek and Nenana River, 28 mi/45 km S of Healy, at Mile 326.7 Alaska Railroad; 63°28'N 148°49'W.

Wiseman: *village*, on Middle Fork Koyukuk River, at junction of Wiseman Creek; 67°25'N 150°06'W.

Wolverine Creek: *stream*, flows S and W 3.2 mi/5.1 km from Mount Eielson to Crystal Creek, E of Muldrow Glacier, 4.5 mi/7.2 km SSE of Eielson Visitor Center; 63°22'N 150°22'W.

Wonder Lake: *lake*, 2.7 mi/4.3 km long, in Denali NP, 27 mi/43 km NNE of Denali; 63°28'N 150°52'W.

Woodchopper: *locality*, on Woodchopper Creek at junction of Deep Creek, 33 mi/53 km ESE of Tanana; 65°03'N 151°00'W.

Wood River: *stream*, heads at glacier in Alaska Range at 63°42'N 147°32'W, flows NW 115 mi/185 km to Tanana River, 14 mi/22 km E of Nenana; 64°35'N 148°38'W.

Wrangell Mountains: *mountain range*, 100 mi/160 km × 60 mi/96 km, bounded on W by Copper River; S-C Alaska.

Yankovich Road: *road*, from Sheep Creek Road to Ballaine Road, N of University of Alaska Fairbanks campus; NW Fairbanks.

Yarger Lake: *lake*, 1.4 mi/2.2 km long, between Alaska Highway and Chisana River, 5.5 mi/8.8 km SE of Northway Junction; 62°58'N 141°39'W.

Yukon-Charley Rivers National Preserve (NP): *National Preserve*, comprises 2,518,000 acres/10,194 km² of subarctic boreal forest in E-C Interior (at 65°N 143°W), administered by U.S. National Park Service; elevations from 590 ft/180m to 6594 ft/2010 m.

Yukon Flats NWR: *National Wildlife Refuge*, comprises 9,000,000 acres/36,421 km² centered on the Yukon Flats, a vast wetland basin at the confluence of the Porcupine and Chandalar rivers with the Yukon River; the third largest conservation area in the National Wildlife Refuge system. See Fort Yukon.

Yukon River: *stream*, about 1500 mi/2414 km long, heads in Marsh Lake, Yukon Territory, flows NW into Alaska to Fort Yukon, then SW to Bering Sea at Norton Sound (W Alaska).