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Birds of the Major Mainland Rivers of Southeast Alaska

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Cover: Stikine River. Photo by A. Flesch.

Abstract

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This publication describes the bird communities of major mainland rivers of southeast Alaska and is based on a review of all known relevant studies as well as recent fieldwork. We synthesized information on the composition, structure, and habitat relationships of bird communities at 11 major mainland rivers. Information on current management concerns and research needs are also included.

Keywords: Bird communities, distribution, status, riparian, major mainland rivers, southeast Alaska.

Summary

We synthesized information on the regional abundance, breeding status, and habitat relationships of birds recorded at 11 major mainland rivers in southeast Alaska. These major mainland rivers are classified as (1) those that transect the coastal mountains to connect the ecologically distinct regions of southeast Alaska and the Canadian interior (transmountain), and (2) those rivers with watersheds limited to the coastal mountains (coastal). Both types of rivers contain a heterogeneous mixture of highly diverse and productive avian habitats—from freshwater marshes to deciduous forests that are among the most structurally and floristically complex in Alaska.

In all, 211 bird species were recorded at these rivers. Of these, 128 species were known or suspected breeders, which constituted 50 percent of the total breeding avifauna for Alaska and 80 percent of the total breeding avifauna of southeast Alaska. Major mainland rivers not only support a diverse breeding avifauna but are also migratory corridors and staging areas for large numbers of waterfowl, seabirds, shorebirds, and landbirds. The major mainland rivers support an avifauna that includes many species more common in the Canadian interior that rarely occur elsewhere in southeast Alaska.

Although the major mainland rivers of southeast Alaska are among the most intact riparian zones in the United States, threats to these systems include road building, mining, hydroelectric power development, and timber harvest. To successfully maintain the integrity of these riverine landscapes, careful monitoring of land use and periodic assessment of bird populations are needed.

Contents

Introduction

The major mainland rivers of southeast Alaska provide important habitats for birds throughout the annual cycle. Dynamic physical and biological processes occurring in these rivers produce floristically diverse, structurally complex, and biologically productive habitats that support rich assemblages of breeding birds. Furthermore, the major mainland rivers provide corridors and staging areas for migrating birds and support large concentrations of staging waterfowl, seabirds, and shorebirds. The largest riparian systems in southeast Alaska occur on the narrow mountainous mainland where two types of rivers occur—transmountain and coastal rivers. Originating in the Canadian interior, transmountain rivers, the largest river systems in southeast Alaska, bisect the Coast Range or St. Elias Mountains to form a continuous corridor between ecologically distinct regions of coastal southeast Alaska and the Canadian interior. Coastal rivers are mainland rivers that do not bisect the Coast Range or St. Elias Mountains; their watersheds are primarily confined to the seaward slopes of the coastal mountains. Although coastal rivers do not provide direct connectivity between southeast Alaska and the Canadian interior, they are indirectly connected to the interior by major tributaries of transmountain rivers, their proximity to transmountain rivers, or their location at the end of long, narrow inlets that penetrate the mainland. This connectivity by rivers provides an unencumbered route for dispersal or movement of flora and fauna between coastal and interior regions. Southeast Alaska's mainland river corridors support a unique and diverse avifauna, including many species that are more common in the Canadian interior and occur infrequently elsewhere in southeast Alaska.

Southeast Alaska's mainland river corridors support a unique and diverse avifauna, including many species that are more common in the Canadian interior and occur infrequently elsewhere in southeast Alaska.

In contrast to the vast literature describing the use of riparian zones by birds in much of North America, information on the riparian bird communities of southeast Alaska is relatively limited. Swarth's 1919 (1922) exploration of the Stikine River, from Telegraph Creek in interior British Columbia to Wrangell, Alaska, was the first effort to thoroughly describe the avifauna of a major mainland river. Other contributions during the early 20th century include brief visits to major mainland rivers by Bailey (1927), Jewett (1942), Swarth (1911), and Webster (1950). An increase in activity by museum collectors and biologists took place during the mid-1970s to mid-1980s: Gibson and MacDonald (1975) described the breeding bird communities of several major mainland rivers; MacDonald and MacDonald's (1975) study of the birds of the Chickamin River provided one of the few descriptions of nonbreeding bird communities at a major mainland river other than the Stikine; Heglund and Rosenberg (1989) conducted spring, summer, and fall aerial waterfowl surveys, breeding landbird surveys, and provided thorough habitat descriptions at the Stikine River; Gibson's (1984) work at the Stikine River during

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fall migration provided detailed information on bird timing, abundance, habitat use, and migratory movements; and Gibson (1986) described the breeding birds of the Salmon River. To add to the knowledge of the distribution and abundance of birds and the habitats they use, we conducted intensive breeding bird surveys along 10 mainland rivers from 2000 to 2002 (Johnson 2003).

Knowledge of the birds of the major mainland rivers has increased dramatically over the last three decades, yet the majority of information has been in the form of unpublished reports, and therefore difficult to access. Furthermore, anthropogenic disturbances such as road development projects and mining activities that will affect the major mainland rivers in southeast Alaska and Canada are being proposed or are occurring at a rapidly increasing pace. Herein, we synthesize existing information on riparian bird communities in the region and provide information for 11 major mainland rivers. The purpose of this review is to provide a thorough inventory of bird species recorded at the major mainland rivers and a comprehensive description of the use of southeast Alaska's major mainland rivers by birds. Herein, we describe the distribution, regional abundance, breeding status, and habitat relationships of birds in these riparian corridors. Because of the scarcity of information on nonbreeding bird communities, the primary focus of this review is on breeding birds.

Description of the Region and Rivers

We defined southeast Alaska (fig. 1) as extending from Dixon Entrance (54°43′ N 131°11′ W) to Icy Bay (59° 54′ N 141°26′ W). Approximately 850 km long and 210 km wide, this region is bounded in the east by the crest of the Coast Range and St. Elias Mountains and in the west by the Pacific Ocean and Gulf of Alaska. The narrow mainland and more than 2,000 islands of the Alexander Archipelago encompass approximately 9 million ha; the majority of the area lies within the Tongass National Forest. Rising to approximately 5000 m, the mainland is dominated by steep mountains, which contain numerous glaciers, expansive icefields, and barren rock. The climate of southeast Alaska is strongly influenced by the Pacific Ocean and coastal mountains. Warm ocean currents create relatively cool summers and mild winters; daily mean air temperatures at Juneau range from -3.5 °C in January to 13.8 °C in July (National Climate Data Center 2007). Warm, moist marine air lifted by the coastal mountains results in high levels of precipitation for most of the region; mean annual precipitation ranges from 130 cm at Haines to 400 cm at Ketchikan (National Climate Data Center 2007).

We include information on bird communities from 11 of the largest mainland rivers in southeast Alaska—three are transmountain rivers and eight are coastal

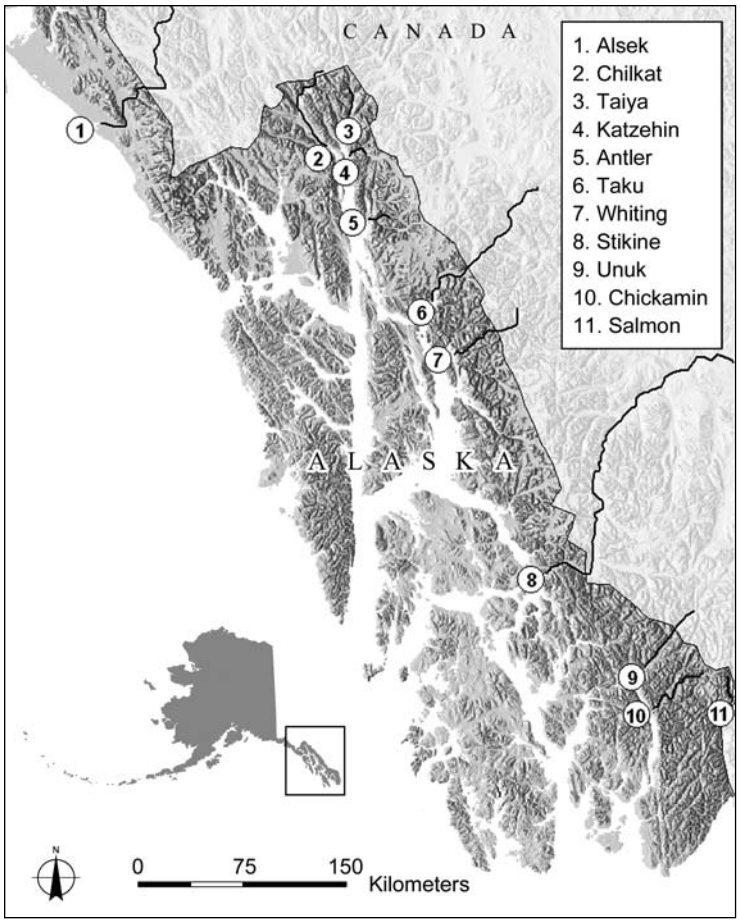


Figure 1—Locations of the 11 major mainland rivers in southeast Alaska described in this report.

rivers (table 1). Both types of mainland river systems were formed by a combination of glacial scouring and downcutting. As a result, valleys are steep-sided, u-shaped, and contain relatively narrow flood plains (rarely >3.5 km wide). The hydrological regime of mainland rivers is greatly influenced by melting snow and ice. Water levels and flow rates fluctuate seasonally, with high flows during summer and low flows during winter. Most mainland rivers are comprised of meandering and braided channels, which combined with dynamic flood processes, influence the extent and development of vegetation communities. Coarse sediments, deposited by melting glaciers, create numerous alluvial bars and islands throughout the river valleys. Fine sediments distributed by water and wind form tidal flats at the mouths of rivers, or at the Stikine River, the only major delta in southeast Alaska. Glaciers may also influence the development and composition of biotic communities by influencing the local climate within river valleys. The Katzehin River valley, for example, is 5 to 8 °C colder than surrounding areas in Lynn Canal (J. Johnson, pers. obs.).

Table 1—Location and features of major mainland transmountain (TM) and coastal (C) rivers in Southeast Alaska listed from north to south

River	Latitude/ longitude	Type	Length of river in Alaska/ total length	Major habitats[a]	Unique features
			Kilometers		
Alsek	59°40′N 138°37′W	TM	70/225	AI, CF, DF, DS, FM, TF	Vast alluvial habitats; predominantly early successional vegetation; several lakes and tributaries; several glaciers
Chilkat	59°12′N 135°28′W	C	75/89	AI, DF, DS, FM, MF, TF FM, LW	In rain shadow of coastal mountains at head of Lynn Canal; broad, braided river; several large tributaries; many lakes and freshwater marshes
Taiya	59°28′N 135°20′W	C	22/28	CF, DF, DS, FM, MF, TF	In rain shadow of coastal mountains at head of Lynn Canal; relatively small amount of deciduous vegetation and freshwater marsh
Katzehin	59°11′N 135°17′W	C	18/18	AI, CF, DF, DS	Cold and windy corridor due to proximity to Meade Glacier; relatively small amounts of deciduous vegetation and freshwater marsh
Antler	58°48′N 134°57′W	C	23/23	CF, DF, DS, EM, FM	Flows into Berner's Bay; extensive estuarine meadow and freshwater marsh
Taku	58°25′N 133°58′W	TM	40/128[b]	AI, CF, DF, EM, FM, LW	Numerous glaciers; relatively large amount of coniferous and mixed forest; several large tributaries, lakes, and extensive freshwater marsh
Whiting	57°57′N 133°52′W	C	40/70	AI, CF, DF, DS, FM, LW	Extremely braided, fast-flowing river; extensive alluvial habitat and mid-successional deciduous forest; large lake
Stikine	56°33′N 133°58′W	TM	45/650	DF, DS, FM, LW	Extensive tidal flats and estuarine meadow; largest delta in region; numerous large lakes and freshwater marshes
Unuk	56°04′N 131°04′W	C	40/110	AI, CF, DS, EM, FM, MF	Dynamic, frequent flood events; several tributaries and lakes
Chickamin	55°49′N 130°55′W	C	60/60	CF, EM, FM, LW, MF	Extensive freshwater marsh; large tributary
Salmon	55°54′N 130°01′W	C	20/30	CF, DF, EM, FM	Southernmost mainland river; river mouth is at head of Portland Canal and farther east than other mainland rivers

[a] AI = alluvial bars and islands, CF = coniferous forest, DF = deciduous forest, DS = deciduous shrubland, EM = estuarine meadow, FM = freshwater marsh, LW = lacustrine waters, MF = mixed forest, and TF = tidal flats.

[b] Total length of Taku includes Nakina River to Nakina village.

Several of the rivers, especially transmountain rivers, flow through southeast Alaska for only a small portion (average = 50 km) of their overall length. The Stikine River, for example, flows only 40 km through southeast Alaska but is >700 km long, and has a watershed of approximately 50 000 km^2, from its headwaters in British Columbia to the Pacific Ocean. In contrast, the Taiya, Katzehin, and Antler

Rivers are relatively short. Each of these coastal rivers flows for an average of 20 km, occurs entirely within southeast Alaska, and supports less extensive deciduous riparian vegetation and freshwater marshes than the other rivers (table 1). A distance of >650 km separates the northernmost Alsek River from the Salmon River in the south.

Bird Habitats

We adapted the work of Gibson and MacDonald (1975) and Viereck et al. (1992) to identify 11 distinct habitats prevalent at the major mainland rivers of southeast Alaska: coniferous forest, deciduous forest, mixed forest, deciduous shrubland, estuarine meadow, freshwater marsh, lacustrine waters and shorelines, fluviatile waters and shorelines, alluvial bars and islands, tidal flats, and estuarine waters. In addition, buildings and other human-made structures scattered throughout the study areas provided nesting habitat for some species.

J. Johnson

Coniferous forest, Stikine River.

Coniferous forests are late-seral communities that occur on well-drained and well-developed soils that are rarely flooded. The dominant tree species of coniferous forests are Sitka spruce (*Picea sitchensis* (Bong.) Carr.) and western hemlock (*Tsuga heterophylla* (Raf.) Sarg.). Trees, reaching heights of >50 m, are widely spaced and form a patchy canopy layer. The primarily sparse shrub understory is most often dominated by devil's club (*Oplopanax horridus* miq.), salmonberry (*Rubus spectabilis* Pursh.), and blueberry (*Vaccinium* spp.).

J. Johnson

Mature deciduous forest, Stikine River.

Deciduous forests are mid-seral communities intermediate between early successional shrub communities and late-successional conifer forests. Deciduous forest sites may be composed entirely of black cottonwood (*Populus balsamifera* Torr. & Gray ex Hook.), red alder (*Alnus rubra* Bong.), or a mixture of both species. At the Chilkat and Taiya Rivers, paper birch (*Betula papyrifera* Marsh.) is also present. Young deciduous forests consist of closely spaced, small- to medium-diameter black cottonwood and red alder. Except for gaps resulting from fallen trees, the tree canopy is mostly closed. The forest understory is sparse and composed of scattered salmonberry, nootka rose (*Rosa nutkana* K. Presl), red-osier dogwood (*Cornus stolonifera* Michx.), and Douglas maple (*Acer glabrum* Torr.). As these forests mature, trees may reach heights of 40 m, with cottonwood often becoming the dominant tree species. Openings in the tree canopy increase light penetration to the forest floor and allow development of a dense shrub understory. Common shrubs in mature cottonwood forest include Sitka alder (*Alnus sinuata* (Regel) Rydb.), salmonberry, red-osier dogwood, highbush cranberry (*Viburnum edule* (Michx.) Raf.), red elderberry (*Sambucus racemosa* L.), and devil's club.

Mixed forests are mid- to late-seral communities that occur on well-drained and well-developed soils that are rarely flooded. These forests are composed of widely spaced mature Sitka spruce, black cottonwood, and red alder; often no single species is clearly dominant. The Chilkat and Taiya Rivers also contain

scattered paper birch. The canopy is patchy, and trees reach heights of 50 m. The dense shrub understory is predominately Sitka alder, red-osier dogwood, highbush cranberry, nootka rose, red elderberry, salmonberry, and devil's club.

Deciduous shrublands are early-seral communities and consist of either tall or low shrublands. Tall shrubland occurs on frequently flooded sites, is composed primarily of Sitka alder and willow (*Salix* spp.) >1.5 m in height, and may contain a few scattered tall deciduous trees. Other understory shrubs include red elderberry, devil's club, red-osier dogwood, and highbush cranberry. Low shrubland occurs on recently disturbed sites. Although small (<1.5 m in height) willow and Sitka alder predominate, patches of young cottonwoods (≤10 m in height) may also be present. Soils are generally rocky and lack a well-developed organic layer.

Estuarine meadows occur at river mouths and are periodically inundated by tidal waters. Vegetation in lower lying areas is comprised primarily of halophytic sedges (*Carex* spp.). Higher and less frequently inundated areas are composed of salt-tolerant grasses (*Festuca* spp.) and scattered forbs (e.g., *Potentilla egedii* Wormsk, *Lupinus nootkatensis* Donn ex Sims); patches of willow and alder may be present in areas seldom flooded by saltwater.

Freshwater marshes occur on sites with poor drainage, such as flooded areas surrounding beaver (*Castor canadensis*) dams. Scattered ponds of varying sizes are typically surrounded by sedges, grasses, forbs, and low shrubs such as willow, sweetgale (*Myrica gale* L.), and Sitka alder.

J. Johnson

Freshwater marsh, Chickamin River.

Lacustrine waters and shorelines include the surface water of lakes and ponds and the sparse vegetation and alluvium at the water's edge.

Fluviatile waters and shorelines include the surface water of rivers, sloughs, and streams and the sparse vegetation and alluvium at the water's edge.

J. Johnson

Extensive alluvial bars and braided river channel, Whiting River.

Alluvial bars and islands consist of either unvegetated or sparsely vegetated gravel and sand deposited or scoured by glaciers or recent flood events. Alluvial islands, in either lacustrine or fluviatile zones, may be sparsely vegetated and are composed of glacial till, gravel, or boulders.

Tidal flats are extensive areas of river-deposited sand and silt that are inundated daily by tidal exchanges.

Estuarine waters include the shallow marine waters occurring at the tidal mouths of rivers.

Bird Information

Timing and effort of observations varied considerably among rivers and ranged from a few days at a primary location to over a year in a variety of habitats.

Included in this report are observations from all known surveys of the major mainland rivers (Bailey 1927; Gibson 1984, 1986; Gibson and MacDonald 1975; Heglund and Rosenberg 1989; Jewett 1942; MacDonald and MacDonald 1975; Swarth 1911, 1922; Webster 1950), unpublished records, and observations published in American Birds and North American Birds from 1970 to 2006. We augmented this information with our own surveys of 10 major mainland rivers (Johnson 2003, table 2). Timing and effort varied considerably among rivers and ranged from a few days at a primary location to over a year in a variety of habitats (table 2).

We followed Kessel and Gibson (1978) to describe seasonal occurrence as resident, migrant, breeder, and visitant (see appendix). We used categories defined by the North American Ornithological Atlas Committee (1990) to describe breeding evidence as observed, possible, probable, and confirmed (table 3). The breeding evidence we report applies only to species observed at major mainland rivers; species not known to breed in the major mainland rivers may, however, breed elsewhere in southeast Alaska. We assigned the migration system, as defined by DeGraaf and Rappole (1995), to each migratory bird species known or suspected

Table 2—Survey dates of primary studies of the bird communities of the major mainland rivers

River	Study	Year	Date
Alsek	Johnson et al. (this study)	2001	22 June–9 July
Chilkat	Jewett (1942)	1942	23–24 July
	Gibson and MacDonald (1975)	1974	5, 10 August
	Johnson et al. (this study)	2000	18 June–8 July
Taiya	Gibson and MacDonald (1975)	1974	5, 9 August
	Johnson et al. (this study)	2002	4–13 July
Katzehin	Johnson et al. (this study)	2002	24 June–1 July
Antler	Johnson et al. (this study)	2002	13 June–21 June
Taku	Bailey (1927)	1927	27–28 June, 4 July
	Gibson and MacDonald (1975)	1974	27 July–1 August
	Johnson et al. (this study)	2000	26 May–5 June, 12–24 July
Whiting	Johnson et al. (this study)	2002	1–10 June
Stikine	Swarth (1922)	1919	21 May–7 September
	Webster (1950)	1945	28 May, 8–10 June, 5–7 July, 5–6 August
	Gibson and MacDonald (1975)	1974	13–21 July
	Heglund and Rosenberg (1989)	1982–83	April 1982–June 1983
	Gibson (1984)	1984	31 August–30 September
	Johnson et al. (this study)	2000	6–15 June, 26 July–5 August
Unuk	Gibson and MacDonald (1975)	1974	23 June–1 July
	Johnson et al. (this study)	2001	28 May–7 June, 28 July–10 August
Chickamin	Swarth (1911)	1909	17–28 June
	MacDonald and MacDonald (1975)	1973–74	11 May–11 December 1973, 6 March– 21 May 1974
	Johnson et al. (this study)	2001	7–18 June, 15–27 July
Salmon	Gibson and MacDonald (1975)	1974	4–9 July
	Gibson (1986)	1986	10–20 June

to breed at major mainland rivers as either Nearctic-Neotropical or Nearctic-Nearctic migrant. To describe how breeding birds use mainland river habitats, we used life history information provided by Ehrlich et al. (1988) and our own observations to assign breeding species to categories within three types of guilds: foraging habitat (aquatic, ground, aerial, bark, foliage), foraging behavior (piscivore [including molluscivores], insectivore, herbivore, carnivore, omnivore, granivore), and nest location (ground, shrub, tree, cavity, cliff, bank, building). We assigned breeding species to the habitats where they were primarily encountered; species could be assigned to multiple habitats. We provide accounts that describe regional abundance, distribution, seasonal occurrence, and habitat use for all species encountered. Bird nomenclature follows the American Ornithologists' Union (AOU 1998, 2000; Banks et al. 2002, 2003, 2006); scientific names are provided in appendix 2.

Table 3—Evidence used to determine breeding status of birds encountered at the major mainland rivers of southeast Alaska[a]

Status	Description
Observed	Male or female observed, but did not show evidence of breeding, was not in suitable nesting habitat, or was an obvious migrant.
Possible	Species (male or female) heard or seen in suitable nesting habitat but no further evidence of breeding was noted; included soaring birds (raptors) over suitable habitat.
Probable	Any of the following behaviors:
	Pair observation—Male and female simultaneously observed in suitable habitat.
	Permanent territory—Permanent territory presumed by observation of multiple, well-spaced, singing males (indicated territory holders). Also, if chases of individuals of the same species were seen.
	Courtship behavior—Male-female behavior observed that was indicative of breeding or observed copulation; included aerial displays of shorebirds.
	Agitated behavior—Adults seen exhibiting anxiety behavior, including distress calls.
Confirmed	Any of the following behaviors:
	Carrying nesting material—Adult observed transporting nest-building items such as sticks.
	Nest building—Adults seen constructing nest at singular nest site.
	Distraction display—Adults observed feigning injury (used by ground-nesting species to deter predators from detecting nest or young).
	Nest with eggs—Nest found that contained eggs.
	Nest with young—Live young seen or heard; dead, identifiable hatchlings found in a nest.
	Precocial young—Flightless young observed in the immediate nest area and were dependent on adults or had limited development.
	Carrying food—Adults seen delivering food to young.
	Recently fledged young—Young birds (either precocial or altricial) observed that were incapable of sustained flight and were restricted to the natal area by dependence on adults or by limited mobility.
	Feeding recently fledged young—Adult observed feeding recently fledged young (those incapable of sustained flight) away from nest site.

[a] Based on North American Ornithological Atlas Committee 1990.

Bird Communities

A total of 211 species, representing 15 orders and 41 families, were recorded in all studies of major mainland river systems of southeast Alaska (see appendix; table 4). This total represents 45 percent of the species known to occur in Alaska (Gibson et al. 2003) and 61 percent of the species known to occur in southeast Alaska (Armstrong and Gordon 2001). Of the 211 species recorded, 128 species were known or suspected to breed at the rivers, representing 50 percent of the breeding avifauna of Alaska (Gibson et al. 2003) and 80 percent of southeast Alaska (Armstrong and Gordon 2001). A large proportion of breeding species were landbirds—94 species were recorded, constituting 72 percent of the state's breeding landbird species (Gibson et al. 2003) and 92 percent of southeast Alaska's breeding landbird species (Armstrong and Gordon 2001).

Eighty-one species (39 percent) were recorded as migrants or visitants—those species not known or suspected to breed at the major mainland rivers. The majority of nonbreeders (57 percent) were waterbirds that primarily breed in arctic and subarctic regions.

Breeding Birds

The breeding season of birds in northern latitudes is relatively short and is dictated primarily by day length, weather, vegetation phenology, and food availability. Most birds in southeast Alaska breed between late May and mid July with a peak in June. Some year-round residents, however, may begin breeding as early as March–April and some may finish as late as August. Breeding bird communities of the major mainland rivers showed a strong pattern of seasonal use (table 5); migrants constituted the majority (69 percent) of the 128 breeding species. Of these 91 species that leave southeast Alaska for the boreal winter, 76 percent were Nearctic-Neotropical migrants and 24 percent were Nearctic-Nearctic migrants. The remaining species (31 percent) were considered year-round residents.

Fifty-three species (41 percent) were recorded at ≥8 rivers and 29 species (22 percent) were recorded at ≤3 rivers (table 4). The most abundant, widely distributed waterfowl species were the mallard (all scientific names of birds are listed in the appendix) and the common merganser. Only one species of shorebird (spotted sandpiper) and two species of seabirds (mew gull and arctic tern) were recorded at the majority of rivers. The most abundant, widely distributed landbirds were the sooty grouse, bald eagle, warbling vireo, tree swallow, ruby-crowned kinglet, hermit thrush, American robin, varied thrush, yellow warbler, yellow-rumped warbler, and Lincoln's sparrow (table 4). *(Text continues on p. 21)*

Table 4—Breeding evidence of all bird species recorded on major mainland rivers of southeast Alaska. Codes indicate confirmed (C), probable (PR), possible (PO) breeding, or breeding was not observed (O)

Species	Alsek	Chilkat	Taiya	Katzehin	Antler	Taku	Whiting	Stikine	Unuk	Chickamin	Salmon
Geese, swans, and ducks:											
Greater white-fronted goose		O						O		O	
Snow goose								O			
Brant	O										
Cackling goose								O			
Canada goose	PR	PR	PR	PR	PR	PR	PR	C	C	C	PR
Trumpeter swan		C			PR	C	PR	O		PR	
Tundra swan										O	
Wood duck		O				O		O			
Gadwall										O	
Eurasian wigeon										O	
American wigeon	PO	C			PR		PR	PR	PO	O	
Mallard	PR	C	PO	PR	PR	PR	PR	C	PR	C	C
Blue-winged teal		PR	O		PR	PR		C	PR	PR	
Cinnamon teal								O			
Northern shoveler	O	O				O		O	O	O	
Northern pintail	O		O					O		O	O
Green-winged teal	PO	PR	PO	PO	PO	C	PO	C	PR	PO	
Canvasback								O		O	
Redhead								C			
Ring-necked duck		C			PR		PR	C		PR	
Greater scaup								O		O	
Lesser scaup								O			
Harlequin duck	PR					PO		PO	C	PR	O
Surf scoter		O	O			O		O	O	O	
White-winged scoter								O	O	O	
Black scoter										O	
Long-tailed duck	O										
Bufflehead								O		O	
Common goldeneye	PR	PR			PO	C	PO	C	PO	PO	
Barrow's goldeneye					PO	PO	PO	O	PR	PR	
Hooded merganser		C			PR	C	PR	C		C	PO
Common merganser	PO	C	PR	PR	PR	C	PR	C	C	C	C
Red-breasted merganser	PO							O		O	
Grouse:											
Ruffed grouse						C		PR			PO
Spruce grouse		C									
Sooty grouse		PR	PR	PR	PR	PR	PR	PR	PR	PR	PR

Table 4—Breeding evidence of all bird species recorded on major mainland rivers of southeast Alaska. Codes indicate confirmed (C), probable (PR), possible (PO) breeding, or breeding was not observed (O) (continued)

Species	Alsek	Chilkat	Taiya	Katzehin	Antler	Taku	Whiting	Stikine	Unuk	Chickamin	Salmon
Loons:											
Red-throated loon	PR						PO	PO	PO		PR
Pacific loon								O		O	
Common loon		PO			PR		PR	PO		PR	
Grebes:											
Pied-billed grebe		O									
Horned grebe		O								O	
Red-necked grebe							O	O		O	
Bitterns and herons:											
American bittern		PR						PR		PR	
Great blue heron		PO		PO	PO			O	PO	PR	
Raptors:											
Osprey		PO				PR		O	PO	PR	
Bald eagle	C	C	C	PR	C	C	PR	C	C	C	PR
Steller's sea-eagle						O					
Northern harrier	PO				PO			O	PO	PO	
Sharp-shinned hawk		PO				PO		O	PO	PO	PO
Northern goshawk		PR						O	PO	PR	
Red-tailed hawk		PR			C	PR	PR	C	C	PR	PO
Rough-legged hawk								O			
Golden eagle		O									
American kestrel		C						O		PO	PO
Merlin		C			PO	C	PO	C	C	C	
Gyrfalcon								O		O	
Peregrine falcon								O			
Rails, cranes:											
Virginia rail		O						O			
Sora		C						C		PR	PR
American coot								O		O	
Sandhill crane								O		O	
Shorebirds:											
Black-bellied plover								O			
American golden-plover		O						O			
Semipalmated plover	C	C	PR	C		C	PR	O		PO	
Killdeer		PR	O			C		O		PO	PO
Spotted sandpiper	C	C	PR	PR	PR	C	PR	C	C	C	C
Solitary sandpiper		O				O		O	PR	O	O
Greater yellowlegs	C	C			C			O		PO	
Lesser yellowlegs	PR		O			O		O	O		

Table 4—Breeding evidence of all bird species recorded on major mainland rivers of southeast Alaska. Codes indicate confirmed (C), probable (PR), possible (PO) breeding, or breeding was not observed (O) (continued)

Species	Alsek	Chilkat	Taiya	Katzehin	Antler	Taku	Whiting	Stikine	Unuk	Chickamin	Salmon
Upland sandpiper		O						O			
Whimbrel	O									O	
Hudsonian godwit	O							O			
Marbled godwit						O					
Black turnstone	O										
Sanderling								O			
Semipalmated sandpiper	O	O	O								
Western sandpiper	O							O		O	
Least sandpiper	C	O	O			O		PR	O	O	O
Pectoral sandpiper		O						O		O	
Sharp-tailed sandpiper								O			
Dunlin								O		O	
Stilt sandpiper								O			
Short-billed dowitcher	O							O		O	
Long-billed dowitcher								O			
Wilson's snipe	C	C			PR	C		C		PR	
Red-necked phalarope	O						O				
Gulls, terns, and jaegers:											
Bonaparte's gull		O	O		O	O		O	O	O	O
Mew gull	C	PR	PR	PR	PR	PR	PR	C	PR	PR	PR
Ring-billed gull								O			O
California gull								O			
Herring gull	C	PO	PO	PO	PO	C		PO	PO	PO	
Thayer's gull					O			O			
Glaucous-winged gull	C	PO						O		O	
Black-legged kittiwake	O	O						O			
Aleutian tern	C										
Caspian tern	PO	PO				C		PO			PO
Arctic tern	C	PR	PR	PR	PR	C	PR	PR	PR	C	PO
Parasitic jaeger	C					O		O	O		
Murrelets:											
Marbled murrelet					PO		PO				
Pigeons and doves:											
Rock pigeon										O	
Band-tailed pigeon								PO	PR	PO	PO
Mourning dove								O		O	O
Owls:											
Western screech-owl										PO	
Great horned owl		PR				PR		O		PR	
Northern hawk owl	O	O									

Table 4—Breeding evidence of all bird species recorded on major mainland rivers of southeast Alaska. Codes indicate confirmed (C), probable (PR), possible (PO) breeding, or breeding was not observed (O) (continued)

Species	Alsek	Chilkat	Taiya	Katzehin	Antler	Taku	Whiting	Stikine	Unuk	Chickamin	Salmon
Northern pygmy-owl		PR				PR		O	PR		
Barred owl		PO	C							PR	
Short-eared owl	C							C		O	
Northern saw-whet owl	PO	C				PO		PO		PR	
Nighthawks:											
Common nighthawk		C				O		O		O	
Swifts and hummingbirds:											
Black swift								PO	PO	PR	PO
Vaux's swift		C	PR	PR	PO	PO	PO	PO	PO	C	C
Rufous hummingbird	PR	PR	PR	PR	PR	C	PR	PR	PR	PR	PR
Kingfishers:											
Belted kingfisher	PR	C	PR	C	C	C	PR	C	C	C	PO
Woodpeckers:											
Red-breasted sapsucker		C	C	C	C	C	C	C	C	C	C
Downy woodpecker	C	C	PR			PO	PR	O	C		PO
Hairy woodpecker	C	C	C	C	C	C	C	C	C	C	C
American three-toed woodpecker		C						PO		PR	
Northern flicker		PR	PR		PR	PR	PR	O	PR	PR	C
Pileated woodpecker											O
Perching birds:											
Olive-sided flycatcher		PO	PO		PR	PR		PR		PO	PO
Western wood-pewee		PR	PR		PR	PR	PR	PR	PR	C	PR
Yellow-bellied flycatcher			O								O
Alder flycatcher		C		PR	PR	PR	PR	PR	PR	PR	PR
Willow flycatcher								PO			PO
Least flycatcher		PO						PO		PO	PO
Hammond's flycatcher		C	PR	PR	PR	C	PR	PR	C	C	PR
Dusky flycatcher								O			
Pacific-slope flycatcher	O	PR	PR	PR	PR	PR	PR	PR	C	C	PR
Eastern phoebe		O									O
Say's phoebe						O		O			
Western kingbird		O	O								O
Eastern kingbird		O						O		O	O
Northern shrike								O		O	
Cassin's vireo		C				PR	PR	PO	PO	PR	PR
Warbling vireo		C	PR	PR	PR	C	PR	C	C	C	C
Red-eyed vireo								PR	PO	PO	PO
Steller's jay		C	PR	PR	PR	C	PR	C	C	C	PO
Black-billed magpie	C	C						O		O	

Table 4—Breeding evidence of all bird species recorded on major mainland rivers of southeast Alaska. Codes indicate confirmed (C), probable (PR), possible (PO) breeding, or breeding was not observed (O) (continued)

Species	Alsek	Chilkat	Taiya	Katzehin	Antler	Taku	Whiting	Stikine	Unuk	Chickamin	Salmon
American crow										O	C
Northwestern crow		PR	PR	PR	PR	PR	PR	PR	PR	PR	
Common raven	PO	C	PR	PO	C	PO	PR	PO	PO	C	PO
Horned lark								O		O	
Tree swallow	C	C	C	C	C	C	C	C	C	C	C
Violet-green swallow		C				C	C	PO	PO	PO	C
Northern rough-winged swallow		PO				PO		C	PO	C	C
Bank swallow	C	PO				C		O		O	PO
Cliff swallow		PO						C		PO	C
Barn swallow	C	C	PR		PR	C	PR	C	C	C	C
Black-capped chickadee	C	C				C		PR			
Chestnut-backed chickadee		C	PR	PR	PR	C	PR	C	C	C	PR
Boreal chickadee								O		O	
Red-breasted nuthatch		PR				C		PR	PR	PR	PR
Brown creeper		PR	PR			PR	PR	PR	C	PR	C
Winter wren		C	PR	PR	PR	PR	C	PR	C	C	PR
American dipper		PR			C		PR	C	C	PR	C
Golden-crowned kinglet	PO	PR	PR	PR	PR	PR	PR	C	PR	PR	PR
Ruby-crowned kinglet	C	C	C	C	C	C	C	C	C	C	PR
Mountain bluebird										O	C
Veery											O
Gray-cheeked thrush	C	PR				PO		PO	PO	PO	PO
Swainson's thrush		C	PR	C	C	C	PR	C	C	C	PR
Hermit thrush	C	C	PR	PR	C	C	PR	PR	PR	PR	PR
American robin	C	C	C	C	C	C	C	C	C	C	PR
Varied thrush	C	C	C	C	C	C	C	C	C	C	PR
Northern mockingbird		O									
European starling		PR	PR					C		PO	C
American pipit			O			O		O	O		
Bohemian waxwing		PR				PR		PR		O	PR
Cedar waxwing		PO			PO	PO		O	O	O	C
Tennessee warbler		PO						C		PO	C
Orange-crowned warbler	C	C	PR	C	C	C	PR	C	PR	PR	PR
Yellow warbler	C	PR	C	C	C	C	PR	C	C	C	PR
Magnolia warbler							C	C	PR	PR	PR
Yellow-rumped warbler	C	C	C	C	C	C	C	C	C	C	C
Townsend's warbler		PR	C	PR	PR	PR	C	PR	C	PR	PR
Blackpoll warbler		O				O				O	
Black-and-white warbler										O	O
American redstart		C	C	C	PR	C	PR	C	C	C	PR
Northern waterthrush		C	PR	PR	PR	PR	PR	PR	C	C	C
MacGillivray's warbler		C				C		PR	C	C	PR

Table 4—Breeding evidence of all bird species recorded on major mainland rivers of southeast Alaska. Codes indicate confirmed (C), probable (PR), possible (PO) breeding, or breeding was not observed (O) (continued)

Species	Alsek	Chilkat	Taiya	Katzehin	Antler	Taku	Whiting	Stikine	Unuk	Chickamin	Salmon
Common yellowthroat		C		PR	PR	C	PR	C	C	C	PR
Wilson's warbler	C	C	PR	PR	PR	C	PR	C	PR	PR	PR
Western tanager		PR	PR		PR	PR	PR	PR	PR	PR	PR
American tree sparrow								O		O	
Chipping sparrow		C	PR			C	C	PR	PR	PR	C
Clay-colored sparrow								O			
Savannah sparrow	C	PR	PR	C	C	PR	PR	PR	PR	C	PR
Fox sparrow	C	C	C		C	C		C	C	C	C
Song sparrow		C	PR	PR	C	C	C	PR	PR	C	PR
Lincoln's sparrow	C	C	PR	C	C	C	C	C	C	C	PR
Harris's sparrow										O	
White-crowned sparrow								O		O	
Golden-crowned sparrow	PR					PR		O		O	
Dark-eyed junco	PR	C	PR		PR	PR	PR	C	C	C	PR
Lapland longspur								O		O	
Snow bunting										O	
Black-headed grosbeak								O			O
Lazuli bunting											O
Bobolink											O
Red-winged blackbird		PR			C	PR		PR	PR	C	C
Yellow-headed blackbird											O
Rusty blackbird		C				C	PO	PR	PR	C	PO
Brown-headed cowbird		C			PO			O		PR	C
Pine grosbeak	PR	C	PR			PO				PR	PO
House finch		O									O
Red crossbill		PR				PR		C	PR	PR	PR
White-winged crossbill		PR	PO			PR		PR		PR	
Common redpoll	PR									O	
Pine siskin		PR	PR	PO	PR	PR	PR	PR	PR	PR	PR
Evening grosbeak											O

[a] Source: Reports (Bailey (1927), Gibson (1984, 1986), Gibson and MacDonald (1975), Heglund and Rosenberg (1989), Swarth (1911, 1922), MacDonald and MacDonald (1975), Jewett (1942), and Webster (1950), documented observations, unpublished notes, and the current study.

Table 5—Migration type, primary habitat use, and guild membership of birds known or suspected to breed at southeast Alaska's major mainland rivers

Species	Migration type[a]	Primary habitat[b]	Guild[c]		
			Nest location	Foraging habitat	Foraging behavior
Geese, swans, and ducks:					
Canada goose	R	FM/FW/LW/TF	Ground	Ground	Herbivore
Trumpeter swan	R	FM/LW/FW	Ground	Aquatic	Herbivore
American wigeon	B	FM/FW/LW	Ground	Aquatic	Herbivore
Mallard	R	FM/LM/FW	Ground	Aquatic	Herbivore
Blue-winged teal	A	FM/FW/LW	Ground	Aquatic	Herbivore
Green-winged teal	A	FM/FW	Ground	Aquatic	Herbivore
Redhead	A	LW	Ground	Aquatic	Herbivore
Ring-necked duck	A	FM/FW	Ground	Aquatic	Herbivore
Harlequin duck	R	FW	Ground	Aquatic	Insectivore
Common goldeneye	R	FW	Cavity	Aquatic	Insectivore
Barrow's goldeneye	B	FW	Cavity	Aquatic	Insectivore
Hooded merganser	R	FW/FM	Cavity	Aquatic	Piscivore
Common merganser	R	FW/FM	Cavity/ground	Aquatic	Piscivore
Red-breasted merganser	A	FW	Ground	Aquatic	Piscivore
Grouse:					
Ruffed grouse	R	DS	Ground	Ground	Omnivore
Spruce grouse	R	CF/MF	Ground	Ground	Herbivore
Sooty grouse	R	CF	Ground	Ground	Herbivore
Loons:					
Red-throated loon	B	FW/LW	Ground	Aquatic	Piscivore
Common loon	B	LW	Ground	Aquatic	Piscivore
Bitterns and herons:					
American bittern	A	FM	Shrub	Aquatic	Piscivore
Great blue heron	B	FW	Tree	Aquatic	Piscivore
Raptors:					
Osprey	A	FW/LW	Tree	Aerial	Piscivore
Bald eagle	R	CF/DF/FW/TF	Tree	Aerial	Piscivore
Northern harrier	A	EM	Ground	Aerial	Carnivore
Sharp-shinned hawk	A	MF/DS	Tree	Aerial	Carnivore
Northern goshawk	B	CF	Tree	Aerial	Carnivore
Red-tailed hawk	A	CF	Tree/cliff	Aerial	Carnivore
American kestrel	A	FM/DF	Cavity	Aerial	Insectivore
Merlin	A	CF/FM	Tree	Aerial	Carnivore
Rails:					
Sora	A	FM	Ground	Ground	Insectivore
Shorebirds:					
Semipalmated plover	A	FW/AI	Ground	Ground	Insectivore
Killdeer	A	FW/AI	Ground	Ground	Insectivore
Spotted sandpiper	A	FW	Ground	Ground	Insectivore
Solitary sandpiper	A	FM/DS	Tree	Ground	Insectivore
Greater yellowlegs	A	FM	Ground	Ground	Insectivore
Lesser yellowlegs	A	FM	Ground	Ground	Insectivore
Least sandpiper	A	FW/AI	Ground	Ground	Insectivore
Wilson's snipe	A	FM	Ground	Ground	Insectivore
Gulls, terns, and jaegers:					
Mew gull	R	FW/LW/AI	Ground	Ground	Omnivore
Herring gull	R	FW/LW/AI	Ground	Ground	Omnivore
Glaucous-winged gull	R	FW/AI	Ground	Ground	Insectivore

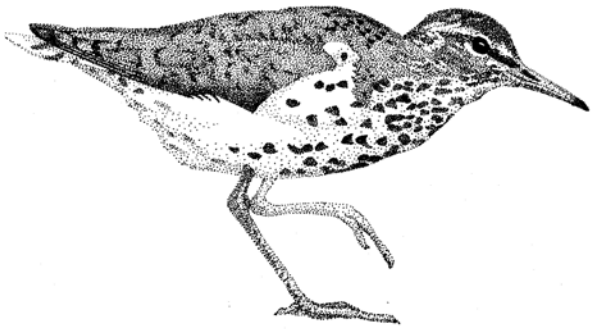
Table 5—Migration type, primary habitat use, and guild membership of birds known or suspected to breed at southeast Alaska's major mainland rivers (continued)

Species	Migration type[a]	Primary habitat[b]	Guild[c]		
			Nest location	Foraging habitat	Foraging behavior
Aleutian tern	B	FW/LW/DS/AI	Ground	Aquatic	Piscivore
Caspian tern	A	FW/LW/AI	Ground	Aquatic	Piscivore
Arctic tern	B	FW/LW/AI	Ground	Aquatic	Piscivore
Parasitic jaeger	B	AI	Ground	Ground	Carnivore
Murrelets:					
Marbled murrelet	B	CF/LW	Tree	Aquatic	Piscivore
Pigeons:					
Band-tailed pigeon	A	CF/DF	Tree	Ground	Granivore
Owls:					
Western screech-owl	R	CF	Cavity	Aerial	Carnivore
Great horned owl	R	CF/MF/DF	Tree/cliff	Aerial	Carnivore
Northern pygmy-owl	R	CF	Cavity	Aerial	Carnivore
Barred owl	R	CF	Cavity	Aerial	Carnivore
Short-eared owl	A	DS	Ground	Aerial	Carnivore
Northern saw-whet owl	R	CF/MF	Cavity	Aerial	Carnivore
Nighthawks:					
Common nighthawk	A	DS/AI	Ground	Aerial	Insectivore
Swifts and hummingbirds:					
Black swift	A	LW/FW	Cliff	Aerial	Insectivore
Vaux's swift	A	DF/FM	Cavity	Aerial	Insectivore
Rufous hummingbird	A	CF/MF/DF/DS	Tree	Foliage	Insectivore
Kingfishers:					
Belted kingfisher	A	FW	Bank	Aquatic	Piscivore
Woodpeckers:					
Red-breasted sapsucker	B	MF/DS	Cavity	Bark	Insectivore
Downy woodpecker	R	DF/DS	Cavity	Bark	Insectivore
Hairy woodpecker	R	CF/MF	Cavity	Bark	Insectivore
American three-toed woodpecker	R	CF	Cavity	Bark	Insectivore
Northern flicker	B	CF/MF	Cavity	Ground	Insectivore
Perching birds:					
Olive-sided flycatcher	A	MF/FM	Tree	Aerial	Insectivore
Western wood-pewee	A	DF	Tree	Aerial	Insectivore
Alder flycatcher	A	DS	Shrub	Aerial	Insectivore
Willow flycatcher	A	DS	Shrub	Aerial	Insectivore
Least flycatcher	A	DF	Tree	Aerial	Insectivore
Hammond's flycatcher	A	DF/MF	Tree	Aerial	Insectivore
Pacific-slope flycatcher	A	CF/MF	Tree	Aerial	Insectivore
Cassin's vireo	A	MF	Tree	Foliage	Insectivore
Warbling vireo	A	DF/DS	Tree	Foliage	Insectivore
Red-eyed vireo	A	DS	Shrub	Foliage	Insectivore
Steller's jay	R	CF/MF	Tree	Ground	Omnivore
Black-billed magpie	R	DS	Tree/shrub	Ground	Omnivore
American crow	B	CF/TF	Tree	Ground	Omnivore
Northwestern crow	R	TF/CF	Tree	Ground	Omnivore
Common raven	R	CF/TF	Cliff/tree	Ground	Omnivore
Tree swallow	A	FM/FW	Cavity	Aerial	Insectivore
Violet-green swallow	A	FM/FW	Cavity	Aerial	Insectivore
Northern rough-winged swallow	A	FW	Bank	Aerial	Insectivore

Table 5—Migration type, primary habitat use, and guild membership of birds known or suspected to breed at southeast Alaska's major mainland rivers (continued)

Species	Migration type[a]	Primary habitat[b]	Guild[c]		
			Nest location	Foraging habitat	Foraging behavior
Bank swallow	A	FW	Bank	Aerial	Insectivore
Cliff swallow	A	FW	Cliff/building	Aerial	Insectivore
Barn swallow	A	FM/FW	Building	Aerial	Insectivore
Black-capped chickadee	R	DS	Cavity	Foliage	Insectivore
Chestnut-backed chickadee	R	CF	Cavity	Foliage	Insectivore
Red-breasted nuthatch	R	CF	Cavity	Bark	Insectivore
Brown creeper	R	CF	Tree	Bark	Insectivore
Winter wren	B	CF/MF	Ground	Ground	Insectivore
American dipper	R	FW	Bank	Aquatic	Insectivore
Golden-crowned kinglet	R	CF	Tree	Foliage	Insectivore
Ruby-crowned kinglet	A	MF/CF	Tree	Foliage	Insectivore
Mountain bluebird	A	CF/DF	Snag	Aerial/ground	Insectivore
Gray-cheeked thrush	A	DS	Shrub	Ground	Insectivore
Swainson's thrush	A	DS/MF	Shrub	Ground	Insectivore
Hermit thrush	A	MF/CF	Ground	Ground	Insectivore
American robin	A	DF/MF	Tree	Ground	Insectivore
Varied thrush	B	CF/DF	Tree	Ground	Insectivore
European starling	R	EM	Snag	Ground	Insectivore
Bohemian waxwing	B	CF	Tree	Foliage	Insectivore
Cedar waxwing	A	MF	Tree	Foliage	Herbivore
Tennessee warbler	A	MF	Ground	Foliage	Insectivore
Orange-crowned warbler	A	DS	Ground	Foliage	Insectivore
Yellow warbler	A	DS/DF	Shrub	Foliage	Insectivore
Magnolia warbler	A	MF/CF	Tree/ground	Foliage	Insectivore
Yellow-rumped warbler	A	MF	Tree	Foliage	Insectivore
Townsend's warbler	A	CF	Tree	Foliage	Insectivore
American redstart	A	DS/DF	Tree	Foliage	Insectivore
Northern waterthrush	A	FM/DS/DF	Ground	Ground	Insectivore
MacGillivray's warbler	A	DS	Shrub	Ground	Insectivore
Common yellowthroat	A	FM	Shrub	Foliage	Insectivore
Wilson's warbler	A	CF	Ground	Foliage	Insectivore
Western tanager	A	MF	Tree	Foliage	Insectivore
Chipping sparrow	A	DS	Tree	Ground	Insectivore
Savannah sparrow	A	EM	Ground	Ground	Insectivore
Fox sparrow	R	DS	Ground	Ground	Insectivore
Song sparrow	R	DS/FM	Ground	Ground	Insectivore
Lincoln's sparrow	A	EM	Ground	Ground	Insectivore
Golden-crowned sparrow	B	DS	Ground	Ground	Insectivore
Dark-eyed junco	B	CF	Ground	Ground	Granivore
Red-winged blackbird	A	FM	Ground/shrub	Ground	Insectivore
Rusty blackbird	B	FM/DS	Tree/shrub	Ground	Insectivore
Brown-headed cowbird	A	EM/DS/CF	Nest parasite	Ground	Insectivore
Pine grosbeak	R	CF	Tree	Foliage	Granivore
Red crossbill	R	CF	Tree	Foliage	Granivore
White-winged crossbill	R	CF	Tree	Foliage	Granivore
Common redpoll	R	DS	Ground/shrub	Foliage	Granivore
Pine siskin	R	DS	Tree	Foliage	Granivore

[a] A = Nearctic–Neotropical, B = Nearctic–Nearctic, R = resident.
[b] AI = alluvial bars and islands, CF = coniferous forest, DF = deciduous forest, DS = deciduous shrubland, EM = estuarine meadow, FM = freshwater marsh, FW = fluviatile waters, LW = lacustrine waters, MF = mixed forest, and TF = tidal flats.
[c] Based on Ehrlich et al. 1988 and the authors.



R. Carstensen

Spotted sandpiper.

Several species reach their breeding range limits within the study area. Species that reach their northern range limits include the hooded merganser, northern pygmy-owl, black swift, Vaux's swift, Pacific-slope flycatcher, Cassin's vireo, American redstart, and western tanager. In contrast, the Aleutian tern, gray-cheeked thrush, and common redpoll reach their southern breeding range limits within the study area. Furthermore, the regional distributions of the ruffed grouse, American bittern, sora, common nighthawk, least flycatcher, Hammond's flycatcher, Cassin's vireo, warbling vireo, red-eyed vireo, American redstart, common yellowthroat, and western tanager are primarily restricted to the major mainland rivers.

Similarity (Sorensen's coefficient; Krebs 1999) of breeding bird communities was lowest among the Alsek and the other 10 rivers (average = 52 percent) relative to other river pair comparisons (average = 74 percent). Several species, including the northern shoveler, northern pintail, red-breased merganser, lesser yellowlegs, Aleutian terns, parasitic jaeger, and common redpoll were known or suspected to breed only at the Alsek River (app. 1; table 4). Species common in mature forests at all of the more southern rivers, such as the sooty grouse, red-breasted sapsucker, Pacific-slope flycatcher, and Townsend's warbler, were rare and not suspected to breed at the Alsek River. Interior associated species, such as the warbling vireo, American redstart, and western tanager, were also absent. Breeding bird community composition at coastal and transmountain rivers (excluding the Alsek River) was highly similar. When comparing coastal rivers to transmountain rivers, excluding the Alsek River, similarity was 92 percent. Interior associated species that were known or suspected to breed at the major mainland rivers were widespread at both coastal and transmountain rivers with only a few exceptions: the common nighthawk (table 6) and ruffed grouse.

Breeding bird community composition at coastal and transmountain rivers (excluding the Alsek River) was highly similar.

Table 6—Breeding species common to the Canadian interior with distributions in Southeast Alaska are primarily restricted to the major mainland rivers

Species	Alsek[a]	Chilkat	Taiya	Katzehin	Antler	Taku[a]	Whiting
Ruffed grouse						•	
American bittern		•					
Sora		•					
Common nighthawk		•					
Least flycatcher		•					
Hammond's flycatcher	•	•	•	•	•	•	•
Cassin's vireo		•				•	•
Warbling vireo		•	•	•	•	•	•
Red-eyed vireo							
American redstart		•	•	•	•	•	•
Common yellowthroat		•		•	•	•	•
Western tanager		•	•		•	•	•
Chipping sparrow		•	•			•	•

Species	Stikine[a]	Unuk	Chickamin	Salmon	Coastal	Trans-mountain
Ruffed grouse	•			•	•	•
American bittern	•		•		•	•
Sora	•		•	•	•	•
Common nighthawk					•	•
Least flycatcher	•		•	•	•	•
Hammond's flycatcher	•	•	•	•	•	•
Cassin's vireo	•	•	•	•	•	•
Warbling vireo	•	•	•	•	•	•
Red-eyed vireo	•	•	•		•	•
American redstart	•	•	•	•	•	•
Common yellowthroat	•	•	•	•	•	•
Western tanager	•	•	•	•	•	•
Chipping sparrow	•	•	•	•	•	•

[a] Transmountain river.

Table 7—Nesting guilds of bird species breeding at major mainland rivers of southeast Alaska

	Breeding species nesting guilds						
River	Ground	Bank	Shrub	Tree	Snag	Water	Other[a]
			Percent				
Alsek	61	0	5	17.5	12	0	4.5
Chilkat	29.5	1	7	36.5	17	3	6
Taiya	37	2	4	37	16	0	4
Katzehin	39	2	9	36	14	0	0
Antler	36	1.5	7	34	12	3	6
Taku	32	2	8	40	15	1	2
Whiting	31	1.5	6	36	17	3	6
Stikine	34	1	10	35	13	1	6
Unuk	31.5	2	9	38.5	14	0	4
Chickamin	31	3	7	35	16	3	5
Salmon	28	4	9	40	15	0	5
All rivers (average)	37	2	7	32	16	2	4

[a] Includes rock, cliff, building, and parasitic.

Breeding Bird Ecology

The heterogeneity of aquatic and terrestrial habitats and structural diversity of vegetation at the major mainland rivers offer a variety of nesting opportunities for breeding birds. The majority (85 percent) of breeding species nested on the ground (37 percent of species), in trees (32 percent), and in cavities (16 percent; table 7). Likely due to its early successional state, the Alsek River supported fewer tree-nesting species, and a greater percentage of birds nested on the ground relative to the other rivers (table 7). Ground-nesting birds, such as the Lincoln's sparrow, Savannah sparrow, and dark-eyed junco placed their nests in dense herbaceous vegetation. Dense shrubs (especially willow and alder) provided nesting substrate to a variety of birds (e.g., Swainson's thrush, orange-crowned warbler, American redstart, MacGillivray's warbler, and song sparrow). Snags provided an important habitat feature for breeding birds at the major mainland rivers. Snags surrounding wetlands, especially those influenced or created by beavers, provided nesting opportunities for cavity-nesting birds, such as the American kestrel, common goldeneye, hooded merganser, Vaux's swift, tree swallow, and violet-green swallow. Snags adjacent to open areas (e.g., wetlands, meadows, alluvial bars) also provided perch sites for singing and foraging passerines, such as the olive-sided flycatcher, and sites for raptors (e.g., bald eagle, red-tailed hawk, and merlin) to search for prey. Snags within mature forests were used by cavity-nesting species, such as the northern saw-whet owl, red-breasted sapsucker, hairy woodpecker, and chestnut-backed chickadee.

The heterogeneity of aquatic and terrestrial habitats and structural diversity of vegetation at the major mainland rivers offers a variety of nesting opportunities for breeding birds.

Most (78 percent) bird species breeding at southeast Alaska's mainland rivers fed on animal foods that consisted of invertebrates (57 percent of species), fish (11 percent), or birds and rodents (10 percent; table 8). Insectivores were dominated by ground gleaners (37 percent), foliage gleaners (25 percent), and aerial foragers (21 percent). The Alsek River supported few aerial and foliage gleaning foragers relative to other rivers (table 9), which resulted in a lower number of insectivores on the Alsek (41.5 percent of the species) relative to the other rivers (average = 59 percent; table 9). The majority (72 percent) of breeding species foraged on the ground (26 percent of species), on foliage (23 percent), or on water (23 percent; table 9). High densities of invertebrates observed at marshes and other aquatic habitats provided food for aerial foraging insectivores such as swifts and swallows. In addition, American kestrels, merlins, olive-sided flycatchers, western wood-pewees, and American robins were observed feeding on aerial and terrestrial invertebrates along edges of freshwater marshes. Merlins, for example, were seen foraging for dragonflies on several occasions. Regurgitated pellets of merlins from one location consisted almost entirely of dragonfly exoskeletons.

Table 8—Diet guilds of bird species breeding at major mainland rivers of southeast Alaska

River	Breeding species diet guilds							
	Aquatic invertebrates	Terrestrial invertebrates	Fish	Birds/ rodents	Omnivorous	Vegetation	Seeds	Nectar
				Percent				
Alsek	9	41.5	16	9	7	10.5	5	2
Chilkat	4	56	10	6	6	11	6	1
Taiya	4	62	8	2	6	8	8	2
Katzehin	5	61	11	0	9	9	2.5	2.5
Antler	3	54	13	3	8	15	3	1
Taku	4	59	8	6	7	9	6	1
Whiting	8	58	12.5	3	5	9	3	1.5
Stikine	7	58	9	4	7	8	6	1
Unuk	6	57	8	8	6	9	5	1
Chickamin	7	54	9	9	5	9	6	1
Salmon	4	67	7.5	2.5	6	6	6	1
All rivers (average)	7	50	11	10	6	9	6	1

Table 9—Foraging substrate guilds of bird species breeding at major mainland rivers of southeast Alaska

River	Breeding species foraging substrate guilds				
	Ground	Foliage	Bark	Aquatic	Aerial
			Percent		
Alsek	32	18	3.5	31.5	5
Chilkat	30	23	6	19	11
Taiya	37	29	8	12	10
Katzehin	39	30	4	14	11
Antler	33	22	3	26	12
Taku	30	27	6	17	13
Whiting	30	23	6	23	13
Stikine	28	29	5	18	13
Unuk	29	24	6	19	12
Chickamin	29	23	5	20	11
Salmon	30	31	5	13	16
All rivers (average)	26	23	5	23	11

The only evidence of prey for rodent-eating species was the presence of several voles (*Microtus* spp.) in the nest of a short-eared owl and rodent hair in the regurgitated pellet of a merlin. Feathers of a yellow-rumped warbler, waxwing (species unknown), and white-winged crossbill were found at a feeding post of a merlin. Other terrestrial food resources included conifer cones, which were important to fringillids, and berries (e.g., *Vaccinium* spp., *Rubus* spp.), which were an important food for corvids, thrushes, waxwings, and sparrows. Several species including the rufous hummingbird, ruby-crowned kinglet, orange-crowned warbler, and yellow

warbler foraged on xylem and entrapped insects at sap wells of the red-breasted sapsucker. Estuarine meadows and freshwater marshes provided nutrient-rich sedges and forbs that are important foods for waterfowl.

Breeding Bird Habitat Use

For terrestrial habitats, the number of species that were known or suspected to breed was greatest in mixed forest (46 species), coniferous forest (42 species), and deciduous forest (35 species; table 10). Among wetland habitats, freshwater marsh supported the highest number of species known or suspected to breed (27 species; table 10). Proportions of migrants were highest in habitats that undergo large seasonal alterations (e.g., deciduous forest, deciduous shrubland, freshwater marsh; table 10). In contrast, proportions of residents were highest in more seasonally stable habitats (e.g., coniferous and mixed forest; table 10).

Table 10—Habitat use by bird species breeding at major mainland rivers of southeast Alaska

Habitat	Number of breeding species	Number (percent) of breeding species	
		Migrants	Residents
Coniferous forest	42	24 (58)	18 (42)
Deciduous forest	35	26 (73)	9 (27)
Mixed forest	46	31 (67)	15 (33)
Deciduous shrubland	21	16 (78)	5 (22)
Estuarine meadow	8	6 (75)	2 (25)
Freshwater marsh	27	24 (89)	3 (11)
Lacustrine waters/shoreline	6	4 (74)	2 (26)
Fluviatile waters/shoreline	15	12 (80)	3 (20)
Alluvial bars	11	8 (75)	3 (25)
Tidal flats	0	0	0
Estuarine waters	0	0	0

Most species recorded in riparian coniferous forests also occured in upland coniferous forests, which included the sooty grouse, Pacific-slope flycatcher, golden-crowned kinglet, hermit thrush, varied thrush, chestnut-backed chickadee, winter wren, and Townsend's warbler. Coniferous forests supported a fairly high number of carnivores (nine species) compared to other habitats where carnivores were observed (average = 2.5 species). The northern goshawk, red-tailed hawk, northern pygmy-owl, barred owl, and northern saw-whet owl were primarily observed in coniferous forests.

The most frequently observed species in deciduous forests were the Hammond's flycatcher, warbling vireo, American robin, Swainson's thrush, yellow warbler, and yellow-rumped warbler. Several breeding species with

B. Christensen

Red-breasted sapsucker wells provide a food source to variety of insectivorous species, Antler River.

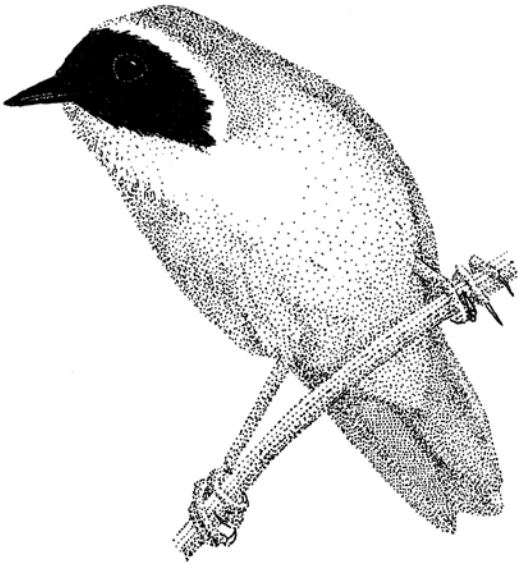
regional distributions that were primarily restricted to major mainland rivers were associated with deciduous forests. These species include the least flycatcher, warbling vireo, red-eyed vireo, and American redstart. Mixed forests supported bird species that frequently occurred in coniferous forests, deciduous forests, and owing to the dense understory of mixed forests, deciduous shrublands. The most frequently recorded species in mixed forests were the red-breasted sapsucker, ruby-crowned kinglet, Townsend's warbler, and yellow-rumped warbler. Several species recorded in mixed forests, such as the Cassin's vireo, magnolia warbler, and western tanager, were primarily restricted to major mainland rivers.

Despite the structural simplicity of deciduous shrublands, this habitat supported a diverse breeding avifauna. The most frequently observed species in deciduous shrublands were the MacGillivray's warbler, American redstart, orange-crowned warbler, yellow warbler, Wilson's warbler, and fox sparrow. Deciduous shrublands supported several breeding species that were restricted to major mainland rivers in southeast Alaska including the ruffed grouse, American redstart, and chipping sparrow.

Despite the structural simplicity of deciduous shrublands, this habitat supported a diverse breeding avifauna.

Relatively few species breed in estuarine meadows; the most frequently observed species were the Savannah sparrow and Lincoln's sparrow. Alder flycatchers, orange-crowned warblers, and song sparrows were often observed in patches of deciduous shrublands within estuarine meadows.

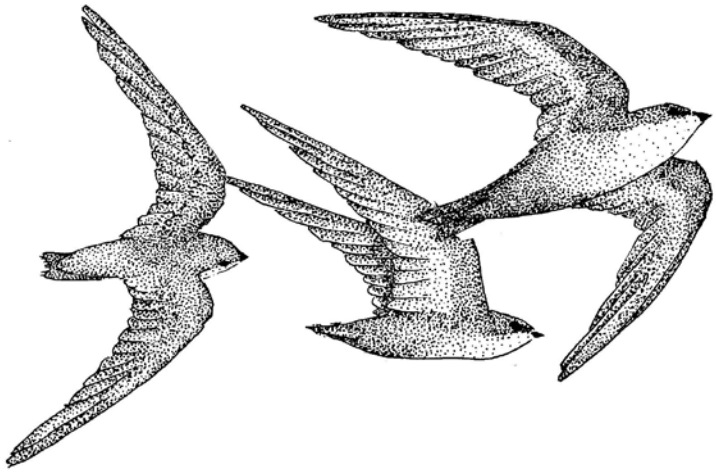
Freshwater marshes of the major mainland rivers were usually influenced to some degree by the activities of beavers. The presence of snags, deciduous shrublands, herbaceous vegetation, and scattered ponds offered an abundance of nesting and foraging resources to birds. Accordingly, freshwater marshes had the highest number of nesting species of any wetland habitat. The most frequently observed species in freshwater marsh habitats were the mallard, Wilson's snipe, tree swallow, common yellowthroat, Lincoln's sparrow, song sparrow, and red-winged blackbird. Several species with regional distributions that were primarily restricted to major mainland rivers were associated with freshwater marsh. These species include the American bittern, sora, and common yellowthroat. Freshwater marsh also provided foraging habitat for raptors, flycatchers, swifts, and swallows.



R. Carstensen

Common yellowthroat.

Forty seven species of breeding seabirds, shorebirds, landbirds, and waterfowl associated with surface water were recorded at the mainland rivers. The most frequently observed species in lacustrine habitats were the Canada goose, mallard, and common merganser. Several shorebird species, including the semipalmated plover and spotted sandpiper, nested and foraged along lacustrine shorelines. Mew gulls, herring gulls, Aleutian



Vaux's swift.

terns, Caspian terns, and arctic terns were observed foraging in lacustrine habitats. Aerial foragers, including the black swift, Vaux's swift, tree swallow, and violet-green swallow were frequently observed foraging over lacustrine waters. Species commonly observed using fluviatile habitats were the bald eagle, mallard, common merganser, spotted sandpiper, and belted kingfisher. Shorebirds, including the greater yellowlegs and lesser yellowlegs, were recorded foraging along fluviatile shorelines. Mew gulls, herring gulls, arctic terns, and Aleutian terns were observed foraging in fluviatile habitats. Colonies of northern rough-winged swallows and bank swallows nested in steep cutbanks along several rivers. Belted kingfishers were also frequently observed nesting in cutbanks. Large flocks of common mergansers were observed on fluviatile waters of the rivers, and bald eagles congregated at the mouths of rivers and along tributaries when salmon (*Onchorynchus* spp.) were present.

Alluvial habitats provided foraging and nesting resources primarily for seabirds and shorebirds. Shorebirds observed nesting in alluvial habitats included the semi-palmated plover, killdeer, and spotted sandpiper. Large concentrations of breeding herring gulls, glaucous-winged gulls, and arctic terns were encountered on alluvial islands at the Alsek River, and smaller numbers of breeding mew gulls, herring gulls, and arctic terns were observed nesting on alluvial islands at most other rivers. Rarer breeding species such as the Caspian tern, parasitic jaeger, and common nighthawk also nested in alluvial habitats. Species associated with tidal flats during the breeding season included the great blue heron, Canada goose, bald eagle, and mew gull. Although not extensively used during the breeding season, tidal flats provide important stopover or staging habitat for numerous species of migrating

waterfowl, seabirds, and shorebirds (Gibson 1984, MacDonald and MacDonald 1975). Similarly, bird use of estuarine waters was primarily restricted to nonbreeding species during migration periods and winter.

Nonbreeding Birds

Information on bird use of the major mainland rivers during migration is scarce and primarily limited to the Stikine and Chickamin Rivers (Gibson 1984, Heglund and Rosenberg 1989, MacDonald and MacDonald 1975); however, it is evident that the rivers provide critical resting and foraging habitats for vast numbers of migrants en route to breeding sites throughout Alaska or, in fall, to nonbreeding areas as distant as southern South America and Indonesia.

The rivers provide critical resting and foraging habitats for vast numbers of migrants en route to breeding sites throughout Alaska or, in fall, to nonbreeding areas as distant as southern South America and Indonesia.

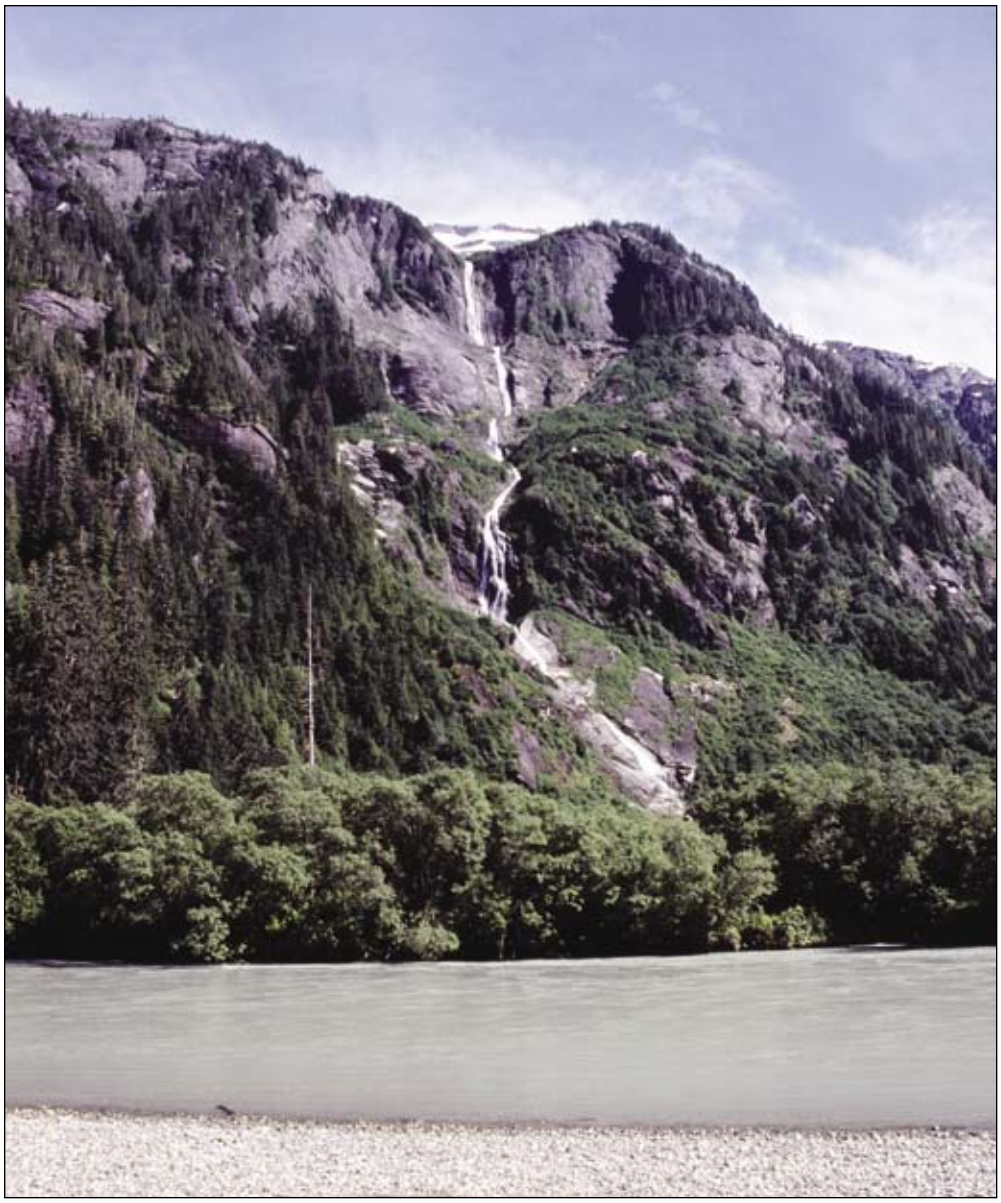
Although birds migrate to southeast Alaska via several flyways, the majority of species follow a coastal route. This is certainly the case for the many waterfowl and shorebirds species that winter along the Pacific Coast as well as for the numerous thrushes, warblers, and sparrows associated with temperate rain forest or other coastal habitats. Other species migrating along the coast, such as the sandhill crane and several raptors, take advantage of updrafts over the coastal mountains, particularly in the fall. The extent to which birds use the major mainland rivers as migratory corridors is poorly understood. During fall migration, there does appear to be some downriver movement along the Stikine River by species that breed in the interior. The migration routes of more common species whose regional distributions are primarily restricted to the major mainland rivers, including the warbling vireo, American redstart, common yellowthroat, and western tanager, are unknown. Because information for nonbreeding bird communities is limited to a small number of rivers that differ in coastal–interior connectivity as well as the availability and extent of seasonally important habitats, the abundance, timing, and composition of nonbreeding birds is likely to differ considerably among the major mainland rivers. Appendix 1 contains additional detailed information on nonbreeding bird use of the major mainland rivers.

Spring Migrants

During mid March to early April, the first pulse of migrants, predominately waterfowl and gulls, arrive to the lower, ice-free sections of the rivers.

During mid March to early April, the first pulse of migrants, predominately waterfowl and gulls, arrive to the lower, ice-free sections of the rivers. Peak spring abundances of several waterbird species, including common merganser, red-breasted merganser, Bonaparte's gulls, mew gulls, and Thayer's gulls are synchronized with the eulachon (*Thaleichthys pacificus*) spawning run at the Stikine and Chickamin Rivers (MacDonald and MacDonald 1975, Marston et al. 2002, Webster 1950). Bald eagles are also common at rivers where eulachon spawn; >1,000 have been

J. Johnson



Cliff and waterfall used by black swifts, Chickamin River.

observed in April at the Stikine River (Heglund and Rosenberg 1989, Iverson 1991). At Berners Bay, more than 46,000 avian predators composed primarily of gulls, but also including 34 additional species of seabirds, shorebirds, waterfowl, and land-birds, were observed foraging on both live and dead eulachon (Marston et al. 2002, Willson and Marston 2002). Eulachon are also likely an important spring resource for birds at the several other major mainland rivers where they spawn. In May, up to 15,000 snow geese concentrate at Sergief Island, Stikine River, and large numbers of Canada geese, mallards, and American wigeon frequent estuarine meadows at the Stikine and Chickamin Rivers (Heglund and Rosenberg 1989, MacDonald and

MacDonald 1975, Webster 1950) where they feed on nutrient-rich sedges and forbs.

Migratory shorebirds, most en route to northern breeding areas, arrive to the region in late April to early May. By far the most important site in southeast Alaska for migrating shorebirds is the Stikine River Delta. The resource-rich tidal flats support 350,000 western sandpipers (Iverson and Walsh 1994), a substantial proportion of the species population (11 percent); least sandpipers in the low thousands (Heglund and Rosenberg 1989); and >7,000 dunlin (Iverson 1991). American golden-plovers, pectoral sandpipers, and long-billed dowitchers were also frequently observed at the Stikine River Delta (Heglund and Rosenberg 1989). Based on their abundance on tidal flats and river estuaries near Yakutat (Andres and Browne 2007), it is likely that the Stikine River Delta (and to a lesser degree the estuaries of other major mainland rivers) also supports large numbers of black-bellied plovers, semipalmated sandpipers, and short-billed dowitchers.

Migrating landbirds that were frequently detected during spring include the northern harrier, American kestrel, sandhill crane, and tree swallow. Songbirds are typically the last migrants to pass through the region—generally from mid May to the first week of June. Among the more common species were the American robin, American pipit, and yellow-rumped warbler (MacDonald and MacDonald 1975).

Autumn Migrants

Autumn migration is, in general, more protracted and diffused than spring migration. This pattern results from species' different nesting periods, differing departure times from breeding areas by adults and juveniles, varied molt schedules, and the extended availability of food resources. Although the first migrants—predominately failed or nonbreeders—are detected as early as mid June, peak migration for most species does not occur until August and September.

Bonaparte's gulls and mew gulls begin arriving to the rivers in late June, and large numbers are present in estuarine waters of most rivers by July. The latter species, as well as common mergansers and bald eagles, concentrate at clear water tributaries where salmon spawn. Snow geese, Canada geese, trumpeter swans, mallards, and northern pintails were abundant fall migrants at the Stikine and Chickamin Rivers (Gibson 1984, Heglund and Rosenberg 1989, MacDonald and MacDonald 1975). Thousands of sandhill cranes were observed in late September at Sergief Island, Stikine River, or in flight down the coast (Gibson 1984).

Fall shorebird migration at the Stikine River does not reach the magnitude observed in spring (Heglund and Rosenburg 1989). However, black-bellied plovers, pectoral sandpipers, and spotted sandpipers were frequently recorded in fairly large numbers during September (Gibson 1984). The small numbers of western

sandpipers recorded at the Stikine River during September–October 1982 and 1984 (Gibson 1984, Heglund and Rosenberg 1989) is likely a result of the late survey dates; this species is an abundant migrant in July and August at Blacksand Spit, Yakutat (Andres and Browne 2007).

Migrating landbirds that were frequently detected during fall migration include the northern harrier, sharp-shinned hawk, red-tailed hawk, and American kestrel. Common songbirds recorded include the tree swallow, hermit thrush, American robin, American pipit, orange-crowned warbler, yellow-rumped warbler, Savannah sparrow, and fox sparrow. The few American redstarts observed during September at the mouth of the Stikine River (Gibson 1984), where they were one of the most frequently detected breeding songbirds (Johnson 2003), may indicate that this species flies upriver to reach an interior migration route. In contrast, warbling vireos and common yellowthroats may migrate along the coast as indicated by their abundance in September at the mouth of the Stikine River. The American pipit and Lapland longspur, two interior breeding species that are common coastal migrants, were frequently observed flying down the Stikine River. Rarer, predominately interior breeding species, such as the ring-billed gull, California gull, mourning dove, and common nighthawk were also recorded flying downriver (Gibson 1984).

As winter approaches, strong storm systems from the southeast characterized by high levels of precipitation and strong winds become more frequent in the region. Nevertheless, a few hardy migrants such as Wilson's snipe, golden-crowned sparrow, and dark-eyed junco were detected during November and as late as December (MacDonald and MacDonald 1975).

Winter Residents

A small fraction of the overall number of species recorded at the major mainland rivers are thought to remain during winter. During average years, rivers are frozen from November through February and valleys are covered with snow by December. The majority of overwintering species are landbirds associated with coniferous forest including grouse, raptors, woodpeckers, corvids, and fringillids. These species occur in forested habitat during winter throughout southeast Alaska. Bald eagles occur in numbers of up to 4,000 during October–February at the Chilkat River, where an alluvial fan reservoir creates an ice-free section of river several miles long where eagles feed on salmon carcasses. Canada geese, buffleheads, scoters, and several species of gulls occur on estuarine waters at the mouths of major mainland rivers (MacDonald and MacDonald 1975). Because most studies did not assess wintering populations, a greater number of species might be residents than reported here.

Discussion

Clearly, the major mainland rivers of southeast Alaska support one of the most diverse assemblages of breeding and nonbreeding birds in Alaska. A disproportionately high number of breeding birds were recorded in the relatively small areal extent encompassed by these rivers. The avifauna comprises several species with distributions in Alaska that are primarily restricted to the major mainland river systems. Bird diversity at the major mainland rivers may be attributed to several ecological factors including the presence of unique habitats, habitat heterogeneity, structural and compositional complexity of vegetation, high primary productivity, presence of surface water, and unique connectivity to other regional populations of birds.

Bird diversity at the major mainland rivers may be attributed to several ecological factors including the presence of unique habitats, habitat heterogeneity, structural and compositional complexity of vegetation, high primary productivity, presence of surface water, and unique connectivity to other regional populations of birds.

Similar to riparian systems in arid environments (Brinson et al. 1981), the diversity and structural complexity of habitats in riparian areas in southeast Alaska contrasts markedly with the relative homogeneity of adjacent upland habitats, which is generally dominated by spruce-hemlock forest. River processes in the region create novel habitats, such as extensive willow-dominated shrublands and freshwater marshes, and form a dynamic mosaic of vegetation patches characterized by unique interfaces between stream channel and riparian vegetation and between riparian and upland vegetation. These transition zones are particularly important habitats for birds in the river systems. For example, the ecotone between freshwater marsh and both riparian and upland vegetation was one of the most diverse avian habitats surveyed. This habitat edge provides an abundance of nesting and foraging resources to a diverse assemblage of waterbird and landbird species. Aquatic habitats on mainland rivers provide surface water and associated resources for foraging, nesting, and moulting waterfowl and piscivorous birds. Estuarine meadows, estuarine waters, and tidal flats, although not used extensively during the breeding season, provide critical food resources for numerous migratory and overwintering species.

The linearity and connectivity of riparian zones allows for the dispersal of flora and fauna at multiple spatial scales (Malanson 1993). Riparian vegetation may help connect patchy or fragmented habitats within a watershed and facilitate the transfer of nutrients between aquatic and terrestrial habitats. At larger scales, the major mainland rivers act as corridors for the movement and dispersal of species across otherwise ecologically distinct regions. This is especially evident at the transmountain rivers (with the exception of the Alsek) where plant and bird species characteristic of the Canadian interior penetrated into and integrated with sister taxa in the coastal rain forests of southeast Alaska. The extension of interior plant communities into coastally influenced areas along these rivers allowed for the

colonization of interior-associated birds such as the warbling vireo, American redstart, and common yellowthroat. Although interior-associated species probably first reached southeast Alaska via the Taku and Stikine Rivers, it is apparent by their presence and abundance that these species have successfully colonized coastal rivers. Although it is not known how interior-associated species originally colonized coastal rivers, short overland flights from the interior, in the case of the Chilkat and Salmon Rivers, or from transmountain rivers via major tributaries, in the case of the Stikine-Iskut Rivers and Unuk River, appears most likely. The only exception of an interior-associated species not present at the majority of coastal rivers is the ruffed grouse, which was recorded only at the Taku, Stikine, and Salmon Rivers. This species is the only interior-associated species that is a year-round resident of southeast Alaska and may be confined to these rivers owing to its decreased ability to disperse compared to more mobile migratory species.

In southeast Alaska, the distribution of many Canadian interior species may be influenced by the size of the river valley and the frequency of flooding, which in turn influences the amount of deciduous riparian vegetation available for breeding (Willson and Comet 1996a, 1996b). The scarcity of appropriate habitats, especially deciduous riparian vegetation, probably limits further dispersal in the region.

Coastal mountains may act as movement barriers that divide bird communities in southeast Alaska and the Canadian interior into allopatric zones. Several species that commonly breed in the coastal rain forest, such as the sooty grouse, red-breasted sapsucker, Pacific-slope flycatcher, Steller's jay, and Townsend's warbler, are rare or absent in the interior. Conversely, numerous common interior species are rare or absent along the coast (e.g., yellow-bellied sapsucker, dusky flycatcher, gray jay, black-capped chickadee, and purple finch). Coastal mountains likely limit the dispersal of birds from one region to the other indirectly by governing climatic differences (temperature and precipitation) that subsequently affect both the timing of breeding and the condition and availability of preferred habitat.

Bird use of riparian zones increases dramatically during migration (Brinson et al. 1981). Riparian zones may attract 10 times the number of migrating birds found in adjacent upland sites during spring migration (Stevens et al. 1977) and 14 times the number of species recorded in upland sites during fall migration (Hehnke and Stone 1979). Although information on bird use of the major mainland rivers during migration is scarce, existing information indicates the rivers support a diverse avian assemblage. Lower portions of rivers (e.g., estuarine meadows and waters, tidal flats) provide important habitats for a large number of migrating birds, particularly waterfowl, seabirds, and shorebirds. Less is known about use of riparian habitats by migrant landbirds, but our casual observations suggest that coniferous-breeding

birds, such as the Townsend's warbler, may rely on deciduous fringes of riparian areas as sites for staging or stopover during autumn migration. Riparian habitats may also support a higher concentration of upland species that descend to lower elevations during migration and winter (e.g., horned lark, red-breasted nuthatch, American pipit). Furthermore, mainland rivers, particularly transmountain rivers, provide an obvious route for migration between interior and coastal regions. Migration movement patterns were noticed for a handful of species, but the extent to which the rivers are used as migratory corridors remains largely unknown.

The major mainland rivers occur from extreme south to north in southeast Alaska, a distance covered by more than 650 km. The influence of latitude on the presence of bird species at the major mainland rivers is most apparent between the Alsek River and the other major mainland rivers. Several bird species commonly observed at the more southerly rivers are rare or absent at the Alsek River. Similarly, species recorded at the Alsek River that are more commonly observed north of the Alsek River region were not recorded at the other major mainland rivers, which suggests that this area may be a transitional zone for several bird species (Andres and Browne 2007). At the Alsek River, the absence or rarity of species common to the other rivers may be due to factors such as the predominance of early-successional plant communities and relative lack of mature forest and freshwater marsh habitats in the case of species associated with coastal southeast Alaska, or the composition and extent of vegetation communities at the river's origin in southern Yukon Territory in the case of interior-associated species. For example, species that commonly occur in the Canadian interior, such as Hammond's flycatcher, but are currently absent from the Alsek River may colonize the area once plant succession advances and creates more appropriate habitat conditions.

In general, riparian systems contain a fairly predictable set of feeding guilds (Brinson et al. 1981). Similar to riparian systems in other regions (Stevens et al. 1977), insectivores dominated the foraging guilds of birds along the rivers in southeast Alaska. In a southeast Alaska study, Willson and Comet (1996b) found that deciduous understory foliage and leaf litter supported a higher density of invertebrates in deciduous forests than in coniferous forests. This higher prey availability is thought to contribute to both higher numbers of bird species and abundance in deciduous compared to coniferous forests in southeast Alaska and British Columbia (Willson and Comet 1996b).

The presence of large populations of anadromous fish distinguishes riparian areas in coastal regions from those further inland. The arrival of spawning salmon to the rivers marks an influx of one of the most important food resources for a variety of animals (Willson and Halupka 1995) including numerous birds such as bald eagle,

osprey, great blue heron, and several gull species. Eggs and juvenile salmon also provide an important food base for many birds such as loons, mergansers, terns, belted kingfishers, and American dippers (Obermeyer et al. 1999). In addition to providing a direct food source, salmon introduce a pulse of marine-derived nutrients that enrich both freshwater and terrestrial food webs through their decomposition or the feces of salmon-eating mammals (Ben-David et al. 1998) and birds. The enrichment of these riparian systems results in the increased abundance of aquatic and terrestrial invertebrates that, in turn, may result in relatively high densities of breeding birds near salmon streams compared to non-salmon streams in southeast Alaska (Gende and Willson 2001).

Although much smaller than Pacific salmon, eulachon also provide an important food source for birds at several major mainland rivers. Eulachon are high in lipid content and provide an abundant, early spring food resource for birds, and may be an important factor in determining the reproductive success of bald eagles and other species of piscivorous birds.

Management Considerations

Because of the high bird species diversity, uniqueness of breeding bird communities, and presence of regionally uncommon habitat types, major mainland rivers of southeast Alaska are regarded as regionally significant to bird populations by biologists, conservationists, and land managers. Although these rivers are currently governed by natural processes, few have protective status and therefore face increasing disturbance by human activities such as road-building, mining, timber harvest, and urban development. Such activities could drastically alter or destroy riparian habitat quality and their value to a regionally unique avifauna.

Major road developments in southeast Alaska are proposed for the Stikine River valley and Lynn Canal. The latter project would connect the cities of Skagway and Juneau and thereby affect bird populations along the Katzehin River and Berners Bay (including the Berners, Lace, and Antler Rivers that flow into it) directly through loss of habitat. More importantly, the indirect effects of road development will affect the avian communities by changing patterns of hydrology and by opening these systems to urban development, timber harvest, mining, oil and gas exploration, hydro electric development, and pollution. Mining activities are currently underway at Berner's Bay and several projects are proposed for the Taku and Stikine River watersheds in British Columbia. In addition to the potential for chemically treated mine tailings to pollute fresh and marine water ecosystems, mine construction and subsequent infrastructure would result in substantial habitat loss. Furthermore, access roads to the mines would open large tracts of land to potential development.

Any plans that affect the quality and quantity of habitats within the major mainland river valleys should take into account the fact that these rivers not only provide unique and valuable habitat to birds during the breeding season but also provide critical staging and stopover areas for birds during migration.

Several species of regional concern use the major mainland rivers in southeast Alaska and thereby warrant conservation consideration by managers of these river systems. Boreal Partners in Flight (1999) has listed several species associated with the major mainland rivers as priority species of conservation concern owing to small and restricted populations, which include the black swift, Vaux's swift, western wood-pewee, Hammond's flycatcher, and MacGillivray's warbler. Additionally, the Vancouver Canada goose, Queen Charlotte goshawk, bald eagle, red-breasted sapsucker, hairy woodpecker, and brown creeper have been selected in the Tongass Land Management Plan (USDA FS 1997) as management indicator species. These species may be important in assessing the health of ecosystems in southeast Alaska and have been recorded at the major mainland rivers in varying degrees of abundance.

Conservation strategies for riparian areas should incorporate bird population monitoring in relation to changing land use. Because the majority of major mainland rivers either originate in Canada or provide direct connectivity between southeast Alaska and the Canadian interior, international cooperation may be needed to address conservation issues for these ecosystems. Riparian areas contain unique ecological communities that are sensitive to both human and natural disturbances. Any periodic assessment of the status of bird populations or response to habitat alteration will require designs that address the complex mosaic of habitats and the unique and diverse assemblages of bird taxa along these mainland river systems. Further knowledge of the magnitude of use of riverine tidal flats by migrating birds is desirable.

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English Equivalents

When you know:	Multiply by:	To get:
Centimeters (cm)	0.394	Inches
Meters (m)	3.28	Feet
Kilomters (km)	0.6215	Miles
Hectares (ha)	2.47	Acres
Square kilometers (km^2)	0.386	Square miles
Degrees Celsius	1.8° C + 32	Degrees Fahrenheit

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Appendix: Annotated Lists of Birds

The following accounts describe the abundance, seasonal occurrence, breeding behavior, habitat preferences, and observational records of the 211 species recorded at the Alsek, Chilkat, Taiya, Katzehin, Antler, Taku, Whiting, Stikine, Unuk, Chickamin, and Salmon Rivers. Information is compiled from all relevant publications and reports as well as fieldwork conducted by the authors. A complete description of subspecies and their status and distribution was beyond the scope of this paper owing to the lack of detailed morphological information. Gibson and Kessel (1997) provided a thorough treatment of subspecies occurring in Alaska.

Seasonal occurrence and abundance categories are based on Kessel and Gibson (1978). The following categories were assigned to species based on observations at the major mainland rivers. For seasonal occurrence and abundance of species at the state level, refer to Gibson (2001); for seasonal occurrence and abundance of species in southeast Alaska, see Armstrong and Gordon (2001).

Seasonal Occurence Categories

Resident: A species present throughout the year.

Migrant: A seasonal transient between wintering and breeding ranges; in spring, includes species that have overshot their normal breeding range.

Breeder: A species known to breed; prefixed by "possible" or "probable" if concrete breeding evidence is unavailable.

Visitant: A nonbreeding species; also, in fall, a species not directly en route between breeding and wintering ranges.

Abundance Categories

Abundant: Species occurs repeatedly in proper habitats, with available habitat heavily utilized, and/or the study areas regularly host great numbers of the species.

Common: Species occurs in all or nearly all proper habitat, but some areas presumed suitable habitat are occupied sparsely or not at all, and/or the study areas regularly host large numbers of the species.

Fairly common: Species occurs in only some of the proper habitat, and large areas of presumed suitable habitat are occupied sparsely or not at all, and/or the study areas regularly host substantial numbers of the species.

Uncommon: Species occurs regularly, but uses little of the suitable habitat, and/or the study areas regularly hosts relatively small numbers of the species; not observed regularly even in proper habitats.

Rare: Species within its normal range, occurring regularly but in very small numbers.

Casual: A species beyond its normal range, irregular observations are likely over a period of years; usually occurs in very small numbers.

Accidental: Species so far from its normal range that further observations are unlikely; usually occurs singly.

Breeding behavior and status follows North American Ornithological Atlas Committee criteria (1990). Species nomenclature follows American Ornithologist's Union checklist format (1998, 2000) and Banks et al. (2002, 2003, 2006).

Specific dates are included for rare species. Refer to table 2 for dates of specific studies. Primary sources of information are abbreviated and include the following: AB = Bailey, (1927), DGa = Gibson (1984), DGb = Gibson (1986), DW = Webster (1950), GM = Gibson and MacDonald (1975), HR = Heglund and Rosenberg (1989), HSa= Swarth (1911), HSb = Swarth (1922), MM = MacDonald and MacDonald (1975), and SJ = Jewett (1942), AD = Demartini (pers. comm.), TS = Schantz (unpub. notes), TT = Tobish (pers. comm.), and JJ = authors. Information from American Birds (1970–1993) and North American Birds (1994–present) are abbreviated as AB = volume/number and NAB = volume/number, respectively.

Species Accounts

Order Anseriformes

Family Anatidae

Greater white-fronted goose (*Anser albifrons*). Uncommon migrant and rare summer visitant. Estuarine meadow and tidal flats. Spring records include small numbers at the Stikine River in 1982 (HR) and two birds observed in a flock of Canada geese on 9 May and four on 15 May 1973 at the Chickamin River (MM). The only summer record was a single bird observed 19 June at the Chilkat River (NAB 45/5). Small numbers were recorded during fall at Sergief Island, Stikine River (DGa, HR). A single bird was observed 3–9 September at the mouth of the Chickamin River (MM).

Snow goose (*Chen caerulescens*). Abundant migrant and rare summer visitant. Estuarine meadow and tidal flats. Several thousand were observed in April (maximum count 5,500 on 13 April; minimum count 10 on 8 May) at Sergief Island, Stikine River (Iverson 1991); an estimated 15,000 used the Delta by 25 May 1982 (HR). Flocks of up to 30 were seen in late April and early May at the Stikine River (DW). The only summer record was a flock of 15 in flight on 9 June 1945 at the Stikine River (DW). A flock of 20 was seen 23–27 September, Sergief Island, Stikine

River (DGa). Thousands (maximum count 18,000 on 4 October) were recorded at the Stikine River in fall (HR).

Brant (*Branta bernicla*). Rare summer visitant. Fluviatile and lacustrine waters. Flocks of 5 to 10 adults were observed 29 June–3 July 2001 at the east Alsek River (JJ). Similar-sized flocks are regularly seen on lacustrine waters of Dry Bay during breeding season (Capra pers. comm.).

Cackling goose (*Branta hutchinsii*). Fairly common migrant. Estuarine meadow and waters. Flocks of 300 to 500 were observed during spring and fall 1982 at the Stikine River Delta (HR).

Canada goose (*Branta canadensis*). Fairly common to abundant migrant, uncommon breeder, and fairly common winter resident. Lacustrine and fluviatile waters and shorelines, freshwater marsh, tidal flats, estuarine waters. The dusky Canada goose (*B.c. occidentalis*) occurs during migration; only the Vancouver Canada goose (*B.c. fulva*) breeds in southeast Alaska. Spring records include flocks of up to 90 birds during mid May at the Stikine River (DW, HSb) and numerous flocks of up to 600 birds flying down the Chickamin River during the third week of April (MM); only a few geese were seen by mid May at the Chickamin River (MM). Pairs were seen during summer at all rivers (DGb, DW, GM, JJ, MM). Few birds were observed; however, tracks, feathers, and droppings were seen on shorelines and alluvial bars, which may indicate that birds are more numerous in suitable habitats. Evidence of breeding includes a flock of five adults with 20 young on 6 July, Stikine River (DW), pairs with goslings in late June and mid July at the Unuk River (TS), and a brood in late June at the Chickamin River (HSa). This species is a fairly common to abundant fall migrant at the Stikine River: few birds were observed until 15 September 1984, and flocks of up to 100+ were observed thereafter (DGa); 2,000+ *B.c. fulva* were observed in late August (HR). Flocks of up to 225 birds were seen through August and November at the Chickamin River, and a flock of 20 to 250 overwintered at this river's mouth (MM).

Trumpeter swan (*Cygnus buccinator*). Uncommon resident and breeder. Lacustrine waters and freshwater marsh. Pairs were observed during the breeding season on small lakes and in freshwater marshes at the Antler (JJ), Whiting (JJ), and Chickamin (JJ, MM, TS) Rivers. Breeding was confirmed in freshwater marshes during June and July at the Chilkat and Taku Rivers (JJ). Several flocks of up to 35 adults and immatures were seen in July at the Chilkat River (JJ). During fall, trumpeter swans were fairly common in October and early November (maximum count 337 on November 4; minimum count 55 on 18 October) at the Stikine River (HR).

Individuals were observed in all months except July–September at the Chickamin River (MM).

Tundra swan (*Cygnus columbianus*). Rare fall migrant. Fluviatile waters. Two adults and two immatures were seen on 28 October 1973, and a single bird was observed 1–20 November 1973 at the Chickamin River (MM).

Wood duck (*Aix sponsa*). Casual summer visitant. Fluviatile waters. One female, presumably the same individual, was observed flying out of deciduous forest 22–25 June 2000 at the Chilkat River (JJ), one female was seen on 20 June 2000 at the Taku River (NAB 53/4), and one eclipse male was noted on 10 July 1976 at the Stikine River (NAB 30/5).

Gadwall (*Anas strepera*). Rare summer visitant. Lacustrine waters. A pair was observed on a beaver pond 1–2 June 1973 at the Chickamin River (MM).

Eurasian wigeon (*Anas penelope*). Casual spring visitant. Fluviatile waters. A single male was observed in a flock of American wigeons on 15 May 1973 at the mouth of the Chickamin River (MM).

American wigeon (*Anas americana*). Uncommon to fairly common migrant and rare breeder. Fluviatile and lacustrine waters. The species was fairly common in April and early May at the Stikine River (HR). Several singles and small flocks were observed in May (earliest record 27 May) at the Chickamin River (MM). Summer records consist of several small flocks during June and July at the Alsek River (JJ) and pairs during June and July at the Chilkat (JJ), Antler (JJ), Whiting (JJ), Stikine (JJ), and Unuk (TS) Rivers. Evidence of breeding consists of a female observed on a nest containing eight eggs on 28 June 2000 at Chilkat River (JJ). American wigeon were fairly common from August–October at the Stikine (DGa, HR) and Chickamin (MM) Rivers.

Mallard (*Anas platyrhynchos*). Fairly common to common migrant, fairly common resident and breeder. Lacustrine, fluviatile, and estuarine waters. Mallards were frequently observed during May at the Chickamin River (MM). Summer records consist of pairs, small flocks of adults in breeding plumage, and groups of eclipse males at all rivers (DGb, DW, GM, JJ, MM). Broods were found on the Chilkat (JJ, SJ), Stikine (GM), Chickamin (MM), and Salmon (GM) Rivers. During fall, mallards were frequently observed during August–September at the Stikine River (DGa, HSb). Thousands were recorded during September and October (peak 7,500 on 15 Oct) at the Stikine River (HR). A flock of 100 overwintered at the mouth of the Chickamin River (MM).

Blue-winged teal (*Anas discors*). Uncommon migrant and breeder. Fluviatile and lacustrine waters. Small numbers were observed in May (earliest record 15 May) at the Chickamin River (MM). Records during the breeding season include flocks of nonbreeders in June at the mouth of the Taiya River (JJ), several pairs in June and July at the Chilkat (JJ) and Antler (JJ) Rivers, two pairs in early June on the Taku River (JJ), a single at the Stikine River (NAB 31/6), and a pair in early June at the Unuk River (JJ). A brood of five downy young was observed on 23 July 1982 at the Stikine River (HR). Small numbers occurred during September at the Chickamin (MM) and Stikine (DGa) Rivers.

Cinnamon teal (*Anas cyanoptera*). Casual spring and summer visitant. Fluviatile and estuarine waters. Single males were noted on 6 May 1982 (AB 36/5), 20 May 1977 (Kessel and Gibson 1978), and 23 June 1990 (NAB 44/5) at the mouth of the Stikine River.

Northern shoveler (*Anas clypeata*). Fairly common migrant and summer visitant. Fluviatile waters. During spring, several flocks of up to 30 were observed during April and May at the Stikine (DW) and Chickamin Rivers (MM). Several single individuals, small groups, and pairs were seen during May–July at the Alsek (JJ), Chilkat (JJ), Taku (JJ), Unuk (TS), and Chickamin (MM) Rivers. Shovelers were frequently observed during September at the Stikine River (DGa).

Northern pintail (*Anas acuta*). Uncommon to common migrant and rare summer visitant. Fluviatile, lacustrine, and estuarine waters. Pintails were observed occasionally during April and May (earliest record 4 April) at the Chickamin River (MM). Several individuals were seen throughout the breeding season on beaver ponds at the Leduc-Chickamin lowlands (MM), and two males were observed at the mouth of the Salmon River (DGb). A flock of 25 adults and young of the year were noted on 5 July 2001 at the east Alsek River (JJ). During fall, two were seen at the Taiya River in August (GM). Pintails were common during August–October at the Stikine River (DGa, HSb, HR) and abundant at the Chickamin River from September to November where flocks of several hundred were observed at the mouth of the river (MM).

Green-winged teal (*Anas crecca*). Uncommon to common migrant and breeder. Fluviatile and lacustrine waters. Green-winged teal were common in April at the Stikine River (HR), and small flocks were observed from late March to May (earliest record 20 March) at the Chickamin River (MM). Records during summer include single adults on the Stikine (GM) and Unuk (TS) Rivers, flocks of 4 to 6 and 15 at the Alsek River (JJ), and small flocks at the Taiya (JJ), Katzehin (JJ), Antler (JJ), Whiting (JJ), and Chickamin (MM) Rivers. Breeding evidence includes

pairs at the Chilkat, Taku, Stikine, and Unuk Rivers (GM, JJ), young of the year and a defensive female on the Taku River (GM), and a brood of seven downy young at the Stikine River (HR). The species was fairly common from August–October at the Stikine River (DGa, HR, HSb) and from August–November (latest 25 November) at the Chickamin River (MM).

Canvasback (*Aythya valisinera*). Rare fall visitant. Lacustrine waters. A pair was observed on 24 September 1984 at Sergief Island, Stikine River (DGa) and single birds were observed on 29 September and 12 October 1973 at the Chickamin River (MM).

Redhead (*Aythya americana*). Casual breeder. Lacustrine waters. A brood of three downy young was observed on 24 July 1982 at the Stikine River (HR).

Ring-necked duck (*Aythya collaris*). Uncommon migrant and breeder. Lacustrine and fluviatile waters. Small numbers, including several pairs during April and May (earliest 18 April) were observed at the Chickamin River (MM). Summer records include a flock of seven in July at the Stikine River (GM), pairs on ponds and freshwater marshes in June at the Chilkat (JJ), Antler (JJ), and Whiting (JJ) Rivers, and several pairs and males throughout the breeding season at the Chickamin River (JJ, MM). Breeding evidence consists of several females with broods in early July at the Chilkat River (JJ), a female with a brood on 13 July and a flock of 15 with a brood on 2 September at the Stikine River (GM). Fall records include a flock of 10 on 5 September at Barnes Lake, Stikine River (DGa) and several flocks of 25 to 50 birds in September at the Chickamin River (MM).

Greater scaup (*Aythya marila*). Rare summer and fall visitant. Fluviatile waters. Summer records include a pair on 8 June 2001 (JJ) and several individuals on 4 July 1973 (MM) at the Chickamin River. A pair was observed on 24 September 1984 at Sergief Island, Stikine River (DGa).

Lesser scaup (*Aythyla affinis*). Rare summer visitant and fall migrant. Lacustrine waters. A pair was observed on 13 July 1974 at the Stikine River (GM). Fall records include flocks of 20 on 2 September, 3 on 8 September, and 18 on 5 September 1984 at the Stikine River (DGa).

Harlequin duck (*Histrionicus histrionicus*). Uncommon resident and breeder. Fluviatile, lacustrine, and estuarine waters. Records during the breeding season include single individuals on the Taku (AD) and Stikine (JJ) Rivers and a group of 15 at the Salmon River (DGb). Breeding evidence includes pairs at the Alsek (JJ), Unuk (JJ), and Chickamin (JJ, MM) Rivers, an agitated female near the confluence of a fast-flowing, clear water tributary of the Unuk River (JJ), and an adult female

with two young of the year in July at the Unuk River (JJ). Fall records consist of a flock of four on 21 September at the Stikine River (DGa). Small numbers were observed at the mouth of the Chickamin River throughout the year (MM).

Surf scoter (*Melanitta perspicillata*). Uncommon to common summer visitant and uncommon fall migrant. Estuarine, lacustrine, and fluviatile waters. Records during the breeding season include pairs and single adults on the Chilkat (GM), Taiya (JJ), Taku (JJ), Stikine (JJ), and Unuk (JJ, TS) Rivers. Rafts of 200+ were observed during June and July on estuarine waters of the Unuk River (JJ). Flocks of 500 to 1,000 birds were seen in July at the Chickamin River (JJ, MM). In fall, flocks of up to 40 were observed during September on the lower Stikine River (DGa).

White-winged scoter (*Melanitta fusca*). Fairly common summer visitant and uncommon fall migrant. Estuarine waters. Summer records include a group of 10+ adults during June and July on estuarine waters of the Unuk (JJ) and Chickamin (JJ) Rivers and a raft of 100 to 150 on 4 July on estuarine waters of the Chickamin River (MM). A flock of 11 and a single individual were seen on 17–18 September at the lower Stikine River (DGa). White-winged scoters were also periodically observed in small numbers at the Chickamin River throughout September and October (latest record 24 October MM).

Black scoter (*Melanitta nigra*). Rare summer visitant. Estuarine waters. A raft of 10+ individuals was observed during June and July 2001 at the mouth of the Chickamin River (JJ).

Long-tailed duck (*Clangula hyemalis*). Rare summer visitant. Fluviatile waters. A male in breeding plumage was seen on 3 July 2001 at the east Alsek River (JJ).

Bufflehead (*Bucephela albeola*). Uncommon migrant and fairly common winter resident. Fluviatile, lacustrine, and estuarine waters. Buffleheads were fairly common during the last half of March at the Stikine River (HR). Small numbers, usually pairs occurred during April and May (earliest record 17 April) at the Chickamin River (MM). Birds began appearing in October and were fairly common by mid October at the Stikine and Chickamin Rivers (HR, MM). Individuals overwintered at the mouth of the Chickamin River (MM).

Common goldeneye (*Bucephala clangula*). Uncommon migrant, resident, and breeder. Lacustrine, fluviatile, and estuarine waters. Small numbers were detected during March–May (earliest record 5 March) at the Chickamin River (MM). Summer records include a single adult male on the east Alsek River (JJ) and small groups of adult males and females on the Antler (JJ), Taku (JJ), Whiting (JJ), Stikine (JJ), Unuk (TS), and Chickamin (JJ) Rivers. Breeding evidence consists

of pairs on the Alsek (JJ) and Chilkat (JJ) Rivers and broods on the Taku (JJ) and Stikine (GM, JJ) Rivers. Birds began appearing in early October and were fairly common by 25 October at the Chickamin River (MM).

Barrow's goldeneye (*Bucephala islandica*). Uncommon migrant and probable breeder. Lacustrine and fluviatile waters. Four pairs were seen during April and May at the Chickamin River (MM). Summer records include several single adults on the Antler (JJ), Taku (JJ), and Whiting (JJ) Rivers. Evidence of breeding includes pairs on the lower Unuk (JJ) and Chickamin (JJ) Rivers and a defensive female on a beaver pond on 16 July at the Chickamin River (MM). Nine birds were observed on 2 September at Barnes Lake, Stikine River (DGa).

Hooded merganser (*Lophodytes cucullatus*). Uncommon resident and breeder. Fluviatile and lacustrine waters. Small numbers were observed throughout the year on ponds and streams at the Chickamin River (MM). Several individuals were observed during the breeding season at the Chilkat (JJ), Antler (JJ), Taku (JJ), Whiting (JJ), Stikine (JJ), and Salmon (DGb) Rivers. Broods were observed at the Chilkat (GM, JJ, SJ), Taku (GM), Stikine (GM), and Chickamin (MM) Rivers. Small numbers were seen during September at the Stikine River (DGa).

Common merganser (*Mergus merganser*). Common resident and breeder. Fluviatile, lacustrine, and estuarine waters. Common mergansers were common in May at the mouth of the Stikine River (HSb), and large numbers foraged on spawning eulachon in early April at the Chickamin River (MM). The species was observed at all rivers during the breeding season (DGb, GM, HSa, JJ, MM). Large flocks of 50 to 75 were seen in June at the Unuk (JJ) and Chickamin (JJ) Rivers, and a raft of 150 to 200 adults was observed in mid July at the Chickamin River (JJ). Breeding evidence includes broods on the Chilkat (JJ), Taku (GM, JJ), Stikine (GM, JJ), Unuk (GM, JJ), Chickamin (HSa, JJ, MM), and Salmon (DGb) Rivers. The species was common during September at the Stikine River (DGa) and August–September at the Chickamin River (MM).

Red-breasted merganser (*Mergus serrator*). Common spring migrant and uncommon possible breeder. Fluviatile waters. Large flocks of up to 500 birds foraged on eulachon 15 April–2 May at the lower Stikine River (DW). Following breakup, when the river water became clouded with glacial sediments, small flocks remained only at the mouths of clear water tributaries (DW). Fourteen birds foraged on eulachon in April at the Chickamin River (MM). A pair and flocks of 6 to 10 were noted in late June on the east Alsek River (JJ).

Order Galliformes
Family Phasianidae

Ruffed grouse (*Bonasa umbellus*). Uncommon resident and breeder. Deciduous forest and deciduous shrubland. Drumming was heard in cottonwood forest during the breeding season on the Taku (JJ), Stikine (DW, JJ), and Salmon (DGb) Rivers. An agitated female performed a distraction display in deciduous riparian shrubland on 31 May at the Taku River (JJ). Small numbers were observed during September on Limb Island, Stikine River (DGa).

Spruce grouse (*Falcipennis canadensis*). Rare resident and breeder. Coniferous and mixed forest. Two females with broods were observed in mixed forest in mid July 2000 and 2002 at the Chilkat River (JJ).

Sooty grouse (*Dendragapus fuliginosus*). Fairly common resident and breeder. Coniferous forest. The earliest record was a hooting male on 18 March at the Chickamin River; males were commonly heard by 11 May (MM). Sooty grouse were seldom seen, but heard daily in coniferous forest during the breeding season at all rivers (DGb, GM, JJ, MM), except for the Alsek. A hooting male was heard 5 September, Ketili Creek, Stikine River (DGa).

Order Gaviiformes
Family Gaviidae

Red-throated loon (*Gavia stellata*). Uncommon resident and probable breeder. Lacustrine, fluviatile, and estuarine waters. Records during the breeding season include a single bird at the Whiting River (JJ), two on the Stikine River (GM), and three at the Unuk River (TS). Pairs in breeding plumage were seen at the Alsek River (JJ) and the Salmon River mouth (DGb). Breeding has been confirmed in southeast Alaska (Gabrielson and Lincoln 1959). One bird was observed on 2 September at the Stikine River (DGa). This species was fairly common throughout the year at the mouth of the Chickamin River (MM).

Pacific loon (*Gavia pacifica*). Rare summer visitant. Estuarine waters. Single adults were observed on 11 June 2000 at the Stikine River (JJ) and 5 July 1996 at the mouth of the Chickamin River (TS).

Common loon (*Gavia immer*). Uncommon resident and probable breeder. Lacustrine and fluviatile waters. This species was uncommon throughout the year at the mouth of the Chickamin River (MM). Summer records include single adults at the Chilkat (JJ) and Stikine (DW, GM) Rivers and pairs at the Antler (JJ), Whiting (JJ), and Chickamin (MM) Rivers. Breeding has been confirmed in southeast Alaska (Gabrielson and Linclon 1959).

Order Podicipediformes
Family Podicipedidae

Pied-billed grebe (*Podilymbus podiceps*). Casual spring and summer visitant. Freshwater marsh. Single birds were observed on 25 May 1999 (NAB 53/3) and 25 July 2002 (NAB 56/4) at the Chilkat River.

Horned grebe (*Podiceps auritus*). Rare fall visitant. Freshwater marsh and lacustrine waters. Single birds were observed on 6 August 1999 at the Chilkat River (AD) and on 29 October 1973 at the Chickamin River (MM).

Red-necked grebe (*Podiceps grisegena*). Rare summer and fall visitant. Lacustrine waters. A single adult was observed 3–10 June 2002 at the Whiting River (JJ). Fall records consist of three birds on 2 September and four birds on 5 September 1984 at Barnes Lake, Stikine River (DGa) and single birds on 29 September and 12 October 1973 at the Chickamin River (MM).

Order Ciconiiformes
Family Ardeidae

American bittern (*Botaurus lentiginosus*). Rare probable breeder. Freshwater marsh. Single individuals were heard 17 June 1990 (NAB 44/5) and at the same wetland on several occasions in June 1999 (AD) at the Chilkat River. Two males were heard calling in a freshwater marsh 13 July 1974 (GM), and a single calling male was observed 17 May 1977 (NAB 31/5) and 6 June 1979 (NAB 33/6) at the Stikine River. An individual was observed and heard calling from a freshwater streambank and from sedges at the edge of a beaver pond on 18 June 1973 at the Chickamin River (MM). The latest record was 28 September 1973 at the Chickamin River (MM).

Great blue heron (*Ardea herodias*). Uncommon resident and probable breeder. Estuarine meadow, tidal flats, and the edge of coniferous forest. Summer records include single adults at the Chilkat (JJ), Katzehin (JJ), Antler (JJ), Unuk (JJ), and Chickamin (JJ) Rivers. Breeding has been confirmed in southeast Alaska (Wik 1968). Individuals were recorded in small numbers during September at the lower Stikine River (DGa) and in November at the Chickamin River (MM).

Order Falconiformes
Family Accipitridae

Osprey (*Pandion haliaetus*). Rare fall migrant and probable breeder. Fluviatile shorelines and deciduous forest. During the breeding season, a calling adult was observed on 24 June 2002 at the Chilkat River (JJ), a pair was seen throughout

June and July 2000 on the upper Taku River (JJ), a single adult was noted on 5 August 2001 near the mouth of the Unuk River (JJ), and a single individual was observed on 9 June 1973 over the Chickamin-Leduc lowlands (MM). The most convincing breeding evidence was an agitated pair observed calling and attacking a bald eagle 12 June 2001 at the upper Chickamin River (JJ). Single birds were observed on 14, 20, and 24 September, Sergief Island, Stikine River; all were apparently flying south down the coast (DGa).

Bald eagle (*Haliaeetus leucocephalus*). Common resident and breeder. Alluvial bars, tidal flats, and forested shorelines. Bald eagles were common during spring eulachon spawning run at the Stikine River where >1,000 (maximum count 1,073 on 13 April; minimum 22 on 10 May) were observed (Iverson 1991). At least 12 eagles were seen in early April during the eulachon run at the Chickamin River (MM). The species was observed during summer at all rivers (DGb, GM, JJ, MM, SJ). Occupied nests and juveniles were observed at the Alsek (JJ), Chilkat (JJ), Taiya (JJ), Antler (JJ), Taku (GM, JJ), Stikine (JJ), Unuk (GM, JJ), and Chickamin (JJ, MM) Rivers. An all-white adult was seen at the upper Taku River 27 May–4 June 2000 (JJ). Bald eagles were common during September at the Stikine River (DGa). They were also common at the Chickamin River in July (JJ, MM); by December, small numbers were present at the mouth of the river (MM). Up to 4,000 occur annually at the confluence of the Tsirku and Chilkat Rivers during November and December.

Steller's sea-eagle (*Haliaeetus pelagicus*). Accidental. Fluviatile waters, tidal flats. This Asiatic vagrant was first observed on the lower Taku River in 1989 (NAB 44/5). Since then, this individual was regularly observed near Swede Point, Taku River. The most current observations were 5 July 2000 (JJ) and June 2001 (NAB 55/4).

Northern harrier (*Circus cyaneus*). Fairly common to common migrant and rare possible breeder. Estuarine meadow and freshwater marsh. Observed almost daily between 4 April–21 May at the Chickamin River (MM). Records during the breeding season consist of single adults on 3 July at the Alsek River (JJ) and on 10 June on the Chickamin River (JJ). Pairs were seen hunting over estuarine meadows on 14 June at the lower Antler River (JJ) and on 30 May–1 June at the Unuk River (JJ). Harriers were observed almost daily (maximum counts of 12+ on 16 and 25 September) during September at the Stikine River (DGa, HSa). The species is a fairly common migrant throughout September and October at the Chickamin River (MM).

Sharp-shinned hawk (*Accipiter striatus*). Rare to fairly common migrant and uncommon possible breeder. Coniferous and mixed forests, deciduous shrubland. The only spring record was of a single individual observed on 1 May at the Chickamin River (MM). Single adults were observed during the breeding season at the Chilkat (JJ), Taku (JJ), Unuk (JJ), and Chickamin (HSa, JJ, MM) Rivers. Food-carrying adults were seen at the Unuk (JJ) and Salmon (GM) Rivers. Migrating sharp-shinned hawks were observed almost daily during September (maximum count of 15 birds on 4 September) at the Stikine River (DGa), and small numbers were observed in September (maximum of seven birds on 15 September) at the Chickamin River (MM).

Northern goshawk (*Accipiter gentilis*). Rare to uncommon migrant, rare probable breeder and winter visitant. Coniferous forest. An adult was observed on 25 April 1974 at the Chickamin River (MM). Records during summer consist of an immature being chased by a merlin on 23 July 1920 (SJ) and an agitated adult calling from coniferous forest 20 June 2000 (JJ) at the Chilkat River and two single adults 6 June and 30 June 1977 at the Unuk River (TS). Fall records include single adults and immatures frequently observed throughout September 1974 at the Stikine River (DGa). Additional fall records include two immatures observed 2–5 August 1973 (MM), single adults and immatures seen 25 September–4 October 1973, and an adult observed on 2 December 1973 at the Chickamin River (MM).

Red-tailed hawk (*Buteo jamaicensis*). Rare to fairly common migrant and uncommon breeder. Observed soaring over fluviatile shorelines and alluvium or perched at edge of conifererous forest. Spring records consist of single birds seen on 17 April, 13 May, and 24 May at the Chickamin River (MM). Records during the breeding season include single adults and pairs observed at the Chilkat (JJ, SJ), Antler (JJ), Taku (GM, JJ), Whiting (JJ), Stikine (DW, GM, JJ), Chickamin (HSa, JJ, MM), and Salmon (DGb) Rivers. Immatures were noted at the Stikine (JJ) and Unuk (JJ) Rivers. Pairs identified as Harlan's (*B.j. harlani*) were observed at the Antler (JJ) and Taku (JJ) Rivers. Occupied nests were found at the Antler (JJ), Stikine (JJ), and Unuk (JJ) Rivers. Migrating red-tailed hawks were observed throughout September (maximum count of four birds on the 21 September) at the Stikine River (DGa). A single bird was seen on 31 August at the Chickamin River (MM).

Rough-legged hawk (*Buteo lagopus*). Uncommon fall migrant. Migrating rough-legged hawks were observed in September (maximum count of three on 22 September) at the Stikine River (DGa).

Golden eagle (*Aquila chrysaetos)*. Casual spring visitant. An immature was recorded on 17 May 1999 in the Chilkat River valley (AD).

Family Falconidae

American kestrel (*Falco sparverius*). Fairly common to common migrant and rare breeder. Forest edges adjacent to open habitat and in the presence of snags, estuarine meadow. Kestrels were observed almost daily in April and May at the Chickamin River (MM). Summer records include individuals at the Chilkat (JJ, SJ), Chickamin (MM), and Salmon (DGb GM) Rivers during June and July. The first known breeding record in southeast Alaska was an occupied nest in a cottonwood snag at the edge of a large freshwater marsh 21 June 2000 at the Chilkat River; on 2 July 2000 the male and female were observed carrying food to this nest (JJ). Migrating birds were seen almost daily during September (maximum count of 12 on 4 September and 6 birds on 14 September; only single birds were observed 16–26 September) at the Stikine River (DGa). Kestrels were observed almost daily 11 August–14 October at the Chickamin River (MM).

Merlin (*Falco columbarius*). Fairly common migrant and uncommon breeder. Edge of coniferous forest, open habitats. Single birds were observed on 31 March, 12 May, and 15 May at the Chickamin River (MM). Records during the breeding season include single adults at the Antler (JJ) and Whiting (JJ) Rivers. Breeding was confirmed at the Chilkat (JJ), Taku (JJ), Stikine (JJ), Unuk (JJ), and Chickamin (JJ) Rivers. All breeding season observations were of black merlins (*F.c. suckleyi*). Single birds were noted on 14 and 19 August (DW) and observed almost daily from the last week of August to 27 September (maximum count of four on 4 September) at the Stikine River (DGa, HSb).

Gyrfalcon (*Falco rusticolus*). Rare spring and fall visitant. A single bird was observed on 14 April 1974 at the Chickamin River (MM) and a single bird was seen on 24 September 1984 at the lower Stikine River (DGa).

Peregrine falcon (*Falco peregrinus*). Uncommon fall migrant and rare summer visitant. The only summer record was an adult in flight 7 June 2000 at the Stikine River (JJ). Single birds were observed during mid to late September at the Stikine River (DGa).

Order Gruiformes

Family Rallidae

Virginia rail (*Rallus limicola*). Casual summer visitant. Freshwater marsh. The first Alaskan record was a dead bird found 17 February 1986 on Prince of Wales Island (Gibson and Kessel 1992). Additional records for Alaska consist of one bird heard calling 2–3 July 1995 at Ketili Creek, Stikine River (NAB 49/5) and up to two individuals heard and seen (presumably the same individuals) during June 1996, 1998, and 2000 near Juneau (NAB 50/5, 52/4, 54/4). The most recent record

for Alaska was a single adult observed and heard calling from a freshwater marsh 9–25 July 2002 at the Chilkat River (JJ).

Sora (*Porzana carolina*). Rare breeder and fall visitant. Freshwater marsh. Soras are regularly recorded during summer at the Chilkat and Stikine Rivers (AD, Trapp et al. 1981) where the species has bred. Also, the species was observed and heard calling near the edge of beaver ponds during mid to late June 1973 at the Chickamin River (MM) and on 17–18 June 1995 at Hyder flats, Salmon River (NAB 49/5). Three, all likely birds of the year, were observed 20–27 September, Sergief Island, Stikine River (DGa).

American coot (*Fulica americana*). Casual summer and fall visitant. Freshwater marsh. At the Stikine River, one adult was seen 5 June 1981 at Binkley's slough (NAB 35/5) and one bird was observed on 25 September 1984 at Sergief Island (DGa). Four coots were seen on 29 September 1973 and nine birds were noted 11–13 October 1973 at the Chickamin River (MM).

Sandhill crane (*Grus canadensis*). Common migrant. Estuarine meadow. Single birds were observed 13 May at the Stikine River (DW) and large flocks were seen in flight 22 April–6 May down the Chickamin River valley (MM). Thousands of migrating cranes were observed in May at the Stikine River Delta (HR). During fall, flock size varied considerably from 40+ to 1,000+ between 6–25 September (earliest record, 5 September) at Sergief Island, Stikine River; all flocks were flying south down the coast (DGa). A flock of unknown size was heard 12 September at the mouth of the Chickamin River (MM).

Order Charadriiformes

Family Charadriidae

Black-bellied plover (*Pluvialis squatarola*). Uncommon fall migrant. Tidal flats. Flocks of up to 35 were seen 23–26 September at the Stikine River (DGa).

American golden-plover (*Pluvialis dominica*). Uncommon to fairly common migrant. Tidal flats. One bird was observed on 30 April at the Stikine River (DW). A single bird was observed 8 August at the Chilkat River (AD). The species was observed periodically in small numbers 6–16 September and observed daily from 23–27 September (maximum count of 30 on 26 September) at the Stikine River (DGa).

Semipalmated plover (*Charadrius semipalmatus*). Rare to uncommon migrant and uncommon breeder. Fluviatile and lacustrine shorelines and alluvium. Semipalmated plovers were observed in small numbers 1–15 May at the Chickamin River (MM). Summer records consist of singles and pairs observed on sand and

gravel bars at the edge of deciduous shrubland and/or deciduous forest on the Alsek (JJ), Taiya (GM, JJ), Katzehin (JJ), Taku (GM, JJ), Whiting (JJ), and Chickamin Rivers (MM). Evidence of confirmed breeding consists of several pairs with young at the Alsek River (JJ), adults with young at the Chilkat River (AD), adults performing distraction display at the Katzehin River (JJ), and adults with young at the Taku River (GM). One bird was seen 6 September at the Stikine River (DGa).

Killdeer (*Charadrius vociferus*). Rare migrant and breeder. Fluviatile shorelines and alluvium. Two birds were seen 2 May 1945 at the Stikine River (DW), and a single bird was observed 24 May 1973 at the Chickamin River (MM). During summer, single birds were recorded 17–19 June 1986 at the Salmon River mouth (DGb). Evidence of breeding consists of a pair 22 June 2000 at the Chilkat River (JJ), a pair performing a distraction display 28 May 2000 at the Taku River (JJ), and an adult female with three juveniles 27 July 1974 at the Taku River (GM). Single individuals were noted 9 August 1974 at the Taiya River (GM) and single birds 7 August 1919 (HSb) and 15 August (DW) at the Stikine River.

Family Scolopacidae

Spotted sandpiper (*Actitis macularia*). Fairly common migrant and common breeder. Alluvial bars and along fluviatile and lacustrine shorelines. The earliest record of spotted sandpipers was 11 May; the species was common by the end of May at the Chickamin River (MM). Individuals were recorded during the breeding season at all rivers (DGb, DW, GM, HSa, JJ, MM, SJ). Nests were found at the Alsek (JJ), Chilkat (JJ), Taku (GM, JJ), Stikine (GM, JJ), Unuk (GM, JJ), Chickamin (JJ, MM), and Salmon (GM) Rivers. Small numbers were regularly recorded 2–21 September (maximum count of five on 15 September) at the Stikine River (DGa).

Solitary sandpiper (*Tringa solitaria*). Rare to uncommon migrant and rare probable breeder. Fluviatile and lacustrine waters and estuarine meadow. A single individual was seen 16 May 1974 at the Chickamin River (MM). Records during summer include 13 adults and juveniles thought to be migrants on 27–30 July 1974 at the Taku River (GM) and single individuals on 17 June 1986 at the Salmon River (DGb). The only evidence of breeding was an agitated bird in appropriate habitat 1 July 1974 at the Unuk River (GM). Fall records include a single individual seen on 6 August 2001 at the Chilkat River (AD), small numbers observed from 1–20 September 1984 at the Stikine River (DGa), an immature female seen on 15 August 1945 at Sergief Island, Stikine River (DW), and a single bird observed on 18 August 1973 at the Chickamin River (MM).

Greater yellowlegs (*Tringa melanoleuca*). Rare migrant and uncommon breeder. Freshwater marsh, estuarine meadow, and fluviatile shorelines. A flock of six was observed on 17 April and a single bird was seen on 25 April at the Chickamin River; the earliest record was 8 April (MM). Records during the summer include a single adult seen at the Chickamin River estuary (MM). Evidence of confirmed breeding includes two pairs of adults with young seen in early July at the edge of Dog Salmon Creek, Alsek River (JJ) and the east Alsek River (JJ), an agitated pair observed in mid June at the Antler River (JJ), and an adult with young seen in late June at the upper Chilkat River (JJ). During fall, a single bird was seen 5 September at the Stikine River (DGa) and a flock of seven 15 August and a single bird 13 September were noted at the Chickamin River (MM).

Lesser yellowlegs (*Tringa flavipes*). Rare migrant and breeder. Freshwater marsh and fluviatile shorelines. Summer records include a flock of 10 to 12 adults and juveniles 2–5 July 2001 at the Alsek River (JJ); the species is known to breed in southeast Alaska at the Situk River (Isleib and Kessel 1973). Small flocks were observed 7 July 1974 at the Taiya River and during late July and early August 1974 at the Taku River (GM). Fall records consist of two birds seen 6 September 1974 at the Stikine River (DGa) and a flock of four observed 3 August 2001 at the Unuk River (JJ).

Upland sandpiper (*Bartramia longicauda*). Uncommon fall migrant. Estuarine meadow. A single bird was observed 7 August 2001 (AD) and singles and small numbers of birds were observed at intervals 19 August–2 September (JJ) at the Chilkat River. One bird was observed 1–2, 4 September and a second bird was heard calling in flight on 12 September, Sergief Island, Stikine River (DGa).

Whimbrel (*Numenius phaeopus*). Rare spring migrant and summer visitant. Tidal flats. A flock of 15 was observed 19 May 1973 at the Chickamin River (MM). Two adults in flight were seen in late June 2001 at Dry Bay, Alsek River, and a single bird was observed in late June 2001 at the east Alsek River (JJ).

Hudsonian godwit (*Limosa haemastica*). Rare spring migrant and summer visitant. Tidal flats. Small numbers were seen 16 May 1982 at the Stikine River (NAB 36/5). In summer, a flock of 30 was seen on 5 July 2001 at the east Alsek River (JJ).

Marbled godwit (*Limosa fedoa*). Casual summer visitant. Tidal flats. A single bird was observed 23 May 2001 at the Taku River (AD).

Black turnstone (*Arenaria melanocephala*). Casual summer visitant. Fluviatile shorelines, alluvium. A flock of 10 was observed on a gravel bar in late June 2001 at the east Alsek River (JJ).

Sanderling (*Calidris alba*). Rare fall migrant. Tidal flats. A flock of 20+ birds was observed 23 September 1984 at the mouth of the Stikine River (DGa).

Semipalmated sandpiper (*Calidris pusilla*). Rare summer visitant and fall migrant. Alluvium and tidal flats. Several birds were observed foraging in flocks of western sandpipers in early July 2001 at the east Alsek River (JJ). Semipalmated sandpipers were also observed 7–12 July 2002 at the Chilkat River (AD); a single bird was seen 9 August 1974 at the mouth of the Taiya River (GM).

Western sandpiper (*Calidris mauri*). Common to abundant migrant and fairly common to common summer visitant. Tidal flats. Thousands were observed during late April to mid May (maximum 72,000 on 4 May) at the Stikine River Delta (Iverson 1991). Flocks of up to 400 were recorded in May at the Chickamin River (MM). Records during summer include several flocks of up to 100+ seen during early July at the east Alsek River (JJ), 600+ observed on 20 July at Stikine River Delta (GM), and several flocks of up to 50 noted in mid July at the Chickamin River (MM). Few western sandpipers were observed in September at the Stikine River: three on 6 September, >5 birds on 23 September, and a single individual on 26 September (DGa). The species was common from August to the third week of September at the Chickamin River (MM).

Least sandpiper (*Calidris minutilla*). Uncommon to fairly common migrant and uncommon breeder. Alluvium, freshwater marsh, fluviatile shorelines, and tidal flats. A few small flocks were observed in mid May at the Chickamin River (MM). Records during summer include flocks of adults at the Chilkat (JJ), Taiya (JJ), Taku (GM, JJ), Stikine (JJ), Unuk (GM, JJ), Chickamin (JJ, MM), and Salmon (GM) Rivers. Evidence of breeding includes several agitated adults observed performing distraction displays on Dry Bay, Alsek River (JJ), and a defensive pair seen in a freshwater marsh at the Stikine River (GM). A flock of 60+ was noted at the mouth of the Taiya River (GM). Least sandpipers were fairly common from 17 August to 7 September at Sergief Island, Stikine River (HSb). Eight birds were observed 6 September, and a single bird was seen on 27 September at the Stikine River (DGa).

Pectoral sandpiper (*Calidris melanotos*). Uncommon to common migrant and rare summer visitant. Alluvium and tidal flats. A flock of 40 was observed 16 May at the Stikine River (DW). Records during summer include single individuals seen on 13 June 1945 at Sergief Island, Stikine River (DW), and on 5 June 1974 at the Leduc-Chickamin lowlands (MM). Single individuals were noted on 12 August at the Chilkat (AD) and several small flocks were observed during September at the Chickamin River (MM). In contrast, the species is a common migrant at the Stikine River where observations include flocks up to 50 in mid August (DW), single

birds to flocks of 2 to 3 in August increasing to flocks of 20 to 30 by 1 September (HSb), and flocks in September (maximum count of 130 on 26 September and latest observation 27 September; DGa).

Sharp-tailed sandpiper (*Calidris acuminate*). Uncommon fall migrant. Tidal flats. Small numbers (1 to 11 birds) were observed 14–26 September 1984 at Sergief Island, Stikine River (DGb).

Dunlin (*Calidris alpina*). Uncommon to common migrant. Tidal flats. Iverson (1991) estimated 3,600 to 7,200 dunlins occurred during early May at the Stikine River Delta. Twenty-five were seen in a large flock of western sandpipers on 25 April and approximately five were observed in a flock of western sandpipers on 19 May at the Chickamin River estuary (MM). A single bird was noted on 26 September at the Stikine River (DGa).

Stilt sandpiper (*Calidris himantopus*). Rare fall visitant. Tidal flats. One immature was seen 6 September and two birds were observed 15 September 1984 at the Stikine River (DGa).

Short-billed dowitcher (*Limnodromus griseus*). Uncommon summer visitant and rare fall migrant. Estuarine meadow, fluviatile shorelines, and tidal flats. Records during summer include single individuals noted in early July 2001 at the east Alsek River (JJ), 14+ individuals that were mostly paired seen in an estuarine meadow 20 July 1974 at Sergief Island, Stikine River (GM), and several single individuals observed 5 and 16 June 1973 at the Chickamin River (MM). Two birds were observed 6 September 1984 at the Stikine River (DGa).

Long-billed dowitcher (*Limnodromus scolopaceus*). Common fall migrant. Tidal flats. The species was recorded in intervals during September (maximum count of 100+ on 25 September; latest record 27 September) at Sergief Island, Stikine River (DGa).

Wilson's snipe (*Gallinago delicata*). Uncommon to common migrant, uncommon breeder, and rare winter visitant. Freshwater marsh and estuarine meadow. Several birds were observed throughout April and early May (earliest record 8 April; first "winnowing" on 17 May) at the Chickamin River (MM). During the breeding season, snipe were seen or heard "winnowing" at the Alsek (JJ), Chilkat (JJ), Antler (JJ), Taku (GM), Stikine (GM), and Chickamin (MM) Rivers. Nests with eggs were found at the Alsek (JJ), Chilkat (JJ), Taku (JJ), and Stikine (JJ) Rivers. The species was common throughout August and September (maximum count of 50+ on 26 September) at the Stikine River (DGa, HSb). Small numbers were observed or

heard calling in September at the Chickamin River (MM). A single bird on 11 December was the latest record at the Chickamin River (MM).

Red-necked phalarope (*Phalaropus lobatus*). Rare summer visitant. Lacustrine waters. A single individual was seen on a small pond 25 June 2001 near the east Alsek River (JJ), and small flocks were observed in early June 2002 on Crescent Lake, Whiting River (JJ).

Family Laridae

Bonaparte's gull (*Larus philadelphia*). Common migrant and fairly common summer visitant. Estuarine and fluviatile waters. Large flocks of up to 200+ were observed in mid May at the Chickamin River estuary (MM). Bonaparte's gulls were observed during summer in small numbers at the Chilkat (JJ), Antler (JJ), Taku (GM), upper Stikine (JJ), Unuk (TS), Chickamin (MM), and the Salmon River (GM). Flocks of 60+ were observed in June at the Taiya River (JJ). Large flocks of up to 200+ were recorded in late June and mid July at the Chickamin River estuary (JJ, MM). The species was present, often in flocks of up to 100, throughout September at the mouth of the Stikine River (DGa). Birds were less common at the Chickamin River in autumn where numbers decreased by 5 August (MM).

Mew gull (*Larus canus*). Uncommon to common resident. Fluviatile and estuarine shorelines and waters, alluvium. Mew gulls were fairly common in March and became more common in April when approximately 300 birds were observed during the eulachon run at the Chickamin River (MM). During summer, small numbers including pairs were observed at all rivers (DGb, DW, GM, JJ, MM). Evidence of confirmed breeding includes a breeding colony of 50+ seen on the sparsely vegetated lateral moraine of the Grand Plateau Glacier, Alsek River (JJ) and a small breeding colony with 15 to 20 flightless young at Shakes Lake, Stikine River (JJ). By mid July, hundreds of mew gulls were observed in estuarine waters of most rivers (JJ).

Ring-billed gull (*Larus delawarensis*). Rare summer visitant and fall migrant. Estuarine waters and tidal flats. Summer records include an adult seen on 21 July 1974 (GM) and several noted after early July 1999 at the mouth of the Stikine River (NAB 53/4) and two birds observed on 15 June 1991 at the Salmon River (NAB 45/5). A second-winter individual was seen on 10 September 1984 at the Stikine River (DGa). The species probably uses the Stikine River as a migratory corridor between breeding areas in interior British Columbia and coastal wintering areas (DGa).

California gull (*Larus californicus*). Uncommon fall migrant. Estuarine waters. The species was observed throughout September (maximum count of six on 10 September) at the mouth of the Stikine River (DGa). The species probably uses the Stikine River as a migratory corridor between breeding areas in interior British Columbia and coastal wintering areas (DGa).

Herring gull (*Larus argentatus*). Uncommon to common breeder and resident. Fluviatile and lacustrine shorelines and waters. Herring gulls were common at the Alsek River where they were observed during summer in flocks of 1,000+ (JJ). The species was uncommon at the other rivers where it was recorded: flocks of 2 to 20 were seen on the Chilkat (JJ), Taiya (JJ), Katzehin (JJ), Antler (JJ), Taku (GM), Stikine (DW, JJ), Unuk (JJ), and Chickamin (MM, JJ) Rivers. Evidence of breeding includes a large breeding colony with numerous downy young on an island near Williams Creek, Alsek River (JJ), and a breeding colony of 20 to 25 adults and at least five nests on an islet in Twin Glacier Lake, Taku River (JJ). Herring gulls were fairly common throughout September at the mouth of the Stikine River (DGa).

Thayer's gull (*Larus thayeri*). Abundant spring migrant and uncommon fall migrant. Estuarine waters. Abundant during spring at the mouth of the Antler, Lace, and Berners Rivers, Berner's Bay, where over 12,000 were observed in May (Snell 2002). The species was also observed during September at the Stikine River (DGa).

Glaucous-winged gull (*Larus glaucescens*). Fairly common to common resident and breeder. Fluviatile waters, alluvium. The glaucous-winged gull was the most abundant gull on the Alsek River; a large breeding colony of 1,000+ was observed on Egg Island, Alsek River (JJ). This island had numerous nests with eggs and downy young in early July 2001 (JJ). Flocks of 1,000+ were also seen at the mouth of the east Alsek River (JJ). Single birds were observed during summer at the Chilkat (AD), Stikine (DW), and in small numbers at the Chickamin River estuary (MM). Glaucous-winged gulls were fairly common during September at the Stikine River (DGa).

Black-legged kittiwake (*Rissa tridactyla*). Common resident except in summer when it is an uncommon visitant. Estuarine and fluviatile waters. During summer, 25 were seen in a mixed flock of mew, herring, and glaucous-winged gulls in early July at the mouth of the east Alsek River (JJ) and individuals were observed during June and July at the Chilkat River (AD). The species was a common fall migrant and winter resident at the mouth of the Stikine River (DGa).

Aleutian tern (*Sterna aleutica*). Uncommon breeder. Fluviatile and lacustrine waters and deciduous shrubland. Aleutian terns were only observed at the Alsek River where several individuals were seen from late June to early July (JJ). Evidence of confirmed breeding includes two agitated pairs in flight seen over deciduous shrubland in late June, a nest with three eggs found in mixed deciduous shrubland on 2 July (JJ), and a flock of 30 adults and 8 juveniles observed on 4 July at Alsek Lake (JJ).

Caspian tern (*Sterna caspia*). Rare spring visitant and breeder. Lacustrine and fluviatile shorelines and waters, alluvium. Caspian terns have been observed regularly in southeast and south coastal Alaska since 1981 (Gibson and Kessel 1992). Spring records include a pair from 13–18 May 1982 at the Stikine River mouth (NAB 36/5) and four on 31 May 1988 in the Hyder/Salmon River area (NAB 42/3). Records during summer include four adults observed daily during late June and early July 2001 at the mouth of the east Alsek River (JJ) and a single bird seen 6–7 July 1984 in the Chilkat River valley (NAB 38/6). The first confirmed breeding record in southeast Alaska was a breeding colony of approximately 16 adults and at least four nests with eggs (two nests found on 2 June and two different nests on 4 and 5 June 2000) observed on a small rocky islet at the Taku River (JJ).

Arctic tern (*Sterna paradisaea*). Uncommon migrant and fairly common to common breeder. Lacustrine and fluviatile waters. A pair was seen in early May at the mouth of the Chickamin River (MM). The species was seen in small numbers, including breeding pairs, during the summer at all rivers (DW, GM, JJ, MM, SJ). At the Alsek River, several adults defended at least three downy young on the sparsely vegetated gravel flats of Dry Bay and 15 to 20 adults defended and fed downy young on the lateral moraine of the Grand Plateau Glacier (JJ). Hundreds of adults were observed on a small island across from Williams Creek at the lower Alsek River; this site is probably a breeding colony (JJ). On 26–28 June 1920, Bailey (1927) recorded a breeding colony of at least 1,000 pairs on glacial moraine in front of the Norris Glacier, Taku River. Although Arctic terns were observed locally in small numbers at the Taku River during the 2000 breeding season (JJ), the colony described by Bailey (1927) was not present.

Parasitic jaeger (*Stercorarius parasiticus*). Fairly common breeder, rare summer visitant, and rare fall migrant. Fluviatile waters and broad alluvial areas. The species is a fairly common breeder at the Alsek River where several nests and downy young were found on the sparsely vegetated flats of Dry Bay (JJ). Single individuals in flight were observed on 7 June 2000 at the Taku River (AD), on 13 June 2000 at

the Stikine River (JJ), and on 30 June 1974 at the Unuk River (GM). One adult was seen 8 September 1984 at the Stikine River (DGa).

Family Alcidae

Marbled murrelet (*Brachyramphus marmoratus*). Rare probable breeder. Lacustrine waters and in flight over conifer forest. Although marbled murrelets were scarcely detected, they likely breed in coniferous forest at all rivers except for the Alsek. Several individuals in flight were heard in June at the Antler (JJ) and the Whiting (JJ) Rivers. Also, pairs were seen in early June on Crescent Lake, Whiting River (JJ).

Order Columbiformes

Family Columbidae

Rock pigeon (*Columba livia*). Casual spring visitant. A tame bird was present 8–17 April 1974 near Wolfe cabin at the Chickamin River (MM).

Band-tailed pigeon (*Patagioenas fasciata*). Rare migrant and probable breeder. Coniferous forest. One bird was heard calling 20 July 1974 at Garnet Ledge, near the mouth of the Stikine River (GM); a pair was observed during the breeding season for several successive years (dates unknown) at the Unuk River Post, Unuk River (GM); a single bird was seen 4 June 1997 at the Unuk River (TS), at least two individuals in flight were observed 4 July 1972 over the lower Chickamin River valley (MM); one bird was observed and another was heard calling 5 July 1974 near Fish Creek, Salmon River (GM); and on 20 June 1986, a pair in flight was seen over Portland Canal, in the Salmon River area (DGb). Single birds were observed 4, 8, 12, and 20 September 1984 at the Stikine River (DGa).

Mourning dove (*Zenaida macroura*). Casual spring, summer, and fall visitant. Estuarine meadow. Single birds were observed 18 May 1973 at the lower Chickamin River (MM), 1–5 June 1996 in the Hyder/Salmon River area (NAB 50/5), 3 September at the Stikine River (HSb), and 17 and 27 September 1973 at the Chickamin River (MM).

Order Strigiformes

Family Strigidae

Western screech-owl (*Megascops kennicottii*). Rare possible breeder. Coniferous forest. One bird was heard calling 7 June 1996 at the lower Chickamin River (TS).

Great horned owl (*Bubo virginianus*). Uncommon resident and probable breeder. Coniferous forest. Individuals and pairs were observed and heard during summer

at the Chilkat (JJ), Taku (AD), and Chickamin (MM, TS) Rivers. One was observed 24 September at Sergief Island, Stikine River (DGa), and one or two birds were heard from 7 August–3 November at the Chickamin River (MM).

Northern hawk owl (*Surnia ulula*). Rare summer visitant. Deciduous shrubland, but more typically in coniferous forest. A single adult was observed roosting in a small patch of alders 2 July 2001 at the Alsek River (JJ), and an individual was seen in July 1994 at the Chilkat River (AD).

Northern pygmy-owl (*Glaucidium gnoma*). Rare resident and probable breeder. Coniferous forest. Single individuals were heard calling 8–10 July 2000 at the Chilkat River (NAB 54/4), on 4–5 June 2000 at the Taku River (JJ), on 4 July 1995 at the Stikine River (NAB 49/5), and 12–16 June 1997 at the Unuk River (TS). Single individuals were seen 2 and 5 September 1984 along Ketili Creek, Stikine River (DGa).

Barred owl (*Strix varia*). Rare resident and breeder. Coniferous forest. One was heard in early summer 1990 (NAB 44/5) and 12 June 2000 (NAB 54/4) at the Chilkat River and 9–12 June 2001 at the Chickamin River (JJ). A nest with two young was found 11 June 1990 near the Taiya River (NAB 44/5).

Short-eared owl (*Asio flammeus*). Rare migrant, rare breeder, and winter visitant. Estuarine meadow, freshwater marsh, deciduous shrubland. A single adult in flight was observed 30 June 2001 over Dry Bay, Alsek River (JJ). A nest with three eggs was found on a sparsely vegetated gravel flat 1 July 2001 at the Alsek River; on 7 July the nest contained three nestlings (JJ). A single adult was observed in flight on 13 July 1974 at the Stikine River (GM). A nest that contained two eggs was found 17 June 1982 at Sergief Island, Stikine River (HR). A single bird was seen 8 September and four birds were seen together 16 September 1984 at the Stikine River (DGa). A number of observations were made, perhaps of the same individual, from 27 September–1 December 1973 at the Chickamin River (MM).

Northern saw-whet owl (*Aegolius acadicus*). Uncommon resident and breeder. Coniferous and mixed forest. Several individuals were heard calling during March and April at the Chickamin River (MM). Records during the summer include one bird calling from a stand of mature spruce near Grizzly Island, Alsek River (JJ), and one calling in early June at the Taku River (JJ). A fledgling was observed in mixed forest at the Chilkat River in early July (JJ). Fall records include a juvenile on 31 August, single birds recorded on 5 and 8 September, and two adults on 14 September at the Stikine River (DGa). A single bird was heard calling 8 August–16 September at the Chickamin River (MM, TS).

Order Caprimulgiformes
Family Caprimulgidae

Common nighthawk (*Chordeiles minor*). Rare migrant and breeder. Alluvium with scattered low shrubs. A common breeder in the Canadian interior, the common nighthawk is seen often during fall in southeast Alaska; those records are thought to be of birds migrating from the interior (Gibson and MacDonald 1975). The first documented nesting activity in Alaska was of at least three displaying males and a female with a developing brood patch on 12 June 1997 at the Klehini River, Chilkat River valley (NAB 51/5). Additional breeding evidence of nighthawks in southeast Alaska includes pairs, courtship flights, and adults performing distraction displays in appropriate nesting habitat in the Chilkat and Klehini River valleys during June 1998 and 1999 (M. and J. Stotts, pers. comm., AD). The breeding of this species was again confirmed for Alaska when two downy, flightless chicks were found 9 July 2002 on an alluvial flood plain at the Klehini River (JJ). An adult, separate from the above pair, was observed performing a distraction display in similar habitat, suggesting that multiple pairs may have nested in the same area (JJ). In addition, one nighthawk was observed in flight at the Taku River 29 July 1974 (GM). Records at the Stikine River include three nighthawks in flight seen on 2 September 1984 at Barnes Lake, and single birds observed 12 and 23 September 1984 at Sergief Island (DGa). One to three birds foraging over estuarine meadow were observed 2–5 September 1973 at the Chickamin River (MM).

Order Apodiformes
Family Apodidae

Black swift (*Cypseloides niger*). Common migrant and fairly common probable breeder. Over fluviatile and lacustrine waters and freshwater marsh, cliffs. A flock of 50 was observed on 27 May at the Chickamin River (MM). Records during summer include flocks of up to 40 seen on the Stikine (DW, GM, JJ), Unuk (GM, JJ), Chickamin (MM), and Salmon (DGb, GM) Rivers. Smaller flocks (3 to 5 birds) were noted at several locations on the Unuk and Chickamin Rivers (JJ). Black swifts performing what appeared to be courtship behavior were observed during the last 2 weeks of June at the Chickamin River (MM), and an individual was seen foraging and repeatedly visiting a cliff face on 9 June at the Chickamin River (JJ). Flocks of 75 to 100 were observed from 17 August–7 September at the Stikine River (HSa). Additional records at the Stikine River include five birds observed on 31 August, eight birds seen on 4 September, and two seen on 5 September (DGa). A flock of 20 was observed 13 August and a flock of 100 was noted 26–27 August at the Chickamin River (MM).

Vaux's swift (*Chaetura vauxi*). Uncommon migrant and breeder. Over lacustrine and fluviatile waters, freshwater marsh, deciduous and coniferous forests. Single birds were observed beginning 16 May at the Chickamin River (MM). The species was observed during summer in flocks of 4 to 12 at all rivers except for the Alsek River (DGb, DW, GM, HSa, JJ, MM). Breeding evidence consists of an adult seen feeding young in late June at the Chilkat River (JJ), a female collected with a partly formed egg in mid June at the Chickamin River (HSa), and a bird observed gathering nest material in mid June at the Salmon River (DGb). One bird was seen 5 September and eight birds were noted 6 September at the Stikine River (DGa). A flock of 10 was seen 7 September at the Chickamin River (MM).

Family Trochilidae

Rufous hummingbird (*Selasphorus rufus*). Common migrant and fairly common breeder. Deciduous and mixed forests and shrublands. The first migrant was observed during the last week of April at the Chickamin River (MM). The species was widespread during the breeding season at all rivers (DGb, GM. HSa, JJ, MM). Hummingbirds were most frequently observed where there was an abundance of flowering salmonberry (J. Johnson, pers. obs.). Breeding evidence consists of an unoccupied nest found in an alder in early August at the Taku River (JJ). No hummingbirds were observed after the second week of August at the Chickamin River (MM).

Order Coraciiformes

Family Alcedinidae

Belted kingfisher (*Ceryle alcyon*). Uncommon migrant and breeder. Fluviatile shorelines, especially near clearwater streams and rivers. The first spring record at the Chickamin River was 7 March; numbers increased during the eulachon run when a high count of eight was observed on 14 April (MM). Singles and pairs were observed during the breeding season at all rivers (DGb, DW, GM, HSa, JJ, MM, SJ). Several occupied nests were found in steep, sandy cutbanks at the Chilkat, Katzehin, Antler, Taku, Stikine, Unuk, and Chickamin Rivers (JJ). Kingfishers were observed throughout September at the Stikine River (DGa). Small numbers were observed until 26 November at the Chickamin River (MM).

Order Piciformes

Family Picidae

Red-breasted sapsucker (*Sphyrapicus ruber*). Uncommon migrant and fairly common breeder. Deciduous, mixed, and to a lesser degree, coniferous forest and deciduous shrubland. Sapsuckers were observed during the breeding season at all

rivers except the Alsek (DGb, GM, JJ, MM). Evidence of breeding includes occupied nests, primarily found in cottonwood snags but also in dead spruce at all rivers except for the Alsek (DGb, HSa, MM, JJ). The species was observed periodically in small numbers 5–25 September at the Stikine River (DGa).

Downy woodpecker (*Picoides pubescens*). Uncommon resident and breeder. Deciduous forest and deciduous shrubland. Records during the breeding season include singles and pairs observed at the Alsek (JJ), Taiya (GM, JJ), Chilkat (JJ), Taku (GM), Whiting (JJ), Unuk (GM, JJ), and Salmon (GM) Rivers. Breeding evidence includes a nest with young at the Alsek River (JJ), an adult with fledglings at the Chilkat River (JJ), and a pair drumming, calling, and excavating at the Unuk River (JJ). Small numbers of downy woodpeckers were observed during September at the Stikine River (DGa).

Hairy woodpecker (*Picoides villosus*). Uncommon to fairly common resident and breeder. Deciduous, coniferous, and mixed forests. A female was observed on 24 May in a large cottonwood tree at the Chickamin River (MM). Seldom encountered by past studies at the major mainland rivers (GM, MM), hairy woodpeckers were frequently observed during the 2000–2002 breeding seasons (JJ). Hairy woodpeckers were observed at all rivers (DGb, GM, HSa, JJ) and occupied nests were found in both cottonwood and spruce snags at all rivers (DGb, JJ). Single hairy woodpeckers were observed throughout September at the Stikine River (DGa).

American three-toed woodpecker (*Picoides dorsalis*). Uncommon resident and breeder. Coniferous forest. Observed at the Chilkat (GM, JJ), Stikine (GM), and Chickamin (JJ) Rivers. A nest was found in June 1974 at the Mosquito Lake campground, Chilkat River (GM). Also at the Mosquito Lake campground, an occupied nest was found in a live spruce in June 1999 (AD) and a female feeding young was observed at the same location in July 2002 (JJ). Additional breeding evidence consists of a pair observed in coniferous forest at the Chilkat River (JJ) and a pair seen in coniferous forest at the Chickamin River (JJ). Fall records include one bird detected 21 September at the Stikine River (DGa) and a male seen 20 November at the Chickamin River (MM).

Northern flicker (*Colaptes auratus*). Uncommon breeder. Coniferous and mixed forests. One flicker was heard calling 17 May and a red-shafted (*C.a. cafer*) was observed on 27–28 May at the Chickamin River (MM). Singles and pairs were observed during the breeding season at the Chilkat (JJ), Taiya (JJ), Antler (JJ), Taku (AD), Whiting (JJ), Unuk (GM), Chickamin (JJ, MM), and Salmon (DGb, GM)

Rivers. Yellow-shafted flickers (*C.a. luteus*) were seen at the Chilkat and Taiya Rivers (JJ), and both red-shafted and yellow-shafted were seen at the Salmon River (DGb). A nest with young fed by a male red-shafted was found in a tree stump at the edge of Hyder, near the Salmon River in June (DGb). One yellow-shafted flicker was seen 25 September at Sergief Island, Stikine River (DGa).

Pileated woodpecker (*Dryocopus pileatus*). Casual summer visitant. A single male was observed in mixed forest during summer 1995 and 5 June 1996 at the Salmon River (NAB 50/5).

Order Passeriformes

Family Tyrannidae

Olive-sided flycatcher (*Contopus cooperi*). Rare migrant and uncommon probable breeder. Edges of freshwater marshes, beaver ponds, or similarly open habitats. One bird was observed flycatching in mid May at the Chickamin River (MM). Summer records include singing birds at the Chilkat (JJ), Taiya (JJ), Antler (JJ), Taku (GM, JJ), Stikine (DW, GM, JJ), Chickamin (JJ, MM), and Salmon (GM) Rivers. One bird was seen on 10 September at the Stikine River (DGa).

Western wood-pewee (*Contopus sordidulus*). Fairly common migrant and uncommon breeder. Edges of deciduous and mixed forests and shrublands bordering fluviatile shorelines. The species was fairly common in May (earliest record 17 May) at the Chickamin River (MM). Summer records include singing birds heard at all rivers except for the Alsek and Katzehin (DGb, DW, GM, JJ, MM). Evidence of breeding includes a pair observed at the Chickamin River (MM) and a nest with one egg found in a red alder at the edge of coniferous forest at the Leduc-Chickamin lowlands (MM). Western wood-pewees were observed almost daily 1–9 September (maximum count of nine on 2 September), and single birds were seen 18 and 21 September at Sergief Island, Stikine River (DGa). The latest record at the Chickamin was during the second week of August (MM).

Yellow-bellied flycatcher (*Empidonax flaviventris*). Casual summer visitant. Coniferous forest. One was observed in June 1997 at the Taiya River (B. Andres) and a singing male (presumably the same individual) was seen on 18 June 1989 (NAB 43/5) and 24–25 July 1990 (NAB 44/5) at the Salmon River.

Alder flycatcher (*Empidonax alnorum*). Uncommon migrant and fairly common breeder. Shrublands at the edge of freshwater marshes. Summer records include singing males and/or pairs at all rivers except for the Alsek and Taiya (DGb, DW, GM, JJ, MM). An active nest was found in June at the Chilkat River (AD). Single birds were observed on 7, 18, and 19 September at the Stikine River (DGa).

Willow flycatcher (*Empidonax traillii*). Rare possible breeder. Deciduous shrubland. The first records of willow flycatchers in Alaska were singing males on 13 June 1986 at the Salmon River (DGb) and 4 July 1986 near Juneau (Gibson and Kessel 1992). Since then, there have been several records of singing males at the Stikine and Salmon Rivers: one seen 21 June 1989 at Sergief Island, Stikine River (Gibson and Kessel 1992), one observed 23 and 25 June 1990 at Texas Creek, Salmon River (Gibson and Kessel 1992), and one noted on 18 June 1995 in the Hyder/Salmon River area (NAB 49/5).

Least flycatcher (*Empidonax minimus*). Rare possible breeder. Deciduous forest. The first Alaska record was a singing male on 18 June 1969 near Juneau (Kessel and Gibson 1992). Since then, the species has been regularly recorded in the Hyder/Salmon River area (Gibson and Kessel 1992). Singing males have also been recorded on 24 May 1988 (Gibson and Kessel 1992), June 1995 (B. Andres), and 16 June 1996 (NAB 50/5) in the Chilkat River valley. Additional observations include one 3 June 1995 at the Stikine River (NAB 49/5) and a singing male 12 June 2001 at the Chickamin River (JJ).

Hammond's flycatcher (*Empidonax hammondii*). Uncommon migrant and fairly common breeder. Mature deciduous and mixed forest. The earliest record of Hammond's flycatcher at the Chickamin River was 24 May (MM). During the breeding season, singing males were observed at all rivers except for the Alsek (DGb, GM, JJ, MM, SJ). Evidence of breeding includes observations of food-carrying adults at the Chilkat, Unuk, and Chickamin Rivers in June and July (JJ) and an adult feeding young at the Taku River (JJ). Birds were periodically recorded 3–21 September (maximum count of two on 10 and 21 September) at the Stikine River (DGa).

Dusky flycatcher (*Empidonax oberholseri*). Casual migrant. Shrublands and open forests. Two single birds were collected on 15 and 21 September 1984 at Sergief Island, Stikine River (DGa).

Pacific-slope flycatcher (*Empidonax difficilis*). Fairly common migrant and breeder. Coniferous and mixed forest. The earliest record at the Chickamin River was 12 May (MM). During the breeding season, the species was frequently heard singing from late May until mid June when singing levels declined (JJ). Singing males were heard at all rivers (DGb, GM, HSa, JJ, MM). Pacific-slope flycatchers were rare at the Alsek, Chilkat, and Taiya Rivers (JJ) where the species reaches its northern range limit. Adults carrying food and nests with young were observed at the Unuk (JJ) and Chickamin (JJ) Rivers. An incubating female was collected at the

Chickamin River (HSa). The species was recorded daily 1–10 September (maximum count of four on 4 and 10 September) and irregularly through 18 September at the Stikine River (DGa).

Eastern phoebe (*Sayornis phoebe*). Casual summer visitant. Open habitats, deciduous shrubland. Single males were observed 11 June 1998 at the Klehini River (a tributary of the Chilkat River; B. Andres) and 21 June 1993 at the Salmon River (NAB 47/5).

Say's phoebe (*Sayornis saya*). Casual summer and fall visitant. Open habitats, near buildings. One was observed 18–22 May 2002 at the Taku River (AD) and an immature was collected on 21 August 1919 at the Stikine River (HSb).

Western kingbird (*Tyrannus verticalis*). Rare summer visitant. Open habitats, human-made structures. Singles were observed 18 June and 4 July 2002 at the Chilkat River (NAB 56/4) and on 9 June 1978 at the Taiya River (NAB 32/5). Most records at the major mainland rivers were single individuals from the Salmon River: 7 and 20 June 1989 (NAB 43/5), 27 June 1990 (NAB 44/5), 16 June 1991 (NAB 45/5), 9–10 June 1994 (NAB 48/5), and 14 June 1995 (NAB 49/5).

Eastern kingbird (*Tyrannus tyrannus*). Casual fall migrant and rare summer visitant. Open habitats, forest edges. Records during summer include singles observed 4–10 July 2001 (NAB 55/4) and 18 June and 4 July 2002 (NAB 56/4) at the Chilkat River. A female and another individual of unknown sex were observed 3–14 September at the Leduc-Chickamin lowlands (MM). Most records at the major mainland rivers were singles from the Salmon River: 10 June 1986 (DGb), 22 June 1990 (NAB 44/5), 15 June 1992 (NAB 46/5), and 14 June 1995 (NAB 49/5). Three singles were seen 3–14 September migrating up the Stikine River (DGa).

Family Lanidae

Northern shrike (*Lanius excubitor*). Uncommon migrant. Edges of open habitats. Single individuals were observed 21 March–30 May (MM). In fall, one shrike was seen 24 September and three were observed 25 September at Sergief Island, Stikine River (DGa). One adult and an immature were present 24 September–25 November at the Chickamin River (MM).

Family Vireonidae

Cassin's vireo (*Vireo cassinii*). Uncommon breeder. Coniferous and mixed forest. The first records of Cassin's vireo in Alaska were from the Salmon River: a singing male was observed and collected 11 June 1986 and a singing male was heard 12–15 June 1986 (DGb). Additional records from the major mainland rivers include

a singing male heard on 8 August 2002 at the Chilkat River (AD), a singing male with female observed in mixed forest 27 May–3 June 2000 at the Taku River (JJ), a singing male with a female observed in mixed forest on 7 June 2002 at the Whiting River (JJ), a singing male 3 July 1995 at the Stikine River (NAB 49/5), a singing male 15 June 1997 at the Unuk River (TS), a pair observed vigorously defending a territory against two Steller's jays and a downy woodpecker 19 June 1996 at the Chickamin River (TS) and a singing male present on 7 July 1996 at the same location (TS), a separate singing male heard 27 June 1996 at the Chickamin River (TS), a singing male in mixed forest heard 2 June 2001 at the Chickamin River (JJ), and singing males heard 15–17 June 1991 (NAB 45/5) and 29 June 1998 (NAB 52/4) in the Salmon River valley. The first confirmed breeding record for Alaska was a pair feeding nestlings on 4 June 2005 at the Klehini River (tributary of the Chilkat River) (L. DeCicco, pers. comm.).

Warbling vireo (*Vireo gilvus*). Fairly common migrant and common breeder. Deciduous and mixed forests. The warbling vireo was one of the most abundant species in deciduous forests during the 2000–2002 breeding seasons at all rivers except for the Alsek (Johnson 2003). Breeding evidence includes nests and adults feeding fledglings at the Chilkat (JJ), Taku (JJ), Stikine (JJ), Unuk (JJ), Chickamin (JJ), and Salmon (TT) Rivers. Small numbers were recorded almost daily 1–8 September (maximum count of > six birds on 5 September) and single individuals were observed 14 and 15 September at the Stikine River (DGa).

Red-eyed vireo (*Vireo olivaceus*). Rare fall visitant and probable breeder. Deciduous forest and deciduous tall shrubland. Most records at the major mainland rivers were from the Stikine River: four singing males in deciduous forest and riparian alder thicket 13–14 July 1974 (GM), a singing male on 10 July 1976 (NAB 30/5), two singing males on 22 June 1989 (NAB 43/5), and a pair and lone singing male in deciduous shrubland on 13 June 2000 (JJ). Additional records include one singing male on 27 June 1997 at the Unuk River (TS), four singing males and one individual of unknown sex in June and July 1972 and 1973 at the Leduc-Chickamin lowlands (MM), three singing males in early June 2001 at the Chickamin River (JJ), and two individuals 16–17 June 1991 at the Salmon River (NAB 45/5). The only fall record consists of a single individual observed 2 September 1984 at Sergief Island, Stikine River (DGa).

Family Corvidae

Steller's jay (*Cyanocitta stelleri*). Uncommon resident and breeder. Coniferous and mixed forests. Singles and pairs were observed at all rivers during the

breeding season except for the Alsek (DGb, GM, JJ, MM). The species was fairly inconspicuous during most of the breeding season, but became more noticeable when young fledged. Fledglings were seen at the Chilkat (JJ), Taku (JJ), Stikine (JJ), Unuk (GM, JJ), and Chickamin (JJ, MM) Rivers. Some movement, possibly dispersion of local birds was observed at the Stikine River during September (DGa).

Black-billed magpie (*Pica hudsonia*). Rare resident and breeder. Deciduous shrubland and coniferous forest. Five were observed 23 July 1941 at the upper Chilkat River (SJ). Breeding evidence includes a flock of adults and young of the year in early July 2001 at the Alsek River (JJ), a pair of adults nest building in conifer forest late May and early June 1999 at the upper Chilkat River (NAB 53/4), and an unoccupied nest 2 July 2000 (JJ) at the Chilkat River. Records in fall include single individuals seen 21–27 September and two birds observed 26 September 1984 at the Stikine River (DGa) and one bird on 11 October 1973 at the Chickamin River (MM).

American crow (*Corvus brachyrhynchos*). Rare resident and breeder. Coniferous forest and tidal flats. The only substantiated records of American crows in Alaska are from the Hyder/Salmon River area where they have bred (Gibson and Kessel 1992). Populations have fluctuated widely from a maximum count of 70+ 10–20 June 1986 (DGb) to two on 2–3 July 1993 (NAB 47/5). The only other known records of American crows outside the Hyder/Salmon River area were two individuals heard and observed on 26 July 1996 at the headwaters of Indian Creek, Chickamin River, less than 50 km from Hyder (TS).

Northwestern crow (*Corvus caurinus*). Uncommon resident and breeder. Coniferous forest, estuarine meadows, and fluviatile shorelines. Records during the breeding season include singles and pairs observed at all rivers except for the Alsek and Salmon (DW, GM, HSa, JJ, MM). At the Chickamin River, numbers of crows fluctuated from small feeding flocks in July and increased to a single flock of 100 on 27 August; crows were rare by the third week of October (MM).

Common raven (*Corvus corax*). Uncommon resident and breeder. Coniferous forest, cliffs, and tidal flats. During the breeding season, single birds and flocks of two to five were observed at all rivers (DGb, GM, JJ, MM). Breeding evidence includes adults observed with three to four fledglings at the Chilkat River (JJ), adults with three recently fledged young at the Antler River (JJ), and a food-carrying adult making several trips to a probable nest site at the Leduc-Chickamin lowlands (MM). Ravens were uncommon during September at the Stikine River (DGa).

Family Alaudidae

Horned lark (*Eremophila alpestris*). Uncommon migrant. Estuarine meadow. Records include a flock of 10 on 8 May, a flock of 15 on 11 May, and two birds on 15 May at the Chickamin River (MM). A single bird was observed on 8 September, and two birds were seen on 9 September at the Stikine River (DGa).

Family Hirundinidae

Tree swallow (*Tachycineta bicolor*). Common migrant and breeder. Over fluviatile and lacustrine waters, freshwater marsh, and estuarine meadow. Several hundred tree swallows were present by May 13 (earliest record, 10 on 23 April) at the Chickamin River (MM). The species was recorded at all rivers during the breeding season (DGb, DW, GM, JJ, MM, SJ). Nests were found in woodpecker cavities in cottonwood and spruce snags at the edges of freshwater marshes at all of the rivers surveyed (DGb, GM, JJ, MM). Tree swallows were common in early to mid August and not observed after the third week of August at the Chickamin River (MM).

Violet-green swallow (*Tachycineta thalassina*). Uncommon to fairly common migrant and uncommon breeder. Fluviatile and lacustrine waters, freshwater marsh, estuarine meadow, and buildings. Approximately 50 violet-green swallows were seen in a flock of several hundred tree swallows 13 May (earliest record 3 April) at the Chickamin River (MM). The species was observed during the breeding season at the Chilkat (JJ), Taku (GM, JJ), Whiting (JJ), Stikine (JJ), and Chickamin (HSa, MM) Rivers. Violet-green swallows and tree swallows nested in the same cottonwood snags at the Chilkat (JJ), Taku (JJ), and Whiting (JJ) Rivers. Nests in buildings were found in the Hyder/Salmon River area (DGb, GM).

Northern rough-winged swallow (*Stelgidopteryx serripennis*). Rare spring migrant and breeder. Fluviatile waters and shorelines. Single individuals were recorded 27 May 2001 at the Taku River (AD) and on 15–16 May and 31 May at the Chickamin River (MM). Although two unoccupied burrows were found in a cutbank in early June 1974 at the Salmon River (GM), the first mainland breeding record for southeast Alaska was not confirmed for another 12 years when a female was collected with a soft-shelled egg in her oviduct on 19 June 1986 at the Salmon River (DGb). More recent mainland breeding records include adults entering a nest cavity on 19 July 1997 at the Stikine River (P. Cotter, pers. comm.) and adults entering a nest cavity on 27 July 1996 at the Chickamin River (TS). Additional records during summer include individuals in mid June 2003 at the Chilkat River (AD); 30 June 1974 at the Unuk River (GM); May and June 1973 (MM) and 22 June–1 July 1996 at the Chickamin River (TS); and June 1986 (DGb), June 1989 (NAB 43/5), June 1991 (NAB 45/5), and June 1992 (NAB 46/5) at the Salmon River.

Bank swallow (*Riparia riparia*). Rare to uncommon migrant and uncommon to fairly common breeder. Over fluviatile waters and shorelines, especially near steep cutbanks. Spring records include single birds observed 25 April and 13 May at the Chickamin River (MM). Summer records include colonies of 70+ birds at several locations at the Alsek River (JJ), a small breeding colony of three to four pairs at the Taku River (JJ), individuals at the Chilkat River (AD) and Leduc-Chickamin lowlands (MM), and a flock of 70 at the mouth of the Salmon River (DGb). Fall records include flocks of two on 2 September and 30 on 8 September and single birds on 10 and 21 September at the Stikine River (DGa).

Cliff swallow (*Petrochelidon pyrrhonota*). Rare migrant and breeder. Fluviatile waters and buildings. Single birds were observed 14 May and 25 May 1974 at the Chickamin River (MM). Records during summer include three individuals foraging with barn and tree swallows in late June 2001 at the Chilkat River (JJ), and a single bird 9 June 1973 at the Leduc-Chickamin lowlands (MM). Three pairs of adults feeding young on 20 July 1974 at the Stikine Duck Club cabin comprised the first breeding record for southeast Alaska (GM). A second breeding record for the region was a nest in June (year unknown) at the Salmon River (TT).

Barn swallow (*Hirundo rustica*). Uncommon to fairly common migrant and fairly common breeder. Over fluviatile and lacustrine waters, estuarine meadow, fresh-water marsh, and buildings. Several were observed in mid May (earliest record, 9 May) at the Chickamin River (MM). Barn swallows were recorded during the breeding season at all rivers except for the Katzehin (DGb, GM, JJ, MM, SJ). Nests on buildings were found at the Alsek (JJ), Chilkat (JJ), Taku (JJ), Stikine (JJ), Unuk (JJ), Chickamin (JJ), and Salmon (TT) Rivers. The species was seen frequently from mid August–30 August (HSb) and flocks of eight on 2 and 4 September, and one bird 8 September were observed at the Stikine River (DGa). The latest observation at the Chickamin River was 7 September (MM).

Family Paridae

Black-capped chickadee (*Poecile atricapillus*). Uncommon resident and breeder. Deciduous shrubland and to a lesser degree deciduous forest. A few singing males were heard during the breeding season, but the species was fairly inconspicuous until approximately the first week in July when adults with fledglings were observed in deciduous shrubland. Recorded at the Alsek (JJ), Chilkat (GM, JJ, SJ), Taku (GM, JJ), and Stikine (GM, JJ) Rivers. Adults feeding young were observed at the Alsek (JJ), Chilkat (JJ), and Taku (JJ) Rivers. One bird was observed 26 September at the Stikine River (DGa).

Chestnut-backed chickadee (*Poecile rufescens*). Common resident and breeder. Coniferous forest and to a lesser degree mixed and deciduous forests. Singing males, pairs, adults carrying food, occupied nests, and adults with fledglings were observed at all rivers except for the Alsek (DGb, DW, GM, JJ, MM). Individuals were observed throughout September at the Stikine River (DGa).

Boreal chickadee (P*arus hudsonicus*). Rare fall visitant. One was observed 25 September 1984 at the Stikine River (DGa) and one was seen 23 September 1973 at the Chickamin River (MM).

Family Sittidae

Red-breasted nuthatch (*Sitta canadensis*). Uncommon resident and breeder. Coniferous and mixed forests. Singing males were observed at the Chilkat, Taku, Stikine, Unuk, Chickamin, and Salmon (DGb, GM, JJ, MM, TT) Rivers. A nest in a spruce snag was found in July at the Taku River (JJ). Single individuals were seen on 1, 9, and 23 September at the Stikine River (DGa). The majority of observations in the Chickamin River valley were during autumn, suggesting that the species is an elevational migrant in the region (MM).

Family Certhiidae

Brown creeper (*Certhia americana*). Uncommon resident and breeder. Coniferous, deciduous, and mixed forests. Singing males were observed in small numbers at the Chilkat (JJ), Taiya (GM), Taku (JJ), Whiting (JJ), Stikine (JJ), Unuk (JJ), and Chickamin (JJ) Rivers. Breeding evidence includes a fledgling at the Unuk River (TS) and a family group in the Hyder/Salmon River area (DGb). Observed regularly during September at the Stikine River (DGa) and throughout the year at the Chickamin River (MM).

Family Troglodytidae

Winter wren (*Troglodytes troglodytes).* Common resident and breeder. Coniferous forest and to a lesser degree in mixed forest and deciduous riparian thickets with scattered spruce trees. Singing was first recorded 11 April at the Chickamin River (MM). Wrens were common during the breeding season at all rivers except the Alsek (DGb, GM, JJ, MM). Adults carrying food were seen at the Chilkat, Whiting, Unuk, and Chickamin Rivers (JJ), and an adult with four recently fledged young was observed 4 July at the Chickamin River (MM).

Family Cinclidae

American dipper (*Cinclus mexicanus*). Uncommon resident breeder. Fast-flowing, clearwater streams and rivers. Records during the breeding season include singles

and pairs at the Chilkat (JJ), Antler (JJ), Whiting (JJ), Stikine (DW, GM), Unuk (GM, JJ), Chickamin (MM, JJ), and Salmon (DGb, GM) Rivers. Adults carrying food were observed at the Stikine (DW), Unuk (JJ), and Salmon (DGb) Rivers. An adult was observed feeding young at the Antler River (JJ).

Family Regulidae

Golden-crowned kinglet (*Regulus satrapa*). Fairly common resident and breeder. Coniferous and mixed forests. The species was frequently observed at all rivers (DGb, GM, JJ, MM) except for the Alsek where the species is considered rare (JJ). The only confirmed breeding evidence was of four juveniles observed in montane alder thickets at Shakes Lake, Stikine River (GM).

Ruby-crowned kinglet (*Regulus calendula*). Fairly common to common migrant and common breeder. Mixed and coniferous forests, and deciduous shrubland with scattered spruce. Ruby-crowned kinglets were frequently observed in April (earliest record of singing, 1 April) at the Chickamin River (MM). Breeding was confirmed at all rivers (GM, JJ, MM), except for probable at the Salmon River where the species was considered uncommon (DGb). Dozens of birds were observed migrating upriver almost daily throughout September at the Stikine River (DGa).

Family Turdidae

Mountain bluebird (*Sialia currucoides*). Rare migrant and rare breeder. Open habitats, buildings. Eight males and one female were present 4–14 April 1974 at the Chickamin River (MM). Southeast Alaska's first breeding record was a pair building a nest in an abandoned building 16–18 June 1989 in the Hyder/Salmon River area (NAB 43/5). One female was observed 6–7 November 1973 at the Chickamin River (MM).

Veery (*Catharus fuscescens*). Casual summer visitant. Deciduous shrubland. The first Alaska record was a singing male observed in a riparian thicket 22 June 1990 in the Hyder/Salmon River area (NAB 44/5). This record was followed by a second observation of a singing male 14 June 1991 in the same area (NAB 45/5). The species has bred in Stewart, British Columbia, less than 5 km from the Hyder/Salmon River area (D. Gibson, pers. comm.).

Gray-cheeked thrush (*Catharus minimus*). Uncommon migrant and uncommon to fairly common breeder. Deciduous shrubland. Most summer records are probably late migrants (during first two weeks of June). Singing males were observed at the Alsek (JJ), Chilkat (JJ), Taku (JJ), Stikine (GM, JJ), Unuk (JJ), Chickamin (JJ), and Salmon (NAB 44/5) Rivers. Several food-carrying adults and nests with young were found in early-successional deciduous forest and deciduous shrubland

at the Alsek River, where the species is considerably more common than at other rivers (JJ). Several territorial males were recorded during June and early July at the Chilkat River (JJ).

Swainson's thrush (*Catharus ustulatus*). Fairly common migrant and fairly common to common breeder. Deciduous and mixed forests and deciduous shrubland. The species arrived later than other thrushes; the earliest spring record was 29 May at the Chickamin River (MM). Observed during the breeding season at all rivers except for the Alsek (DGb, GM, JJ, MM). Nests with eggs and young were found at the Chilkat (JJ), Katzehin (JJ), Antler (JJ), Taku (JJ), Stikine (JJ), Unuk (JJ), and Chickamin (JJ) Rivers. Encountered in small numbers until 8 September (maximum count of more than four on 4 September) at the Stikine River (DGa). The latest fall record was 30 September at the Chickamin River (MM).

Hermit thrush (*Catharus guttatus*). Fairly common migrant and fairly common to common breeder. Coniferous and mixed forests. Earliest recorded 7 May (MM) and first song heard 16 May at the Chickamin River (MM). Observed during the breeding season at all rivers (DGb, GM, JJ, MM). The hermit thrush was one of the most common passerine species at the Dry Bay/Alsek River area where it was ubiquitous in deciduous shrubland with scattered small spruce. Numerous nests with eggs and young were found in 1- to 3-m-tall spruce (JJ). Evidence of breeding at the other rivers includes food-carrying adults at the Chilkat River (JJ), a nest at the Antler River (JJ), and fledglings at the Taku River (JJ). The species was observed almost daily throughout September at the Stikine River; there were two apparent migration peaks: 7–10 and 21–27 September (DGa).

American robin (*Turdus migratorius*). Common migrant and breeder. Coniferous, deciduous, and mixed forests, deciduous shrubland with scattered tall trees, estuarine meadow, buildings. Flocks of up to 100 were seen in estuarine meadow in April (earliest record, 28 March) at the Chickamin River (MM). Robins were observed during the breeding season at all rivers (DGb, GM, JJ, MM, SJ). Breeding was confirmed at all rivers (DGb, GM, JJ, MM). Observed daily throughout September (maximum counts of 48+ and 50+ on 6 and 19 September, respectively) at the Stikine River (DGa). The species was frequently observed throughout September at the Chickamin River (MM).

Varied thrush (*Ixoreus naevius*). Common migrant and breeder. Coniferous and mixed forests, deciduous shrubland, estuarine meadow. Flocks of up to 100 were observed feeding at the receding snowline in estuarine meadow in mid April (earliest record, 30 March) at the Chickamin River (MM). Varied thrushes were one of the most common species during the breeding season in coniferous forests at

all rivers (DGb, GM, JJ, MM). Adults with fledglings were also frequently observed foraging in deciduous shrubland (JJ). At the Alsek River, the species occurred primarily in deciduous shrubland with scattered short spruce (JJ). Breeding was confirmed at all rivers (DGb, GM, JJ, MM) except for probable at the Salmon (DGb, GM). The species was recorded throughout September at the Stikine (DGa) and was common during August and September and fairly common in mid October at the Chickamin River (MM).

Family Mimidae

Northern mockingbird (*Mimus polyglottos*). Casual summer visitant. A single was observed in June 1999 at the Chilkat River (B. Andres).

Family Sturnidae

European starling (*Sturnus vulgaris*). Uncommon resident and breeder. Estuarine meadow, buildings. Several flocks were observed in estuarine meadow during April and May (earliest record, 29 March) at the Chickamin River (MM). Small flocks occurred during the breeding season at the Chilkat (AD, JJ), Taiya (JJ), Stikine (GM), Chickamin (MM), and Salmon (DGb) Rivers. Nests were found at Sergief Island, Stikine River (GM), and the Salmon River (DGb). In fall, flocks of two and three were observed 24–26 September at Sergief Island, Stikine River (DGa). Several flocks of up to 14 birds were seen in October and November at the Chickamin River; last observed on 25 November (MM).

Family Motacillidae

American pipit (*Anthus rubescens*). Abundant migrant and rare summer visitant. Estuarine meadow, tidal flats, and alluvium. At the Chickamin River, several hundred were observed in estuarine meadow from April until the third week of May, when numbers decreased significantly (MM). Records during the summer include small flocks on alluvial bars 9 July 2001 at the Taiya River (JJ) and 27–29 May 2000 at the Taku River (JJ), and a single on 23 June 1986 at the Unuk River (GM). This species breeds above treeline in southeast Alaska. Pipits occurred in small numbers in early September at the Stikine River with numbers increasing 10–28 September (DGa). A flock of 15 was noted on 24 October at the Chickamin River (MM).

Family Bombycillidae

Bohemian waxwing (*Bombycilla garrulus*). Rare probable breeder and winter visitant. Coniferous forest. Pairs were observed in June at the Chilkat (JJ), Taku (JJ), and Stikine (JJ) Rivers. The only evidence of breeding at the major mainland rivers

was a female with an enlarged oviduct and varied-sized ova collected on 5 July 1974 at the Salmon River (GM). However, due to the proximity of the Canadian border, this female may not have bred in southeast Alaska (GM). A flock of five was observed 3 December 1973 at the Chickamin River (MM).

Cedar waxwing (*Bombycilla cedrorum*). Rare migrant and uncommon breeder. Mixed forest and deciduous shrubland. Observed during the breeding season at the Chilkat (JJ), Antler (JJ), Taku (GM, JJ), Stikine (GM), Unuk (TS), Chickamin (HSa, MM), and Salmon (DGb, GM) Rivers. A female that had recently laid (e.g., distended oviduct, one collapsed follicle, and varied-sized ova) was collected at the Salmon River (GM). Single individuals were observed 2 and 4 September, and two were observed 8 September 1984 at the Stikine River (DGa).

Family Parulidae

Tennessee warbler (*Vermivora peregrina*). Rare migrant and breeder. Mixed forest and deciduous shrubland. Records during the breeding season include individuals in June 2000 at the Chilkat River (AD) and on 4 July 1991 at the Stikine River (NAB 45/5). Breeding evidence is comprised of a singing male on 9 June 2001 at the Chickamin River (JJ), a pair of food-carrying adults on 8 July 1974 (the first breeding record for Alaska) in the Hyder/Salmon River area (GM), a singing male and a brood of three fledglings on 17 July 1974, Shakes Slough, Stikine River (GM), and a pair of agitated adults on 18 July 1974, Shakes Slough, Stikine River (GM). Single birds were observed 4, 10, 12, and 15 September at the Stikine River (DGa).

Orange-crowned warbler (*Vermivora celata*). Common to abundant migrant and fairly common to common breeder. Deciduous shrubland. Small flocks were noted in May (earliest record 9 May and singing by 11 May) at the Chickamin River (MM). Estimates of summer abundance vary considerably among rivers and years (Johnson 2003). Singing males were observed at all rivers (DGb, GM, JJ, MM). Nests with eggs or young were found at the Alsek (JJ), Chilkat (JJ), Katzehin (JJ), Antler (JJ), Taku (JJ), and Stikine (JJ) Rivers. The species was abundant 31 August–21 September and scarce thereafter at the Stikine River (DGa).

Yellow warbler (*Dendroica petechia*). Fairly common migrant and common breeder. Deciduous shrubland and mid-successional deciduous forest. Several individuals were observed in May (earliest record 17 May and singing first heard on 24 May) at the Chickamin River (MM). Observed during the breeding season at all rivers (DGb, GM, JJ, MM). Breeding was confirmed at the Alsek (JJ), Taiya (JJ), Katzehin (JJ), Antler (JJ), Taku (JJ), Stikine (JJ), Unuk (JJ), and Chickamin (JJ, MM) Rivers. Numbers decreased after 10 September, and yellow warblers were not recorded after 25 September at the Stikine River (DGa).

Magnolia warbler (*Dendroica magnolia*). Rare migrant and breeder. Mixed forest and deciduous shrubland. A female collected 10 June 1973 at the Chickamin River comprised the first Alaska record (MM). Records during the breeding season included singing males during June 2001 at the Unuk (JJ) and Chickamin (JJ) Rivers. Singing males were recorded almost annually during June and July 1986–1991 at the Salmon River (DGb, NAB 41/5, NAB 43/5, NAB 45/3, NAB 46/5, NAB 47/5). The first evidence of confirmed breeding in Alaska includes a family group in June 1989 at the Whiting River (AD), a nest containing four nestlings in mixed forest at the Stikine River (JJ), and a territorial pair 15–17 June 1991 at the Salmon River (NAB 45/5). Fall records include an immature and adult observed on 1 and 12 September, respectively, at the Stikine River (DGa).

Yellow-rumped warbler (*Dendroica coronata*). Common migrant and fairly common breeder. Deciduous and mixed forests. At the Chickamin River, yellow-rumped warblers were first recorded on 25 April and were common by 13 May; 90 percent of sightings were of the western Audubon's subspecies (*D.c. auduboni*) with the remainder comprised of the northern and interior myrtle subspecies (*D.c. hooveri*). During the breeding season, only myrtles were observed at the Alsek (JJ), Taiya (JJ), Katzehin (JJ), Antler (JJ), Chilkat (GM, JJ), Taku (JJ), and Whiting (JJ) Rivers. At the Stikine, the majority of observations were of myrtles, but several male and female Audubon's were recorded (JJ). Both subspecies were observed in small numbers at the Unuk and Chickamin Rivers (GM, JJ, MM). All yellow-rumped warblers seen at the Salmon River were Audubon's (GM); however, during a subsequent visit to this river, one male myrtle was detected (DGb). Intergrades were observed at the Stikine and Chickamin Rivers (Gibson and Kessel 1997, MM). Breeding was confirmed at all rivers (GM, JJ, MM). The species was observed almost daily 1–27 September (maximum count of 45+ on 8 September) at the Stikine River; birds appeared to migrate upriver (DGa). Yellow-rumped warblers were a common fall migrant (latest record two myrtles on 28 September at the Chickamin River (MM).

Townsend's warbler (*Dendroica townsendi*). Uncommon migrant and fairly common breeder. Coniferous and mixed forests. The earliest spring arrival at the Chickamin River was observed 25 April and the first heard singing 15 May (MM). Summer records include singing males, food-carrying adults, and/or immatures recorded at all rivers except for the Alsek (DGb, GM, JJ, MM). At the Stikine River, Townsend's warblers were observed daily 1–5 September and infrequently thereafter until 20 September (DGa). Last recorded on 24 September at the Chickamin River (MM).

Blackpoll warbler (*Dendroica striata*). Rare migrant and probable breeder. Deciduous shrubland. Summer records include single individuals observed in June 2000 at the Chilkat and Taku Rivers (JJ) and a singing male with a female seen 13 June 1973 at the Chickamin River (MM). Records during autumn include one 4 September, two 10 September, and one 16 September at the Stikine River (DGa).

Black-and-white warbler (*Mniotilta varia*). Casual summer visitant. The first Alaska record was an immature observed 10–12 October 1977 at the Colville River Delta (Kessel and Gibson 1978). Records in southeast Alaska include a singing male seen in willow shrubland 11 June 1992 in the Hyder/Salmon River area (NAB 46/5) and a singing male 31 May 1998 in Juneau (NAB 52/3). The most recent record was a singing male in deciduous shrubland 17 June 2001 at the Chickamin River (JJ).

American redstart (*Setophaga ruticilla*). Rare migrant and fairly common breeder. Well-developed shrub understory of deciduous forest. The species arrives later to southeast Alaska than other warbler species; first observed between 5–10 June at the Taku (JJ) and Chickamin (JJ, MM) Rivers. Redstarts were observed during summer at all rivers except for the Alsek (DGb, DW, GM, JJ, MM). Breeding was confirmed at the Chilkat (JJ), Taiya (JJ), Katzehin (JJ), Taku (GM, JJ), Stikine (JJ), Unuk (GM, JJ), and Chickamin (JJ) Rivers. Single birds were noted on 2 and 14 September at the Stikine River (DGa).

Northern waterthrush (*Seiurus noveboracensis*). Rare migrant and uncommon breeder. Forests with a well-developed deciduous shrub understory and standing or slow-moving water and to a lesser degree in deciduous shrubland bordering freshwater marsh. Singing males were observed during the breeding season at all rivers except for the Alsek (DGb, GM, JJ, MM). Food-carrying adults were noted at the Chilkat (JJ), Unuk (JJ), and Chickamin (JJ) Rivers. A defensive pair feeding at least one fledgling was observed in the Hyder/Salmon River area (GM). During fall migration, singles or pairs were observed 2–21 September at the Stikine River (DGa).

MacGillivray's warbler (*Oporornis tolmiei*). Uncommon migrant and fairly common breeder. Dense shrub understory in mixed and deciduous forest and deciduous shrubland at the edge of wet meadows and freshwater marshes. The species was fairly common by 1 June (earliest record 17 May) at the Chickamin River (MM). Singing males were observed during the breeding season at the Chilkat (JJ), Taku (GM, JJ), Stikine (DW, GM, JJ), Unuk (GM, JJ), Chickamin (HSa, JJ, MM), and Salmon (DGb, GM) Rivers. Nests were found at the Chilkat (JJ), Taku (JJ), Unuk (JJ), and Chickamin (MM, JJ) Rivers. Observed in small numbers 6–15 September

at the Stikine River (DGa). A family group of at least five birds was observed until 4 August, which was the latest date the species was observed at the Chickamin River (MM).

Common yellowthroat (*Geothlypis trichas*). Fairly common migrant and breeder. Freshwater marsh, sedges bordering lakes and ponds, and to a lesser degree, estuarine meadow. Earliest spring record was 17 May, and singing was first heard on 20 May at the Chickamin River (MM). Yellowthroats were observed at all rivers during the summer except for the Alsek and Taiya (DGb, DW, GM, HSa, JJ, MM). Breeding was confirmed at the Chilkat (JJ), Taku (JJ), Stikine (JJ), Unuk (JJ), and Chickamin (JJ, MM) Rivers. Small numbers were observed almost daily 1–27 September (maximum count of eight birds on 8 September) at the Stikine River (DGa). Latest record was six birds on 3 September at the Chickamin River (MM).

Wilson's warbler (*Wilsonia pusilla*). Uncommon migrant and fairly common to common breeder. Deciduous shrubland, and to a lesser degree, dense shrub understory in mature mixed and deciduous forests. Small numbers of Wilson's warblers were recorded until June (earliest record 15 May), and uncommonly thereafter, at the Chickamin River (MM). Wilson's warblers were considered a common breeder at the Alsek River and fairly common breeder at the remaining rivers (JJ). The species was observed during summer at all rivers (DGb, GM, JJ, MM). Breeding was confirmed at the Alsek (JJ), Chilkat (JJ), Taku (JJ), and Stikine (JJ) Rivers; singing males and pairs were seen at the Unuk (JJ) and Chickamin (JJ) Rivers. Wilson's warblers were recorded irregularly and in small numbers through 1–28 September at the Stikine River (DGa). Three adult males observed 3 September was the only fall record at the Chickamin River (MM).

Family Thraupidae

Western tanager (*Piranga ludoviciana*). Rare migrant and uncommon probable breeder. Mixed and coniferous forests. The earliest record at the Chickamin River was two males and two females on 28 May (MM). Singing males and pairs were observed during the breeding season at all rivers except for the Alsek and Katzehin (DGb, DW, GM, JJ, MM). A male was observed 4 September and a female was seen with a flock of ruby-crowned kinglets on 9 September migrating up the Stikine River (DGa).

Family Emberizidae

American tree sparrow (*Spizella arborea*). Rare migrant. Estuarine meadow. One was observed 16 September 1984 at Sergief Island, Stikine River (DGa). Small numbers were seen 23 September–24 October 1973 at the Chickamin River (MM).

Chipping sparrow (*Spizella passerina*). Uncommon migrant and rare to uncommon breeder. Alluvial bars with scattered shrubs. Singing males were observed during the breeding season at all rivers except for the Alsek, Katzehin, and Antler (DGb, GM, JJ, MM). Food-carrying adults were seen at the Chilkat (JJ) and Whiting (JJ) Rivers, and adults feeding juveniles were observed at the Taku River (GM). Single immature birds were observed 4–21 September at the Stikine River (DGa).

Clay-colored sparrow (*Spizella pallida*). Casual fall visitant. A single immature male was collected 21 September 1984 at Sergief Island, Stikine River. This was the first record for Alaska (DGa).

Savannah sparrow (*Passerculus sandwichensis*). Fairly common to common migrant and fairly common breeder. Estuarine meadow, freshwater marsh edge, willow shrubland interspersed with grass/forb meadow. The species was fairly common by 19 May (earliest record 25 April) at the Chickamin River (MM). Singing males were observed during the summer at all rivers (DGb, DW, GM, HSa, JJ, MM). Food-carrying adults and juveniles were seen at the Alsek (JJ), Katzehin (JJ), Antler (JJ), and Chickamin (JJ) Rivers. Savannah sparrows were seen daily from mid August to September at the Stikine River (DGa, HSb).

Fox sparrow (*Passerella iliaca*). Fairly common to common migrant and breeder. Dense shrub understory in deciduous and mixed forests and deciduous shrubland. Fox sparrows were observed in small numbers until the third week of May (earliest record 12 April) and were common by the end of May at the Chickamin River (MM). The species was observed during the breeding season at all rivers except for the Katzehin and Whiting (DGb, DW, GM, HSa, JJ, MM). Breeding was confirmed at all rivers (JJ) except for the Salmon (DG, GM). During fall migration, fox sparrows were observed daily from mid August–30 September at the Stikine River (DGa, HSb).

Song sparrow (*Melospiza melodia*). Fairly common migrant and uncommon breeder. Dense shrub understory in deciduous forest and deciduous tall shrubland at the edges of freshwater marshes and sloughs. Small numbers were observed throughout April and May (earliest record 1 April) at the Chickamin River (MM). Song sparrows were observed during the summer at all rivers except for the Alsek (DGb, DW, GM, HSa, JJ, MM). Breeding was confirmed at the Chilkat (JJ), Antler (JJ), Taku (JJ), Whiting (JJ), and Chickamin (JJ) Rivers. The species was observed almost daily 17 August–30 September at the Stikine River (DGa, HSb).

Lincoln's sparrow (*Melospiza lincolnii*). Fairly common migrant and breeder. Freshwater marsh, willow shrubland at the edge of freshwater marsh, and estuarine meadow. During spring at the Chickamin River, small numbers were observed until mid May (earliest record 3 April) when they became fairly common to common (MM). Observed during the breeding season at all rivers (DGb, GM, JJ, MM). Breeding was confirmed at all rivers except for probable at the Taiya and Salmon Rivers (GM, JJ, MM). Lincoln's sparrows were observed throughout September at the Stikine River (DGa).

Harris' sparrow (*Zonotrichia querula*). Casual fall visitant. An immature was observed in red alder at the edge of estuarine meadow on 31 October 1973 at the Chickamin River (MM).

White-crowned sparrow (*Zonotrichia leucophrys*). Rare to fairly common migrant. Deciduous shrubland. Single birds and a flock of four were seen in mid May at the Chickamin River (MM). The species was observed in small numbers almost daily from 5 September–30 September (DGa).

Golden-crowned sparrow (*Zonotrichia atricapilla*). Fairly common to common migrant and rare probable breeder. Deciduous shrubland. First spring arrivals were observed 24 April and small numbers were seen thereafter until 24 May at the Chickamin River (MM). Breeding season records include two singing males in late June 2001 at Alsek Lake, Alsek River (JJ) and several, including one that appeared to be nesting, 27–28 June 1920 at Norris Glacier, Taku River (AB). The species was recorded almost daily 1–30 September at the Stikine River (DGa, HSb). An immature was observed 15 November 1973 at the Chickamin River (MM).

Dark-eyed junco (*Junco hyemalis*). Fairly common migrant and uncommon to fairly common breeder. Mixed forest with open shrub understory, the edge of coniferous forest, and to a lesser degree, deciduous shrubland. Small numbers were observed during April (earliest record 13 April) and May at the Chickamin River (MM). Singing males were observed during the breeding season at all rivers except for the Katzehin (DG, GM, JJ, MM). All breeding records were of the Oregon subspecies (*J.h. oreganus*). Nests were found at the Chilkat (JJ) and the Unuk (JJ) Rivers, and fledglings were observed at the Stikine (JJ) and Chickamin (MM) Rivers. Oregon juncos were recorded daily in small numbers throughout September at the Stikine River; small numbers of the northern and interior distributed slate-colored junco (*J. h. hyemalis*) were observed at the end of September (DGa). Small numbers of Oregon juncos were seen in September and October with an increase in abundance during the last two weeks of October and decreasing by the end of November at the Chickamin River (MM).

Lapland longspur (*Calcarius lapponicus*). Fairly common migrant. Estuarine meadow. Small numbers were observed until 8 April (earliest record 22 March) at the Chickamin River (MM). The species was observed 4–30 September, including flocks of up to 200+ birds during the last week of September; longspurs were one of the few species observed migrating down the Stikine River (DGa, HSb). Small numbers were observed in early September and large flocks were present on 29 September at the Chickamin River (MM).

Snow bunting (*Plectrophenax nivalis*). Estuarine meadow. Uncommon migrant. A flock of 25 birds was observed 7 March and a single bird was seen 15 March at the Chickamin River (MM). A flock of 30 birds was present 4 November–4 December at the Chickamin River (MM).

Family Cardinalidae

Black-headed grosbeak (*Pheucticus melanocephalus*). Casual summer visitant. Deciduous shrubland. Single males were observed 15 June 1992 (NAB 46/5) and 17 June 1996 (NAB 50/5) at the Salmon River. Also, a single female and a pair were observed 7 June 1997 at the Salmon River (NAB 51/5). A singing male was recorded 30 June 1996 at the Stikine River (NAB 50/5).

Lazuli bunting (*Passerina amoena*). Casual summer visitant. Deciduous shrubland. A single male was observed 10 June 1992 at the Salmon River (NAB 46/5).

Family Icteridae

Bobolink (*Dolichonyx oryzivorus*). Casual summer visitant. The second Alaska record was a male observed in estuarine meadow 14 June 1991 at the Salmon River (NAB 45/5).

Red-winged blackbird (*Agelaius phoeniceus*). Uncommon migrant and breeder. Freshwater marsh. Several were observed during April and May (earliest record 3 April) at the Chickamin River (MM). Earliest nest construction observed 17 May and first egg layed 21 May; clutch was completed 21 May at the Chickamin River (MM). Pairs and singing males were observed during the breeding season at the Chilkat (JJ), Antler (JJ), Taku (JJ), Stikine (JJ), Unuk (JJ), Chickamin (JJ, MM), and Salmon (DG) Rivers. Nests were found at the Antler (JJ) and Chickamin (MM) Rivers, and an adult feeding fledglings was noted at the Salmon River (DGb). Small numbers (one to five birds) were observed 14–27 September at the Stikine River (DGa). The latest observation at the Chickamin River was three immatures with an adult male on 7 September (MM).

Yellow-headed blackbird (*Xanthocephalus xanthocephalus*). Casual summer visitant. Freshwater marsh. A single adult was observed 10 June 1997 at the Salmon River (NAB 51/5).

Rusty blackbird (*Euphagus carolinus*). Uncommon migrant and breeder. Freshwater marsh and deciduous shrubland. Small numbers were heard flying over the Chickamin Valley 15 May–9 June (earliest record 1 May) at the Chickamin River (MM). The species was recorded during summer at all rivers except for the Alsek, Taiya, Katzehin, and Antler (GM, JJ, MM) Rivers. A nest containing eggs was found at the Chilkat River (JJ), young of the year were observed at the Taku River (GM), and a food carrying adult was recorded at the Chickamin River (MM). Small numbers were recorded 7–27 September (maximum count of 20+ birds on 14 September) at the Stikine River (DGa). During fall migration, several flocks of up to 10 birds were observed in September at the Chickamin River; also, one was seen on 7 November, a flock of five was noted 22 November, and one was observed 24 November at the Chickamin River (MM).

Brown-headed cowbird (*Molothrus ater*). Rare migrant and breeder. Estuarine meadow, deciduous shrubland, and coniferous forest. Spring records include an adult male seen 11 May, two males observed in mid May 1974, and a pair noted 28 May 1973 at the Chickamin River (MM). Records during the breeding season include a pair 23 June 2002 at the Klehini River, Chilkat River Valley (JJ) and a single singing male 18 June 2002 at the Antler River (JJ). The only confirmed breeding evidence was a nestling being fed by a pine grosbeak in 1996 at the Chilkat River (AD) and at least four copulating pairs 14–17 June 1991 at the Salmon River (NAB 45/5). Fall records include an immature bird seen 24 September 1984 at the Stikine River (DGa) and an immature bird noted 12 September 1973 at the Chickamin River (MM).

Family Fringilidae

Pine grosbeak (*Pinicola enucleator*). Uncommon resident and breeder. Coniferous forest. Two flocks were observed 6–7 March at the Chickamin River (MM). Pine grosbeaks were observed during the breeding season at the Alsek (JJ), Chilkat (GM, JJ), Taiya (JJ), Taku (GM), and Chickamin (HSa, MM) Rivers. Pairs were observed at the Alsek (JJ), Taiya (JJ), and the Chickamin (MM) Rivers, and a nest was found at the Chilkat River (AD).

House finch (*Carpodacus mexicanus*). Casual summer visitant. The first records for southeast Alaska were a single female seen 12 July 1991 in the Chilkat River Valley (NAB 45/5) and a single male 1–2 June 1996 observed at the Salmon River (NAB 50/3).

Red crossbill (*Loxia curvirostra*). Fairly common to common resident and breeder. Coniferous and mixed forests. Spring records at the Chickamin River spring include flocks of 30 seen 30 March, a pair observed 9 May, and a flock of 10 noted 15 May (MM). During summer, flocks of 10 to 15 were seen at the Unuk (JJ), Chickamin (JJ), and Salmon (DGb, GM) Rivers. Smaller numbers were observed at the Chilkat (JJ), Taku (GM, JJ), Stikine (JJ), and Unuk (GM) Rivers. An adult female incubating eggs, evidenced by brood patch and condition of her oviduct, was collected 28 August at Sergief Island, Stikine River (HSb). The species was seldom recorded during September 1984 at the Stikine River (DGa).

White-winged crossbill (*Loxia leucoptera*). Uncommon probable breeder and resident. Coniferous and mixed forests. White-winged crossbills were observed during the breeding season at the Chilkat (JJ), Taiya (GM), Taku (JJ), Stikine (JJ), and Chickamin (MM) Rivers.

Common redpoll (*Carduelis flammea*). Rare spring visitant and fairly common breeder. Deciduous shrubland. At least three were observed in a large flock of pine siskins 2 May 1973 at the Chickamin River (MM). Several flocks of five to 10 were observed at Dry Bay, Alsek River, and several males were seen in courtship flights and pairs were observed in alder thickets at Alsek Lake, Alsek River (JJ).

Pine siskin *(Carduelis pinus*). Common to abundant resident and probable breeder. Coniferous, deciduous, and mixed forests, riparian alder shrubland, and willow/herb glacial outwash. Abundances of pine siskins varied considerably among years at the Chickamin River; several small small flocks were seen in March 1972 and 1974 and large flocks of several hundred birds were observed during May 1973 (MM). Small flocks of 5 to 20 and large flocks of up to 100 were observed during the breeding season at all rivers except for the Alsek (DGb, GM, HSa, JJ, MM). The species was fairly common during August (HSb) and September (DGa) at the Stikine River.

Evening grosbeak (*Coccothraustes vespertinus*). Casual summer visitant. A flock of at least five was observed 8–9 June 1992 at the Salmon River (NAB 46/5).

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