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BIRDS AND MAMMALS OF THE COPPER RIVER DELTA

By

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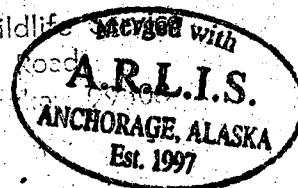
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INTRODUCTION

The objectives of this report are: (1) to describe the habitats available for birds and mammals on the Copper River Delta (CRD), (2) to present an annotated list of birds and mammals--their seasonal occurrence and abundance, and their habitat requirements, and (3) to state possible effects of land management practices on birds and mammals and their habitat.

The bulk of this report is from "Birds of the North Gulf Coast - Prince William Sound Region, Alaska" by M. E. "Pete" Isleib and Brina Kessel. Occurrence and abundance of birds and mammals in habitats has been from my own observations and are verified by Pete Isleib, local ornithologist and commercial fisherman. J. D. Solf, and Julius Reynolds of the Alaska Department of Fish and Game and Larry Kritchen provided information on land mammals. The occurrence and abundance of sea mammals is from observations by Isleib. I will accept full responsibility for any technical errors in this report.

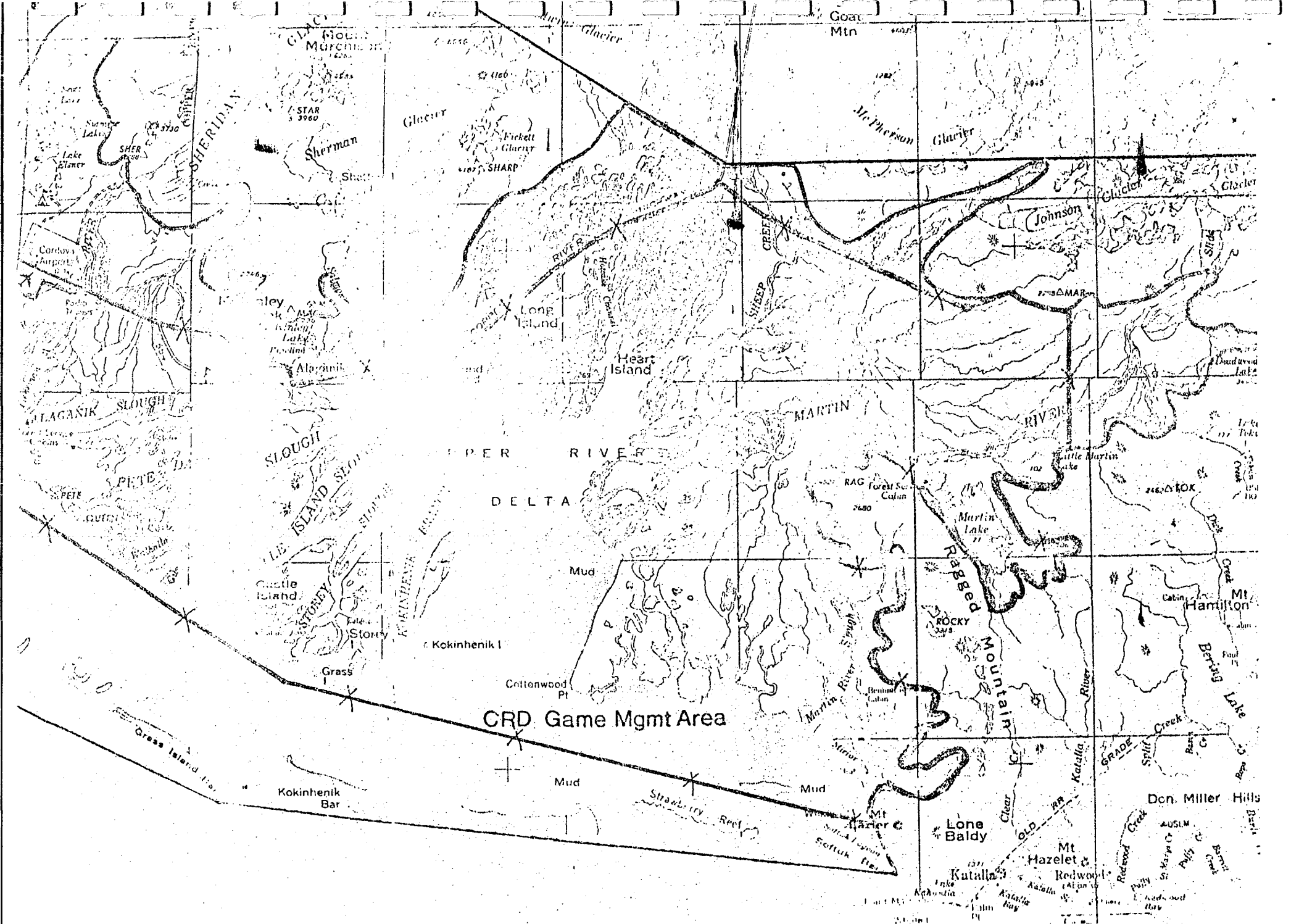
The area concerned in this report is the Copper River Delta Game Management Area and its barrier islands (Figure 1). The Copper River Delta Game Management Area (330,000 acres) is bounded on the west by the Heney Mountains, on the north by the Copper River Highway (CRH) between Eyak River and Mile 39 and by a line running east southeast to Martin River Glacier, on the east by the mountains immediately surrounding Martin Lakes and by the Ragged Mountains, and on the south by the Gulf of Alaska (Figure 1). For this report, the area north of the CRH from Eyak River to Mile 27, bounded by the Chugach Mountains, and the coastal sandbar islands and immediately adjacent waters from Point Whittished to Softuk Bar are also included. When referring to the upper Delta, this includes the area of willow and alder shrubs northward. The outer coast refers to the coastline along the Gulf side of the barrier islands.

DESCRIPTION OF HABITATS

Within this area nine recognizable habitat types occur. In order from interior to coast these include: hemlock (Tsuga heterophylla) Sitka spruce (Picea sitchensis) forests, bogs, mixed deciduous - spruce woodlands, shrub thickets, lakes, marshes, rivers and sloughs, tidal flats, and barrier islands. Within these zones occur almost pure stands of black cottonwood (Populus balsamifera), sand dunes, and mud flats.

Hemlock-Sitka Spruce Forest

The hemlock-Sitka spruce forests are found at elevations higher than ten feet and occur principally north of the CRH from Eyak



Lake

Lakes are water bodies over 25 acres and are found mainly on the upper CRD, in the Martin River system, and on some of the larger islands of the Copper River (Figure 1). Vegetation includes: sago pondweed (Potamogeton pectinatus), clasping-leaf pondweed (P. perfoliatus var. richardsoni), floating-leaved pondweed (P. natans), water milfoil (Myriophyllum spicatum), bladderwort (Utricularia spp.), buttercup (Ranunculus sp.), bur reeds (Sparganium spp.), and yellow water lilies in the deeper water. Shoreline vegetation consists of buckbean, marsh five-finger (Potentilla palustris), sedges (Carex aquatilis and C. rostrata), mare's tail (Hippuris vulgaris), horsetail (Equisetum fluviatile), and rushes (Juncus spp.).

Marsh

Marshes comprise the largest acreage of habitat. Small ponds and sloughs are numerous throughout the marsh habitat. Shrubs occur in the more upland marshes--willow, alder, and sweet gale are the predominant species. Other species are: horsetail, grasses, sedges (especially Carex Lyngbyaei), cottongrass, yellow rattle (Rhinanthus minor), grass-of-Parnassus, silverweed (Potentilla Egedii), and vetch (Vicia spp.). Vegetation in ponds includes: pondweeds, manna grass (Glyceria sp.), softstem bulrush (Scirpus validus), spikerush (Eleocharis spp.), buttercup, marsh five-finger, caltha (Caltha palustris), water milfoil, tufted loosestrife (Lysimachia thyrsiflora), and chara (Chara sp.). At well-drained sites, such as along sloughs, the following plants are common: willow, alder, grasses, iris (Iris setosa), dock (Rumex spp.), chrysanthemum (Chrysanthemum arcticum), river beauty (Epilobium latifolium), beach lovage (Ligusticum scoticum), yarrow (Achillea millefolium), and sweet gale.

River and Slough

Rivers and sloughs meander across much of the CRD, generally flowing southwestward. The tidal influence extends upstream approximately five miles.

Tidal Flat

Tidal flats extend from the grass banks (Gulf side of the marshes) out to the barrier islands. Since the 1964 earthquake, the former tidal flats are becoming vegetated near the old high-tide line. These upper flats have sedges (mainly Carex Lyngbyaei), grasses (especially Puccinellia phryganodes), and arrow grasses (Triglochin palustris and T. maritimum).

Barrier Islands

Barrier islands lie from two to five miles off the grass banks. Most are sandy with little vegetation except beach grass (*Elymus arenarius*). The largest, Egg Island, is about 25 square miles. It has vegetation characteristic of tidal flats and marshes. In addition, willow, alder, and spruce occur sparingly.

PHENOLOGY

Spring

Spring migration of birds is confined to a period from early April to late May. Millions of birds migrate across the CRD as it is along the main Pacific route for northern latitude breeders. The high Chugach Mountains, the northern arc of the Gulf of Alaska, and the Copper River corridor tend to funnel birds across the CRD. A good description of the migratory paths and abundance of birds can be found in Isleib and Kessel (1973).

Movements of aquatic and marine mammals on the CRD are no longer restricted once river and pond ice breaks up in May and early June. Young of many land mammals cause parents to increase food gathering activities. Spring is also the time bears and marmots emerge from their winter dens.

Summer

Most birds begin nesting in late May. The breeding season continues through mid-July, when most young passerines can fly. By mid-August young of the larger birds--waterbirds and raptors are fledged or nearly fledged.

As with birds, the summer finds young mammals maturing, and reaching a state of self-sufficiency.

Fall

Fall migration of birds is less spectacular than the spring migration. The migration is diffuse and extends from mid-July through late November. Shorebirds and swallows are first to move south--beginning in July. Most passerine movement occurs from mid-August to mid-September. Large movements of migratory cranes, hawks, and eagles pass eastward across the CRD during September and October. Most waterfowl migrate south from mid-September to mid-October.

During fall, many mammals prepare for the winter by feeding intensively or by storing food. Bears begin denning in late October. Most beaver ponds are frozen by late October. Small mammal movements slow and reproduction halts.

Winter

Mainly resident species of birds occupy the CRD during the winter. These species include: raptors, ptarmigan, Spruce grouse, and some passerines. Mammals conspicuously active during winter months on the CRD include: members of the weasel family, the canids, lynx, porcupines, snowshoe hares, deer, moose, and goats.

ANNOTATED LIST OF BIRDS AND MAMMALS

A total of 179 species of birds and 36 of mammals have been recorded on the CRD (Table 1). Common and scientific names of birds follow the Fifth Edition (1957) of the "American Ornithologists' Union." Names of mammals are according to Purr and Grossenheider (1959).

I have adopted the terminology for status and abundance of birds used by Isleib and Kessel (1973) and have used these for mammals. Abundance is stated with respect to size of the animal, its territory or home range size, and the extent of its preferred habitat. The definitions are as follows:

resident--a species represented within the area throughout the year.

migrant--a seasonal transient through the area.

Breeder--a species with known or probably breeding populations within the area.

visitant--a species having populations that may remain in the area for a period of time, but which is not adequately described by the preceding terms.

The following abundance terms have been utilized:

abundant--species occurs in preferred habitats, with available habitat heavily utilized, and/or the area regularly hosts great numbers of the species.

common--species occurs in all or nearly all preferred habitats, but some preferred habitat is occupied sparsely or not at all and/or the area regularly hosts large numbers of the species.

fairly common--species occurs in only some of the preferred habitat, and large areas of preferred habitat are occupied sparsely or not at all and/or the area regularly hosts substantial numbers of the species.

uncommon--species occurs regularly, but utilizes very little of the preferred habitat, and/or the area regularly hosts relatively small numbers of the species; not observed regularly even in preferred habitat.

rare--species occurs, or probably occurs, regularly within the area, but in very small numbers.

casual--species has been recorded no more than a few times, but irregular observations are likely over a period of years.

accidental--species has been recorded only a time or two; it is so far from its usual range that further observations are considered unlikely.

Table 1

BIRDS AND MAMMALS OF THE COPPER RIVER DELTA

B I R D S

- * Breeding record(s)
- # Probable breeding
- + Possible breeding
- o Casual or accidental
- XX Habitat most likely to occur in on the Copper River Delta
- X Habitat of secondary importance on the Copper River Delta

	Shrub thickets	Coniferous forest	Bogs	Mixed woodlands	Marsh & ponds	Lakes	Rivers and Sloughs	Barrier Islands	Peaches - tidal flats	Coastal tidewaters
Common Loon					X	XX*				XX
Yellow-billed Loon										XX
Arctic Loon							X			XX
Red-throated Loon					XX*	X	XX			XX
Red-necked Grebe										XX
Horned Grebe					XX*	XX*	X			XX
Double-c Cormorant						X				XX
Red-faced Cormorant										XX
Pelagic Cormorant										XX
Great Blue Heron					XX	X	X		XX	
Whistling Swan					XX	X	X		X	XX
Trumpeter Swan					XX*	XX*	X		X	X
Canada Goose	X*		X		XX*	XX#	X	XX*	XX	X

BIRDS

	Shrub thickets	Coniferous forest	Bogs	Mixed woodlands	Marsh and ponds	Lakes	Rivers and Sloughs	Barrier Islands	Beaches - tidal flats	Coastal tidewaters
Black Brant					X			X	XX	XX
Emperor Goose					X			X	X	XX
White-fronted Goose					XX			X	XX	X
~~Snow Goose~~					XX			X	XX	XX
Mallard	X*		X		XX*	XX*	XX	X	XX	XX
Gadwall					XX*	XX*	X		XX	X
Pintail	X*				XX*	XX*	XX	X	XX	XX
Green-winged Teal	XX*	X*	X		XX*	XX	X	X	XX	XX
Blue-Winged Teal					XX#				X	X
Cinamon Teal°					XX					X
European Widgeon°					XX					X
American Widgeon					XX*	XX	X	X	XX	X
Shoveler					XX*	X	X	X	XX	X
Redhead°					XX+	X				
Ring-necked Duck					X	XX				
Canvasback					XX*	XX				X
Greater Scaup					XX*	XX	X	X	XX	XX
Lesser Scaup					XX+	XX				

BIRDS

	Shrub thickets	Coniferous forest	Bogs	Mixed woodlands	Marsh and ponds	Lakes	Rivers and Sloughs	Barrier Islands	Beaches - tidal flats	Coastal tidewaters
Common Goldeneye		X				XX	X		X	XX
Barrow's Goldeneye		XX*		XX*	X	XX	XX		X	XX
Bufflehead					X	XX	X		X	XX
~~Oldsquaw~~					X	X	X			XX
Harlequin Duck	X*	X*					XX			XX
White-winged Scoter							X		X	XX
Surf Scoter							X		X	XX
Common Scoter									X	XX
Hooded Merganser						XX	X			X
Common Merganser	X*					XX	XX	X	X	XX
Red-breasted Merganser				X*	X	X	XX		X	XX
Goshawk	X	XX*		XX*	X				X	
Sharp-shinned Hawk	XX	XX+		XX	X				X	
Red-tailed Hawk°				XX						
Harlan's Hawk°				XX						
Rough-legged Hawk	X				XX			X		
Golden Eagle		XX								
Bald Eagle	X	XX*		XX*	XX	X	XX	XX	XX	XX

BIRDS

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BIRDS

	Shrub thickets	Coniferous forest	Bogs	Mixed woodlands	Marsh and ponds	Lakes	Rivers and Sloughs	Barrier Islands	Reaches - tidal flats	Coastal tidewaters
Spotted Sandpiper					X	XX*	XX*	X	X	
Solitary Sandpiper			XX		XX	XX			X	
Wandering Tattler			X				X	X	XX	
~~Greater Yellowlegs~~			XX*		XX	X	X	XX	XX	
Lesser Yellowlegs			XX*		XX#	X	X	XX	XX	
Knot								X	XX	
Rock Sandpiper									XX	
Sharp-tailed Sandpiper ^o					X				XX	
Pectoral Sandpiper					XX			X	XX	
White-rumped Sandpiper ^o					XX				X	
Baird's Sandpiper					XX			X	XX	
Least Sandpiper			X		XX*	X		XX	XX	
Dunlin					X			X	XX	
Short-billed Dowitcher					XX*			X	XX	
Long-billed Dowitcher					XX			X	XX	
Semipalmated Sandpiper					XX			X	XX	
Western Sandpiper			X		X+			X	XX	
Hudsonian Godwit					XX+			X	XX	
Sanderling								X	XX	

BIRDS

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BIRDS

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BIRDS

	Shrub thickets	Coniferous forests	Bogs	Mixed woodlands	Marsh and ponds	Lakes	Rivers and Sloughs	Barrier Islands	Beaches - tidal flats	Coastal tidewaters
Traill's Flycatcher	XX*	X		X						
Olive-sided Flycatcher	X	X		XX						
~~Horned Lark°~~	-							XX		
Violet-green Swallow			X	X	XX	XX	X	X	XX	X
Tree Swallow		X	X	XX*	XX	XX	X	X	XX	X
Bank Swallow					XX	X	XX*	X	X	X
Barn Swallow					XX	X	X	X	X	X
Cliff Swallow					XX	X	X		X	X
Gray Jay	X	X		XX*						
Steller's Jay	X	XX*		X					X	
Black-billed Magpie	XX*	X	X	XX*	X			X	X	
Common Raven	X	XX*	X	XX	XX	X	X	X	XX	X
Northwestern Crow		XX		X	X			XX	XX	X
Black-capped Chickadee	X	X		XX+						
Boreal Chickadee	X			XX						
Chestnut-b Chickadee	X	XX*								
Red-breasted Nuthatch	X	XX#		XX#						

BIRDS

	Shrub thickets	Coniferous forests	Bogs	Mixed woodlands	Marsh and ponds	Lakes	Rivers and Sloughs	Barrier Islands	Peaches - tidal flats	Coastal tidewaters
Brown Creeper		XX*		XX						
Dipper						X	XX*			
Winter Wren	XX	XX#		X						
Robin	XX*	XX*		XX*	X			X	X	
Varied Thrush	XX*	XX*	X	XX*	XX			X	XX	
Hermit Thrush	XX*	XX*	X	XX*	X			X	X	
Swanson's Thrush	XX	X								
Gray-checked Thrush	X	X		XX						
Golden-crowned Kinglet	X	XX#		XX+						
Ruby-crowned Kinglet	XX	XX*		XX*						
Water Pipit			X		XX			XX	XX	
Bohemian Waxwing	X	X		XX						
Northern Shrike	XX*	X		XX*	XX					
Orange-crowned Warbler	XX*	XX*		XX*	X					
Yellow Warbler	XX*			X	X					
Myrtle Warbler	X	X		XX						

BIRDS

	Shrub thickets	Coniferous forests	Bogs	Mixed woodlands	Marsh and ponds	Lakes	Rivers and Sloughs	Barrier Islands	Beaches - tidal flats	Coastal tidewaters
Townsend's Warbler	X	XX		XX						
Northern Waterthrush	XX			X						
Wilson's Warbler	XX*	X		XX						
~~Red-winged Blackbird~~ ^o	X-				XX					
Rusty Blackbird	XX*	X	X	X	XX			X	X	
Pine Grosbeak	X	IX*		XX+						
G-c Rosy Finch	XX									
Hoary Redpoll	XX			X	X					
Common Redpoll	XX	X		XX	X					
Pine Siskin	XX	XX*		XX	X					
Red Crossbill		XX#		XX+						
White-winged Crossbill		XX#		XX+						
Savannah Sparrow	XX*	X	X	X	XX*			X	X	
Slate-colored Junco	XX*	X		XX						
Oregon Junco	XX*	X		XX						
Tree Sparrow	XX*				X					
White-crowned Sparrow	XX*			XX	X					

BIRDS

[illegible]

MAMMALS

	Shrub thickets	Coniferous forests	Bogs	Mixed woodlands	Marsh and ponds	Lakes	Rivers and Sloughs	Barrier Islands	Reaches - tidal flats	Coastal tidewaters
Masked Shrew	X	XX	X	X	X					
Dusky Shrew	X	XX	X	X	X					
Black Bear	XX	XX	X	X						
~~Brown Bear~~	XX	XX	XX	XX	X				X	
Marten		XX								
Shorttail Weasel	XX	X	X	XX	XX				X	
Least Weasel				X	XX					
Mink	X		X		XX	XX	XX			
Wolverine	X	XX	X	XX	X					
River Otter			X		XX	XX	XX		X	
Sea Otter								X	X	XX
Red Fox	XX	X	X	XX	X				X	
Coyote	XX	X	X	XX	X		X	X	X	
Gray Wolf	XY	XX		XX	X		X		X	
Lynx	X		X							
Northern Sea Lion							X			X
Harbor Seal							XX	X	X	XX
Hoary Marmot	X	X	X							

MAMMALS

[illegible]

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Common Loon (Gavia immer)

The Common Loons are fairly common residents of the CRD. In the spring migrants are fairly common from mid-April to mid-May. Birds begin their breeding season in late May. Young are fledged by September. Fall migrants are fairly common along the coast from early October through early November. These loons are uncommon in winter—frequenting the outer coast along the barrier islands.

The Common Loon nests on the larger, upland lakes—primarily on the upper Copper Delta—Long Island, in lakes near the mouth of the Martin River, and at Martin Lakes. It builds a nest of mud and vegetation on or along the shoreline. Fish from the nesting pond are the primary food source during the breeding and brood-rearing seasons.

Yellow-billed Loon (Gavia adamsii)

The Yellow-billed Loon is a rare spring and fall migrant over waters along the barrier islands. It occurs as a rare visitant in salt water at all seasons, being most frequent in fall (mid-October to mid-November) and winter.

Arctic Loon (Gavia arctica)

The Arctic Loon is a common spring and fall migrant and an uncommon winter visitant of the CRD. Like the Yellow-billed Loon, it is found in salt water along the outer coast, and occurs as a rare non-breeding visitant during the summer.

Spring migrants occur along the outer coast from late April through mid-May and fall migrants pass eastward along the coast from late September through early November.

Red-throated Loon (Gavia stellata)

Red-throated Loons are common seasonal migrants, common breeders, and uncommon winter visitants. Spring migrants move along the coast from mid-April to late May. Breeders are common on shallow ponds of the lower Copper River Delta. They begin nesting in late May or early June. Nests are built of mud and sedges along the shoreline of ponds. Each pair may raise one or two young which are capable of flying by late August.

Fall migrants are fairly common along the outer coast from early September until early November. They are uncommon along the outer coast in the winter.

Red-necked Grebe (*Podiceps grisegena*)

The Red-necked Grebe is a fairly common seasonal migrant, a rare summer visitant, and an uncommon winter visitant. The spring migration occurs from late April through mid-May along the coast. The fall migration lasts from late August to late October.

Horned Grebe (*Podiceps auritus*)

Horned Grebes are residents of the CRD. They occur seasonally as common migrants (late April through mid-May in spring) and September until early November in the fall; uncommonly as breeders, and as fairly common winter visitants. Horned Grebes breed on lakes on the Delta. Migrants utilize waters near the tidal flats, and the freshwater lakes and ponds.

Fulmar (*Fulmarus glacialis*)

Fulmars are uncommon, but irregular year-round visitants along the outer coast. They are occasionally observed inside the barrier islands along the surf line searching for food during foggy weather.

Pink-footed Shearwater (*Puffinus creatopus*)

The Pink-footed Shearwater is a rare, but irregular summer visitant outside the outer coast.

Sooty Shearwater (*Puffinus griseus*)

Sooty Shearwaters are uncommon, but irregular summer visitants. They are found near the Gulf side of the barrier islands.

Slender-billed Shearwater (*Puffinus tenuirostris*)

Slender-billed Shearwaters are uncommon, but irregular summer and fall visitants along the surf line of the outer coast.

Fork-tailed Petrel (*Oceanodroma furcata*)

Fork-tailed Petrels are rare spring migrants, uncommon summer visitants and fairly common fall migrants in adjacent Gulf waters off the barrier islands. Following storms in the Gulf of Alaska during the fall (September - October), they may become locally common and are found inside the barrier islands.

Double-crested Cormorant (Phalacrocorax auritus)

Double-crested Cormorants are common residents just west of the CRD. Spring migrants pass westward along the coast from late March through early May. Birds nesting between Point Whited and Hinchinbrook Island and winter residents feed in waters near Egg Island. Fall migrants are common from August until November passing along the coast and occasionally may be found visiting freshwater areas of the upper Delta.

Pelagic Cormorant (Phalacrocorax pelagicus)

The Pelagic Cormorant is an abundant resident immediately to the southeast and southwest of the CRD. This species feeds in waters around Egg Island, Strawberry Island, and Softuk Bar. Spring movements occur in April and fall movements in September and October.

Red-faced Cormorant (Phalacrocorax urile)

Red-faced Cormorants are rare year-round visitants in the adjacent Orca Inlet area. Some of these birds irregularly may stray into coastal waters.

Great Blue Heron (Ardea herodias)

Great Blue Herons are uncommon residents of adjacent Prince William Sound, and regularly occur as uncommon visitants to tidal and freshwater marshes on the Delta during a post-breeding dispersal period (August - December). Wandering non-breeders occur as rare visitants during the remainder of the year.

Whistling Swan (Olor columbianus)

Whistling Swans are common migrants and casual summer and winter visitants of the CRD. Spring migrants move across the Delta from mid-April to mid-May. They become locally abundant during the peak of migration in late April or early May. Individuals and small groups of non-breeders may linger on marshes of the lower Delta in summer, remaining until fall migration. Fall migrants begin moving in mid-September with most arriving in the first half of October. By early November most have departed. Winter visitants are casual; individuals may attempt to overwinter.

Trumpeter Swan (Olor buccinator)

Trumpeter Swans are common residents of the CRD. Spring migrants arrive in the last week of March and are common by the second

week of April. Most breeding pairs are at their nest sites in early May. Most Trumpeter Swans nest on Castle Island, Long Island, and in the Martin River system. Pairs nest in emergent vegetation on lakes and on beaver ponds. Larger lakes are often utilized for feeding, loafing, and molting by non-breeding swans (Hansen et al 1971). Young hatch from mid-June to early July and are capable of flying by early September. Most Trumpeter Swans depart by mid-October. A few family groups overwinter where open water is available--such as the outlets of Eyak Lake and Martin Lake.

Dusky Canada Goose (*Branta canadensis occidentalis*)

Dusky Canada Geese are abundant seasonal migrants and breeders. They arrive on the CRD in the last days of March or the first days of April and are abundant by late April. The peak of nesting is in late May. Dusky Canada Geese prefer to nest on the lower west Copper River Delta where they build nests on the levees along sloughs. Densities of 108 nests per square mile have been recorded (Hansen, 1962). Since the 1964 earthquake, more nesting habitat is available because of the lack of tidal flooding on the marshes. Geese also nest in the driftwood zone along the lower sloughs, a few nest in marshes along the Copper River Highway, and in the beach rye grass portions of the barrier islands.

Most young hatch in the last half of June, but some hatch as late as mid-July. Family groups utilize marshes and vegetated tidal flats of most of the western half of the CRD. Most young gain flight by mid-August. Then family groups move to preferred staging areas along the tidal flats; on the eastern, lower CRD near the coast; the marshes of Martin Lake; and to the upper CRD where horsetail grows abundantly.

Dusky Canada Geese begin leaving in late September and most are gone by late October. In the fall these geese receive moderate hunting pressure on the CRD.

Taverner's Canada Goose (*Branta canadensis taverneri*)

Taverner's Canada Geese are fairly common seasonal migrants. Spring migrants pass through from mid-April through early May. In late September and early October most migrate south although a few occur irregularly in November. For short periods during migration, this species utilizes the coastal marshes, and upper tidal flats.

Cackling Goose (*Branta canadensis minima*)

Cackling Geese are uncommon seasonal migrants. A few flocks occur from late April to late May, but most migrate offshore (both in spring and fall). They are uncommon during September, but in some years become fairly common along the coast in early October during poor weather in the Gulf of Alaska.

Black Brant (*Branta nigricans*)

The Black Brant is a fairly common spring migrant, a rare summer visitant, and a rare fall migrant of the CRD. This species migrates close to the coast during late April and early May. In some years a substantial number of non-breeders may move through during May and early June. A few birds linger along the barrier islands after mid-June, but generally are absent by mid-July. From mid-August to October, a few brant are recorded along the barrier islands of the CRD. They are very irregularly shot on coastal marshes during October.

Emperor Goose (*Philacte canagica*)

The Emperor Goose is a rare and possible winter visitant of the CRD. Small numbers of spring migrants, mixed with other migrant waterfowl, pass westward in late April and early May. They occur close to the coast along sloughs and on the barrier islands.

Fall hunters reportedly have shot Emperor Geese during October and November on coastal marshes. In winter, birds may use tidal flats along the coast; such occurrences are casual.

White-fronted Goose (*Anser albifrons*)

The White-fronted Goose is a common migrant utilizing the CRD. It arrives in late April, is locally common during early May, and usually has departed by mid-May. Flocks of late migrants have been reported as late as June 10th. (Isleib and Kessel, 1973).

Fall migrants begin arriving during the first half of August, the majority pass within ten days of the first of September, and are rarely seen after mid-September. In fall, Whitefronts generally overfly the coastal marshes of the western CRD, but tend to stage on the coastal marshes of the east CRD and along Martin River towards the coast. Concentrations of 100,000 birds have been reported in early September (Isleib and Kessel, 1973).

Snow Goose (Chen hyperborea)

Snow Geese are common migrants along the CRD. Spring migrants arrive between 20 April and 5 May, but occasionally a few large flocks appear in late May. Irregularly, singles or a few individuals occur into early June. Fall migrants generally begin arriving in mid-September and are locally abundant from late September to mid-October. These birds concentrate on and utilize the vegetated tidal flats and coastal marshes, especially east of the Copper River during the fall, and west of the Copper River in spring.

Mallard (Anas platyrhynchos)

Mallards are abundant migrants, fairly common breeders, and common winter visitants. Spring migrants are abundant during late April and early May. Nesting commences in early May. Mallards nest in a variety of habitats--from coastal marshes to shrubby marshes of the upper Delta. Eggs hatch by mid-June. Post-breeding birds occupy a wide range of wetland habitats. Fall migrants are common during late August to mid-October. These birds utilize the tidal flats and outer marshes, but may be found further inland in sloughs, creeks, and on lakes and ponds. Mallards are the most regularly encountered dabbler during the winter where they frequent the coast and unfrozen freshwater areas.

Gadwall (Anas strepera)

Gadwalls are fairly common migrants and breeders, but rare winter visitants of the CRD. Spring migrants arrive from the third week of April until mid-May. Gadwalls nest around coastal ponds from the Pete Dahl Slough area eastward to Martin River Slough. They are late breeders and their young sometimes do not gain flight until mid-September.

Gadwalls are late migrants, generally leaving in October. A few individuals regularly attempt overwintering and generally are associated with Mallards.

Pintail (Anas acuta)

Pintails are abundant migrants, common breeders, and casual winter visitants on the CRD. Spring migrants arrive from early April through early June. Pintails are the most abundant ducks with millions occurring during late April and early May, the height of their migration. They utilize the coast, but large numbers migrate far offshore.

Pintails are one of the most common ducks breeding on the CRD. Pintails nest on levees and in marshes on the Copper River flats. Nesting begins in early May and most eggs hatch by mid- to late June. Post-breeders occur on the tidal flats from mid-June and flocks become abundant by mid- to late August.

Pintails are abundant on the marshes in the fall, but most of the large migrant flocks pass swiftly through the region often utilizing only the tidal flats. They are abundant locally until mid-October. Most of the fall migrants leave by early November. However, individuals are irregularly recorded during the winter in association with Mallards.

Green-winged Teal (*Anas carolinensis*)

Green-winged Teal are abundant migrants, fairly common breeders, and casual winter visitants. Spring migrants arrive in mid-April, are abundant in late April, and generally have departed by late May. Spring migrants use the marshes of the CRD.

Green-winged Teal breed as scattered pairs on coastal marshes, but are more common on the upper marshes and beaver dams. Post-breeding males utilize the outer tidal flats after mid-July, becoming fairly common in August. These are joined by fall migrants in late August and early September when they may occur in flocks containing hundreds of birds. Fall migrant Teal also utilize brackish sloughs and small ponds along the coast; although, less commonly than the tidal flats.

Fall migrants become uncommon by late September and most have departed by late October. Wintering Green-winged Teal are casual and generally are associated with other wintering dabblers. Possibly a few winter on the tidal flats.

Blue-winged Teal (*Anas discors*)

Blue-winged Teal are rare migrants and probably breed on the CRD. A few spring observations have been reported in the first half of May. They may breed on the Delta, but there are no summer records. Hunters and fishermen report a few Blue-winged Teal (generally on the coastal marshes) every fall from late August to as late as mid-October.

Cinnamon Teal (*Anas cyanoptera*)

The Cinnamon Teal is an accidental visitant to the CRD. Robert Ingebo, Cordova resident, reported a male on the marshes near the outlet of Eyak River during early May, 1954, (Isleib and Kessel, 1973).

European Widgeon (*Mareca penelope*)

The European Widgeon is a rare migrant on the CRD. One male was seen by Shepherd on May 5, 1978 on Big Glacier Slough. Over many years, hunters shoot an occasional European Widgeon (Isleib and Kessel, 1973).

American Widgeon (*Mareca americana*)

The American Widgeon is an abundant migrant and a fairly common breeder. Spring migrants arrive as early as mid-April, are abundant in late April and early May, and are fairly common until late May. It is a fairly common breeder, generally on the upper marshes.

Fall migrants utilize the tidal flats beginning in mid-August and are abundant in September. Flocks of widgeon are common until mid-October, but most leave by early November.

Shoveler (*Spatula clypeata*)

Shovelers are fairly common migrants and common breeders. Spring migrants arrive as early as the third week of April and are fairly common from early May until early June.

Shovelers are among the most numerous breeding dabblers on the CRD. Nesting begins in late May and extends through mid-June. Shovelers nest in marshes near ponds and sloughs. Most young hatch by mid-July. Broods and molting adults prefer the heavy cover of sedges along ponds.

In mid-August, fall migrants begin appearing on tidal flats. They are fairly common until early October. In early September, Shovelers are among the most frequently shot waterfowl on the CRD.

Redhead (*Aythya americana*)

The Redhead is a casual visitant to the CRD in spring and fall. In the marshes at Pete Dahl Slough a pair was observed by Shepherd on 26 May 1959, and Maxwell reported three were shot there in early October 1969 (Isleib and Kessel, 1973).

Ring-necked Duck (*Aythya collaris*)

The Ring-necked Duck is a rare spring migrant which has been reported at Mile 11 CRH and at Eyak Lake (Isleib and Kessel, 1973). It probably occurs as a fall migrant, but thus far, it has escaped detection.

Canvasback (Aythya valisneria)

Canvasbacks are uncommon migrants and breeders. Small flocks of spring migrants occur along the coast and in inland waters during the first three weeks of May. Breeding pairs are mainly found in the Pete Dahl Slough area, but do occur as far north as Long Island (July 1973), and probably occur in coastal marshes east of Pete Dahl Slough. Nesting begins in late May and early June. Most young hatch by mid-July.

Local breeders appear to migrate during the first days of September. Migrant Canvasbacks move through in late September and early October. These birds fly over and may stop at marshes along the coast.

Greater Scaup (Aythya marila)

The Greater Scaup is an abundant migrant, a common breeder, and an uncommon winter visitant to the CRD. The spring migration occurs from late April to mid-May.

Greater Scaup are probably the most numerous breeding duck on the coastal-sedge marshes. They prefer to nest in dense stands of sedge (Carex Lyngbyaei--which is the most common species on the flats). Greater Scaup also nest on ponds and lakes of the upper Delta--notably on Long Island. Nesting begins from late May through mid-June. Most young hatch in July.

Fall migrants pass through from early September until early November, being most common in late September and early October. Flocks of Greater Scaup use the larger ponds on the upper Delta and are found at Martin Lake.

Wintering Greater Scaup are common in Orca Inlet near Cordova, and a few stray to the tidal waters of the western portion of the CRD.

Lesser Scaup (Aythya affinis)

The Lesser Scaup is a rare migrant in early May and, again, in the fall. It is most frequent in late September and early October. They are seen in company with Greater Scaup in some of the lakes of the upper CRD.

Common Goldeneye (Bucephala clangula)

The Common Goldeneye is a fairly common migrant and uncommon winter visitant on the CRD. Spring migrants arrive on freshwater ponds and along the coast from late March through early

May and are most numerous in mid- and late April. Fall migrants appear along the outer coasts in mid-September, are fairly common during October, and most have departed by late November. Winter visitants are uncommon, both in open freshwater areas and along the outer coast.

Barrow's Goldeneye (Bucephala islandica)

The Barrow's Goldeneye is a common migrant, a fairly common breeder, and a fairly common winter visitant. From late March to early May, spring migrants are fairly common along the outer coast. They are most numerous as pairs and small flocks in mid- and late April.

Barrow's Goldeneyes nest in the vicinity of ponds and lakes on the upper Delta. Generally, they are tree cavity nesters.

Fall migrants are fairly common along the outer coasts from mid-September until late October. Winter visitants are abundant near the CRD. However, they are only fairly common on open waters on and bordering the CRD.

Bufflehead (Bucephala albeola)

Buffleheads are common migrants and fairly common winter residents. Spring migrants pass along the coast from late March to late May and at times are locally abundant during mid-April. Fall migrants arrive in early September becoming common between late September and early November. Migrants are found in sloughs near the coast, in tidal areas, and in the larger lakes of the upper Delta. Winter visitants also use these areas when not frozen.

Oldsquaw (Clangula hyemalis)

Oldsquaws are common migrants and winter visitants. Spring migrants are most common from late April to mid-May but during some years, may be locally abundant anytime between late March and late May. Fall migrants arrive after mid-September and are fairly common as scattered small flocks during October and November. Migrants and winter visitants are found along the coast in tidal waters.

Oldsquaws are rare visitants on the lakes and ponds of the Delta, where they may be recorded during the summer. They are not known to breed.

Harlequin Duck (*Histrionicus histrionicus*)

Harlequin ducks are abundant residents of the North Gulf Coast. Some do utilize coastal waters near Point Whited and near Softuk Bar where they are locally uncommon.

They breed in mountain streams above the upper Delta. Their occurrence in the rivers and streams of the Delta is local and rare.

Steller's Eider (*Polystica stelleri*)

The Steller's Eider has been reported as a rare winter visitant in nearby Prince William Sound. It can be expected as a casual visitant to the outer coast of the CRD in winter.

Common Eider (*Somateria mollissima*)

Common Eiders are rare winter visitants in adjacent Prince William Sound. - They may occasionally visit the outer coast of the CRD in winter.

King Eider (*Somateria spectabilis*)

King Eiders are rare winter visitants in waters of adjacent Prince William Sound. They probably are casual to the outer coast of the CRD, especially in winter.

White-winged Scoter (*Melanitta deglandi*)

White-winged Scoters are abundant residents along the coast. Migrant scoters are numerous along the outer coast in April and May, and from late September to early November. They do not breed on or near the CRD, but non-breeders are present, as are winter residents along the coast in tidal waters.

Surf Scoter (*Melanitta perspicillata*)

The Surf Scoter is an abundant resident and most numerous sea duck of the coast. Migrants are abundant in April and May and again from September to November in tidal waters. Large numbers of non-breeders remain along the coast in the summer, as do winter visitants.

Common Scoter (*Oidemia nigra*)

The Common Scoter is a fairly common migrant, an uncommon summer visitant, and a common winter visitant. It is the least numerous of the three scoters in the CRD area.

They usually occur as singles or small flocks except in migration and in winter when flocks occur along the coast. Migrant Common Scoters apparently are present from early April to late May and, again from late September through November. Winter visitants and migrants are in tidal waters.

Hooded Merganser (*Lophodytes cucullatus*)

The Hooded Merganser is a rare visitant. It has been reported on lakes, ponds, and streams near the coast from May through October, however, it may occur throughout the year. Most observations are of singles (immature and sub-adults) which are probably stragglers from southeastern Alaska, where the Hooded Mergansers are breeding residents (Isleib and Kessel, 1973).

Common Merganser (*Mergus merganser*)

The Common Merganser is a common resident. It becomes fairly common along the outer coasts and unfrozen freshwater areas from late March to early May. It probably breeds along the water areas of the upper Delta and particularly at Martin River and in freshwater areas near timber and shrubs along the CRD coast.

Fall migrants are found along the outer coast and in lakes and streams from mid-September through November, occasionally occurring in flocks of several hundred birds--sometimes mixed with Red-breasted Mergansers. Winter visitants are found in open freshwater and in protected areas along the coast.

Red-breasted Merganser (*Mergus serrator*)

The Red-breasted Merganser is a common migrant, a fairly common breeder, and a fairly common winter visitant. During April and May, it occurs in small flocks all along the outer coast.

Red-breasted Mergansers nest in brushy or timbered sites along beaver ponds and creeks on the upper CRD and along sloughs to the east of the Copper River. Young hatch by early July.

In September, fall migrants are fairly common and become common along the outer coast in October and into November. Winter visitants are fairly common along the outer coast and into tidal waters of sloughs.

Goshawk (*Accipiter gentilis*)

The Goshawk is a fairly common resident of the timbered portions of the CRD. It is essentially non-migratory except for dispersal in the winter to available food sources.

This species nests in hemlock-spruce forests and is regularly recorded along the CRH.

Sharp-shinned Hawk (*Accipiter striatus*)

The Sharp-shinned Hawk is a fairly common migrant, a possible breeder, and a casual winter resident. It is most frequently seen between 25 April and 10 May and, again, between 1 September and 25 September. This species irregularly winters on the CRD. It inhabits coniferous forests and brushy areas.

Red-tailed Hawk (*Buteo jamaicensis*)

The Red-tailed Hawk is a casual visitant to the CRD. Isleib and Kessel (1973) have a report of one adult seen on May 1, 1970 on the CRD.

Harlan's Hawk (*Buteo harlani*)

The Harlan's Hawk is a casual visitant to the CRD. Pete and Ruth Isleib saw a migrant adult flying eastward on October 13, 1969 at Mile 24 (Isleib and Kessel, 1973).

Rough-legged Hawk (*Buteo lagopus*)

Rough-legged Hawks are rare migrants and casual winter visitants. Spring migrants pass through from mid-April to mid-May and fall migrants from late August to late October. They irregularly are recorded during mild winters on the CRD. These birds occupy the open marsh and brush habitats.

Golden Eagle (*Aquila chrysaetos*)

The Golden Eagle is a rare visitant to the CRD. It may occur more regularly along the mountain slopes of the upper Delta.

Observations are largely confined to the period from March through November and generally consist of sub-adult, wandering individuals.

Bald Eagle (*Haliaeetus leucocephalus*)

Bald Eagles are abundant residents of the CRD. Spring migrants are apparent throughout April and early May. They nest on the CRD from the coast to inland areas. Most nests are in spruce or cottonwood, although Isleib (pers. comm.) reported one in driftwood on an alluvial deposited mound west of Cottonwood Point.

Fall migration extends from late August through early November, with most birds passing eastward along the slopes of the upper CRD. Overwintering eagles concentrate at available food sources such as spawned-out salmon and winter-killed Sitka Blacktail Deer. Such concentrations may exceed a hundred individuals.

Marsh Hawk (*Circus cyaneus*)

Marsh Hawks are common migrants, uncommon breeders, and rare winter visitants. Spring migrants are common from 25 April to 10 May. In the summer, Marsh Hawks are uncommon when at least a few nesting pairs occur on the upper marshes of the Delta.

Fall migrants are common from 25 August to 20 September, but most leave by early November. Some occur irregularly in the winter. One was seen from mid-November to mid-March, 1970, and local trappers reported others during mild winters coinciding with high rodent (Tundra Redback Voles and Tundra Voles) populations (Isleib and Kessel, 1973).

Osprey (*Pandion haliaetus*)

The Osprey is an uncommon migrant on the CRD. The main spring movement occurs from late April to early May. Fall migration is from late August to mid-October (less than ten per migration). It prefers timbered areas near streams and lakes but has been recorded along the barrier islands.

Gyrfalcon (*Falco rusticolus*)

The Gyrfalcon is probably a rare visitant and migrant. Although no reports of this species have been recorded on the CRD, it is probably an irregular migrant associated with migrating waterfowl.

Peregrine Falcon (*Falco peregrinus*)

The Peregrine Falcon is a rare migrant and winter visitant of the CRD. Migrants¹ appear most regularly between 15 April and 5 May and again, between 10 September and 15 October. These movements are associated with the mass movements of waterfowl on the CRD. They are rare but regular along the coast during the winter. Breeding birds are known from areas contiguous to the Delta, suggesting probable irregular occurrence during the summer.

¹ Most appear to be *F. p. pealei*, but some migrants and one winter bird (an adult male) show characteristics of the rare and endangered *F. p. anatum* (Isleib and Kessel, 1973).

Pigeon Hawk (*Falco columbarius*)

The Pigeon Hawk is an uncommon migrant and rare winter visitant of the CRD. Spring migration lasts from late March through early May (5 to 15 per spring migration). The fall migration occurs from early September through late October (5 to 15 per fall migration). One adult was seen at Mile 9 on 20 November 1971 and another on 23 December 1972.

Sparrow Hawk (*Falco sparverius*)

The Sparrow Hawk is a rare fall migrant of the CRD. It generally occurs between Mile 7 and Mile 27 from late August to mid-October and most frequently between 1 and 15 September (3 to 10 per fall migration).

Spruce Grouse (*Canachites canadensis*)

Spruce Grouse are fairly common residents. They inhabit spruce-hemlock forests, and are frequently seen on gravel roads.

Willow Ptarmigan (*Lagopus lagopus*)

Willow Ptarmigan are fairly common residents of the CRD area. During the summer, they occur in grassy, brushy valleys between 1,000 and 2,500 feet, but some may breed on the upper Delta. Willow Ptarmigan migrate to the brushy lowlands in late summer and remain until late spring. Wintering flocks generally number fewer than 100 birds per flock, although, flocks in the Martin River valley are somewhat larger. Isleib and Kessel (1973) report that local residents saw concentrations of Willow Ptarmigan numbering several thousands occur irregularly on the brushy flats of the CRD following summers of high reproductive success.

Rock Ptarmigan (*Lagopus mutus*)

Rock Ptarmigan have been recorded in the mountains adjacent to the CRD. During some winters, they probably occur on the Delta.

White-tailed Ptarmigan (*Lagopus leucurus*)

White-tailed Ptarmigan occur in the mountains next to the upper CRD. Although, their occurrence on the Delta is unrecorded, they may occur on the CRD during some winters.

Sandhill Crane (*Grus canadensis*)

Sandhill Cranes are fairly common spring migrants, casual summer visitants, and common, occasionally abundant, fall migrants.

Spring migrants arrive during the last half of April and are present through May. Most pass through during the first week of May. A few flocks stop on the coastal flats of the CRD.

Isleib and Kessel (1973) report a pair of Sandhill Cranes were observed by Alaska Department of Fish and Game personnel in mid-July 1972 near Pete Dahl Slough. This pair exhibited behavior characteristic of nesting birds.

The abundance of fall migrants is variable, ranging from a few 10,000's to several 100,000's. Steven R. Smith observed more than 500,000 cranes pass over the Delta during the daylight hours over a five-day period in late September, 1963 (Isleib and Kessel, 1973). Most migrants arrive from late August through early October. Many will stage on the coastal flats between the Copper River and Martin River Slough. With good weather, flocks do not linger on the flats of the CRD.

Black Oystercatcher (*Haematopus bachmani*)

Black Oystercatchers are residents of rocky shores and reefs nearby in Prince William Sound. Some individuals regularly wander on to the tidal zone of the CRD, particularly along the western boundaries near Point Whittshed.

Semipalmated Plover (*Charadrius semipalmatus*)

The Semi-palmated Plover is a common migrant and fairly common breeder. The spring migration is in the first three weeks of May. Through June and July, the species is represented by scattered individuals on tidal flats and beaches. Breeding birds are fairly common, but local in gravel bar areas of the upper Delta. Fall migration extends from mid-July to mid-September. The peak of migration is in early August (10 to 50 per day).

Killdeer (*Charadrius vociferus*)

The Killdeer is a casual visitant to beaches and alluvial flats of the CRD. Isleib saw one at Mile 7 on 24 May 1972. He has observed one at Cordova on 16 May and 22 May 1965. It may occur annually (Isleib and Kessel, 1973).

American Golden Plover (*Pluvialis dominica*)

American Golden Plovers are common migrants of the CRD. They are found on tidal flats and beaches. Spring migrants arrive in late April, are common in the first two weeks of May, and

have departed by the first week of June. Fall migrants are fairly common but scattered, often as singles and small flocks from mid-July through early September. After mid-September, they are uncommon until mid-October.

Black-bellied Plover (*Squatarola squatarola*)

Black-bellied Plovers are common migrants and uncommon summer visitants to tidal flats and beaches of the CRD. Spring migrants are common during the first half of May and fairly common during the last half of May. They are frequently associated with American Golden Plovers. Small flocks and occasional larger, loose flocks of 100+ birds are regular. Through June and July, summer visitants are uncommon occurring as scattered individuals and small flocks on tidal flats and barrier islands. July fall migrants appear and are fairly common in August and until mid-September. They are uncommon until mid-October.

Surfbird (*Aphriza virgata*)

Surfbirds are uncommon migrants along the coast of the CRD. Spring migrants occur during the last half of April and the first half of May, often associating with Black Turnstones and Rock Sandpipers in April and with Ruddy Turnstones in May.

After mid-July, fall migrants are fairly common along rocky shores near Point Whited through mid-October.

Ruddy Turnstone (*Arenaria interpres*)

Ruddy Turnstones are common spring migrants, rare summer visitants, and fairly common fall migrants, along the coast of the CRD. Spring migrants arrive during the first week of May, often mixed with the last of the Black Turnstone flocks or with Surf-birds. Throughout May, migrant Ruddy Turnstones are fairly common as individuals or small flocks mixed with flocks of other migrant shorebirds.

In the summer small flocks of Ruddy Turnstones are regular but rare. Fall migrants are fairly common in small flocks from mid-July to early September and infrequently to mid-October.

Black Turnstone (*Arenaria melanocephala*)

Black Turnstones are uncommon migrants and visitants along the barrier islands of the CRD. They are present as scattered

singles and small flocks throughout the year, but there is no evidence of nesting (Isleib and Kessel, 1973). Fall migrants are fairly common in small flocks along the coast near Point Whitshed. They are uncommon in September and October. During mild winters, they are present as singles and small flocks near the eastern boundary of the lower Delta.

Common Snipe (*Capella gallinago*)

The Common Snipe is a resident occurring seasonally as a common migrant, a common breeder, and a rare winter visitant. The spring migration lasts from mid-April through mid-May, peaking in early May. They are common breeders in the marshes of the CRD. They nest in May, most young are hatched by mid-June. From early August through late November fall migrants are regular. Loose flocks are common in September and early October. They are uncommon from mid-October until late November. In the winter months they are rare, being most frequent during mild winters.

Whimbrel (*Numenius phaeopus*)

The Whimbrel is a common migrant and uncommon summer visitant. Spring migration begins in the first week of May and peaks by mid-May.

Non-breeding summer visitants are uncommon in small flocks on the tidal flats. Fall migrants are fairly common by mid-July and are common from late July through August, usually as scattered small flocks on tidal flats and beaches. Late fall migrants occur uncommonly until early October.

Bristle-thighed Curlew (*Numenius tahitiensis*)

The Bristle-thighed Curlew may be a casual visitant to the CRD. It has been recorded to the east and to the west of the Delta during spring migration (early May) and fall migration (early August). Most migrate far offshore.

Spotted Sandpiper (*Actita macularia*)

The Spotted Sandpiper is a common migrant and a fairly common breeder of the CRD. The spring migration begins in the second week of May and ends by June. It is common during the latter half of May (10 to 50 per day). This species breeds on the banks of gravelly streams and lakes of the upper Delta. In the fall, migration lasts from August until mid-September, peaking in late August.

Solitary Sandpiper (*Tringa solitaria*)

Solitary Sandpipers are uncommon spring migrants and fairly common fall migrants. Spring migrants arrive in mid-May and have departed by late May. They occur as scattered individuals, occasionally associated with yellowlegs or dowitchers. In August and early September, they are fairly common on the upper Delta.

Wandering Tattler (*Heteroscelus incanum*)

Wandering Tattlers are uncommon migrants of the CRD. By the end of the first week of May, spring migrants are uncommon, occurring as singles or scattered individuals along the outer coast. Fall migrants begin leaving in late July. Most leave in late August and early September, and they are no longer seen in late September. They are most frequently noted near Point Whited.

Greater Yellowlegs (*Totanus melanoleucus*)

Greater Yellowlegs are common migrants and uncommon breeders on the CRD. Spring migrants arrive from mid-April until mid-May, being common in early May (20 - 100 per day). They nest in wet, but shrubby areas of the upper CRD. Fall migrants pass through from late July through October. Most depart in August and early September.

Lesser Yellowlegs (*Totanus flavipes*)

Lesser Yellowlegs are fairly common migrants and uncommon breeders on the CRD. Spring migrants arrive about the first of May and are fairly common (10 - 50 per day) during the first half of May and uncommon in late May. It regularly associates with, but usually is outnumbered by, Greater Yellowlegs.

Lesser Yellowlegs breed on the lower marshes of the CRD. Fall migrants are present in mid-July, fairly common through August (10 - 50 per day) and uncommon in September.

Knot (*Calidris canutus*)

Knots are abundant spring migrants and rare fall migrants. The first spring migrants arrive on the tidal flats during the first week in May. During a three- to four-day period between 10 and 20 May, several thousand birds occur in a brief but spectacular movement. Knots are rare during fall migration, occurring from mid-August to mid-September.

Rock Sandpiper (*Erolia ptilocnemis*)

Rock Sandpipers are uncommon migrants and uncommon winter visitants along the coast of the CRD. They are probably migrating during April and early May. Fall migrants begin moving in mid-August and are fairly common in September and October. Wintering birds are uncommon along tidal flats where they probably outnumber any other species of shorebirds.

Sharp-tailed Sandpiper (*Erolia acuminata*)

The Sharp-tailed Sandpiper is a casual migrant which probably occurs on the CRD. To date, it has been observed only three times in nearby Prince William Sound (Isleib and Kessel, 1973).

Pectoral Sandpiper (*Erolia melanotos*)

Pectoral Sandpipers are fairly common migrants. Spring migrants arrive during the first week of May and become fairly common in the marshes from 10 to 25 May. They usually occur as singles, scattered individuals, or small flocks, often with yellowlegs and Least Sandpipers.

In mid-August fall migrants are fairly common. They become common in late August and early September. Pectoral Sandpipers occur as small flocks (10 - 30 individuals) in the marshes and along the upper edges of the tidal flats. They become uncommon in late September and are rare in October.

White-rumped Sandpiper (*Erolia fuscicollis*)

The White-rumped Sandpiper is a casual visitant. Isleib (pers. comm.) observed one on the coastal marsh east of Cottonwood Point on 8 September 1973.

Baird's Sandpiper (*Erolia bairdii*)

Baird's Sandpipers are uncommon migrants of the CRD. Spring migrants arrive in early May. They occur uncommonly during the second and third weeks of May, usually as singles or a few individuals associated with other shorebirds. Most fall migrants move through the area in August. They usually are associated with Western Sandpipers and Pectoral Sandpipers on the marshes and tidal flats.

Least Sandpiper (*Erolia minutilla*)

Least Sandpipers are abundant migrants and common breeders. Spring migrants arrive during the last week of April and become common by the first week of May. They are abundant in

the second and third weeks of May and common until early June. They are a common breeder in tidal and freshwater marshes. Least Sandpipers are also common on the tidal flats through June and July.

Fall migrants are common in late July, abundant in August, and uncommon after early September.

Dunlin (*Erolia alpina*)

Dunlins are abundant migrants and fairly common summer visitants and uncommon winter visitants. Spring migrants arrive about the first of May and become abundant by the end of the first week of May. They are the second most abundant shorebird (after Western Sandpipers) from 5 to 20 May with millions moving through during this period.

Summer visitants are fairly common through June and July on tidal flats and coastal marshes. There are no observations that would indicate breeding.

Fall migrants are abundant in late July and the first half of August, common until early September, and rare and local from mid-September until mid-October.

Winter visitants are uncommon and local. They are mixed with flocks of wintering Rock Sandpipers.

Short-billed Dowitcher (*Limnodromus griseus*)

Short-billed Dowitchers are abundant migrants and common breeders. Spring migrants arrive in late April and become common during the first week of May. They are abundant during the second and third weeks of May and common into early June.

They begin nesting on marshes in mid-May and most young hatch by mid-June.

Fall migrants are common on muddy beaches and tidal flats through July and August and are uncommon in September.

Long-billed Dowitcher (*Limnodromus scolopaceus*)

Long-billed Dowitchers are common migrants, occurring on tidal flats and muddy beaches. Spring migrants arrive during the first week of May, generally a few days after the first Short-billed Dowitchers. Fall migrants arrive in early August, most pass through in the last half of August and in early September, and all have migrated by mid-October.

Semipalmated Sandpiper (*Ereunetes pusillus*)

The Semipalmated Sandpiper is an uncommon migrant and rare summer visitant. Spring migration begins during the first week of May. This species is represented by scattered individuals or small flocks, either mixed with Western Sandpipers on the tidal flats or loosely associated with Least Sandpipers and Pectoral Sandpipers on the marshes.

Semipalmated Sandpipers are rare in June. These birds are non-breeders. During July and early August, fall migrants are uncommon. By late August all have migrated. During fall migration, they are associated with other small shorebirds in the tidal flats, beaches, and marshes.

Western Sandpiper (*Ereunetes mauri*)

Western Sandpipers are abundant migrants and common summer visitants. Spring migrants arrive about the first of May and are abundant before the end of the first week of May. Millions utilize beaches and tidal flats between 5 and 20 May. At this time, they are the most abundant shorebird. Mixed flocks of Dunlins and Western Sandpipers numbering 50,000 to 100,000 birds regularly occur. Late migrants, non-breeders, and returning unsuccessful nesters are common on the coastal beaches throughout June.

Western Sandpipers are abundant along tidal flats during July and August and are fairly common into early September and largely absent by mid-September.

Hudsonian Godwit (*Limosa naemastica*)

The Hudsonian Godwit is an uncommon spring migrant and probably an uncommon fall migrant. Spring migrants arrive during the first week of May and occur regularly as singles and small flocks during the second week of May.

There is one record of a flock of 12 on 1 July 1959 at Pete Dahl Slough. It probably migrates through in mid-August as one was seen in adjacent Orca Inlet on August 9, 1972 (Isleib and Kessel, 1973).

Sanderling (*Crocethia alba*)

The Sanderling is a common migrant, a fairly common summer visitant, and probably a rare winter visitant. A few spring migrants arrive in early May, scattered amid flocks of other shorebirds. During late May, it is the most numerous shorebird

found in large flocks--at times containing a few thousand individuals. By the third and fourth weeks of May they become common. During June and July, non-breeding summer visitants are fairly common on the tidal flats. Fall migrants arrive sometime in July, are common throughout August, and become rare in September. It may irregularly winter on sandy beaches along the outer coasts.

Red Phalaropes (Phalaropus fulicarius)

Red Phalaropes are irregularly fairly common migrants and rare summer visitants. Spring migrants pass through from mid-May until mid-June. Although most Red Phalaropes migrate offshore, storms may push migrants on shore. At such times, they may be recorded throughout the tidal areas of the Delta.

Summer visitants are rare and occur in waters along the outer coast. Along the outer coast and on tidal rivers and sloughs fall migrants are rare in September and early October.

Northern Phalarope (Lobipes lobatus)

Northern Phalaropes are abundant migrants and abundant breeders. Spring migrants arrive during the first week of May, are abundant during the second and third weeks of May, are common until early June.

They nest on coastal marshes of the CRD. Most young hatch by late June. From late July until September, fall migrants are abundant. Northern Phalaropes are common through September and become rare during October.

Pomarine Jaeger (Stercorarius pomarinus)

Pomarine Jaegers are fairly common migrants and rare summer visitants. Spring migrants occur from mid-April to mid-June. They are fairly common from mid-May until mid-June between Softuk Bar and Pete Dahl Bar (10 - 50 per day) on both sides of the barrier islands.

In the summer, Pomarine Jaegers are rare visitants along the coast. Fall migrants are common in late July and early August, uncommon after mid-August, and rare through October and early November.

Parasitic Jaeger (Stercorarius parasiticus)

Parasitic Jaegers are uncommon spring migrants, common breeders, and common fall migrants. Spring migrants pass through the

region between late April and mid-May. During the second week of May breeders become common. Birds begin nesting on coastal marshes in late May and early June. Young hatch by early July.

Isleib estimated the population at about 250 individuals in May - June, 1963 while 350 to 400 (including 160 to 170 pairs) were present from May through July 1970 (Isleib and Kessel, 1973).

From late July until mid-September, fall migrants are common. They are uncommon until mid-October and rare in November.

Long-tailed Jaeger (*Stercorarius longicaudus*)

Long-tailed Jaegers are rare migrants. Spring migrants pass through without lingering beginning in early May. They are regular (2 - 5 per spring migration) through late May. Long-tailed Jaegers are rare fall migrants occurring from late July until early September (3 - 5 per fall migration). Most observations are from waters bordering the barrier islands.

Glaucous Gull (*Larus hyperboreus*)

Glaucous Gulls are uncommon residents. They occur regularly generally as singles along the coast mostly as first-year birds. Rarely do they occur on tidal sloughs of the upper Delta.

Glaucous-winged Gull (*Larus glaucescens*)

Glaucous-winged Gulls are abundant residents. They are the principal scavenger of the tidelands, being especially abundant wherever food sources are plentiful.

Approximately 20,000 Glaucous-winged Gulls nest on the barrier islands along the CRD. Most nesting is on Egg Island. Nesting begins in mid-May. Most young hatch by late June.

Spring and fall migratory movements are evident between mid-April and mid-May and between mid-September and mid-October.

Considerable numbers overwinter along and off the outer beaches of the barrier islands.

Herring Gull (*Larus argentatus*)

Herring Gulls are residents, occurring seasonally as fairly common spring and fall migrants, possibly as rare local breeders, and as fairly common summer and winter visitants. Migrants pass through (20 - 100 per day) between mid-April and mid-May and between mid-September and mid-October.

Gabrielson (1944) reported a small nesting colony mixed with Mew Gulls on June 10, 1944, but no evidence of this colony now exists.

Herring Gulls (and Thayer's Gulls, *L. a. thayeri*) are fairly common in winter along the outer coast.

Mew Gull (*Larus canus*)

Mew Gulls are abundant residents of the CRD. Mew Gulls migrate from mid-March through May and from August through November. They breed as scattered pairs and loose aggregations on marshes and barrier islands. Nesting begins in mid-May. Most young hatch by early July. They can be found in concentrations wherever food sources are abundant.

In the winter they are fairly common along the coast, although, most of the population moves south.

Bonaparte's Gull (*Larus philadelphia*)

Bonaparte's Gulls are fairly common migrants of the CRD. Spring migrants pass through along the coast during the last week of April and the first half of May. Fall migrants are fairly common along the coast and coastal marshes from late July through mid-October.

Black-legged Kittiwake (*Rissa tridactyla*)

Black-legged Kittiwakes are residents of the CRD occurring as abundant migrants, abundant summer visitants, and uncommon winter visitants. Spring migrants arrive from mid-March to early June. They breed on rocky slopes adjacent to the CRD and range throughout tide waters of the Delta. Fall migrants pass through from mid-August through October. They are uncommon along the coast in winter.

Sabine's Gull (*Xema sabini*)

The Sabine's Gull is a rare spring and fall migrant. It occurs along the coast in late May and again from August through early October.

Arctic Tern (*Sterna paradisaea*)

Arctic Terns are abundant migrants and abundant breeders. Spring migrants arrive from late April through mid-May. They become common during the first week of May and are abundant thereafter.

On marshes and inland ponds Arctic Terns nest as scattered pairs. On the barrier islands they nest in colonies. Nesting begins in mid-May. Young are flying by late July.

Fall migrants are abundant from late July through mid-August, common through late August, and uncommon during the first two weeks of September.

Aleutian Tern (*Sterna aleutica*)

The Aleutian Tern is an uncommon breeder on the CRD. It arrives during the first two weeks of May. Egg laying commences in mid-May. Nesting is largely confined to a one- to two-mile strip along the outer edge of the marsh flats. In early June 1970, Isleib estimated the population at 300 to 500 birds (Isleib and Kessel, 1973).

Breeders depart soon after the young gain flight in late July. They are rare after early August.

Caspian Tern (*Hydroprogne caspia*)

The Caspian Tern is an accidental visitant to the CRD. On 28 August 1965, Isleib tentatively identified a Caspian Tern at Egg Island (Isleib and Kessel, 1973).

Common Murre (*Uria aalge*)

Common Murres are fairly common residents along outer coastal waters off the barrier islands. Migratory movement is over offshore waters. Murres do nest at Martin Islands and some of these birds feed in waters along the outer coast of the CRD.

Pigeon Guillemot (*Cepphus columba*)

Pigeon Guillemots are rare visitants to coastal waters. They are common breeders in areas adjacent to the CRD.

Marbled Murrelet (*Brachyramphus marmoratus*)

Marbled Murrelets are fairly common residents of coastal waters. They display no migratory movements, although, they are more dispersed in the fall. They occur mainly in the offshore waters. Little is known of their breeding habits. They probably nest in screens above timberline.

Kittlitz's Murrelet (*Brachyramphus bevirostris*)

Kittlitz's Murrelets are rare residents of coastal waters. They are found along the coast of the east side of the CRD.

Like the Marbled Murrelet, little is known of their breeding habits.

Ancient Murrelet (*Synthliboramphus antiquum*)

Ancient Murrelets are rare and local visitants to coastal waters. They are seen during summer and fall.

Horned Puffin (*Fratercula corniculata*)

Horned Puffins are rare and local visitants to coastal waters during summer and fall.

Tufted Puffin (*Lunda cirrhata*)

Tufted Puffins are uncommon residents along the CRD coast during the period from May to October. Breeding colonies exist at Boswell Bay on nearby Hinchinbrook Island. Birds from these colonies feed in waters around Egg Island.

Mourning Dove (*Zenaidura macroura*)

The Mourning Dove is a casual fall visitant to the CRD. One was shot on the marshes during the fall hunting season in the late 1950's. There are four other reports from nearby areas in October (Isleib and Kessel, 1973).

Great Horned Owl (*Bubo virginianus*)

Great Horned Owls are fairly common residents of the CRD. They occur regularly in the forested areas of the CRD.

Snowy Owl (*Nyctea scandiaca*)

The Snowy Owl is a rare winter visitant of the CRD. Local trappers and bush pilots report a few Snowy Owls on the barrier islands and marshes at least one or two winters out of every five (Isleib and Kessel, 1973).

Hawk Owl (*Surnia ulula*)

Hawk Owls are uncommon residents of the forests and shrublands. They can be observed from Mile 5 to Mile 27 at 0 to 3 per day from March through September and 1 to 10 per day from October to March. A pair was resident from April through July, 1969 and 1970 in a large cottonwood stand at Mile 25 - 26. They probably nested (Isleib and Kessel, 1973).

Great Gray Owl (*Strix nebulosa*)

Great Gray Owls are local and rare residents of heavily timbered areas. Four or five pairs have been reported in the Martin River valley in March of 1968 and 1969 by J. Ed King, local trapper and guide (Isleib and Kessel, 1973).

Short-eared Owl (*Asio flammeus*)

Short-eared Owls are fairly common migrants, uncommon local breeders, and rare winter visitants. Spring migrants arrive from late April to early June. Most occur during mid-May (10 - 50 per spring migration).

During the years of high small mammal populations, approximately ten pairs nested on the western marshes of the CRD. During years of low rodent populations, few or no pairs nest.

Fall migration is from mid-August through October with most movement in late August and early September (10 - 50 per fall migration).

These owls winter on the CRD two or three years out of five. Their occurrence and abundance is related to weather conditions and the availability of rodents.

Boreal Owl (*Aegolius funereus*)

The Boreal Owl is a rare visitant to the CRD. Eight to ten were trapped in the winter of 1957 - 1958 on the CRD. Few other sightings have been recorded. Their occurrence may be related to food availability and weather conditions.

Saw-whet Owl (*Aegolius acadicus*)

The Saw-whet Owl is probably a rare resident. One was caught in late November, 1970, in a trap located 14 miles east of Cordova. This species occurs in timbered areas mainly on the upper Delta.

Rufous Hummingbird (*Selasphorus rufus*)

Rufous Hummingbirds are common migrants and common breeders. Spring migrants begin arriving during the first half of May, although, most arrive in the latter half of May. In June they are common in forests where they build nests on tree branches.

Rufous Hummingbirds become inconspicuous after early July and apparently begin fall migration in late July. Only a few birds linger beyond mid-September.

Belted Kingfisher (*Megaceryle alcyon*)

Belted Kingfishers are residents, occurring seasonally as uncommon migrants, fairly common breeders, and irregular rare winter residents. Migrants occur along the coast from mid-April to mid-May and again from mid-August to early October.

Nesting along streams and lakes begins as early as mid-May. Pairs burrow into sand and gravel banks to build a nest for the eggs and young. Belted Kingfishers feed on minnows and fry in streams, lakes, and rocky coasts.

Wintering birds are irregular, depending on areas of open freshwater streams.

Yellow-shafted Flicker (*Colaptes auratus*)

Yellow-shafted Flickers are rare summer visitants and rare fall migrants. They occur regularly in forested areas between Cordova and Mile 27 in August and September.

Hairy Woodpecker (*Dendrocopos villosus*)

Hairy Woodpeckers are rare visitants. On the CRD Isleib has recorded fewer than ten individuals a year, usually in the spring and fall (Isleib and Kessel, 1973).

Downy Woodpecker (*Dendrocopos pubescens*)

Downy Woodpeckers are uncommon residents. They occur in thickets and woodlands throughout the year.

Western Kingbird (*Tyrannus verticalis*)

The Western Kingbird is an accidental fall visitant to the CRD. One was observed by Mickelson on August 16, 1973, in alder at the mouth of Alaganik Slough. This is the second sighting of this species in Alaska.

Traill's Flycatcher (*Empidonax traillii*)

The Traill's Flycatcher is an uncommon migrant and a fairly common local breeder. Spring migration occurs in late May and early June.

They are fairly common on breeding territories in willows and alders along the CRH by the second week of June. By the end of August, Traill's Flycatchers have migrated.

Olive-sided Flycatcher (*Nuttallornis borealis*)

The Olive-sided Flycatcher is a rare spring migrant and probably a rare fall migrant. Pete and Ruth Isleib saw three Olive-sided Flycatchers along Eyak Lake on 16 May 1971, (Isleib and Kessel, 1973). They probably occur as migrants in conifers on the upper CRD in both spring and fall.

Horned Lark (*Eremophila alpestris*)

The Horned Lark is a rare migrant to the CRD. One was found dead on the runway of the Cordova airport at Mile 13 on 19 May 1966 (Isleib and Kessel, 1973).

Violet-green Swallow (*Tachycineta thalassina*)

Violet-green Swallows are fairly common migrants and fairly common breeders. Spring migrants arrive about the first of May and become fairly common in mid- and late-May. They nest in crevices in cliffs and in old buildings. Young are out of the nest in July and most have migrated by early August.

Tree Swallow (*Iridoprocne bicolor*)

Tree Swallows are common migrants and common breeders. Spring migrants arrive in late April and become common in the second and third weeks of May. Nesting begins in the last half of May. Pairs nest in tree cavities or buildings near water. Young are out of the nest in July. Fall migrants leave or pass through between mid-July and mid-August, although a few linger until early September.

Bank Swallow (*Riparia riparia*)

Bank Swallows are rare migrants and fairly common breeders of the CRD. A few spring migrants are among the flocks of Violet-green and Tree Swallows in mid- and late-May. Pairs excavate burrows along the cutbanks of the Copper River in late May and early June. Scattered, small colonies of Bank Swallows are found from Cottonwood Point and upper Grass Island Slough to Miles Glacier, beyond the Forest Boundary.

The migration begins in mid-July soon after the young are able to fly.

Barn Swallow (*Hirundo rustica*)

Barn Swallows are uncommon migrants and fairly common breeders of the CRD. Spring migrants arrive in mid-May. They nest in old buildings and under bridges. Nest building is usually in late May and the first half of June.

Migrants depart from late July through mid-September with the bulk leaving in August.

Cliff Swallow (*Petrochelidon pyrrhonota*)

Cliff Swallows are rare migrants and possible rare breeders of the CRD. Spring migrants arrive in late May and early June. A few pairs nest on buildings in Cordova and may nest on old buildings on the CRD. Nest-building occurs in late June and young fledge by mid-August. Migrants depart in late August and early September.

Gray Jay (*Perisoreus canadensis*)

Gray Jays are uncommon local residents. They prefer boreal coniferous forest, but may also be found in adjacent alder-cottonwood habitat. They are found on the upper CRD near the Forest Boundary (Mile 39) and occur in the Martin River area.

During the fall of 1969 an invasion of Gray Jays occurred. Thousands of birds were present in various habitats throughout the Delta from August until October. Some remained until May, 1970, (Isleib and Kessel, 1973).

Steller's Jay (*Cyanocitta stelleri*)

The Steller's Jay is a common resident of the hemlock-Sitka spruce forest. It is conspicuous during the warmer months but is shy in the winter, retiring to the densest woods.

Black-billed Magpie (*Pica tica*)

Black-billed Magpies are fairly common residents. They occupy a range of habitats except during the breeding season when they prefer shrub thickets of mountain slopes on the upper Delta for nesting.

Family groups appear to stay together in late summer and fall but disperse in the winter. They forage at local garbage dumps, on carrion, and along beaches.

Common Raven (Corvus corax)

Common Ravens are abundant residents. They occupy a wide range of habitats. Ravens nest on or near the CRD. Isleib found one nest on a bluff at Martin River Slough on 29 May 1963 which contained three almost fledged young. Ravens are scavengers and occur feeding on carrion, spawned-out salmon, and at garbage dumps. They are one of the most frequently observed species on the frozen, wind-swept lowlands of the Delta during winter.

Northwestern Crow (Corvus caurinus)

Northwestern Crows are uncommon visitants to the CRD. They occur as residents at coastal sites adjacent to the Delta. A few crows regularly straggle on to the Delta, especially along its western fringe.

Black-capped Chickadee (Parus atricapillus)

Black-capped Chickadees are rare residents and rare or irregularly uncommon migrants. They occur in mixed deciduous-spruce woodlands of the upper CRD. A few birds, probably fall migrants, regularly occur with migrating warblers and kinglets from late August until mid-October. A "wave" of Black-capped Chickadees, composed of singles and small flocks, moved eastward across the Delta in September and October, 1971.

Boreal Chickadee (Parus hudsonicus)

The Boreal Chickadee is a rare visitant. It occurs sparingly in spruce-hemlock forests of the upper Delta. Isleib observed three on 15 October 1969 at Mile 25 and one at Mile 27 on 27 March 1969. It may occur regularly in the Martin River - Martin Lake area.

Chestnut-backed Chickadee (Parus rufescens)

Chestnut-backed Chickadees are common residents of hemlock-spruce forests. They nest in tree cavities. The nesting period is during late May through June.

Red-breasted Nuthatch (Sitta canadensis)

Red-breasted Nuthatches are rare residents of coniferous forests of the CRD. In the fall of 1971, thousands of these nuthatches invaded the CRD-Prince William Sound area. They first appeared in late August, were abundant from mid-September until early

November, and a few remained through April, 1970. A similar invasion is occurring during fall of 1973. Normally, a few are recorded every fall and winter. Breeding may occur, but is unrecorded to date.

Brown Creeper (Certhia familiaris)

The Brown Creeper is a rare resident of coniferous forest of the upper Delta. It is recorded more frequently in the fall than during other seasons.

Dipper (Cinclus mexicanus)

Dippers are uncommon residents of the CRD. They are found along rocky streams and lakes of the upper Delta.

Winter Wren (Troglodytes troglodytes)

Winter Wrens are rare residents. They infrequently are recorded within the coniferous forests.

Robin (Turdus migratorius)

Robins are fairly common migrants and uncommon breeders. Spring migrants arrive from mid-April to mid-May, being more numerous during early May. Breeding birds are uncommon in forest edge habitats of the upper Delta. Fall migrants first arrive in August, are more common in September, and generally have departed by November.

Varied Thrush (Ixoreus naevius)

Varied Thrushes are residents, occurring seasonally as abundant migrants, abundant breeders, and rare winter visitants. Spring migrants begin arriving between late March and early April, and are abundant by early May. They breed in coniferous forests. Varied Thrushes nest in May, and young are fledged in June.

Fall migrants begin leaving in mid-August. Most depart during September, but they are fairly common through October. The last of the migrants depart by mid-November. Singles or small flocks do overwinter.

Hermit Thrush (Hylocichla guttata)

Hermit Thrushes are abundant migrants and abundant breeders. Spring migrants arrive in April and are abundant by mid-May. Hermit Thrushes breed abundantly in forests, woodlands, and thickets throughout the Delta.

Fall migrants begin leaving in mid-August; most leave in late August and September. Some regularly linger until 10 October, while a few remain until late October.

Swainson's Thrush (*Hylocichla ustulata*)

The Swainson's Thrush is a rare migrant. Spring migration occurs from mid-May through mid-June. The fall migration is in late August. This species prefers brushy habitat.

Gray-cheeked Thrush (*Hylocichla minima*)

Gray-cheeked Thrushes are rare migrants through the CRD. Each spring migrants arrive in May. During the latter part of August and in early September, fall migrants pass through the area.

Golden-crowned Kinglet (*Regulus satrapa*)

Golden-crowned Kinglets are residents, occurring seasonally as fairly common migrants, uncommon breeders, and uncommon winter visitants. Throughout the year they are found in hemlock-spruce forests. Migrants are fairly common in small mixed passerine flocks during April and May and, again, from mid-August until mid-October. Wintering birds are uncommon and are frequently found with small flocks of chickadees.

Ruby-crowned Kinglet (*Regulus calendula*)

Ruby-crowned Kinglets are abundant migrants and abundant breeders occupying hemlock-spruce forests. Spring migrants arrive between mid-April and mid-May. Fall migrants begin passing through in early August, are abundant from mid-August until early September and remain fairly common until early October.

Water Pipit (*Anthus spinoletta*)

Water Pipits are common migrants and uncommon summer visitants. Spring migrants first arrive in mid-April and are common in early and mid-May. Summer visitants are uncommon on open lowland areas adjacent to alpine uplands above the Delta where it is a fairly common breeding species. Fall migrants are common in flocks along beaches and tidal flats from mid-August until early October. Occasional late migrants or stragglers remain until November.

Bohemian Waxwing (*Bombicilla garrulus*)

Bohemian Waxwings are rare visitants in the CRD area. Occasional small flocks occur most regularly from August to November in

shrubs or mixed deciduous-coniferous habitats. However, they may occur at any season.

Northern Shrike (*Lanius excubitor*)

Northern Shrikes are regular, but uncommon winter visitants on the CRD. From September to April, shrikes are regularly recorded in shrub thickets throughout the CRD. They usually are not numerous (1 - 5 per day) but during some winters, they are fairly common (5 - 20 per day) on portions of the upper Delta. Breeding probably occurs on brush-forest ecotones of the upper Delta.

Orange-crowned Warbler (*Vermivora celata*)

Orange-crowned Warblers are abundant migrants and common breeders. Spring migrants arrive in early May and become abundant during the latter half of May. They are the second most numerous breeding warbler (after Wilson's Warbler). Orange-crowned Warblers utilize shrubs for nesting. By early August, the fall migrants begin leaving and most have departed by early October.

Yellow Warbler (*Dendroica petachia*)

Yellow Warblers are fairly common migrants and fairly common breeders. Spring migrants arrive in late May and early June, becoming fairly common around the first of June. They breed in willow thickets.

Migrating movements across the CRD begins in late July, peak in mid-August, and end by mid-September.

Myrtle Warbler (*Dendroica coronata*)

Myrtle Warblers are rare migrants. They usually arrive in mid- and late May. A few fall migrants annually occur between mid-August and mid-September, usually as single birds associating with other passerine migrants. They typically occur in mixed deciduous-spruce woodlands.

Townsend's Warbler (*Dendroica townsendi*)

Townsend's Warblers are uncommon migrants and breeders. Spring migrants arrive between mid-May and early June. They prefer hemlock-spruce forest of the upper CRD where they are local breeders. Fall migrants pass through in August and a few migrate in early September.

Northern Waterthrush (*Seiuris noveboracensis*)

The Northern Waterthrush is a rare fall migrant and a possible breeder on the CRD. Self saw Northern Waterthrushes along

Martin River Slough in early July, 1954. Fall migration occurs from mid-August through early September.

Wilson's Warbler (*Wilsonia pusilla*)

Wilson's Warblers are common migrants and abundant breeders. Spring migrants begin arriving in early May and are common by late May. These warblers are the most numerous breeding warbler on the CRD. They breed in shrub thickets.

From early August until late September, fall migrants depart with the majority moving out in late August.

Red-winged Blackbird (*Agelaius phoeniceus*)

The Red-winged Blackbird is a casual probably rare, visitant to the CRD. A singing male was seen at Mile 7 in May, 1964. It may irregularly or locally breed on coastal marshes or perhaps on the marsh of Martin Lake.

Rusty Blackbird (*Euphagus carolinus*)

Rusty Blackbirds are residents, occurring as uncommon spring migrants, rare breeders, fairly common fall migrants, and rare winter visitants. Small flocks of presumably spring migrants arrive in April and May. Scattered individuals and pairs are present nearly every summer on the upper CRD in shrubby areas near marshes. A few pairs probably breed.

Fall migrants are fairly common from mid-August until late October, especially on marshes.

Small flocks of overwintering Rusty Blackbirds are rare, but regular, especially when freshwater marshes remain unfrozen.

Pine Grosbeak (*Pinicola enucleator*)

Pine Grosbeaks are uncommon residents of shrub and forested areas. Some migratory movement is apparent, especially during October when small flocks flying eastward are common. Small flocks regularly winter on the upper Delta. They occur in coniferous forests and occasionally in alder thickets.

Gray-crowned Rosy Finch (*Leucosticte tephrocotis*)

Gray-crowned Rosy Finches are rare and irregular visitants. They are most frequently seen in April on portions of the upper Delta.

Hoary Redpoll (*Acanthus hornemanni*)

Hoary Redpolls are rare winter visitants. During "invasion years" this redpoll is fairly common on the upper CRD in shrub thickets.

Common Redpoll (*Acanthus flammea*)

Common Redpolls are fairly common migrants, rare summer visitants, and uncommon winter visitants of the CRD. Summer visitants occur on the upper Delta where breeding undoubtedly occurs on adjacent brushy, mountain slopes. In spring and fall they are at lower elevations and along the coast in shrubs and cottonwoods. Small flocks to flocks of a few thousand birds occur between late November and early March each winter.

Pine Siskin (*Spinus pinus*)

Pine Siskins are residents, generally common during spring and fall, fairly common during summer, and uncommon or rare during the winter. They occur throughout forest and woodland habitats. They probably breed in these areas.

Red Crossbill (*Loxia curvirostra*)

Red Crossbills are rare residents, occurring in hemlock-spruce forests. Small flocks have been reported at all seasons of the year.

White-winged Crossbill (*Loxia leucoptera*)

White-winged Crossbills are uncommon residents. A few flocks occur every year in forests of the upper CRD. In mid-October 1969, from 50,000 to 100,000 flew eastward along the CPL between Mile 17 and Mile 27. This movement in 1969 coincided with other "waves" of Pine Siskins and Pine Grosbeaks, invasions of Red-breasted Nuthatches and Gray Jays, and with the periodic presence of Red Crossbills.

Savannah Sparrow (*Passerculus sandwichensis*)

Savannah Sparrows are abundant migrants and abundant breeders. Spring migrants begin to arrive in late April, although, the majority arrive in mid-May. They breed on coastal marshes.

Fall migrants first occur in early August and become abundant along the coasts in late August and early September. They are fairly common until late October, and a few stragglers may remain until mid-November.

Slate-colored Junco (*Junco hyemalis*)

Slate-colored Juncos are uncommon residents. Spring migrants begin arriving in mid-April and are present until late May. They breed in the understory of coniferous forests.

They pass through on migration from mid-August to late October, and a few overwinter.

Oregon Junco (*Junco oreganus*)

The Oregon Junco is an uncommon resident. The CRD is near the northwestern limit of this species' range. On the CRD, Oregon Juncos interbreed with Slate-colored Juncos--such intergrades have been observed.

They breed in the understory of coniferous forests and a few regularly overwinter, often in mixed flocks with Slate-colored Juncos.

Tree Sparrow (*Spizella arborea*)

Tree Sparrows are rare fall and winter visitants. They occur in marshes and open shrub thickets from late-September through early April.

White-crowned Sparrow (*Zonotrichia leucophrys*)

White-crowned Sparrows are residents, occurring as uncommon migrants, rare breeders, and casual winter visitants. Spring migrants are uncommon among the masses of other migrant sparrows during May. They probably breed in shrubs along the Copper River above the Delta. Fall migrants are uncommon along the coast from August until early November. Wintering birds were present at Cordova in 1968, 1969, and 1970 (Isleib and Kessel, 1973), and may be expected irregularly on upper portions of the Delta.

Golden-crowned Sparrow (*Zonotrichia atricapilla*)

Golden-crowned Sparrows are abundant migrants, and common breeders. Spring migrants begin arriving in late April and, in most years, are abundant between 10 and 25 May. During migration, they are one of the most numerous passerines along the coast.

They breed in shrub thickets of the upper Copper River Delta. By mid-August, Golden-crowned Sparrows move out to the coast. Most have departed by the first of October.

Fox Sparrow (*Passerella iliaca*)

Fox Sparrows are abundant migrants and abundant breeders on the CRD. Spring migrants arrive in April and become abundant along the coast during the first half of May.

Fox Sparrows are among the most numerous breeding passerines. They nest in shrubs.

In early August, migrants move along the coast. Most pass through between late August and late September, although, a few regularly remain until mid-October.

Lincoln's Sparrow (*Melospiza lincolni*)

Lincoln's Sparrows are fairly common migrants and breeders. Migrants pass through in May and, again, from mid-August until mid-September. They breed in marshy-shrub areas of the upper Delta.

Song Sparrow (*Melospiza melodia*)

Song Sparrows are residents, occurring as uncommon migrants, fairly common breeders, and rare winter residents. Spring migrants arrive between mid-April and early May.

They are fairly common breeders and occur on the barrier islands, along the coast, and in marshes with willows. Presumably, most of these birds and others migrate in September and early October. After mid-October, they become rare and overwinter locally along the coast and at Eyak River.

Lapland Longspur (*Calcarius lapponicus*)

Lapland Longspurs are uncommon migrants on the CRD. Spring migrant flocks occur on marshes and beaches from late March to late May. Flocks are usually small (5 - 50 birds) and uncommon (10 - 50 flocks). Fall migrants are fairly common on the coastal marshes between late August and late September. They occur in flocks of 50 to 200 birds.

Snow Bunting (*Plectrophenax nivalis*)

Snow Buntings are uncommon spring migrants and rare fall migrants. Spring migrants appear as scattered, small flocks along the coast from mid-March until early May. A few small flocks appear along the coast and the Copper River from mid-October through November.

Masked Shrew (Sorex cinereus)

Masked Shrews are fairly common residents of the CRD. They are found in a wide variety of habitats from the coast inland.

Dusky Shrew (Sorex obscurus)

Dusky Shrews are fairly common residents. They occupy many habitats on the CRD.

Black Bear (Ursus americanus)

Black Bears are fairly common residents. They are found in timber or brush habitat near timber. Black Bears overwinter at dens generally located in the mountains bordering the Delta.

Brown Bear (Ursus [arctos] middendorffi)

Brown Bears are fairly common residents. They occur throughout the Delta during the spring, summer, and fall. Most remain in dens (usually at higher elevations) from late October and November through April and sometimes May.

Marten (Martes americana)

Marten are residents of the CRD. They are found in hemlock-Sitka spruce forests. East of the Copper River they probably are fairly common residents. A few rarely stray into the timbered area west of the Copper River (Kritchen, pers. comm.).

Shorttail Weasel (Mustela erminea)

The Shorttail Weasel is an abundant resident. It occurs in a wide variety of habitats.

Least Weasel (Mustela rixosa)

The Least Weasel is a rare resident. Over the last 15 years, at least four have been trapped near Mile 20 along a road bridge (Kritchen, pers. comm.). This species prefers meadow-shrub areas.

Mink (Mustela vison)

Mink are common residents along streams, sloughs, and lakes. They are found throughout the Delta. Mink are one of the most sought after furbearers on the CRD.

Wolverine (Gulo luscus)

The Wolverine is a fairly common resident. It generally occurs along the fringes of timber, but occasionally strays out on to the lower Delta.

River Otter (Lutra canadensis)

River Otters are fairly common residents. They are found along rivers, sloughs, lakes, and beaver ponds.

Sea Otter (Enhydra lutra)

Sea Otters are fairly common residents of nearby Prince William Sound where between 50 and 100 are found between Point Whited and Boswell Bay on Hinchinbrook Island (Isleib and Reynolds, pers. comm.). Some of these wander into coastal waters of Egg Island.

Red Fox (Vulpes fulva)

Red Foxes are uncommon residents. They mainly occur on the lower Delta in shrub habitat. Over the past 20 years when populations were higher, they occurred into timbered areas (Kritchen, pers. comm.). Most dens are located in sandy soils below the Mile 27 bridge and near the coast.

Coyote (Canis latrans)

Coyotes are fairly common residents. They primarily occur in brushy habitats of the upper Delta. Some are found on the larger islands of the lower Copper River. A few occasionally wander out onto Egg Island and possibly other barrier islands.

Gray Wolf (Canis lupus)

The Gray Wolf is a resident of the CRD area. It uncommonly occurs along the fringes of mountains east of the Copper River. Individuals occasionally straggle onto the upper Delta west of the Copper River (Kritchen, pers. comm.).

Lynx (Lynx canadensis)

The Lynx is a sporadic visitant and probable rare resident. This species prefers hemlock-spruce forests and shrub areas near timber. It may reside east of the Copper River. In years of low populations of Snowshoe Hares in interior Alaska, Lynx stray down the Copper River valley onto the CRD.

Northern Sea Lion (*Eumetopias jubata*)

Northern Sea Lions are rare visitants. They are found in waters around barrier islands and may occasionally swim up river channels for a few miles (Isleib, pers. comm.).

Harbor Seals (*Phoca vitulina*)

Harbor Seals are common residents. They occur in coastal waters and during summer in rivers and sloughs. Harbor Seals do follow migrating fish up the Copper River beyond the Forest Boundary. They also are frequently seen during summer basking on mud flats of the lower Copper River.

Hoary Marmot (*Marmota caligata*)

Hoary Marmots are rare, local residents. They occur in rocky hillsides. There are a few at Martin Lake and Kritchen (pers. comm.) reports some at Mile 27.

Red Squirrel (*Tamiasciurus hudsonicus*)

Red Squirrels are fairly common residents of hemlock-Sitka spruce forests. They are generally found on the upper Delta between Eyak Lake and Mile 27. They do occur east of the Copper River, but their status is unknown.

Beaver (*Castor canadensis*)

Beavers are common residents. They occur throughout the Delta where willows and alder are available for food and construction of dams and houses. Beavers are known to be abundant in the creek flowing into Martin Lake, in the lakes five miles north-east of Cottonwood Point, in some locations between Mile 15 and Mile 27, and in the Sheep Creek-Johnson River area (Between Mile 39 and Martin River). They are one of the most sought after furbearers on the CRD.

Northern Bog Lemming (*Synaptomys borealis*)

The Northern Bog Lemming is a fairly common resident. It is known to occur on the upper Delta in marsh, bog, and forested habitats (Solf, pers. comm.).

Tundra Redback Vole (*Clethrionomys dawsoni*)

The Tundra Redback Vole is a fairly common resident. It occurs mainly in shrub and forest areas, although, individuals may wander out into the marshes.

Tundra Vole (*Microtus oeconomus*)

Tundra Voles are permanent residents. They occur in drier areas in marshes. Vole populations are cyclic, with populations high every three to four years. In 1968, 1969, and 1970 Tundra Voles were abundant (Isleib and Kessel, 1973). In 1972 and 1973 they appeared to be reaching their cyclic peak.

Muskrat (*Ondatra zibethica*)

Musk rats are fairly common residents. They are primarily found on the marshes and beaver ponds of the upper Delta. Prior to the 1964 earthquake, they were common on the marshes. Musk rats were abundant in the mid-1950's, but many were flooded out by a combination of winter rains and high tides (Kritchen, pers. comm.).

Porcupine (*Erethizon dorsatum*)

Porcupines are common residents. They generally occur in hemlock-spruce forests, but have wandered as far as the coast.

Snowshoe Hare (*Lepus americanus*)

Snowshoe Hares are residents of the CRD. They occupy forests and brushy thickets next to forests. Hares are common on the upper Delta west of the Copper River and are known to occur east of the Copper River.

Sitka Blacktail Deer (*Odocoileus hemionus* [sitkensis])

Sitka Blacktail Deer are residents of the CRD. Populations range from common after mild winters to rare after severe winters. They prefer forested and sub-alpine habitats. They are found along the upper CRD west of the Copper and along the Heney Range. Small concentrations are known or have been found next to Eyak River, near Lake Elsner, and Scott Glacier at Mile 19, and at McKinley Lake (Reynolds and Kritchen, pers. comm.).

Moose (*Alces alces*)

Moose are common residents. The CRD population of moose are descendants of twenty moose transplanted between 1949 and 1959 by the U. S. Fish and Wildlife Service (U. S. Fish and Wildlife records).

Moose occur throughout the CRD where willows are found. In the winter they move to sheltered areas away from the Copper River winds.

Mountain Goat (*Oreamnos americanus*)

Mountain Goats are common residents of the Chugach and Ragged Mountains. They are occasional visitants to the timbered fringes of the CRD. Goats are probably more likely to wander down from preferred sub-alpine areas to timbered fringes in the fall and spring.

Gray Whale (*Rhachianectes glaucus*)

Gray Whales are uncommon spring visitants to the CRD. They migrate through coastal waters in April.

Rorqual Whale (*Balaenoptera borealis*)

Rorqual (Sei) Whales are residents along the Gulf Coast. They are uncommon visitants in coastal waters of the CRD. They can occur along barrier islands at any time of the year.

Piked Whale (*Balaenoptera acutorostrata*)

Piked or Minke Whales are uncommon visitants of the coastal waters. They occasionally swim along the barrier islands during the summer.

Humpback Whale (*Megaptera novaeangliae*)

Humpback Whales are rare visitants. These whales rarely visit coastal waters along barrier islands, generally in late February and early March, and again in October.

Pacific Killer Whale (*Grampus rectipinna*)

Pacific Killer Whales are residents of the Gulf Coast. They are uncommon visitants in coastal waters along the barrier islands and between barrier islands and the coast.

Pacific Harbor Porpoise (*Phocaena vomerina*)

Pacific Harbor Porpoises are fairly common along the coast. They may swim a few miles up river channels and are found around the barrier islands.

Dall Porpoise (*Phocoenoides dalli*)

Dall Porpoises are uncommon visitants to coastal waters of the CRD. They occur along the Gulf side of the barrier islands.

Implications of Land Management Practices on

Birds and Mammals and Their Habitat

A summary of the preferred habitats of birds and mammals is given in Table 2. Marshes and ponds are preferred habitat for 66 bird species and 8 mammal species. Beaches, tidal flats, and coastal tidewaters are next in importance. Management practices affecting these three habitat types will effect the most birds and mammals. The following paragraphs discuss various land management practices--their beneficial and harmful effects on wildlife and their habitat. The effects are subjective, individuals of a species may react differently to the same conditions.

Roads

Construction of secondary or primary roads across National Forest land on the CRD may affect all but the coastal tidewater habitat. An important consequence of a road is disrupted drainage on the upper side of the road. Road grades are generally constructed with the least number of bridges and culverts. Thus, the upstream side of the road becomes more hydric in nature. In some cases, marshes and ponds result--improving habitat for waterfowl and shorebird species. Certainly the road to Alaganik Slough blocked some drainage and favored encroachment of willows, a preferred food of moose. This wetter habitat is now less suited to the invasion of spruce. Similar results are seen along the CRD, where the road grade coupled with shifting glacial streams, has created marshes and flooded some spruce. This type of habitat alteration has favored beavers, muskrats, river otters, moose, and birds preferring shrub thickets and marshes.

Gravel road surfaces on the central Delta may become nesting sites for Arctic Terns and Semipalmated Plovers. Arctic Terns already are nesting on or along the Alaganik road.

Where a road cuts through coniferous or mixed deciduous-coniferous forest, the forest canopy is generally opened enough to encourage shrub growth. Shrubs are habitat for many passerine species, thus, these species benefit while forest and woodland species may lose habitat.

Species which prefer areas unmolested by man suffer the most from roads. Breeding Common Loons usually prefer lakes with little or no human activity nearby. Most nesting swans, geese, and eagles prefer nest sites away from roads. Both species of bears tend to remain away from roads.

Table 2. Preferred Habitats* for Birds and Mammals
of the Copper River Delta Area

Habitat	Birds	Breeding Birds	Mammals
Shrub Thickets	31	21	9
Hemlock-Sitka Spruce Forest	31	19	13
Bog	3	2	2
Mixed Deciduous-Spruce Woodland	47	15	0
Marsh and Pond	66	21	8
Lake	21	7	1
River and Slough	15	4	5
Barrier Island	21	4	0
Beach and Tidal Flat	54	0	1
Coastal Water	40	0	0

* This includes more than one preferred habitat for some species (see Table 1).

Of course, road construction results in loss of nests and homes of those species breeding on the road right-of-way. However, these losses are only for one season, except in cases where a species reuses the nest site, such as Trumpeter Swans, Bald Eagles, Goshawks, owls, woodpeckers, Beavers, and Muskrats.

Perhaps the greatest effect on birds and mammals would be the increased access of recreationists. This aspect will be covered under recreation.

Trails

Trails generally have little impact on wildlife habitat. Nests of those species in the direct path of a trail under construction would become the only serious loss. The major effect of trails would be the increased recreational use in the area.

Recreation

Hunting. Hunters have the greatest impact on game species, particularly waterfowl, Moose, and Brown Bears. Hunters are restricted to taking animals under a sustained yield plan of the Alaska Department of Fish and Game and the Bureau of Sports Fisheries and Wildlife.

For Moose, bears and partially for waterfowl access is the key to hunter harvest. Roads and trails provide the primary access to the upper CRD on the west side of the Copper River. The Alaganik road makes easier access to sloughs west of the Copper River for waterfowl hunters. The improved access on the West Copper Delta has resulted in a better harvest, but locally depletes game, especially in the immediate vicinity of roads. Instead of occupying suitable habitat along roads, game moves further away during hunting season.

Local, long-time residents of Cordova report that there has been a significant shift of waterfowl to the east Copper River Delta. This was not the case 10 to 15 years ago. As hunters move into staging areas on the upper CRH, more geese will move to less accessible areas such as Martin River on the east Delta. These areas are being visited more frequently by Moose, Brown Bear, and waterfowl hunters using airplanes and airboats. Should a road be constructed to this remote area, game kills will dramatically increase--possibly to the detriment of Moose, Brown Bear and of geese on staging grounds. Hunting pressure would force game away from suitable habitat along the road.

Hunters may request permission to use ATV's for better access to the lower Delta and east side of the Delta.

ATV's tend to tear up the ground cover--leading to erosion--and may result in loss of duck and goose nesting and feeding habitat. Therefore, use of ATV's should remain under a restricted status. If hunters want improved access, perhaps temporary landing strips for light aircraft or boat landings could be constructed for better game harvests.

Fishing. Fishermen tend to utilize a few streams and lakes of the western, upper CRD; Clear Creek (near Mile 30), Martin River, and Martin Lake. There usually is no conflict with sport fisherman and wildlife. Disturbance of nesting birds along streams and lakes occurs, but is of little consequence. There is some damage to riparian vegetation when fishermen brush out a path for easier access to fishing sites.

Trapping. Trappers have a significant effect on furbearers. Most trapping pressure is directed at beaver, mink, and river otter along the CRD. Trappers cause little disturbance to other wildlife, except when some bird species (carnivorous) are attracted to bait and wander into traps.

Miscellaneous Recreation

Hikers and photographers tend to have only a minor effect on wildlife and their habitat. There is some disturbance of wildlife by photographers attempting extra-close photos of nesting birds, especially Trumpeter Swans, Dusky Canada Geese, and Bald Eagles.

The major effect of snowmobilers is probably disturbance of moose on their winter range. Harassment of game is illegal but is difficult to enforce. Snowmobilers also cause some damage to tree seedlings which might have become a commercial value. Should damage to vegetation become a problem, then the snowmobile season should be restricted to periods of deep snow in defined areas.

Logging

Both selective and clearcut logging removes timber and opens the forest canopy. Logging in coniferous forest may result in loss of breeding habitat for many species (see Table 1). The most seriously affected individuals would be those breeding in the timber sale area and on the logging road right-of-way.

Logging definitely has many beneficial aspects. Once a forest canopy is opened, shrubs predominate. Timber cuts break up the forest monotype and create more edge-effect. Browse for deer,

Moose, and hares become available. Brush species are utilized by birds breeding in shrub vegetation. The Golden-crowned Sparrow is one species which has increased in abundance. It breeds in second-growth vegetation. The shrub vegetation after logging may attract foxes and Coyotes. Often fruiting shrubs invade a timber cut, thus, enhancing the area for fruit-eating birds and for bears.

Oil and Gas Exploration and Development

Oil and gas exploration and development requires use of ATV's and/or helicopters, and possibly roads. Drilling and pumping equipment would probably be incompatible with concentrations of wildlife during breeding season. Increased human activities during the nesting and brood (or young) rearing periods would have the greatest impact on wildlife and, therefore, should be restricted.

Oil spills would be very detrimental to waterbirds and their habitat. Especially critical areas are beaches and tidal flats--particularly during the peak of migration.

Waterfowl Habitat Alteration

Waterfowl habitat improvement techniques not only benefit waterfowl but also other marsh-dwelling species. Pond drawdowns expose mud flats for foraging Greater Yellowlegs, Short-billed Dowitchers, snipe, and other sandpipers. Food plantings provide more cover for invertebrates and fish which are foods of loons, grebes, some shorebirds, and Mink. Artificial nesting structures for ducks and geese might also provide homes for various shorebirds. Increasing the nesting population of waterfowl also attracts their predators--gulls, jaegers, Bald Eagles, Brown Bears, Land Otters, foxes, and Coyotes.

There are several harmful effects of waterfowl habitat improvement. Drawdowns of ponds force broods of loons, grebes, shorebirds, and passerines.

Commercial Fishing

Commercial fishermen setting drift nets in coastal tidewaters occasionally capture sea birds and Sea Otters. If the animals are still alive when released, they may have a shortened life span. Fishermen also may disrupt movement of marine mammals.

Conclusion

Before land management practices are put into effect, the wildlife and their habitat should be considered. The checklist of birds and mammals and their preferred habitat will reveal what species are likely to be involved. The discussion of occurrence and abundance will be of great help for suggesting the affect of the, proposed practice on that species.

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