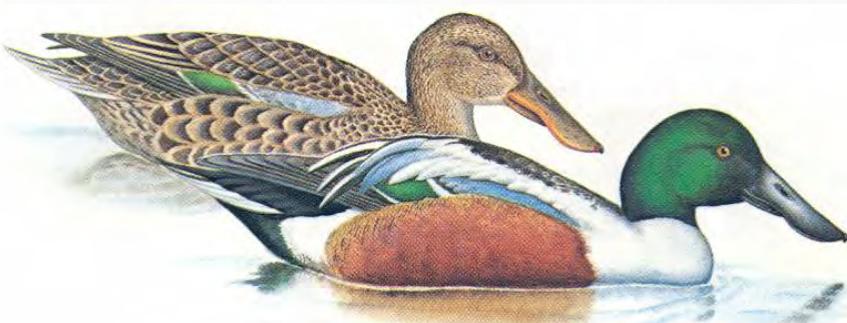
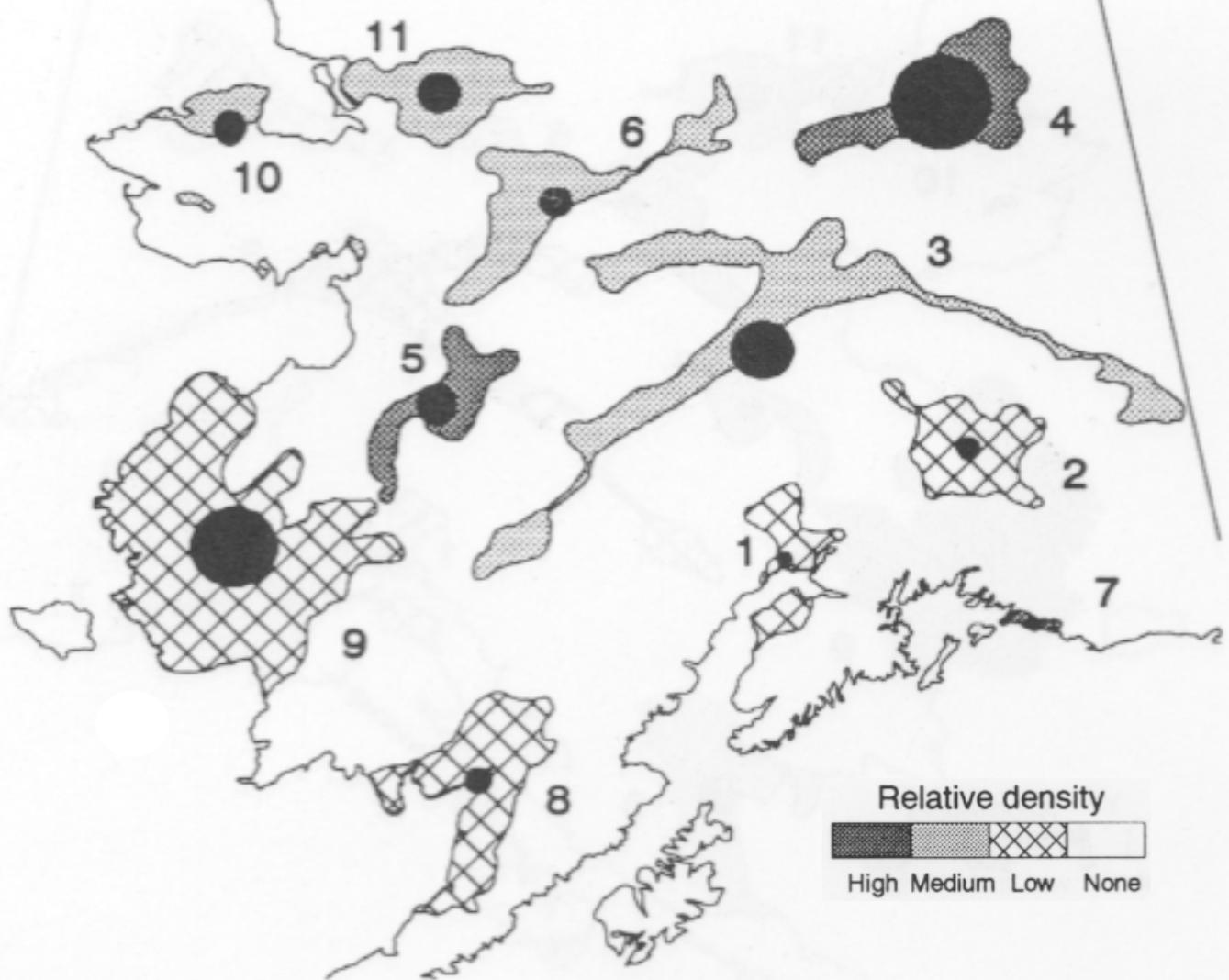


Aerial Survey Observer Manual

Alaska Waterfowl and Other Birds Surveyed in Alaska



7	8	9	10	11	TOTAL
.8	4.9	34	8.4	13	160
.8	0.2	0.5	0.8	0.9	0.8



Acknowledgements

Photographs

Bob Platte, Tim Bowman, Chris Dau, Paul Anderson, Bill Larned, Dennis Marks, Mike Anthony, Tamara Mills, Jim Zalenek, Ed Mallek, Gretchen Rule, Migratory Bird Management, U.S. Fish and Wildlife Service; Abby Powell, John Pearce, USGS.
From the U.S. Fish and Wildlife Service on-line FWS Image Library: Glen Smart, Dave Menke, Dave Stephans, James Mattsson, Jesse Achtenberg, Curtis Curley, Donna Dewherst, William Vinge, James Coe, Gary Zahn, Joseph Taylor.
Anonymous photographs from Google Images: <http://www.google.com/imghp>

Paintings

Field Guide to the Birds of North America, 2nd Edition. National Geographic Society (used by permission).
Waterfowl Identification in the Central Flyway. Fifth Printing. Central Flyway Waterfowl Council.
Ducks at a Distance (on-line). Bob Hines, U.S. Fish and Wildlife Service.

Wing Shots

Bob Platte, Migratory Bird Management, U.S. Fish and Wildlife Service
Samuel Carney. 1992. Species, Age and Sex Identification of Ducks Using Wing Plumage. U.S. Fish and Wildlife Service, U.S. DOI.

Drawings

Chris Dau, C.K. Weaverling

Text Contributions (Identification guide), Suggestions

Bob Platte, Jack Hodges, Bill Larned, Chris Dau, Paul Anderson, Debbie Groves, Bruce Conant, Ed Mallek, Bob Stehn, Bill Eldridge, Tim Bowman, Chris Dau, Dennis Marks, Laura Whitehouse.

Distribution Maps

Hodges, John I., James G. King, Bruce Conant and Henry A. Hanson. 1996. Aerial Surveys of Waterbirds in Alaska 1957-94: Population Trends and Observer Variability. U.S. Department of the Interior, National Biological Service Information and Technology Report 4.
Conant, Bruce and Debbie Groves. 2003. Alaska-Yukon Waterfowl Breeding Population Survey. U.S. Fish and Wildlife Service, Juneau, Alaska.
Bob Platte, Arctic Coastal Plain color density contours.

Checklist of Alaska Waterbirds and Large Landbirds

From Guide to the Birds of Alaska, 1983 Revised Edition. Robert Armstrong. Alaska Northwest Publishing Company, Anchorage and USFWS, Migratory Bird Management waterfowl surveys.

Survey Histograms

Adapted from U.S. Fish and Wildlife Service Migratory Bird Management waterfowl surveys.

Thanks also to Russ Oates, chief, Waterfowl Management Region 7, Alaska

Aerial Survey Observer Manual for Alaska Waterbirds
Migratory Bird Management, Waterfowl Branch
U.S. Fish and Wildlife Service
December, 2003 (w/2010 updates)



For bound hardcopies contact:

Dennis Marks or Bob Platte
Migratory Bird Management
U.S. Fish and Wildlife Service
1011 E. Tudor Road
Anchorage, Alaska 99503

(907) 786-3987/3565
dennis_marks@fws.gov
bob_platte@fws.gov

USFWS Migratory Bird Management Aerial Survey Observer Manual

The purpose of this manual is primarily to provide training materials for bird identification specifically designed for aerial survey observers. Additionally, it is a convenient identification guide observers can use in the field. The manual also contains resources that will help to prepare observers for specific surveys throughout the state of Alaska.

The manual includes:

A. Identification/Study Guide

1. Views of the bird

- a. a sitting detailed view of bird (w/permission of National Geographic)
- b. a view of the bird sitting from above
- c. flying bird from side and above (photo, schematic)
- d. wing shots comparison page of similar species

2. Description

- a. Tips from MBM pros on species identification from the air
- b. Similar species comparisons

B. Survey Prep Aids

1. Range maps for all species
2. Frequency histograms for species for routine surveys
3. Survey descriptions
4. Distribution map (range and relative densities)

Many items are yet to be added, replaced and improved upon. We have included stills from video clips as well as photos, and are interested in adding new photos, drawings, suggestions, etc. While we are looking for useful and good quality images, poor quality aerial shots that show bird shape and plumage patterns have their place in this manual, since the goal is learning to identify birds more than 100 feet away through aircraft glass at around 100 mi/hr. We have limited authorization on some of these images so, for the time being, please do not make copies of the manual. If you are interested in receiving additional copies and/or future updates, please contact Bob Platte, USFWS.

Still intended for the guide:

- More aerial views of birds
- Additional descriptions and photos for discerning similar birds
- More dorsal view drawings and photos of difficult to discern birds
- Silhouettes of birds
- Additional survey descriptions
- Equipment use (e.g., computer, GPS, mouse set-up) and data recording protocols pages

What We Still Need:

- Photographs of all birds from above. Both stills and video (to capture stills and for video training)
- More tips on bird identification (especially for difficult to discern birds)
- Anything else you would like to see included?

Aerial Survey Observer Manual for Alaska Waterbirds

Contents

- **Introduction/Purpose**
- **Checklists of Alaska Waterbirds by Geographic Area**
outlines of relative abundance by species for survey areas throughout the state
- **Bird Abundance Histograms by Survey**
graphically depicts the relative abundance of species in several survey areas
- **Species Identification Pages**
main body of the manual; pics and photos, range maps and descriptions
- **North America Waterfowl Breeding Population and Habitat Surveys**
introduction and methods for breeding bird surveys from 1987 report
- **MBM Observer Protocol for Recording and Transcribing Aerial Observations**
recording methods and transcribing your observations
- **Table of view angles for various transect strip widths at various altitudes**
- **Computer/GPS Hardware Setup for Aircraft**



Region 7 survey areas in pink

Species included in the USFWS Aerial Survey Observer Manual

Birds Described in Detail:

Loons (*Gaviidae*)

1. Pacific Loon
2. Yellow-billed Loon
3. Common Loon
4. Red-throated Loon

Waterfowl (*Anatidae*)

Swans, Geese (*Anserinae*)

1. Tundra Swan
2. Trumpeter Swan
3. Canada Goose
4. Greater White-fronted Goose
5. Emperor Goose
6. Brant
7. Lesser Snow Goose

Dabbling Ducks (*Anatinae/Anatini*)

1. Mallard
2. Northern Pintail
3. Am. G-winged Teal
4. Am. Wigeon
5. Northern Shoveler
6. Gadwall

Diving Ducks (*Anatinae/Aythiini*)

1. Scaup (greater and lesser)
2. Ring-necked duck
3. Canvasback
4. Redhead

Sea Ducks (*Anatinae/Mergini*)

1. Common Eider
2. Spectacled Eider
3. King Eider
4. Steller's Eider
5. Black Scoter
6. White-winged Scoter
7. Surf Scoter
8. Harlequin Duck
9. Long-tailed Duck
10. Goldeneye (Barrow's and Common)
11. Bufflehead
12. Common Merganser
13. Red-breasted Merganser

Birds with Brief Descriptions:

Jaegers, Gulls, Terns (*Laridae*)

1. Arctic tern
2. Parasitic Jaeger
3. Long-tailed Jaeger
4. Bonaparte's Gull
5. Mew Gull
6. Herring Gull
7. Glaucous Gull
8. Glaucous-winged Gull
9. Sabine's Gull
10. Kittiwake (Black and Red-legged)

Misc Waterbirds

1. Red-necked grebe
2. Sandhill Crane
3. Great Blue Heron
4. American Coot

Raptors

1. Golden Eagle
2. Bald Eagle
3. Snowy Owl
4. Short-eared Owl
5. Rough-legged Hawk

**Checklist of Alaska Waterbirds and Large Landbirds
Occurring on Alaska Aerial Surveys, by Survey Area**

C = common, u = uncommon, r = rare, + = accidental, - = not occurring, for Arctic Coastal Plain (ACP), Tanana-Kuskokwim (T-K), Kenai-Susitna (KSU) and Yukon-Kuskokwim Delta (YKD) surveys. From Guide to the Birds of Alaska and USFWS, Migratory Bird Management surveys

PRIMARY SPECIES (eiders, geese, ducks, loons)

	<u>ACP</u>	<u>T-K</u>	<u>KSU</u>	<u>YKD</u>
GAVIIDAE (Loons)				
1. Common Loon	+	C	C	u
2. Yellow-billed Loon	C	-	-	r
3. Pacific Loon	C	C	C	C
4. Red-throated Loon	C	u	u	C
PODICIPEDIDAE (Grebes)				
1. Red-necked Grebe	+	C	C	u
2. Horned Grebe	+	C	u	u
ANATIDAE (Waterfowl)				
Swans, Geese (<i>Anserinae</i>)				
1. Tundra Swans (<i>Cygnini</i>)	C	-	-	C
2. Trumpeter Swans	-	C	C	-
<i>(Anserini - true geese):</i>				
3. Greater White-fronted Goose	C	C	C	C
4. Canada Goose	C	C	C	C
5. Emperor Goose	r	-	-	C
6. Brant	C	-	-	C
7. Snow Goose	u	-	u	r
Dabbling Ducks (<i>Anatinae/Anatini</i>)				
1. Mallard	r	C	C	C
2. Gadwall	+	r	r	+
3. Am. G-winged Teal	u	C	C	C
4. Blue-winged Teal	+	r	r	-
5. Am. Wigeon	u	C	C	C
6. Northern Pintail	C	C	C	C
7. Northern Shoveler	r	C	C	u
Diving Ducks (<i>Anatinae/Aythiini</i>)				
1. Canvasback	-	C	u	r
2. Redhead	+	r	r	+
3. Greater Scaup	C	C	C	C
4. Lesser Scaup	+	C	C	r
5. Ring-necked duck	+	u	u	+
Sea Ducks (<i>Anatinae/Mergini</i>)				
1. Common Eider	C	-	-	C
2. King Eider	u	-	-	u
3. Spectacled Eider	u	-	-	C
4. Steller's Eider	u	-	-	C
5. Black Scoter	+	r	r	C
6. White-winged Scoter	u	C	C	u
7. Surf Scoter	u	C	C	C

8. Harlequin Duck	r	u	u	u
9. Long-tailed Duck	C	u	u	C
10. Barrow's Goldeneye	-	C	C	-
11. Common Goldeneye	+	C	C	r
12. Bufflehead	+	C	C	r
13. Red-breasted Merganser	r	r	r	C
14. Common Merganser	-	r	r	+

RALLIDAE

1. American Coot	+	r	r	+
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SECONDARY SPECIES

LARIDAE (Jaegers, Gulls, Terns)

	<u>ACP</u>	<u>T-K</u>	<u>KSU</u>	<u>YKD</u>
1. Pomerine Jaeger	u	+	+	r
2. Parasitic Jaeger	C	r	r	C
3. Long-tailed Jaeger	C	C	C	C
4. Boneparte's Gull	+	u	u	C
5. Mew Gull	r	C	C	C
6. Herring Gull	+	u	u	r
7. Glaucous Gull	C	r	r	C
8. Glaucous-winged Gull	-	r	r	C
9. Sabine's Gull	C	+	+	C
10 Ivory Gull	r	-	-	-
11. Black-legged Kittiwake	C	-	-	C
12. Red-legged Kittiwake	-	+	+	r
13. Ross' Gull	+	-	-	+
14. Arctic tern	C	u	u	C
15 Aleutian Tern	-	-	-	u

RAPTORS

1. Golden Eagle	u	C	C	u
2. Bald Eagle	+	u	u	r
3. Northern Harrier	r	u	u	u
4. Osprey	+	r	r	r
5. Gyrfalcon	u	u	u	u
6. Peregrine Falcon	r	r	r	r
7. American Kestral	-	C	C	-
8. Merlin	r	u	u	r
9. Northern Goshawk	-	u	u	r
10. Sharp-shinned hawk	-	C	C	r
11. Rough-legged Hawk	C	u	u	C
12. Snowy Owl	u	+	+	u
13. Short-eared Owl	C	C	C	C
14. Great Horned Owl	-	C	C	u
15. Northern Hawk Owl	-	C	C	u
16. Great Gray Owl	-	r	r	-
17. Boreal Owl	-	C	C	r

OTHER

1. Sandhill Crane	u	u	u	C
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Innoko NWR Bird List

(from <http://innoko.fws.gov/pdf/Innoko%20bird%20list.pdf>)

BIRDS

124 bird species have been recorded on the Innoko Refuge. This list describes their abundance and status.



Western Grebe
USPWS/Bob Hines

ABUNDANCE

Common - Occurs in nearly all suitable habitats, with some areas sparsely used.

Uncommon - Occurs regularly, but uses little of the suitable habitat.

Rare - Occurs regularly, but in very small numbers.

STATUS

Resident - Present throughout the year and breeds on the refuge.

Breeder - Occurs as a breeding species only.

Migrant - Travels through on the way to wintering or breeding areas.

Winter Resident - present in the winter only, does not breed on the refuge.

Vagrant - casual or accidental visitor to the refuge.

LOONS

Red-throated Loon - CB

Arctic Loon - CB

Common Loon - UB

GREBES

Horned Grebe - UB

Red-necked Grebe - CB

SWANS, GEESE, DUCKS

Tundra Swan - UB

Trumpeter Swan - UB

White-fronted Goose - CB

Snow Goose - RM

Canada Goose - CB

Green-winged Teal - CB

Blue-winged Teal - UB

Mallard - CB

Northern Pintail - CB

Northern Shoveler - CB

Eurasian Wigeon - UV

American Wigeon - CB

Canvasback - RB

Redhead - RB

Ring-necked Duck - RB

Greater Scaup - CB

Lesser Scaup - CB

Harlequin Duck - UB

Long-tailed Duck - UB

Black Scoter - CB

Surf Scoter - CB

White-winged Scoter - UB

Common Goldeneye - CB

Barrow's Goldeneye - CB

Bufflehead - UB

Red-breasted Merganser - UB

HAWKS, EAGLES, HARRIERS

Osprey - CB

Bald Eagle - CB

Northern Harrier - UB

Sharp-shinned Hawk - UB

Northern Goshawk - UB

Swainson's Hawk - UB

Red-tailed Hawk - CB

Rough-legged Hawk - UB

Golden Eagle - UB

FALCONS

Peregrine Falcon - RM

Gyrfalcon - RBW

GROUSE, PTARMIGAN

Spruce Grouse - CR

Willow Ptarmigan - UR

Ruffed Grouse - UR

Sharp-tailed Grouse - UB

CRANES

Sandhill Crane - UB

PLOVERS

Black-bellied Plover - UM

Lesser Golden-Plover - UB

Semipalmated Plover - CB



Golden Plover USPWS/Bob Hines

SANDPIPERS

Greater Yellowlegs - UB
Lesser Yellowlegs - CB
Solitary Sandpiper - CB
Spotted Sandpiper - UB
Whimbrel - UB
Hudsonian Godwit - CB
Marbled Godwit - UB
Semipalmated Sandpiper - UB
Least Sandpiper - CB
Pectoral Sandpiper - CB
Long-billed Dowitcher - CB
Common Snipe - CB
Red-necked Phalarope - CB



Red-necked Phalarope USFWS/Bob Hines

JAEGERS, GULLS, TERNS

Pomarine Jaeger - RV
Parasitic Jaeger - UB
Long-tailed Jaeger - UB
Bonaparte's Gull - CB
Mew Gull - CB
Herring Gull - UM
Glaucous-winged Gull - UB
Glaucous Gull - UB
Arctic Tern - CB

OWLS

Great Horned Owl - UB
Snowy Owl - RMW
Northern Hawk-Owl - CB
Great Gray Owl - UB
Short-eared Owl - CB

KINGFISHERS

Belted Kingfisher - CB

WOODPECKERS

Downy Woodpecker - UR
Hairy Woodpecker - UR
Three-toed Woodpecker - UR
Black-backed Woodpecker - UR
Northern Flicker - UR

TYRANT FLYCATCHERS

Olive-sided Flycatcher - UB
Western Wood Peewee - UB
Alder Flycatcher - CB
Say's Phoebe - UB

SWALLOWS

Tree Swallow - CB
Violet-green Swallow - CB
Bank Swallow - CB
Cliff Swallow - UB

JAYS, CROWS

Gray Jay - CR
Common Raven - CR

CHICKADEES

Black-capped Chickadee - CR
Boreal Chickadee - CR

OLD WORLD WARBLERS AND FLYCATCHERS, KINGLETS, THRUSHES

Ruby-crowned Kinglet - CB
Swainson's Thrush - CB
Hermit Thrush - UB
American Robin - CB
Varied Thrush - CB
Gray-cheeked Thrush - CB

WAWINGS

Bohemian Wawing - CB

SHRIKES

Northern Shrike - UB

WOOD WARBLERS, SPARROWS, BUNTINGS, BLACKBIRDS

Orange-crowned Warbler - CB
Yellow Warbler - CB
Yellow-rumped Warbler - CB
Blackpoll Warbler - UB
Northern Waterthrush - CB
Wilson's Warbler - CB
American Tree Sparrow - CB
Savannah Sparrow - CB
Fo Sparrow - UB
Lincoln's Sparrow - UB
White-crowned Sparrow - CB
Chipping Sparrow - UB
Dark-eyed Junco - CB
Snow Bunting - UM
Rusty Blackbird - CB

FINCHES

Pine Grosbeak - UR
White-winged Crossbill - UR
Common Redpoll - CR



U.S. Fish & Wildlife Service

Yukon Flats National Wildlife Refuge

Bird Checklist

The Yukon Flats National Wildlife Refuge consists of 8.6 million acres and encompasses the Yukon Flats basin. This basin is located along the Arctic Circle and is bordered by the Brooks Range to the north and the White Mountains to the south. It includes 300 miles of the Yukon River, North America's third longest river. An estimated 20,000 shallow lakes, ponds, and sloughs; and 7,000 miles of rivers and streams are within the Yukon Flats National Wildlife Refuge.

The rich wetlands of the Yukon Flats provide some of the most productive waterfowl breeding areas in North America. It is estimated that 1.5 million ducks breed here annually. The Yukon Flats also include a variety of other habitats such as white spruce, paper birch, and quaking aspen forests; black spruce bogs; willow and alder thickets; grasslands, meadows, and alpine tundra. These habitats are important to songbirds, waterbirds, raptors, and upland game birds.

The following checklist of 160 species has been compiled from Refuge observations and published records. If you have information that could be used to update this list, please contact:

Refuge Manager
Yukon Flats National Wildlife Refuge
101 12th Ave., Room 264
Fairbanks, AK 99701-6293
907/456 0440 or 800/531 0676
Email: yukonflats.fws.gov



Barrow's Goldeneye

COMMON NAME	AB	ST	COMMON NAME	AB	ST
LOONS					
___ Red-throated Loon	U	B*	EAGLES, HAWKS		
___ Pacific Loon	C	B*	___ Osprey	U	B*
___ Common Loon	C	B*	___ Bald Eagle	U	B*
GREBES					
___ Horned Grebe	C	B*	___ Northern Harrier	U	B*
___ Red-necked Grebe	C	B*	___ Sharp-shinned Hawk	U	B
CORMORANTS					
___ Double-crested Cormorant	+	V	___ Northern Goshawk	R	B*
SWANS, GEESE, DUCKS					
___ Tundra Swan	R	M	___ Swainson's Hawk	O	B
___ Trumpeter Swan	C	B*	___ Red-tailed Hawk	C	B*
___ Greater White-fronted Goose	U	B*	___ Rough-legged Hawk	U	B
___ Snow Goose	R	M	___ Golden Eagle	U	B*
___ Brant	+	V	FALCONS		
___ Canada Goose	U	B*	___ American Kestrel	U	B*
___ Green-winged Teal	C	B*	___ Merlin	R	B
___ Mallard	C	B*	___ Peregrine Falcon	U	B*
___ Northern Pintail	C	B*	___ Gyrfalcon	O	B
___ Blue-winged Teal	R	B*	GROUSE		
___ Northern Shoveler	C	B*	___ Spruce Grouse	C	Y*
___ Gadwall	U	B*	___ Willow Ptarmigan	U	Y
___ American Wigeon	A	B*	___ Rock Ptarmigan	U	Y
___ Canvasback	C	B*	___ Ruffed Grouse	C	Y*
___ Redhead	R	B*	___ Sharp-tailed Grouse	R	Y*
___ Ring-necked Duck	C	B*	COOTS		
___ Greater Scaup	U	B*	___ American Coot	O	V
___ Lesser Scaup	A	B*	CRANES		
___ King Eider	+	V	___ Sandhill Crane	C	B*
___ Harlequin Duck	R	B	PLOVERS		
___ Long-tailed Duck	R	B	___ Black-bellied Plover	R	M
___ Black Scoter	R	B*	___ American Golden-Plover	R	B*
___ Surf Scoter	U	B*	___ Semipalmated Plover	C	B*
___ White-winged Scoter	C	B*	___ Killdeer	O	B*
___ Common Goldeneye	U	B*	SANDPIPERS		
___ Barrow's Goldeneye	U	B*	___ Greater Yellowlegs	O	M
___ Bufflehead	U	B*	___ Lesser Yellowlegs	A	B*
___ Common Merganser	R	B	___ Solitary Sandpiper	C	B*
___ Red-breasted Merganser	U	B*	___ Spotted Sandpiper	C	B*
___ Ruddy Duck	U	B*	___ Wandering Tattler	O	B
			___ Upland Sandpiper	O	B*
			___ Whimbrel	R	M
			___ Hudsonian Godwit	O	M
			___ Ruddy Turnstone	O	M
			___ Surfbird	R	B

ABUNDANCE (AB)

- A - Abundant; very numerous
- C - Common; certain to be seen or heard in suitable habitat
- U - Uncommon; locally distributed; or occurring in low numbers
- R - Rare; species occurs regularly in the region but in very small numbers; sighting likelihood poor
- O - Occasional; seen a few times in a five-year period
- + - Accidental; seen once or twice; may not be seen again

STATUS (ST)

- Y - Year-round resident
- B - Breeding species (migratory)
 - * Breeding has been documented through observation of eggs, nests, or dependent (unfledged or recently fledged) young
- M - Migrant; non-breeder traveling between summer and winter range
- V - Visitor; outside its normal range

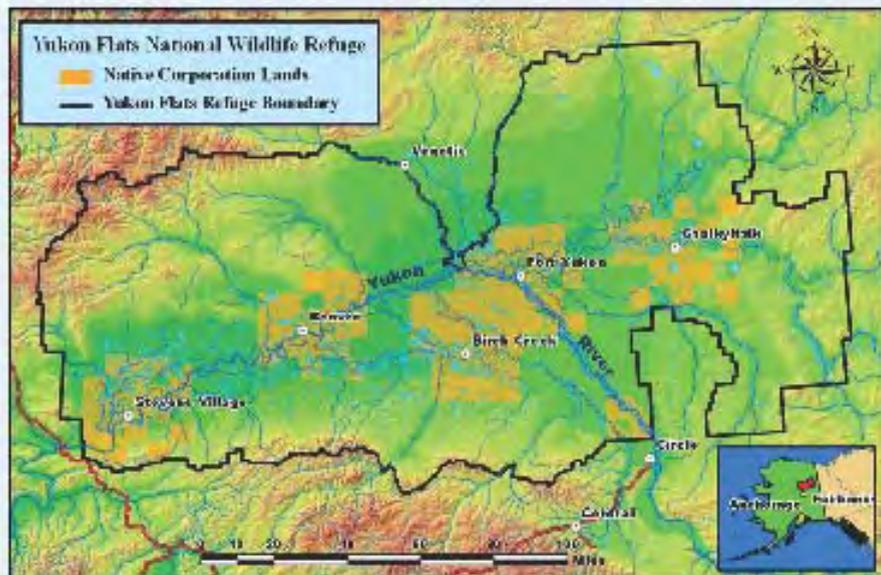
COMMON NAME	AB	ST	COMMON NAME	AB	ST	COMMON NAME	AB	ST
SANDPIPERS <i>continued</i>			WOODPECKERS <i>continued</i>			WAGTAILS, PIPITS		
___ Sanderling	O	M	___ Black-backed Woodpecker	U	Y	___ White Wagtail	+	V
___ Semipalmated Sandpiper	U	M	___ Northern Flicker	C	B*	___ American Pipit	U	B
___ Western Sandpiper	U	M	TYRANT FLYCATCHERS			WAXWING		
___ Least Sandpiper	U	B	___ Olive-sided Flycatcher	U	B	___ Bohemian Waxwing	I	B*
___ Baird's Sandpiper	R	M	___ Western Wood-Pewee	U	B*	SHRIKES		
___ Pectoral Sandpiper	U	M	___ Alder Flycatcher	C	B	___ Northern Shrike	R	B
___ Dunlin	O	M	___ Hammond's Flycatcher	R	B	STARLINGS		
___ Stilt Sandpiper	O	M	___ Say's Phoebe	R	B	___ European Starling	O	V
___ Buff-breasted Sandpiper	O	M	___ Eastern Kingbird	+	V	WOOD WARBLERS		
___ Long-billed Dowitcher	R	M	LARKS			___ Orange-crowned Warbler	U	B*
___ Wilson's Snipe	A	B*	___ Horned Lark	U	B	___ Yellow Warbler	C	B*
___ Wilson's Phalarope	+	B*	SWALLOWS			___ Yellow-rumped Warbler	C	B*
___ Red-necked Phalarope	U	B*	___ Tree Swallow	U	B*	___ Blackpoll Warbler	U	B
___ Red Phalarope	R	M	___ Violet-green Swallow	U	B*	___ Northern Waterthrush	C	B*
JAEGERS, GULLS, TERNS			___ Bank Swallow	C	B*	___ Wilson's Warbler	R	B
___ Long-tailed Jaeger	R	B	___ Cliff Swallow	C	B*	SPARROWS, BUNTINGS		
___ Bonaparte's Gull	C	B*	JAYS, MAGPIES, CROWS			___ American Tree Sparrow	U	B*
___ Mew Gull	C	B*	___ Gray Jay	C	Y*	___ Chipping Sparrow	R	B*
___ Herring Gull	C	B*	___ Black-billed Magpie	+	V	___ Savannah Sparrow	C	B*
___ Glaucous Gull	+	V	___ Common Raven	C	Y*	___ Fox Sparrow	U	B*
___ Arctic Tern	C	B*	CHICKADEE			___ Lincoln's Sparrow	U	B*
PIGEONS, DOVES			___ Black-capped Chickadee	U	Y	___ Golden-crowned Sparrow	O	M
___ Rock Pigeon	O	V	___ Boreal Chickadee	C	Y*	___ White-crowned Sparrow	C	B*
___ Mourning Dove	+	V	___ Gray-headed Chickadee	R	Y	___ Dark-eyed Junco	C	B*
OWLS			NUTHATCHES			___ Lapland Longspur	R	B
___ Great Horned Owl	C	Y*	___ Red-breasted Nuthatch	O	V	___ Smith's Longspur	O	B
___ Snowy Owl	O	V	DIPPERS			___ Snow Bunting	U	M
___ Northern Hawk Owl	U	Y*	___ American Dipper	R	B	BLACKBIRDS		
___ Great Grey Owl	U	Y*	KINGLETS			___ Red-winged Blackbird	U	B*
___ Short-eared Owl	U	B*	___ Ruby-crowned Kinglet	U	B*	___ Rusty Blackbird	C	B*
___ Boreal Owl	U	Y*	THRUSHES			FINCHES		
KINGFISHERS			___ Northern Wheatear	R	B	___ Gray-crowned Rosy Finch	U	B
___ Belted Kingfisher	U	B	___ Townsend's Solitaire	O	B	___ Pine Grosbeak	U	Y
WOODPECKERS			___ Gray-cheeked Thrush	U	B*	___ White-winged Crossbill	C	Y*
___ Downy Woodpecker	U	Y	___ Swainson's Thrush	A	B*	___ Common Redpoll	C	Y*
___ Hairy Woodpecker	U	Y	___ Hermit Thrush	U	B	___ Hoary Redpoll	U	M
___ American Three-toed Woodpecker	C	Y*	___ American Robin	C	B*	Original list compiled by K. Sowl, USFWS and revised by N. Guldager and M. Bertram, USFWS in May 2007.		
			___ Varied Thrush	C	B			



Lesser Yellowlegs

U.S. Fish & Wildlife Service
Yukon Flats National Wildlife Refuge
 101 12th Ave., Room 264
 Fairbanks, AK 99701-6293

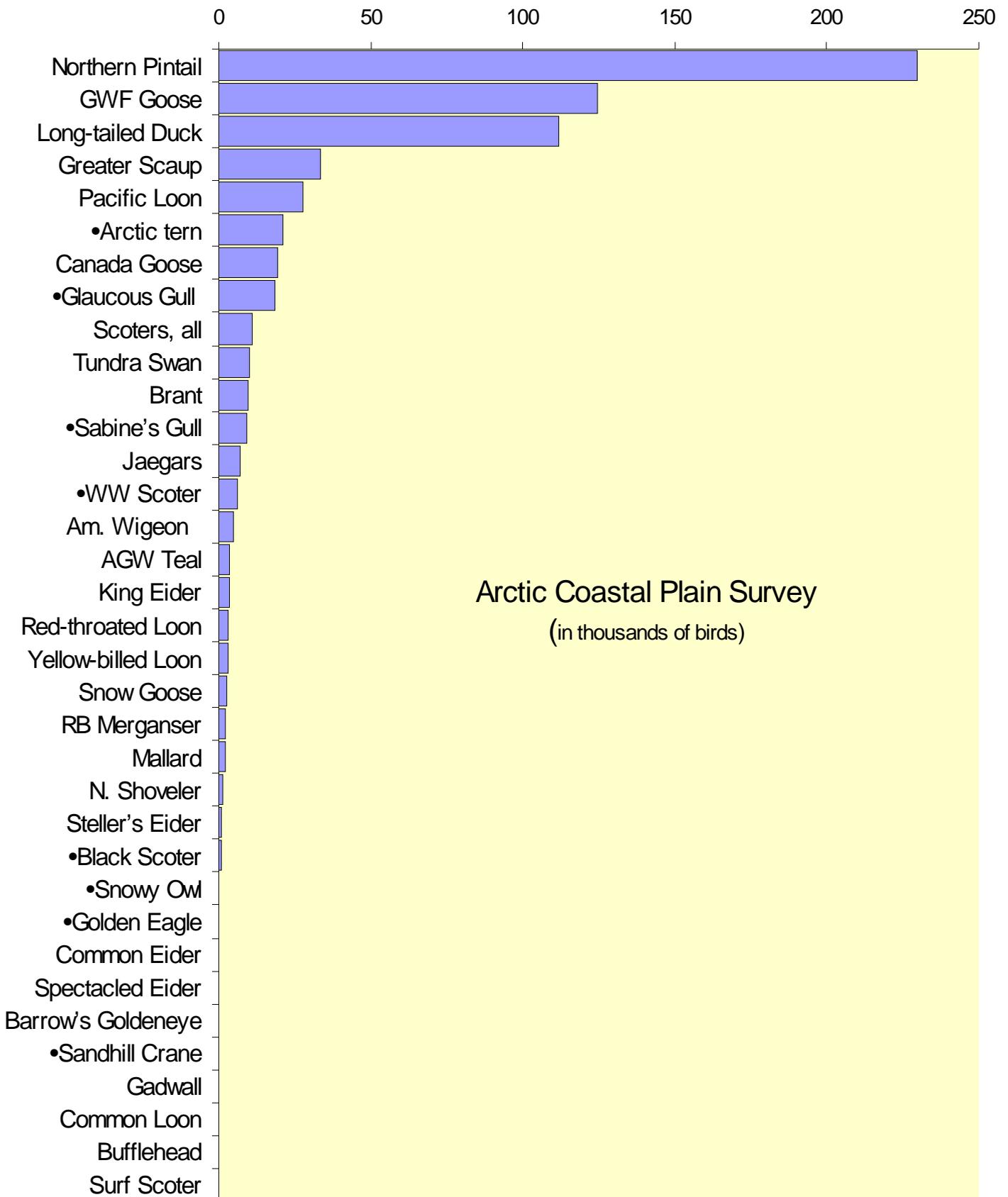
Phone: 907/456 0440 or 800/531 0676
 Fax: 907/456 0447
 Web: <http://yukonflats.fws.gov>
 Email: yukonflats.fws.gov



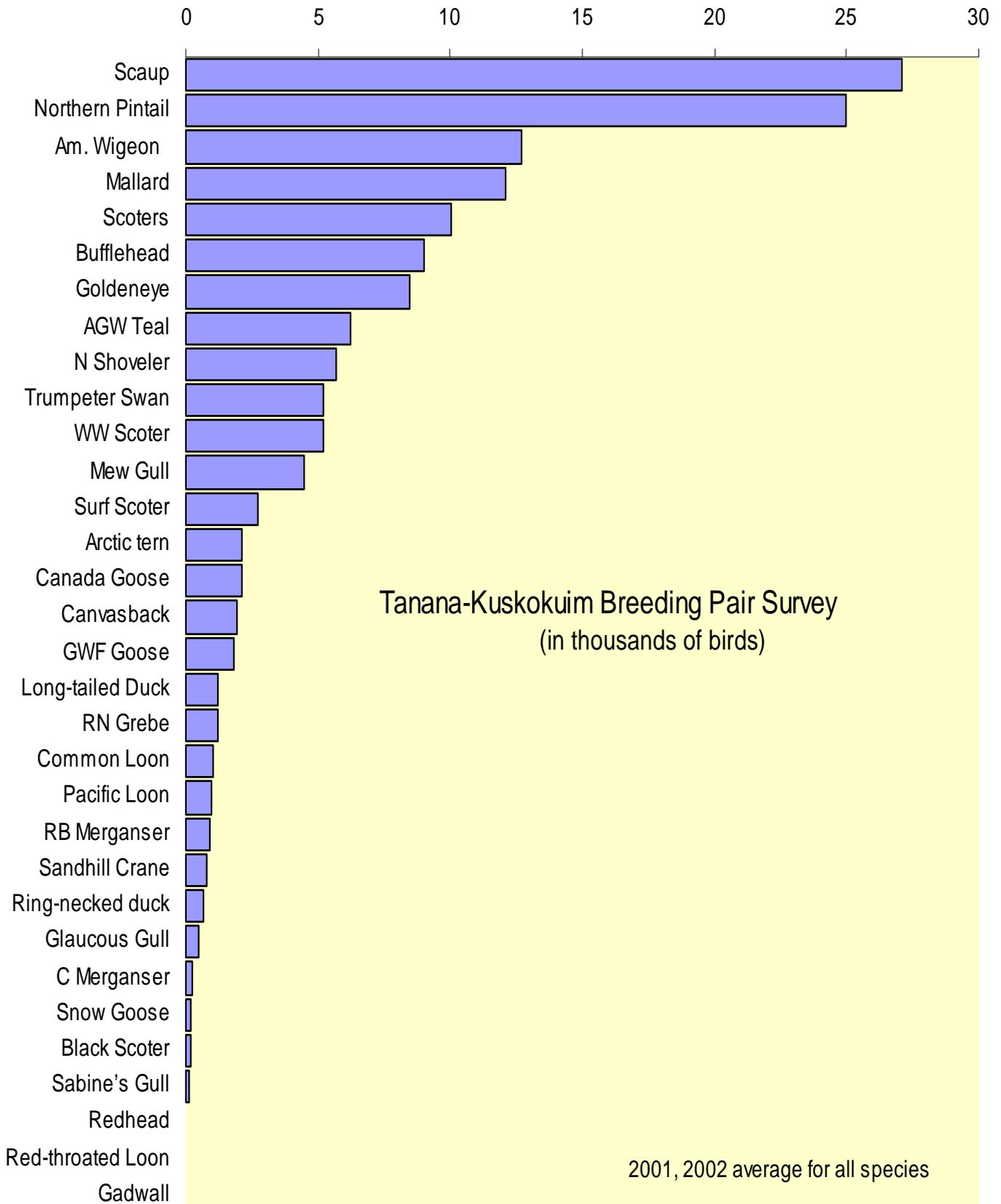
AMERICA'S NATIONAL WILDLIFE REFUGE SYSTEM
Conserving the Nature of America



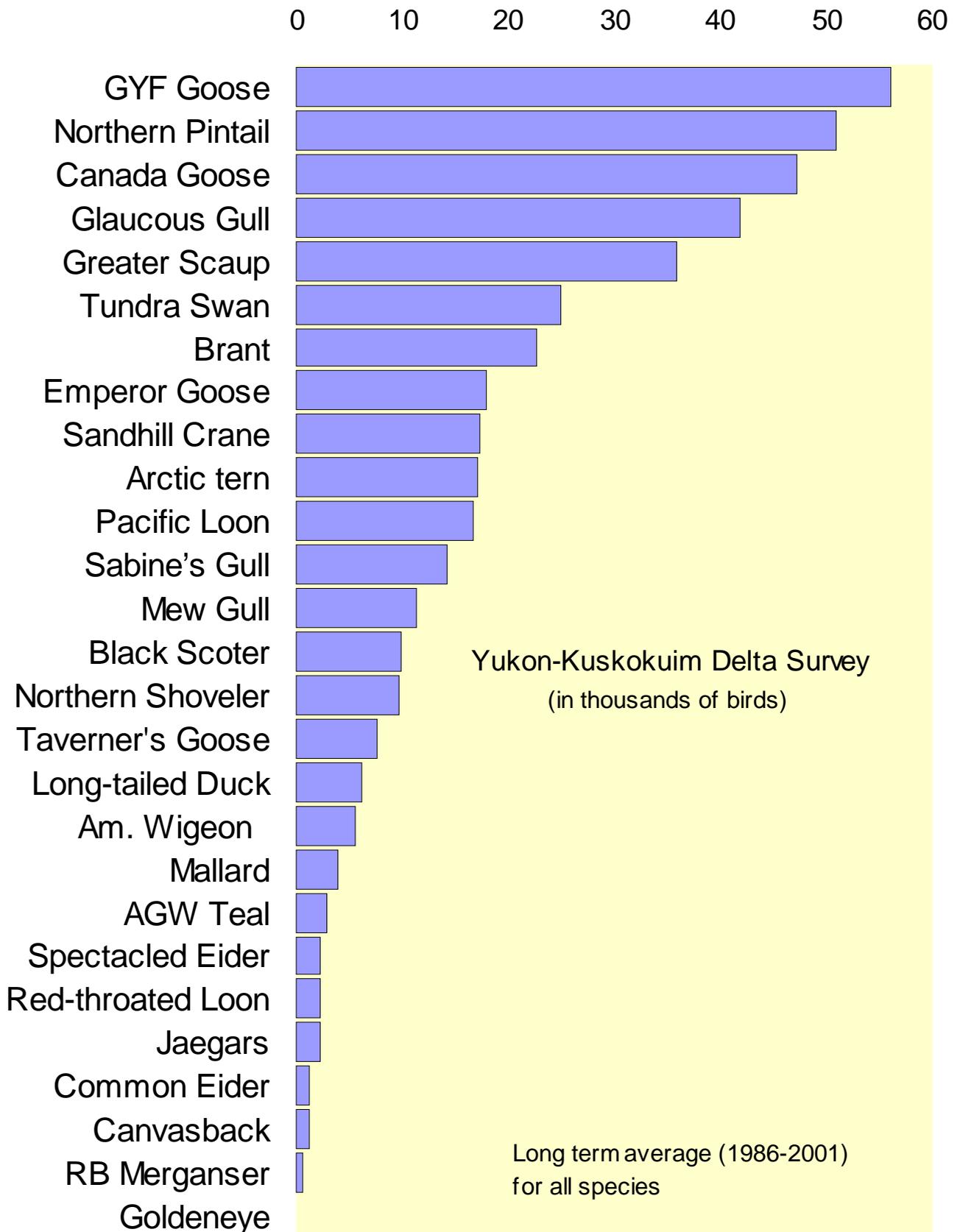
Individual Survey- Relative Bird Abundance

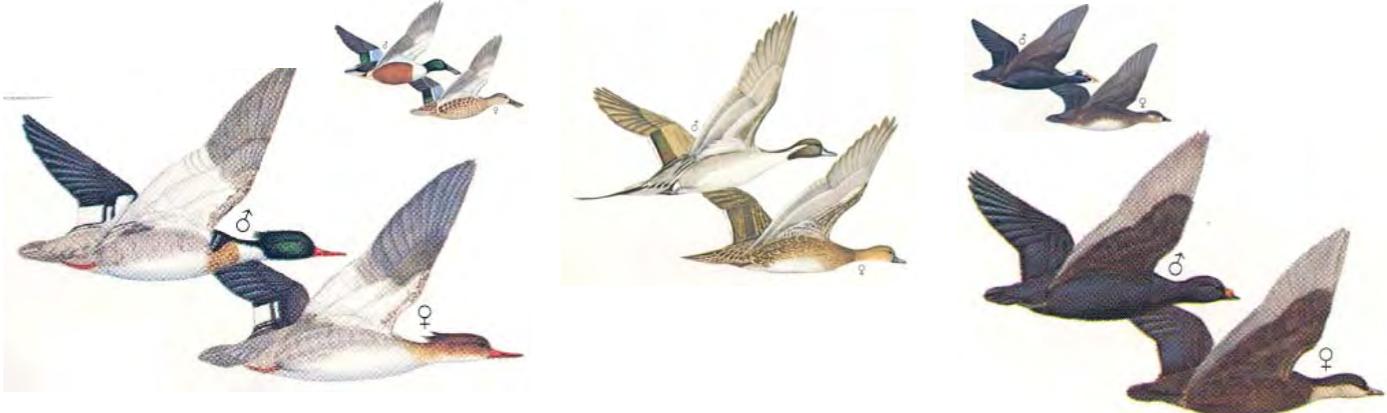


Individual Survey- Relative Bird Abundance

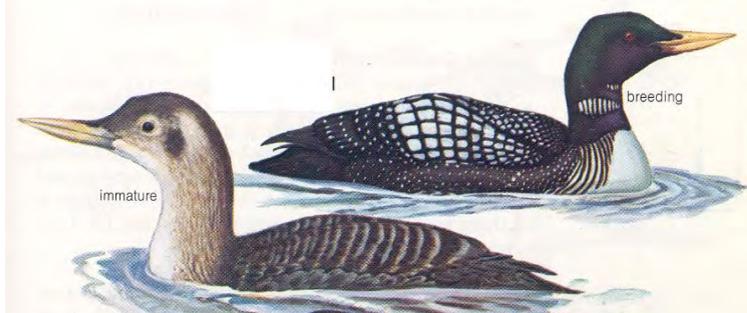
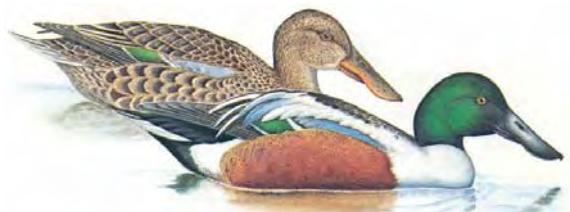


Individual Survey- Relative Bird Abundance

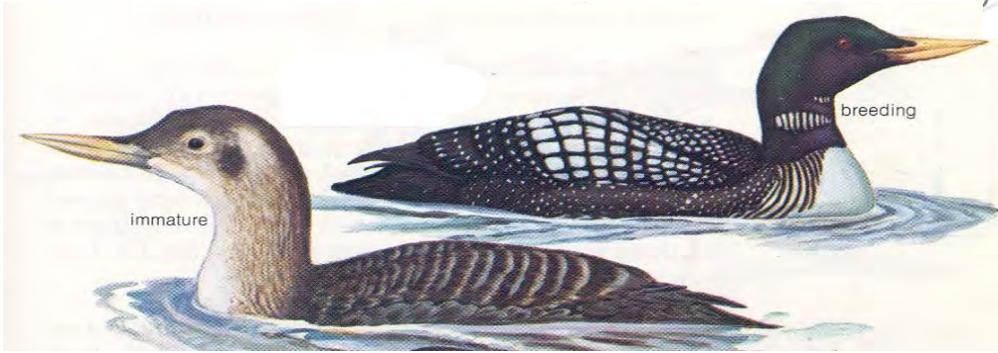
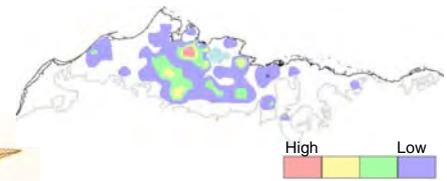




Species ID Pages



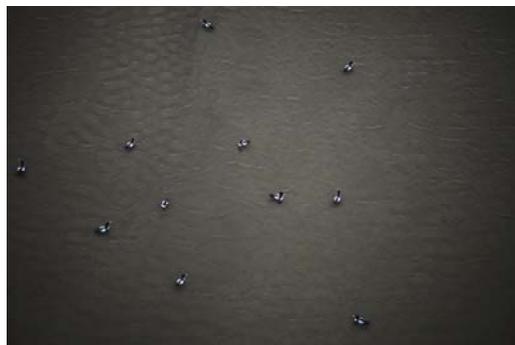
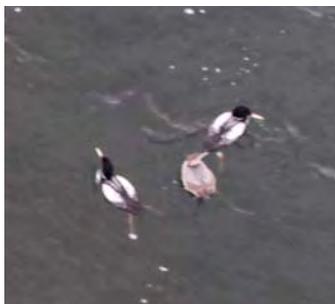
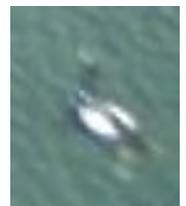
YBLO



■ breeding
■ wintering

- Large bird, biggest loon
- Large yellow bill usually obvious (all other loons, dark billed)
- Checked back looks dark
- Large dark head w/shorter neck
- Most often seen on large lakes in coastal tundra
- **SIMILAR: Common loon (diff range), Greater scaup (glanced at a distance)**

Survey Distribution:			
<u>ACP</u>	<u>Tan-Kusko</u>	<u>Kenai-Su</u>	<u>Y-KDelta</u>
common	absent	absent	rare

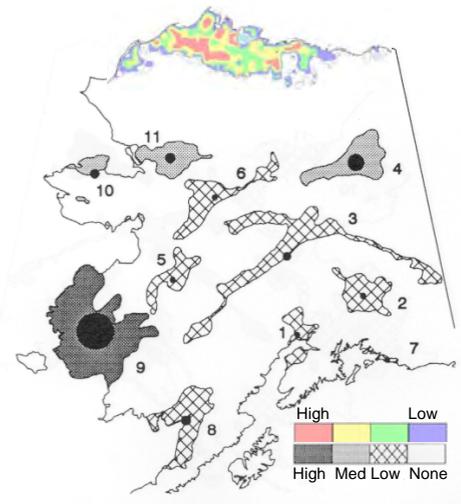
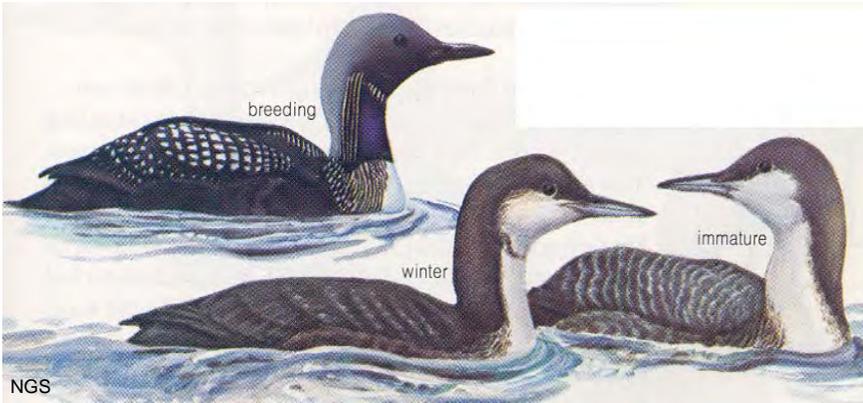


GRSC



Pair with chick

PALO



- White-black-white (“skunk”) across back; white crescents through wings
- Large silver-gray head and neck; “fluffy”, “fat”, “velvety” gray head and neck
- Black bill, throat
- Smaller than YBLO, COLO
- In flight, dark, narrow wings and body, pearl gray neck
- Frequent diver, but can often be identified underwater
- Widespread and most common (“pair on every lake”) on medium to large lakes in coastal tundra and variable-sized lakes in boreal forest
- **SIMILAR: Other loons**

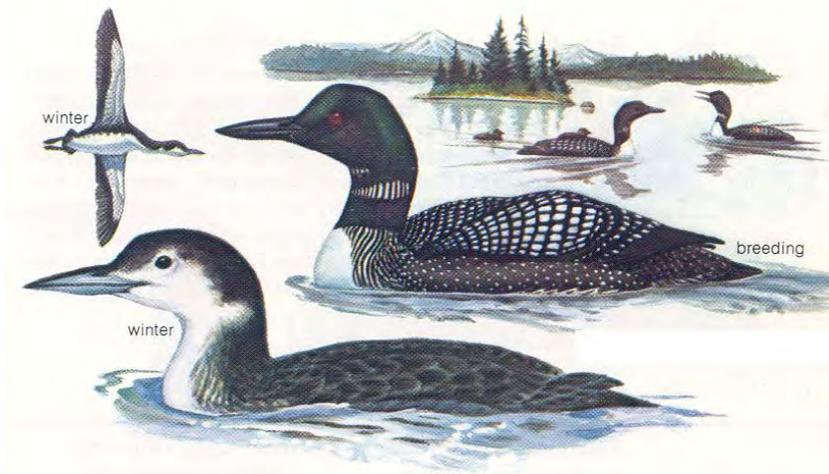


Similar Species

PALO can be observed underwater (left, below)



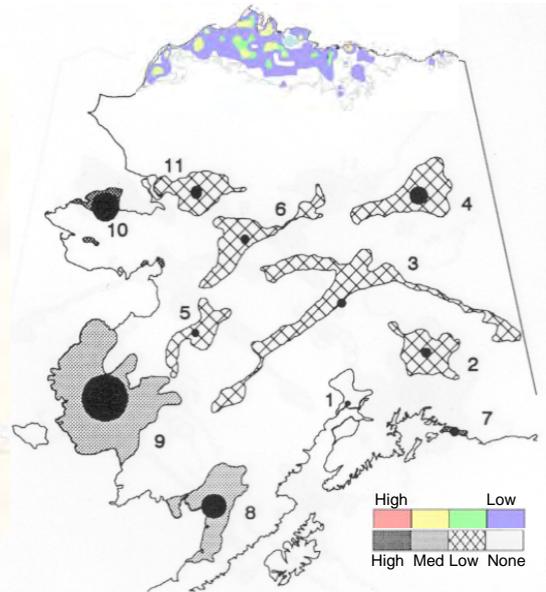
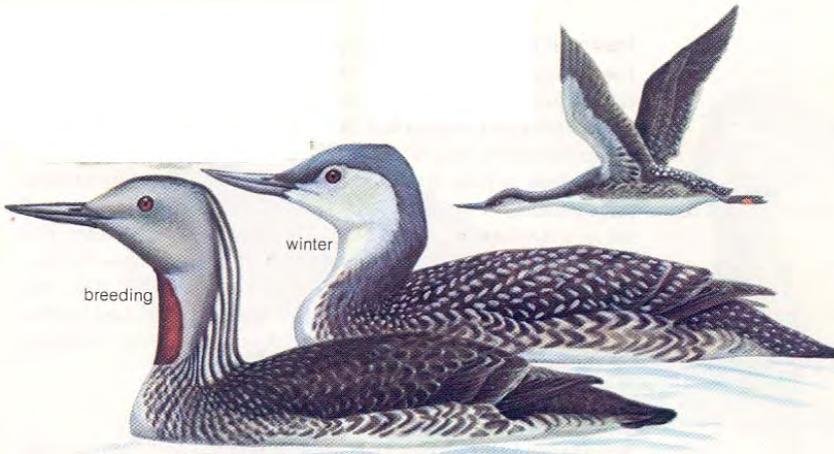
COLO



- Large loon
- Black head, black bill
- Black/white (checked) back; white on breast
- **Similar to yellow-billed loon (virtually no overlap in distribution)**



RTLO

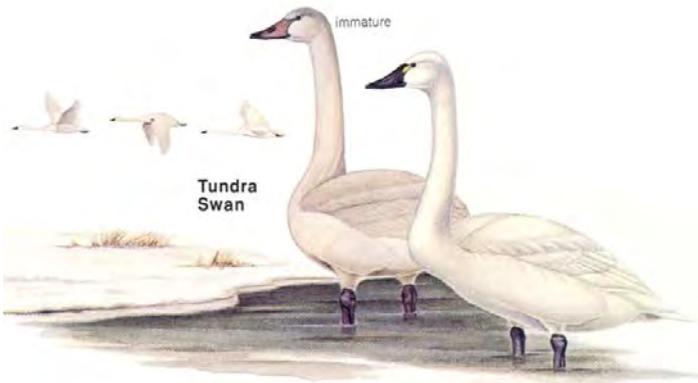


Stratum	1	2	3	4	5	6	7	8	9	10	11	TOTAL
Population	0.0	0.1	0.1	0.2	0.2	0.1	0.3	1.7	5.5	2.7	0.4	11.4
Density	0.0	-	-	-	-	-	0.3	0.1	0.1	0.3	-	0.1

- Mousy brown/gray, sometimes silvery, appearance
- Narrow, snaky head
- Sits low in water, bill raised
- Head-forward, wings-out threat display
- At flyover, often lays down on water, head flat on the water, bill raised
- Frequents smaller lakes and ponds, usually close to coast
- in pairs even more often than other loons
- Often seen on sloughs, shallower lakes



SWANS



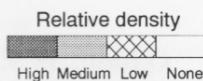
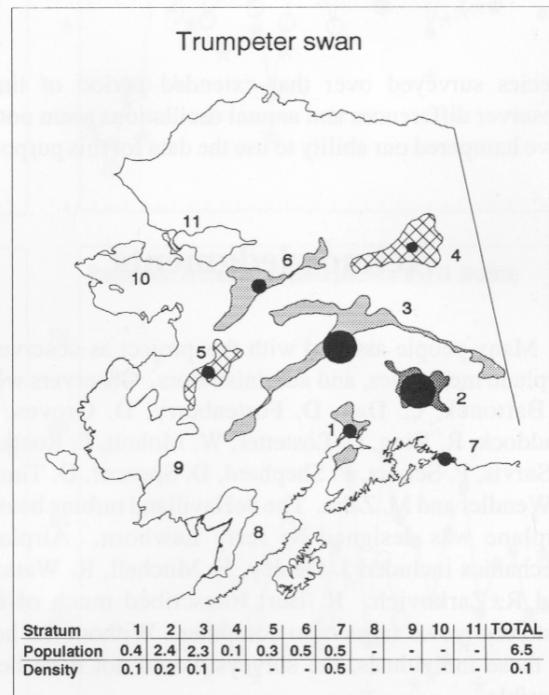
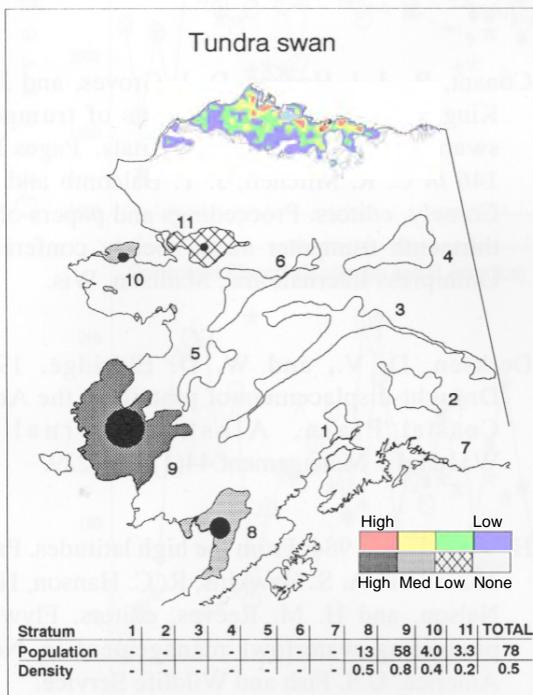
Difficult to tell apart from a distance.

Tundra Swan has yellow on bill, Trumpeter Swan has a straighter, thicker neck.

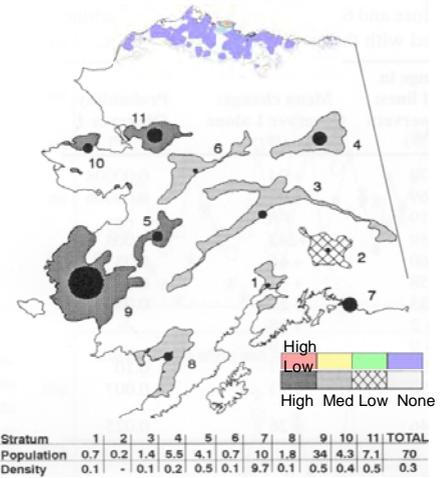
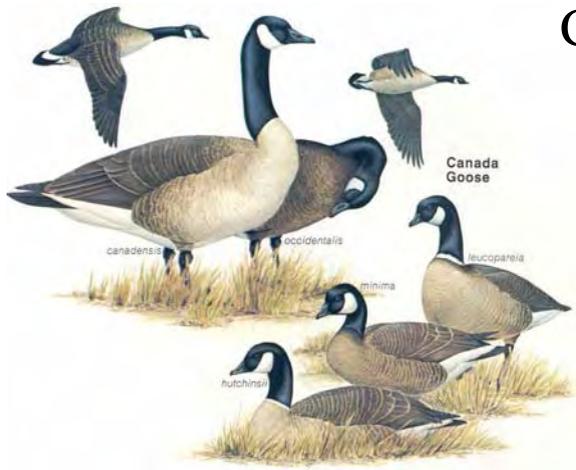
Tundra Swan downy young are a lighter gray, almost white.

Mostly, we define swans by habitat, range:

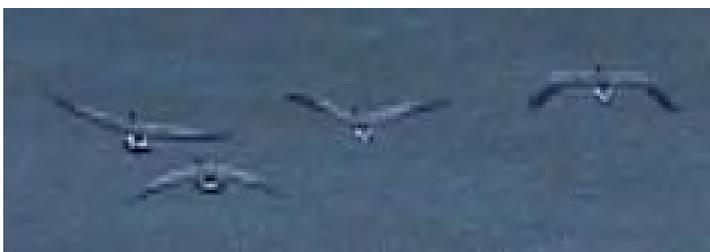
roughly: boreal habitat = Trumpeter Swan, tundra habitat = Tundra Swan



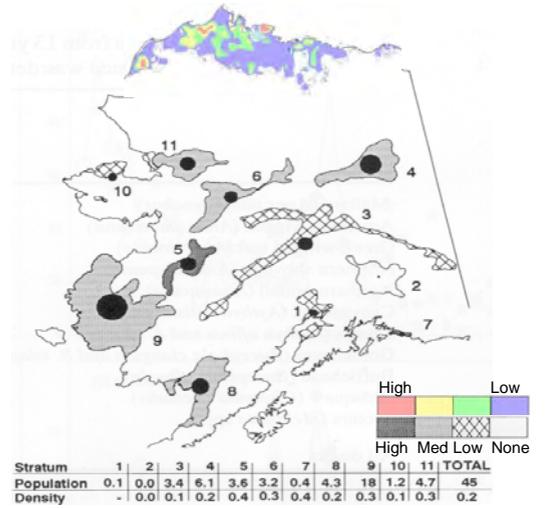
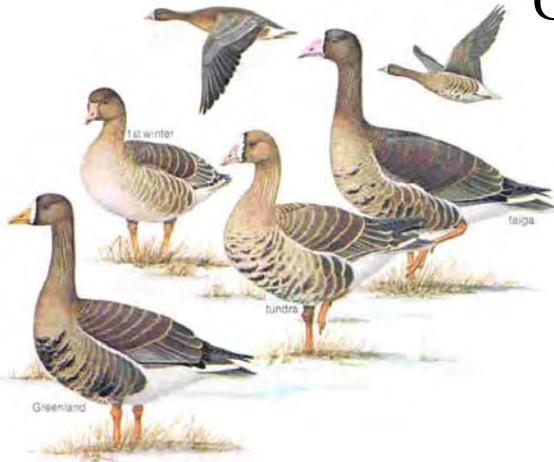
CAGO



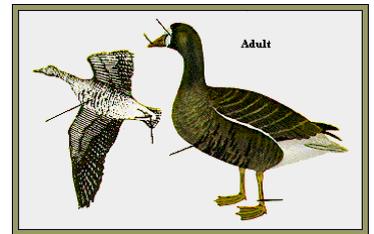
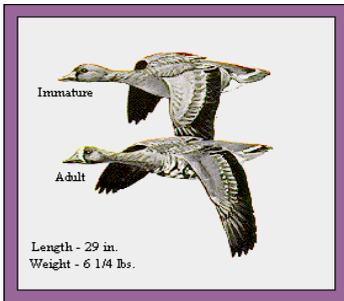
- Dark brown goose with gray- brown wings, back; lighter than BRAN darker than EMGO
- Wings more monotone (vs. two-tone GWFG), lighter and set off from black/white rump
- Black rump and tail separated by white band (almost straight to U-shaped or even V); terminal black band in flight
- Black head/ white chin sometimes visible
- Smaller, with more agile flight than GWFG
- Often reluctant to flush; on breeding grounds, often flying away from aircraft
- **SIMILAR: Other, especially dark, geese**



GWFG

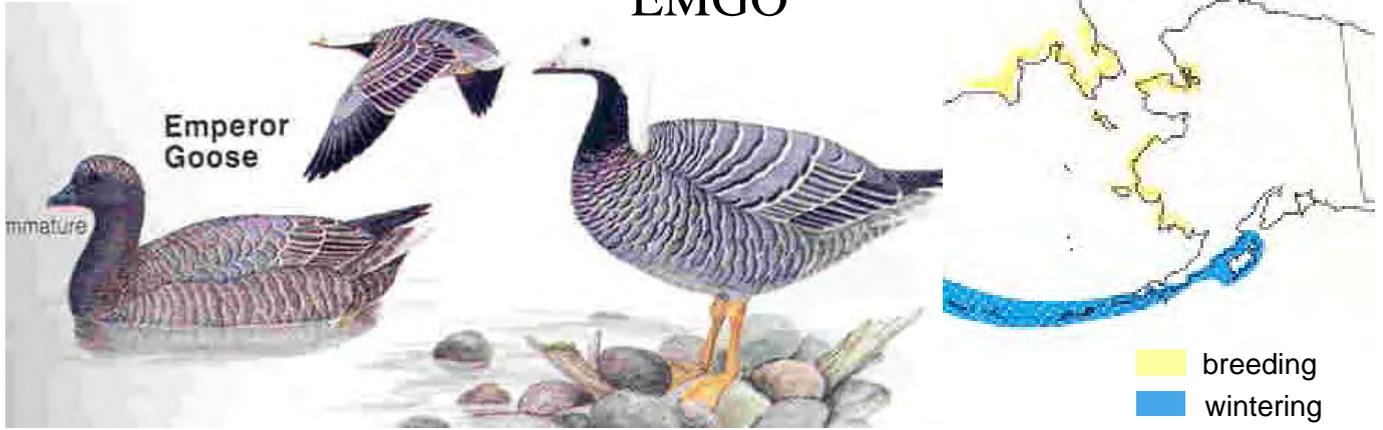


- Light tan-colored goose; lighter than BRAN, darker than EMGO
- Light line on wing (coverts extend laterally), appears like a mid-wing bar
- Thick light band on tail (more V shaped than on CAGO) plus minor light terminus band (see tail shots)
- Slower flight than other AK geese
- Usually flushes readily from aircraft
- **SIMILAR: other geese**



CAGO above, GWFG below

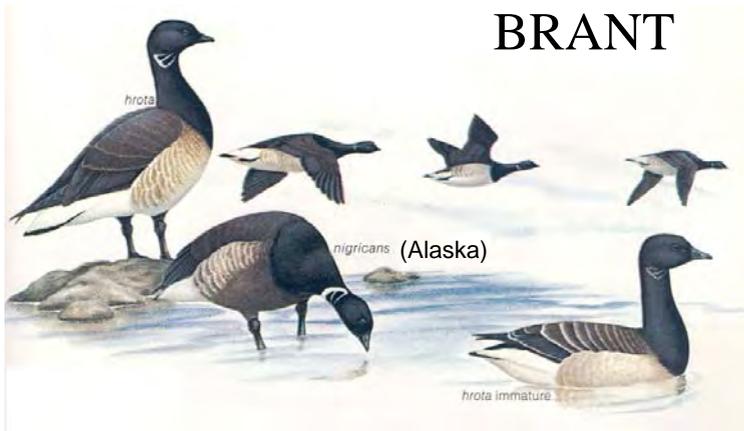
EMGO



- Overall light grey appearance in flight; light head-neck and rear; gray body: light-dark-light
- Appears white-gray-white (white head and tail, gray in middle); head may be stained yellow
- Tail and body lighter than GWFG or CAGO, white head in spring
- Dark primaries
- Juveniles have dark heads that don't stand out against water like adult head and neck
- Usually flushes readily from aircraft
- **SIMILAR: Other geese**

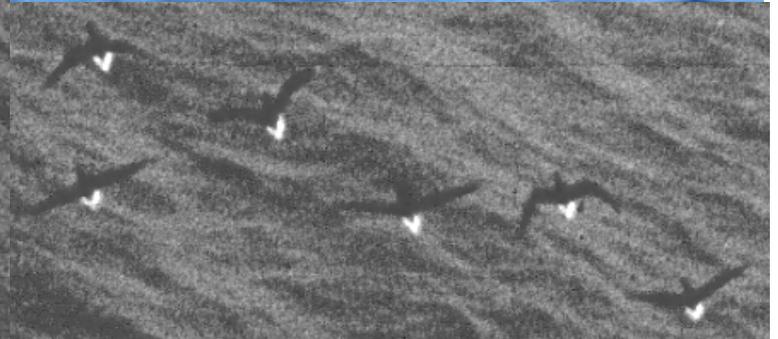
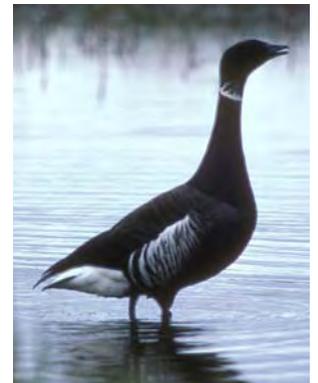


BRANT



Yellow = breeding
Blue = wintering

- Dark brown, nearly black, on back, neck and wings; more uniformly dark above than others
- Smaller than most other dark geese
- Sharp "V" white rump pattern, extends to center top of tail
- Usually seen in flocks near the coast
- Sometimes standing on the mudflats
- Usually flushes readily from aircraft
- **SIMILAR: Other, especially dark, geese**

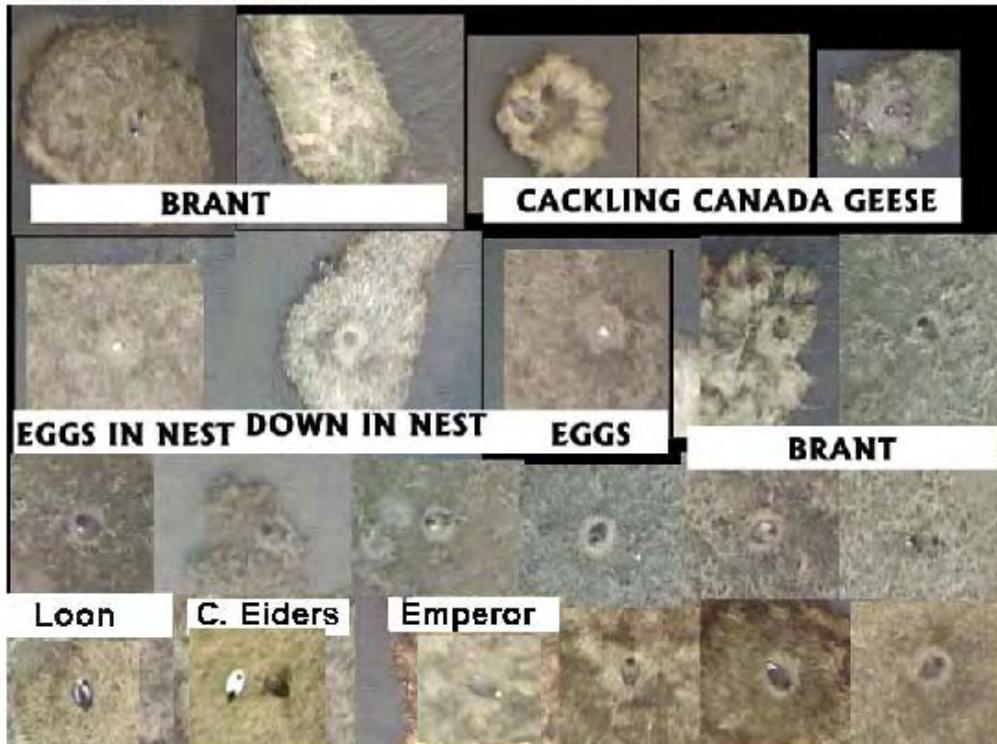




Goose Tail Shots (clockwise from upper left): CAGO, BRAN, EMGO and GWFG.
Photos by T. Bowman (above), B. Platte, P. Anderson, Chris Dau, USFWS.



Waterfowl on Nests



LSGO

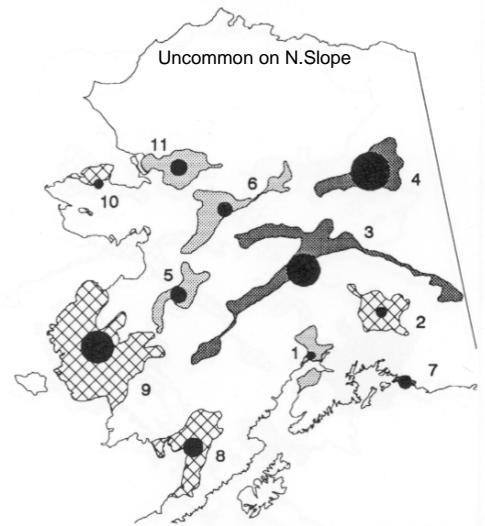
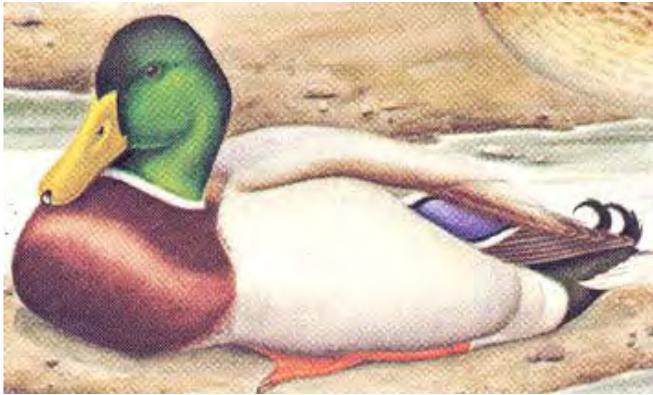


"Blue Goose"

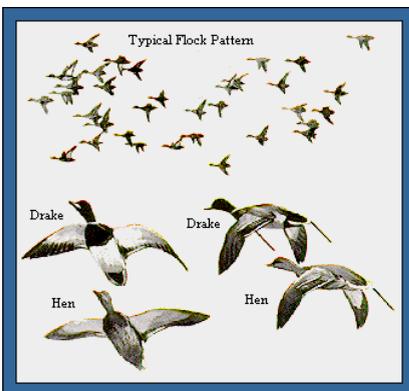
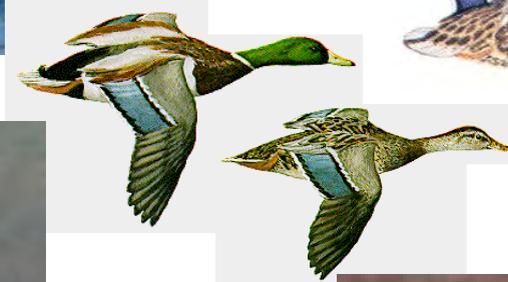
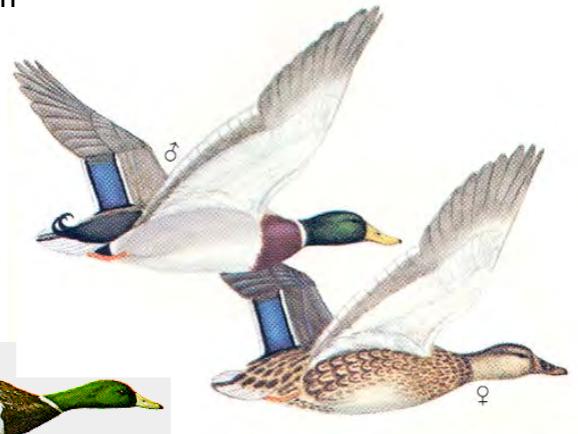


D

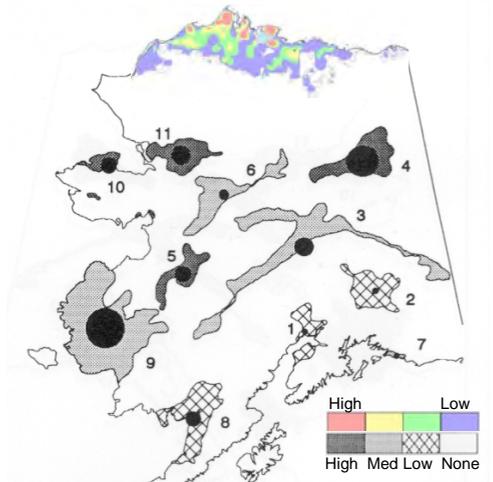
MALLARD



- Large, stocky duck, tan body with dark back, almost a stripe
- Dark head, neck
- Tail appears white; in flight, brown stripe down center!
- White-bordered speculum
- **SIMILAR: Long-tailed duck in flight**

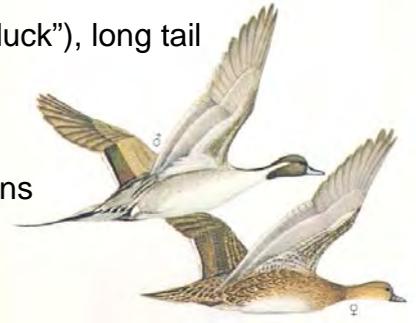


NOPI



Stratum	1	2	3	4	5	6	7	8	9	10	11	TOTAL
Population	3.8	5.1	63	166	58	26	4.5	49	296	104	86	861
Density	0.7	0.5	2.6	5.9	6.5	2.4	4.4	1.9	4.3	10.5	6.2	4.1

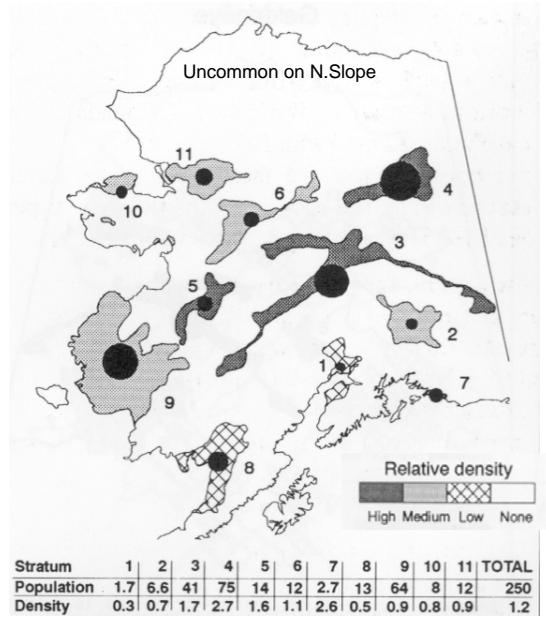
- Drab, light brown, blends in to vegetation
- Slender body, longer, streamlined head & neck (“greyhound duck”), long tail
- Sleek appearance in flight
- White on underside of neck, makes neck appear thin
- Longish, thin wings, dark speculum
- Often seen standing in grass (white/brown blob) at lake margins



note “2-tone” speculum -BP



AGWT/BWTE



- Small, dark duck; “2-toned” bird: chocolate head contrasting with lighter gray-brown body
- In good light, red with dark patch on head
- Dark speculum, with iridescent green in good light and generally dark wing
- Rapid wing beats and tight formations in flight
- **SIMILAR:** Goldeneye hen



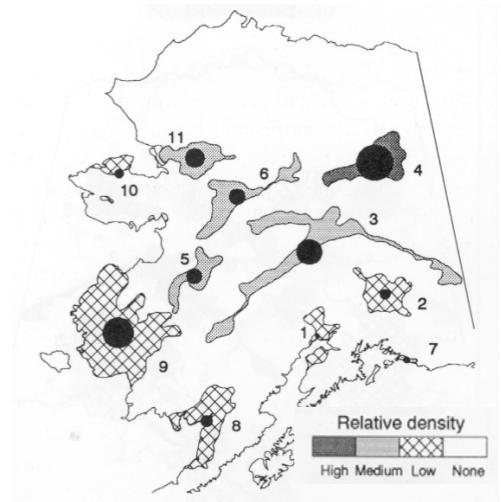
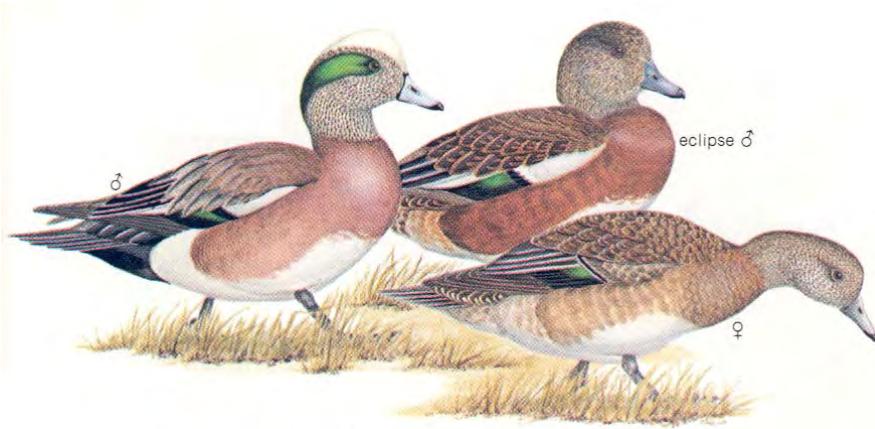
Aleutian *nimia*, below
(*carolinensis* near top of photo)



BWTE



AMWI

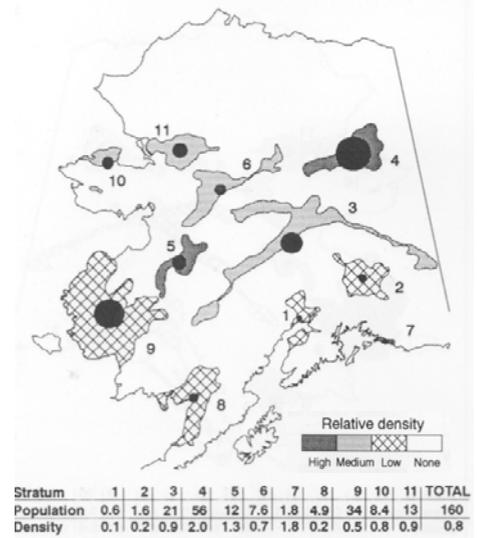
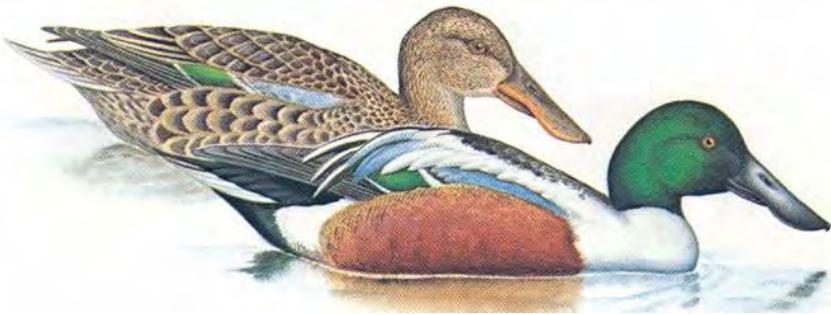


Stratum	1	2	3	4	5	6	7	8	9	10	11	TOTAL
Population	1.4	11	49	120	20	22	2	14	56	10	38	343
Density	0.2	1.0	2.0	4.3	2.3	2.0	2.0	0.6	0.8	1.0	2.7	1.6

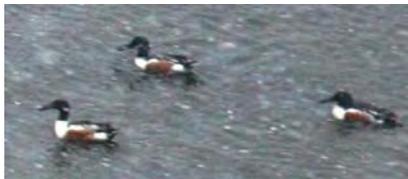
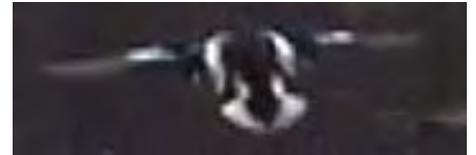
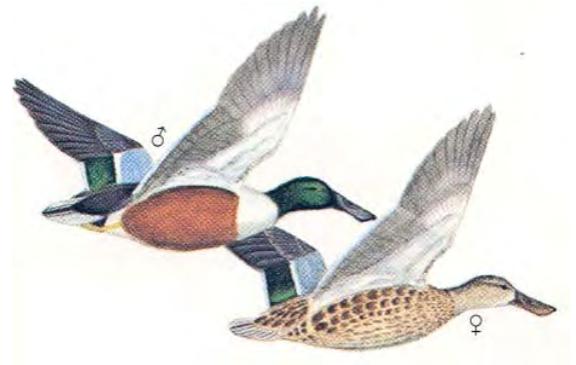
- White patch on top of head (adult male) sometimes visible
- White underside, light and black on rump if side view
- Flying, white leading edge, white wing patch (coverts, like KIEI)
- Dark speculum, iridescent green in good light
- Often seen in sloughs and rivers and in variable-size flocks



NSHO



- Boldly patterned duck: white scapulars/ breast, dark back and head, large bill
- In good light. pale blue and white leading coverts (similar to BWTE wing)
- Dark (green) speculum, dark chestnut sides, white tail
- Blocky, humpback appearance in flight
- Commonly seen in shallow marshy areas
- **SIMILAR: Possibly green-headed mallard**

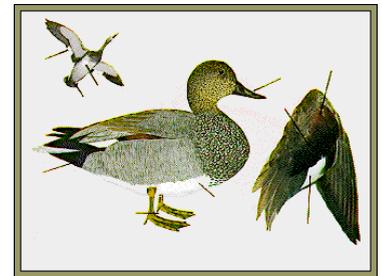


AMWI (r), NSHO (l)

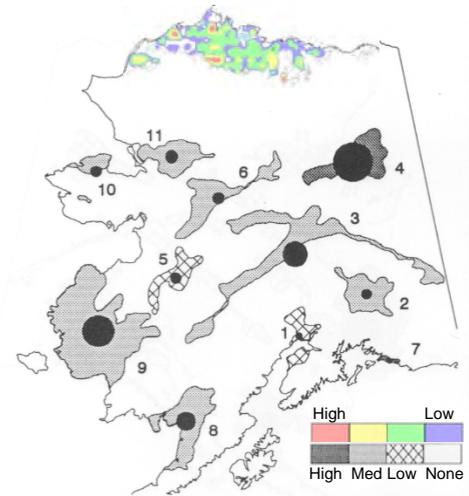
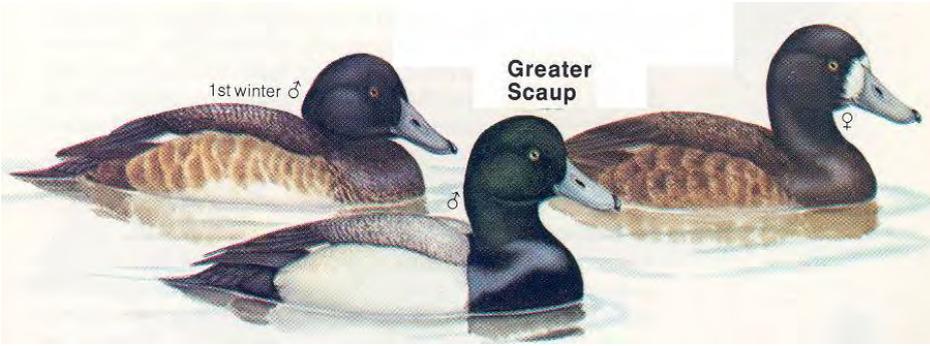
GADW



- Gray/brown bird
- White square patch on speculum, secondaries
- Black swath on rump when viewed from the side

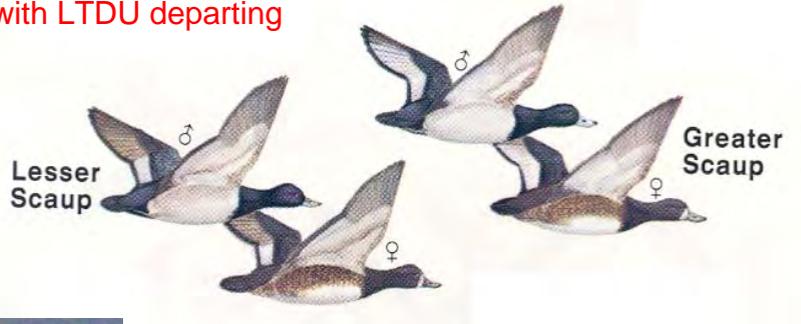


GRSC/LESC



Stratum	1	2	3	4	5	6	7	8	9	10	11	TOTAL
Population	4.0	32	102	253	16	28	7.5	69	217	34	57	820
Density	0.7	3.2	4.3	9.0	1.8	2.7	7.2	2.7	3.2	3.4	4.1	3.9

- Lots of dark over lots of white
- White “footballs” on sides, even when flying (vs. LTDU)
- Lighter gray on back than dark RNDU
- Scapular (2) white “stripes” down back
- Wings dark with light secondaries, extending full wing on greater, inner 2/3 on lesser
- Flies in a straight line with rapid wingbeats, female usually in front
- Generally: greater scaup - tundra habitat; lesser scaup - woodland habitat
- **Similar to ring-necked duck, compare with LTDU departing**



Redhead and G. Scaup



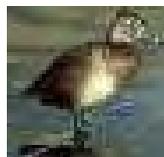
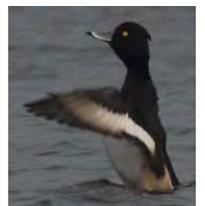
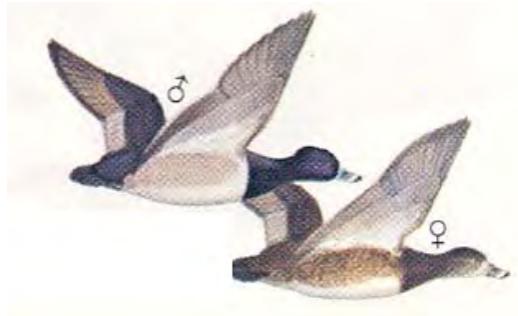
RNDU



- Similar to scaup; longer neck, “humpier” head than scaup on the water
- Black back, compared to lighter gray scaup back
- Appears mostly dark in flight; dark wing with grey trailing edge
- Vertical white stripe in front of the wings on water
- Black and white bands on bill only visible if very near

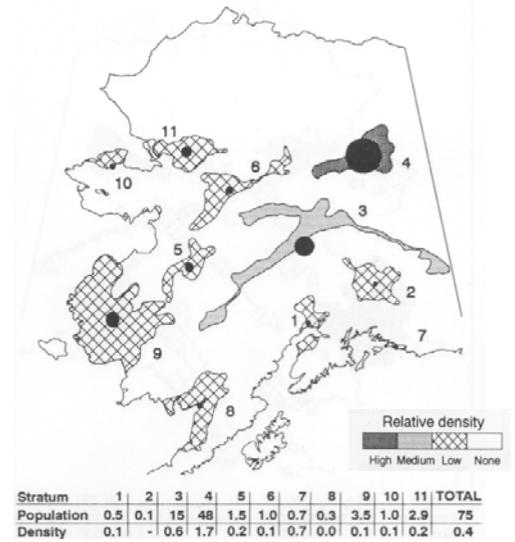
Distribution:

<u>ACP</u>	<u>T-K</u>	<u>KSU</u>	<u>YKD</u>
+	u	u	+

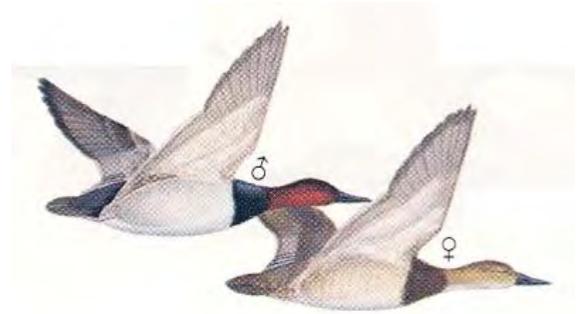


Lesser Scaup

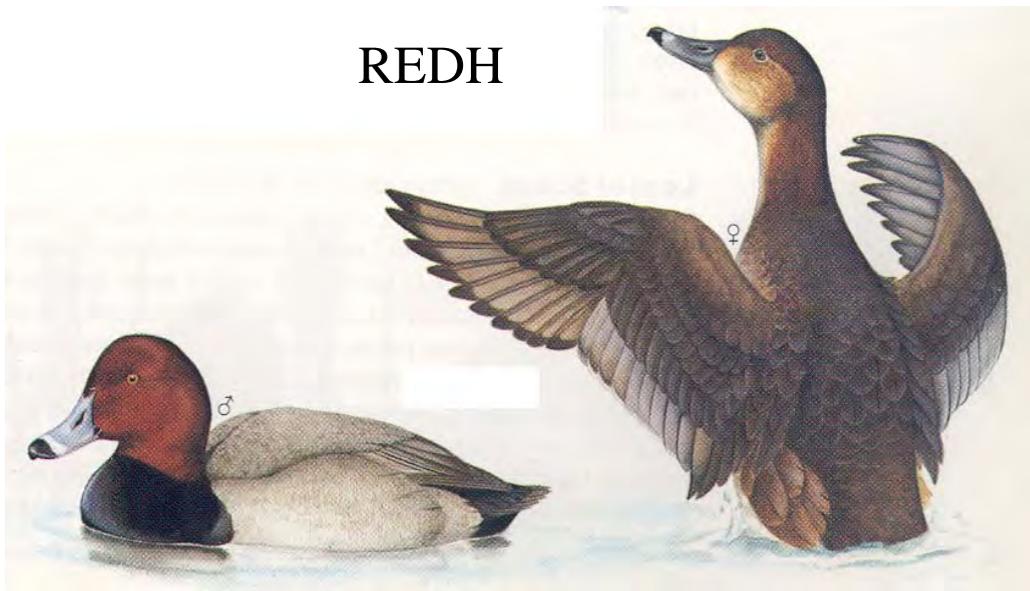
CANV



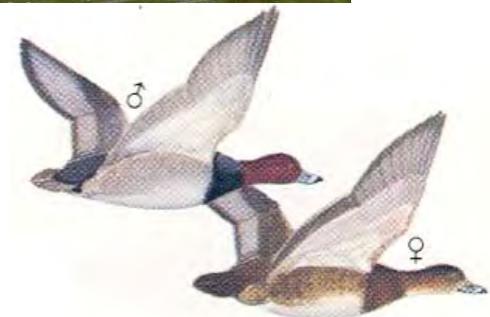
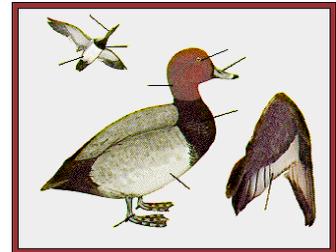
- Male dark head/breast--white body, gray back--dark rump and tail (dark--light--dark)
- Large, chunky duck with long, sloping, dark bill, wedge-shaped head and stout neck
- Wings in-flight appear pale; light/dark on wing reversed (front of wing vs. trailing edge pale)
- Larger than scaup
- Flight straight and direct
- **SIMILAR to scaup, redhead**



REDH



- Pale bill, rusty head
- Very similar size, shape and color patten to Greater Scaup
- Darker than CANV and Scaup; gray back and wings, black upper back
- Bill is shorter than CANV and head more rounded and petite than CANV
- **SIMILAR to scaup, redhead, canvasback**

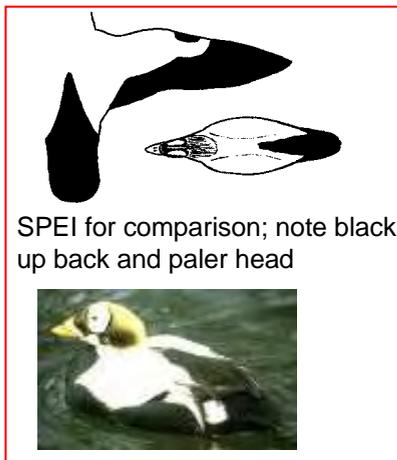
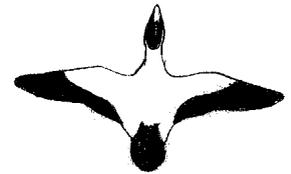
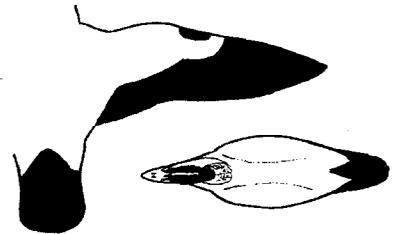
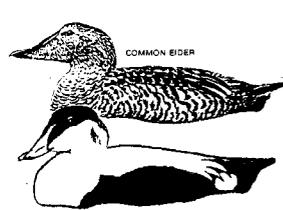


COEI



■ breeding
■ wintering

- Mostly white, whitest of the 3 “common” eiders; black wing “edges”
- Black crown patch sometimes visible; less black on lower back, rump than SPEI
- Neck, back and inner wing white; looks like flying triangle in flight, from above
- Female mottled tan/brown
- Biggest eider, with slowest wing beats, sometimes “humpbacked” flying profile
- Typically seen near the coast or a short distance offshore during breeding season
- Commonly fly in a line low over the water, common over or on sloughs
- Eiders often fly away and perpendicular to aircraft flight path
- **SIMILAR: SPEI (smaller, more black posteriorly, “mottled” head from air, see below)**

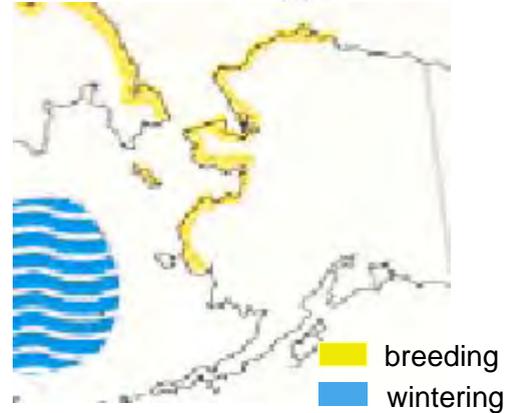
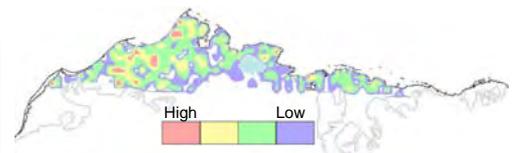


Flocks on water

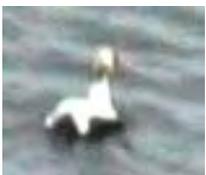


w/NOPI; note “humpbaack” look

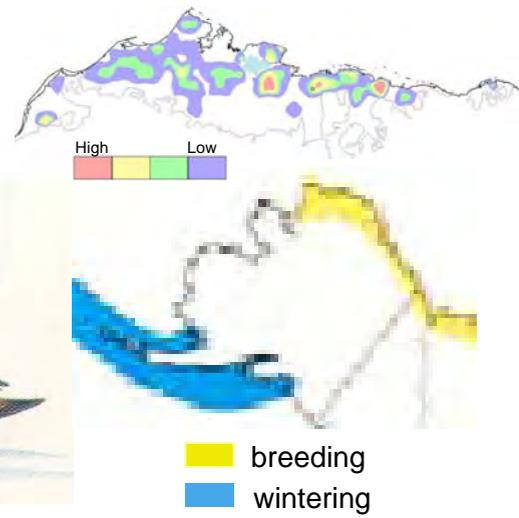
SPEI



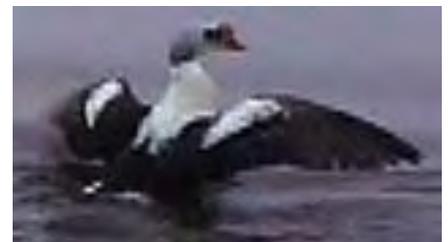
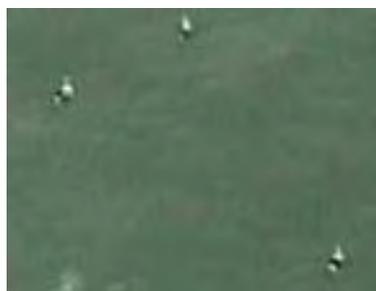
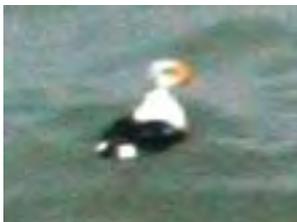
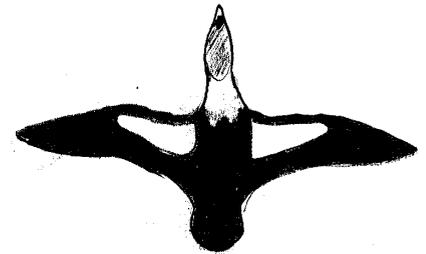
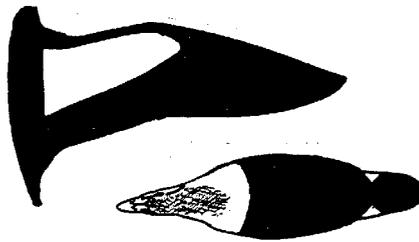
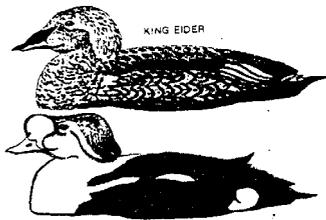
- Smaller than common eider
- More black on back (up rump to mid back)
- Pale head, sometimes looks “mottled” from distance
- Black on belly and chest comes closer to throat than COEI
- White on back extending onto wings, similar to common eider but not as white
- Female mottled tan/brown with paler head and neck than COEI
- Smaller and quicker wing beats than COEI and more erratic in flight
- **SIMILAR: COEI**



KIEI

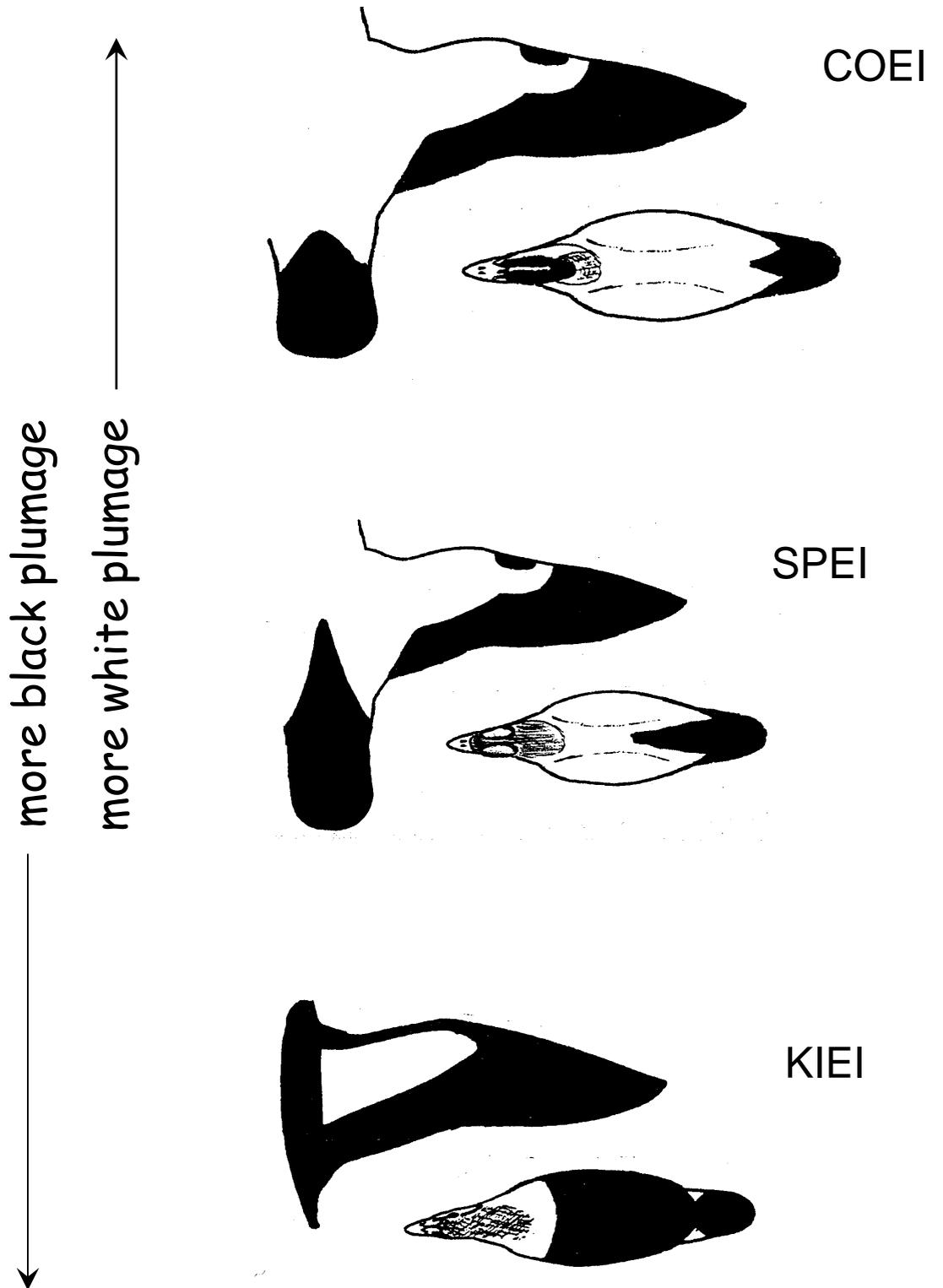


- Black back, white shoulders to head
- White flanks show up as white in rear; bird has white--black--white appearance
- White wing patches on forewing (similar to AMWI) surrounded by black
- Females mottled dark brown



EIDERS

Large, black and white eiders

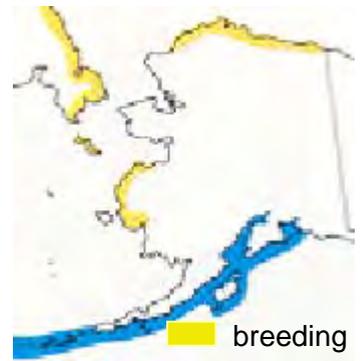




SPEI (above), COEI, KIEI (below)
photos, Chris Dau, USFWS

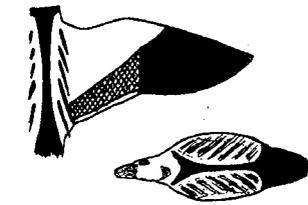
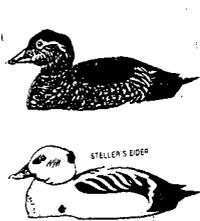


STEI

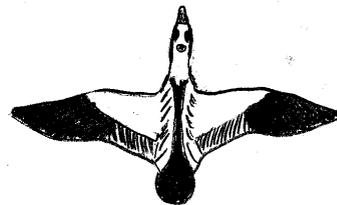


breeding
wintering

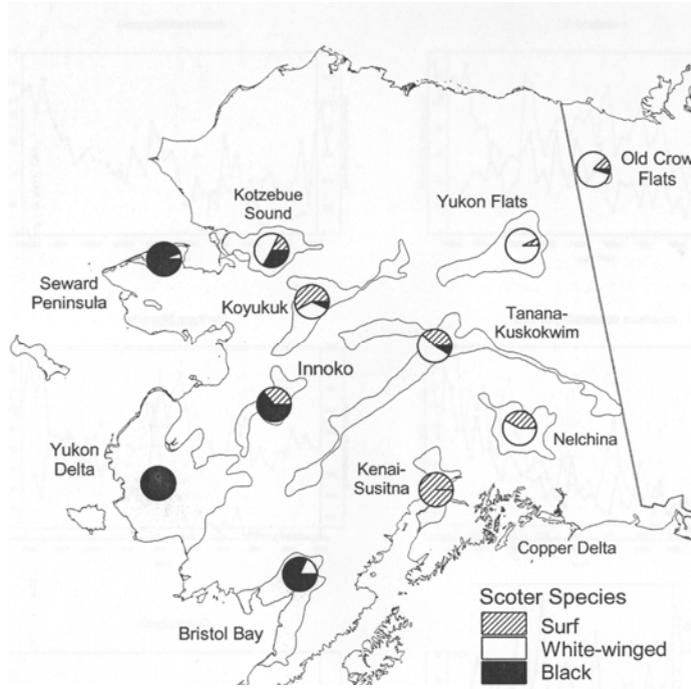
- Pale body, white shoulders
- Broad white wing patch, scapulars, with dark speculum bordered by white on trailing edge
- Darkest eider; black goes all through back
- Female with large dark iridescent speculum with white borders (resembles mallard wing)
- Smallest eider; Scaup sized; quick wing beats
- Usually very dense flocks in spring, fall and winter



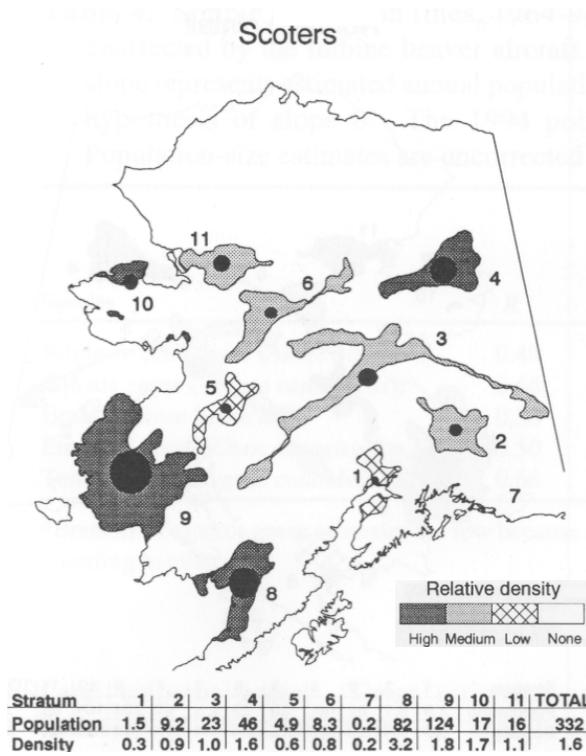
C.Dau



Scoters



1. Scoter relative abundance by strata in 2003. From Conant and Groves 2003.



2. Scoter population and density, 1957-1993. From Hodges et al. 1996

BLSC



breeding
 wintering

- All black males, females dark brown with pronounced single light cheek/throat/neck patch
- Males with orange knob on bill, generally difficult to see from air (may look white)
- Pale outer wing/primaries can look pale in flight (see below)
- Often in pairs, with slightly lighter female
- When approached, will start to fly (vs. WWSC/SUSC- on fall/winter survey)
- **SIMILAR: difficult to distinguish from SUSC, WWSC at a distance**

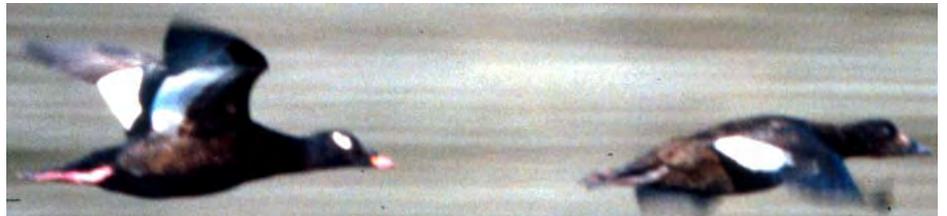


WWSC



■ breeding
■ wintering

- Bigger than Black Scoter, “dumpier” looking, lighter and longer
- White around eye sometimes visible (often more so than white on wing if sitting vs. flying)
- Females dark brown with two indistinct white cheek patches each side
- Both sexes have white speculum
- Reluctant to flush from aircraft
- **SIMILAR: other scoters**



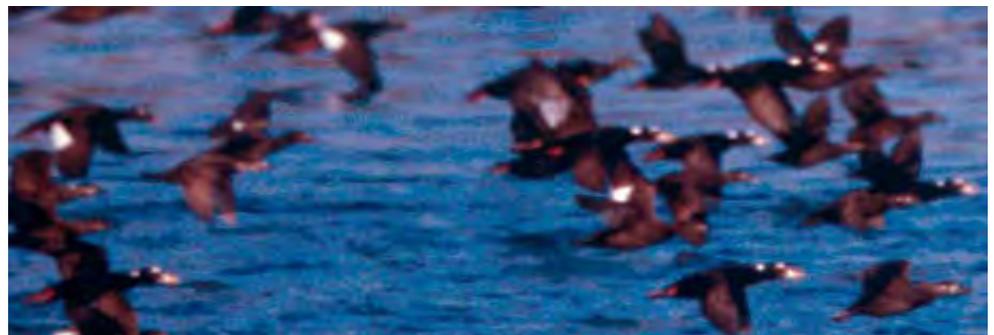
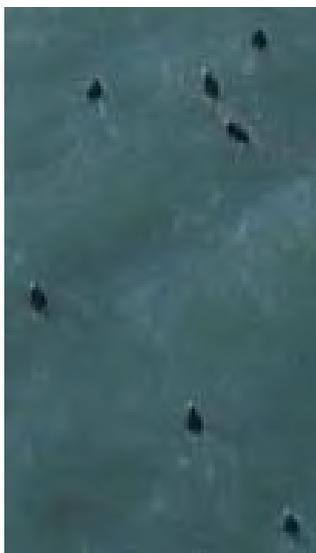
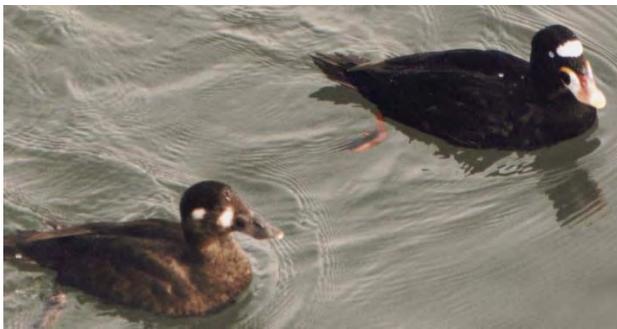
Mixed Scoter flock, BLSC and WWSC (two circled)

SUSC



■ breeding
■ wintering

- White on head, neck (“skunkhead”)
- Females dark brown with double light cheek patches (vs. BLSC, similar to WWSC)
- Typically near shore vs. other scoters
- When approached, will hold tight as passed over (vs. BLSC)-Fall/Winter survey)
- **SIMILAR: difficult to distinguish from BLSC at a distance**



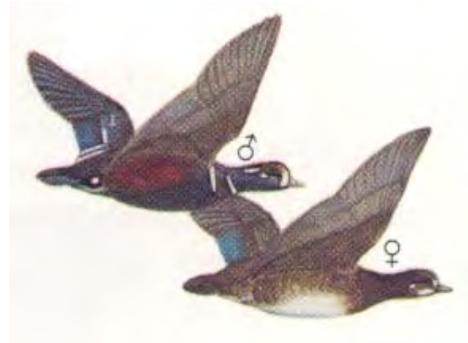
Mixed Scoters (foreground), SUSC, WWSC

HARD



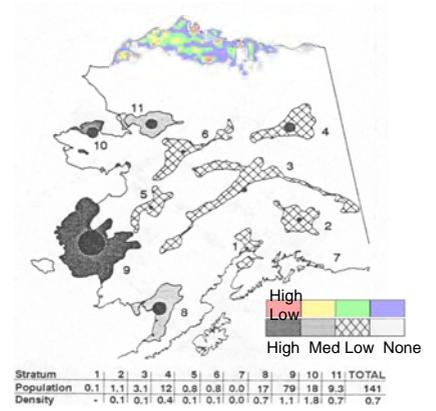
breeding
wintering

- Small duck with steep forehead, short bill, short thick neck & head; small white markings on head and neck
- Male's plumage appears dark at a distance
- Mostly dark wings; males with some white in speculum
- Typically along rocky or gravelly coastal shorelines, close to shore or in kelp beds
- Plumage blends in well, often difficult to detect w/o practice
- Commonly on swift streams (when not in ocean)
- Usually flushes readily from aircraft

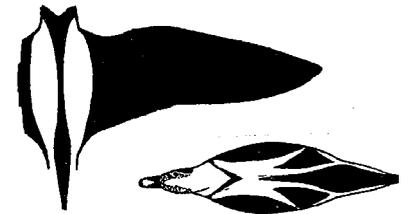
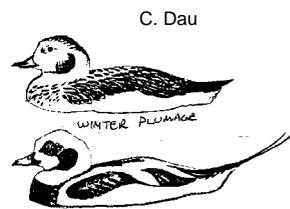




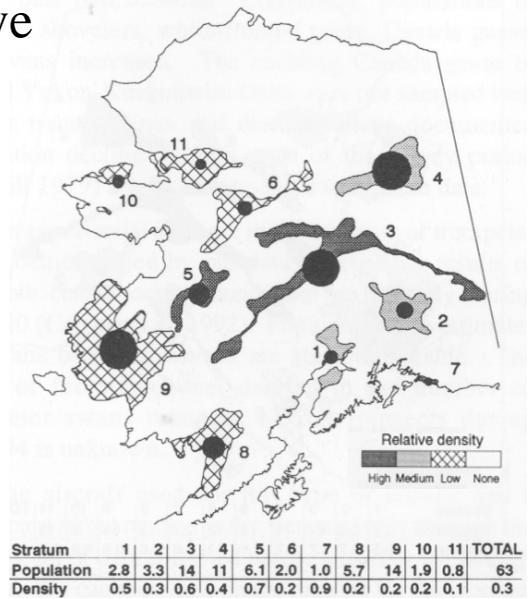
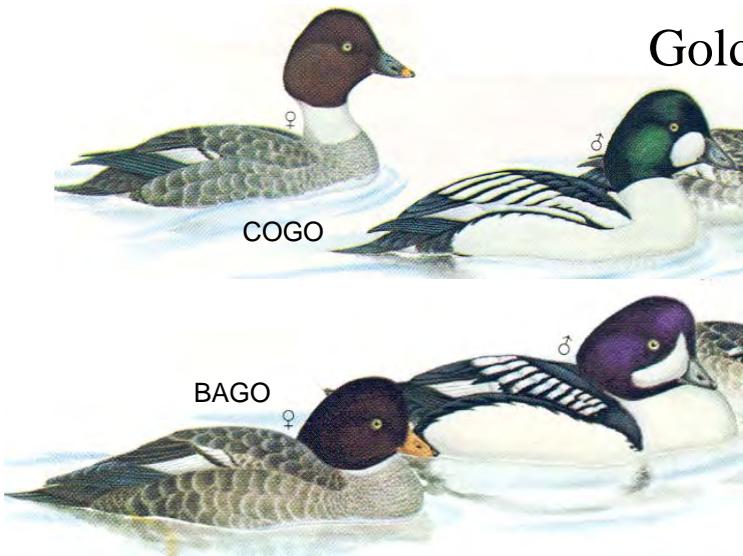
LTRDU



- Unusual looking 2-toned duck:
head to breast dark, uniform dark wings, light rear half
- Head and sides of back in males white in winter, brown May-October
- May be seen in winter, summer or intermediate plumage
- Scapulars white in winter, brown in summer
- White "Y" (black in center) on back when flying
- Fly in straight line, low to water, fast wing beats



Goldeneye

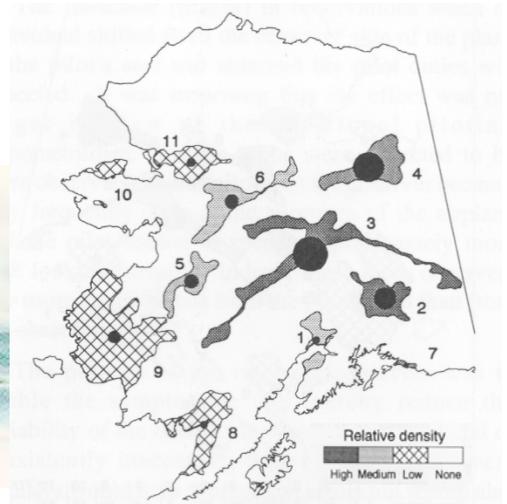


Goldeneye- Barrow's and Common

- More plump and fat than “narrow, pointy mergansers”
- Short head, neck, bill vs. mergansers
- Dark head, white breast and belly (with contrasting black back)
- Bigger than bufflehead, smaller than mergansers
- White secondaries, coverts in flight (scapulars more black in BAGO)
- Tail and rump black & dark grey (vs. much lighter mergansers)
- Barrows much less white showing on scapulars vs. common
- Takes off with patter as in mergansers
- Favors more boreal habitat
- **SIMILAR: Mergansers, bufflehead (above); see wing page**

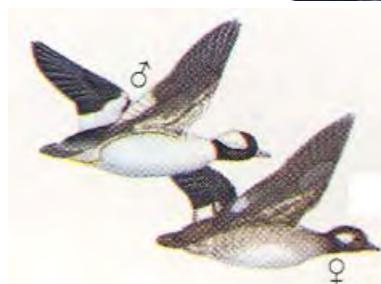


BUFF

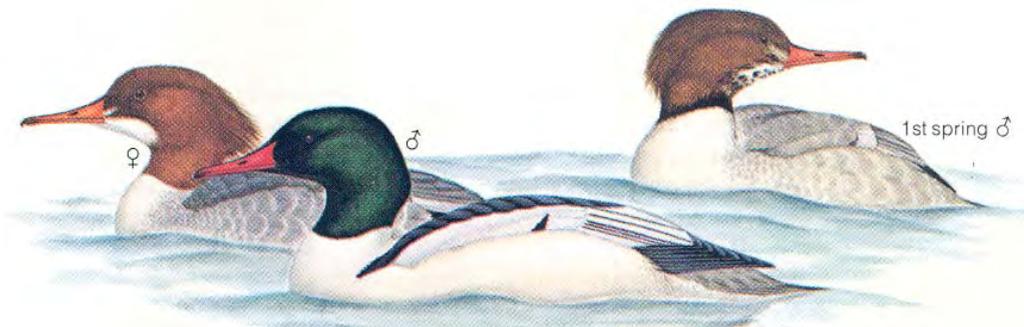


Stratum	1	2	3	4	5	6	7	8	9	10	11	TOTAL
Population	0.5	6.1	17	13	1.6	2.6	0.2	0.7	1.2	0.0	0.5	43
Density	0.1	0.6	0.7	0.5	0.2	0.2	0.2	-	-	-	-	0.2

- Black on head, back, gray rump, light underside
- Smaller duck, male white on head shows well
- Solid white secondaries, coverts on male, vs. partial band on goldeneyes
- Females & juvs. very small white wing patch vs. large on female goldeneyes
- Fast wing beat
- Favors more boreal habitat, often on treed lakes



Mixed flock of diving ducks



Common Merganser

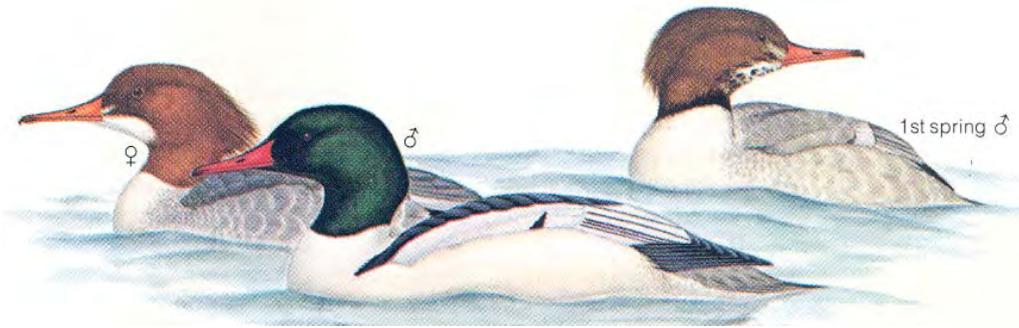
Mergansers, general

- Big bird
- Large block of white on wings
- Light grey lower back and rump vs. black for goldeneyes
- Long neck, head, bill vs. goldeneyes
- Long takeoff patter on water vs. near vertical takeoff for goldeneyes
- Flies low to water surface, shallow, fluttery wing beats, straight vs. erratic for BUFF, GOLD
- Often near rivers, sloughs
- **Similar: Goldeneye**

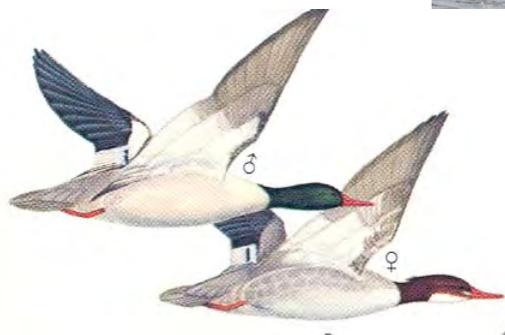


Red-breasted Merganser

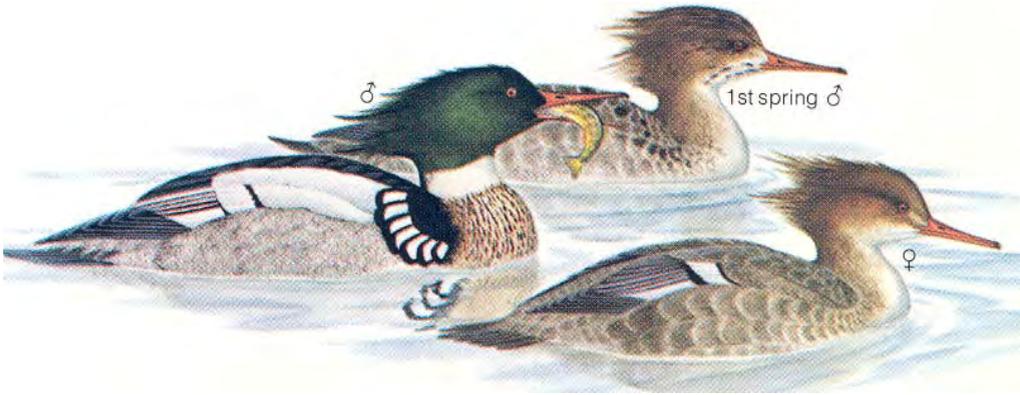
COME



- White breast and body to waterline vs. brown for RBME
- Dark head, appears small compared to white body
- Gray lower back/rump, black upper back/upper scapulars
- Much larger than RBME (rarely in mixed flocks)
- White wing secondaries and coverts
- **Similar: Goldeneye**

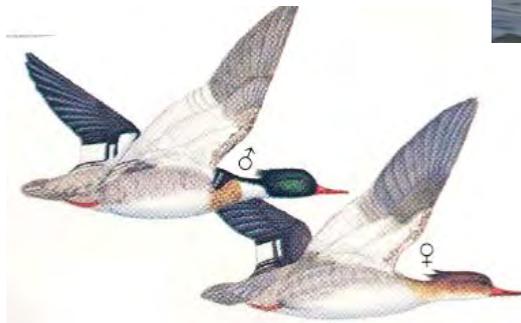


RBME



Red-breasted Merganser

- Long, slender bird
- White neck “ring”, stops at dark breast
- Gray lower back/rump, black upper back and scapulars
- White secondaries/coverts
- Dark head appears small next to white body; green head, long, slender bill
- Diver, slow off the water
- **Similar: Goldeneye**



Duck Wings Identifiable From White Patches



BUFF



COGO



RBME



COME

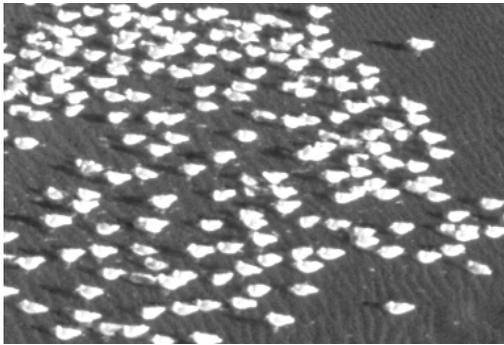
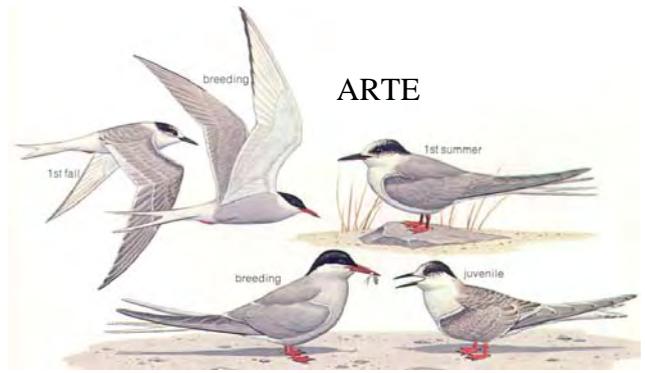


1. Similar Ducks with White Wing Patches

2. Duck Wings Without Large Patches of White



Larids



MEGU



Larids, cont.

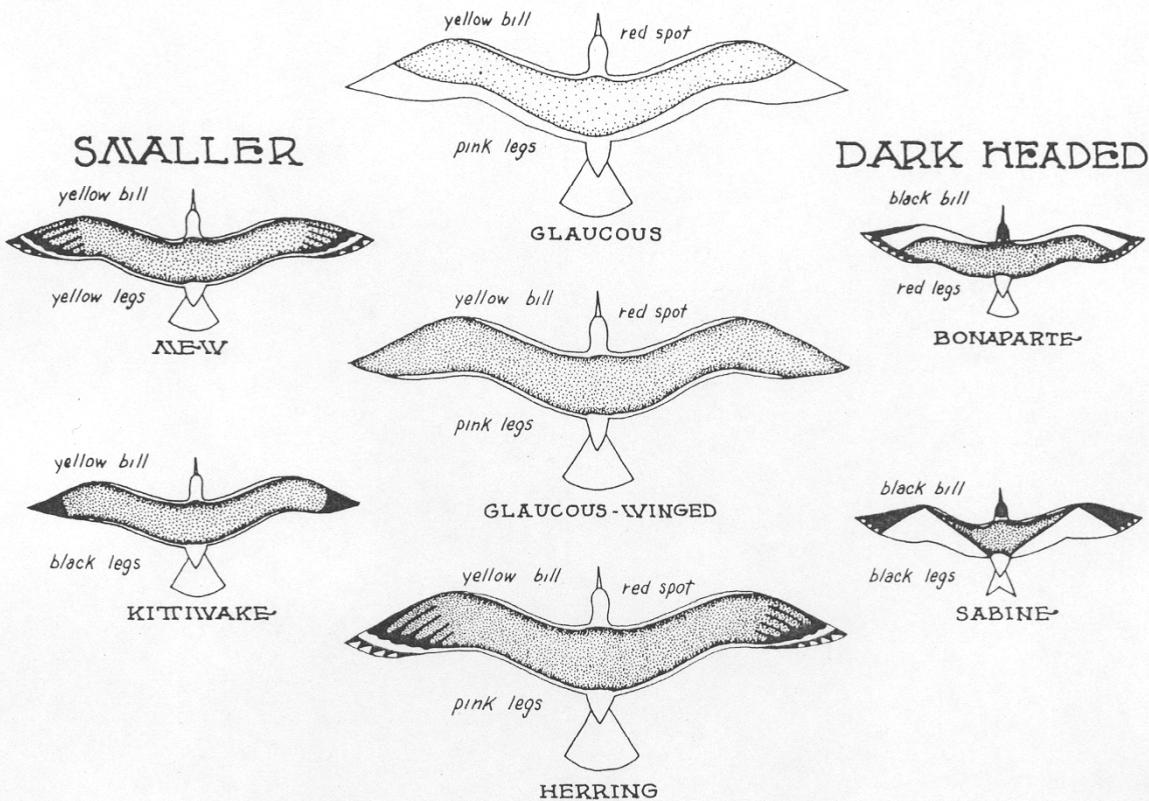


BOGU

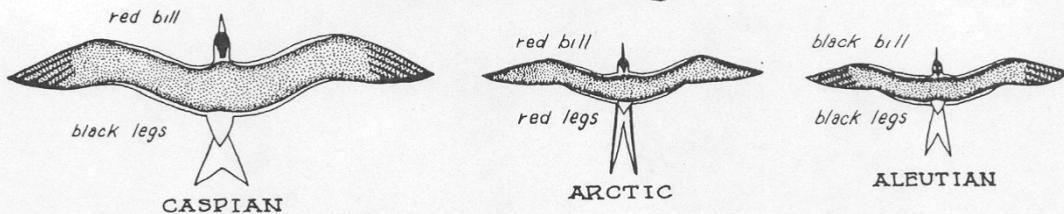


GULLS

IN BREEDING PLUMAGE
PRINCE WILLIAM SOUND
ALASKA



TERNs

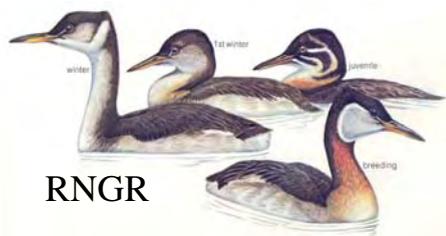


Charles K. Weaverling

for Ann 7 JUNE 2000 Cordova, Alaska

C. K. Weaverling © 1987

Misc Waterbirds



■ breeding
■ wintering



SACR

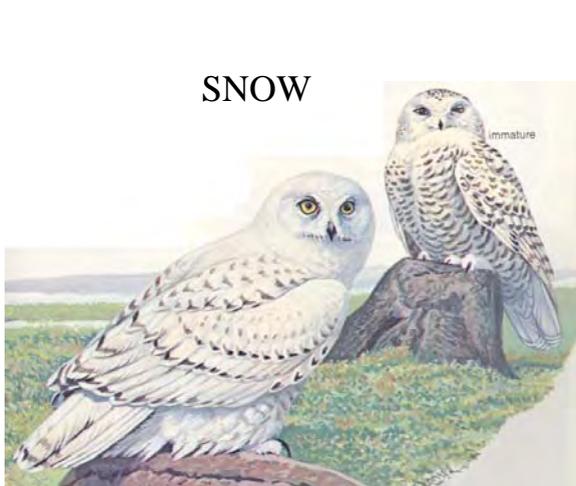
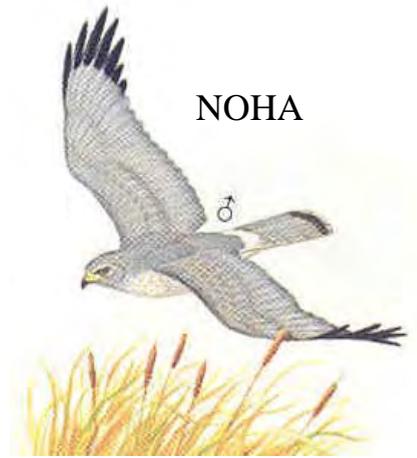


GBHE

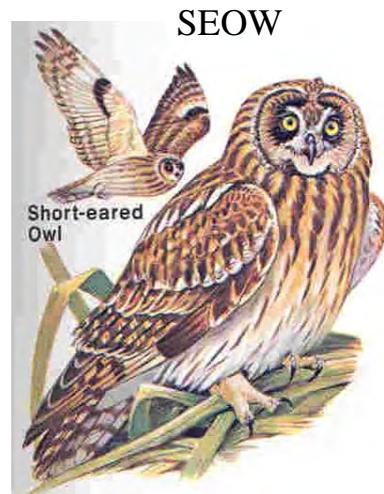


The American Coot is a rare but known breeder in SE, southcoastal and central Alaska

RAPTORS



Juveniles can be fairly dark



Look for moth-like, floppy and erratic, wing beats

Observer Protocol for Recording and Transcribing Aerial Observations

Prior to survey, it is necessary to decide what you are recording and how you are recording it, for that particular survey. Consistency between all survey dates and observers is the goal, but consistency within an observer dataset is necessary.

Species Identification Which species/groups will you include/exclude? For all surveys, WATERFOWL and LOONS are recorded. Other species are: GULLS, TERNS, JAEGERs, GREBES, CRANES, RAPTORs, SHOREBIRDS. For most surveys, all birds listed here are surveyed to some degree (shorebirds being the most difficult and expendable, infrequently identified to species but recorded as "unidentified large or small shorebird"—ULSH and USSH; a "medium" category is used by some). Whether you do or do not record some species, BE CONSISTENT throughout the survey. If you decide part way through that it is not appropriate to record a group (e.g., if you find that large numbers of gulls are distracting you from adequately focusing on waterfowl), make sure you don't transcribe a partial survey for gulls. Delete these records if necessary.

Recording/Transcribing Speak clearly into microphone. Record day, time, survey, weather and say transect numbers a couple different times. Speak briefly, clearly, loudly, and your transcription will go smoother and faster. Save data after each transect, or more often if many recordings. All birds are recorded as "single", "pair", "flocked drake" or "group/open". Generally, call them as you see them, and the population trend analysis program will sort it out. E.g., if you see a flock of nine drakes record and transcribe them this way even though the current program will make any group > 4 into "open", though at a later date, the larger flocks of drakes can be teased from the data. Below are some additional guidelines for how to record and transcribe your observations. For sexually dimorphic species (ducks), the program currently doubles lone and "flocked" (group of 2-4) drakes (except scau, mdu, redh, ruddy don't get doubled due to an excess of males in the sex ratio). So, in small groups of ducks where you can sex them all, pair them up and record excess drakes. Where you can't sex all birds, make what you can from what you do sex. If you can't do this than call them "group/open" (the program will not double these numbers). Go for precision, make your best estimation then get what you can.

Recording unidentified birds

Make your best attempt at identification as unidentified birds are problematic and are not used in general analyses. However, we feel it is better to record birds to the highest unidentified taxon, than to not record it at all (as sometimes prescribed). This is especially true with eiders (UNEI), loons (UNLO or LOON), scoters (SCOT) and jaegers (JAEG). Furthermore, it is not important to be 100 percent consistent here. If you see a LTJA, record it as one, even if the rest are JAEG (same with scoters, etc.). Common shorebird designations are: small unidentified shorebird, USSH, and large unidentified shorebird, ULSH. If uncertain about a bird id, you may record a location with the mouse, then explain later and you can add in the txt.

DUCKS (sexually dimorphic species)

SINGLE- Single drake. These numbers are doubled in the population trend analysis. Single hens are not recorded.

PAIR- Male and female together.

FLOCKED DRAKE- 2-4 drakes together. These numbers will be doubled and so can be recorded or transcribed as 2-4 single drakes. Either gives equivalent results with the analysis program now in use.

OPEN/GROUP ("open" in transcribe program means individuals are considered unpaired and numbers are not doubled)- group of birds >4. All drakes and all or portions of mixed flocks that cannot be called pairs (if you can identify a pair within a group, call it a pair). E.g., a group of 5 = open if you can't sex individuals to pair up; if 2 male, 3 female, record as 2 pair (lone or groups of hens, see exception below, are not counted).

HEN- Hens are counted for eiders only and MUST have a distinct species code (see below).

GEESE are single, pairs (two together, as a lone pair or in a larger group), open/group. Single or paired geese are recorded even if suspected of being on a nest.

LOONS, SWANS and all other birds are all open, or called as pairs, when two together.

Additional Information

Nests- Swans associated with a nest (on or next to) have the nest recorded separately. Traditionally, a swan nest is recorded TUNE (TUSW nest). Using a 5-letter code it is TUSWn; (also PALOn, GLGU_n, if recorded)

Hens- Five letter code is h, e.g., SPEIh;

Young of the year- should be recorded with a y, e.g., CAGOy;

Immature birds should be recorded with an i, e.g., BAEAi;

Adults with young (parents)- should be p, e.g., TRSWp.

Hotkeys

In the Transcribe program (see that section), hotkeys are: single-q, pair-w, flocked drakes-e.

Always be aware of transect boundaries via wing markings (see appendix for marking wings) and record accordingly.

Example of transcribed data:

2002,6,24,rf,dkm,na,60,na,269,na,na,na,na,AC03D005,70.1741,-156.0779,53593.87,0.0,GLGU,1,open
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2002,6,24,rf,dkm,na,60,na,269,na,na,na,na,AC03D005,70.1736,-156.1177,53622.55,0.0,GLGU,1,open
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2002,6,24,rf,dkm,na,60,na,269,na,na,na,na,AC03D005,70.1727,-156.1977,53680.6,0.0,CARI,1,open
2002,6,24,rf,dkm,na,60,na,269,na,na,na,na,AC03D005,70.1695,-156.4615,53870.7,0.0,SAGU,1,open
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2002,6,24,rf,dkm,na,60,na,269,na,na,na,na,AC03D005,70.1692,-156.5287,53919.25,0.0,USSH,2,open
2002,6,24,rf,dkm,na,60,na,269,na,na,na,na,AC03D005,70.1682,-156.6055,53974.34,0.0,LTDU,1,single
2002,6,24,rf,dkm,na,60,na,269,na,na,na,na,AC03D005,70.168,-156.6389,53999.01,0.0,SCAU,1,pair
2002,6,24,rf,dkm,na,60,na,269,na,na,na,na,AC03D005,70.168,-56.6389,53999.01,0.0,SCAU,7,flkdrake
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2002,6,24,rf,dkm,na,60,na,269,na,na,na,na,AC03D005,70.1366,-158.2865,55203.96,0.0,JAEG,1,open
2002,6,24,rf,dkm,na,60,na,269,na,na,na,na,AC03D005,70.1347,-158.3473,55247.79,0.0,TEND,0,open
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2002,6,24,rf,dkm,na,51,na,268,na,na,na,na,AC03D006,70.1032,-159.4726,56012.85,0.0,USSH,22,open
2002,6,24,rf,dkm,na,51,na,268,na,na,na,na,AC03D006,70.1021,-159.4978,56030.75,0.0,LTDU,1,single
2002,6,24,rf,dkm,na,51,na,268,na,na,na,na,AC03D006,70.1021,-159.4978,56030.75,0.0,LTDU,1,single
2002,6,24,rf,dkm,na,51,na,268,na,na,na,na,AC03D006,70.1021,-159.4978,56030.75,0.0,ARTE,2,open
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2002,6,24,rf,dkm,na,51,na,268,na,na,na,na,AC03D006,70.0821,-160.1669,56494.76,0.0,TEND,0,open
2002,6,24,rf,dkm,na,20,na,88,na,na,na,na,AC03D007,70.4054,-160.6798,57409.22,0.0,TEBEG,0,open
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2002,6,24,rf,dkm,na,20,na,88,na,na,na,na,AC03D007,70.4118,-160.4825,57583.66,0.0,GLGU,1,open
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2002,6,24,rf,dkm,na,20,na,88,na,na,na,na,AC03D007,70.4178,-160.3347,57706.97,0.0,SNOW,1,open
2002,6,24,rf,dkm,na,20,na,88,na,na,na,na,AC03D007,70.42,-160.2871,57746.9,0.0,NOPI,1,single

Recording Tips

Speak clearly into microphone. Record day, time, survey, weather and say transect numbers a couple different times. Speak briefly, clearly, loudly, and your transcription will go smoother and faster. Save data after each transect, or more often if many recordings.

Transcribing the voice/position data from Record program

Program files

Opening the program, you will be asked: 1) to enter a 5-character name (e.g., acp02) and to designate the path to find this folder and, 2) to toggle to **Breeding Pair Survey** (vs. **Generic Survey**). Along with the wave (.wav) and position (.pos) files, the target folder has various log files. To get the transcription program to be fully functional this file should also contain: 1) a header file (e.g., acp01hea.der) for entering header info (e.g., date, observer initials, transect number, etc.). I did have an interesting problem on this computer in that it recognized the .der extension but would not let me modify it. I needed to go into the **View>Options>File Types** pull-down window in Windows Explorer and remove the .der extension so it would not recognize it. You also need a species list so the program will allow you to select species from a table (you can write them in individually, but this is time-consuming). You can put a species and header file in from somewhere else, and modify it then put it into the folder, too. To add/change species/header files, I opened in WordPad (the transcribe program should not be open), made changes, then saved as plain text file (one of the options). Lastly, you seem to need a ducklist.txt that allows you to use flkdrk?

Using Transcribe

Using the Transcribe program is really straight-forward and generally works extremely well. Before you move to a new file, you will need to save your entries. You should not have to reenter the header info, only change what needs changing. There are three species blocks, although four pieces of information are needed (two go in the last, the far right, block). In the first, to the left, is just the series number (i.e., 1, 2, 3, ...), which is usually entered automatically. Next is the species (e.g., GWFG). Third and last, is the number (of individuals or PAIRS). In addition to this number, is a designation of **single**, **pair**, **flkdrake** or **open**. These are described as:

SINGLE (hotkey q, in transcribe program) - single isolated drake without a visible associated hen. Lone hen ducks, except for eiders at the present, are not recorded. E.g.:

2, single	2 lone drakes
3, single	3 lone drakes
4, single	4 lone drakes
5, single	5 lone drakes

PAIR (hotkey w) - male and female in close association. Record number of pairs observed, not number of total birds. E.g.:

1,pair	1 male, 1 female together
2,pair	2 pairs
3,pair	3 pairs
4,pair	4 pairs

FLOCKED DRAKES (hotkey e) - 2 or more drakes in close association. E.g.:

2,flkdrake	2 drakes together
3,flkdrake	3 drakes together
4,flkdrake	4 drakes together
5,flkdrake	5 drakes together

It has been stated, in some memo(s), that flocked drakes will be limited to grouping of 2-4 drakes. Leave it to the program to decide this, and record what you saw and stated at the time. If you saw 12 drakes together and recorded ■12 flocked drakes•, transcribe it this way.

OPEN/GROUP (default, no hotkey) - 4 or more of a mixed sex grouping of the same species in close association which cannot be separated into singles and pairs (2 drakes and a hen would be recorded as a pair and lone drake). In short, anytime you can identify a pair within a group, call it a pair. If you simply see a closely dispersed mixed-sex group, record it as a group of x individuals. In such a dispersed mixed-sex group, record the total number of individuals and transcribe as open, rather than trying to pair them up and eliminating ■leftover• hens. Again, if you see pairs in the group, record pairs (and the remaining numbers as ■open•). E.g.:

3,open	3 ducks of mixed sex (i.e., 2 hens and a drake or 3 hens)
4,open	4 ducks of mixed sex
5,open	5 ducks of mixed sex
6,open	6 ducks of mixed sex

Estimating numbers in large flocks

Every individual in a flock can be counted directly if flocks number no more than a few hundred birds. Direct counting is easy with large birds at close range, but becomes progressively more difficult with larger numbers, smaller species and greater distances (Bibby *et al.* 1992).

When the number of birds is greater than a few hundred birds, estimation procedures have to be used (Figure 3). The birds in a large flock may be estimated by counting a block of 50 or 100 birds and then estimating how many similar-sized groups make up the entire flock (Butler *et al.* 1991). Hicklin (1987) used photographs to estimate the average density of flocks on the Bay of Fundy and then measured the area covered by the flocks using terrestrial markers. He then multiplied area by density to estimate the total number of birds within the flock. Total number of birds estimated by the above two methods were within 10% of each other (Hicklin 1987). However, Mawhinney *et al.* (1993) used photographs and 1 m² quadrats to estimate the size of the same population; their estimates were 37-67% higher than Hicklin's, which underscores the tendency of even experienced observers to underestimate large, dense flocks.

Additional problems arise if the flock is moving or if it is a mixed flock with many different species.

Counting mixed-species flocks

In a large mixed-species flock, observers estimate the proportion of the various species making up the flock and then the total number of birds in the flock is divided up into individual species counts according to these estimated proportions. In some cases, where the observers are unable to determine the proportions of each species, only the species composition of the flock is noted. The total count of these unallocated birds is then divided up into individual species counts assuming that the proportions of the unallocated birds is similar to the proportions of identified species in the rest of the site (Stenzel and Page 1988; Skagen and Knopf 1994a,b).

Methods of estimating numbers of shorebirds in flocks

Source: Bibby *et al.* 1992

- a) In small roosts and feeding flocks, the number of birds can be counted directly.
- b) For small flocks of even density, the birds can be counted individually (1, 2, 3, 4, 5 etc.) to produce an accurate total. If a suitable landmark is present it can be used to help count the birds.
- c) In unevenly distributed flocks with small groups of varying size, each group of birds should be rapidly counted and added together.

d) For larger numbers of birds in evenly distributed flocks the birds should be counted in multiples e.g. 2, 4, 6, 8 or 3, 6, 9, 12, etc. Again if landmarks are present they can be used to help divide the flocks in order to count them more accurately.

e) For densely packed flocks in flight or at a roost, the birds should be counted in estimated blocks. The size of the blocks used (10, 100, 1000 etc.) varies according to the size of the block. The largest flocks of 10 000 birds or more present the biggest counting problems with even the block method giving a rough estimate of numbers.

f) Flying flocks often bunch in the centre. In this case it is important that the blocks are closer together in the centre of the flock than towards the edges, but in practice this may be difficult to achieve.

Viewing angle below horizon for various maximum observation distances at given survey altitudes

Altitude ft	Alt meters	max observation distance from centerline (meters)									
		100	150	200	250	300	350	400	450	500	
100	30.5	17.0	11.5	8.7	7.0	5.8	5.0	4.4	3.9	3.5	
125	38.1	20.9	14.3	10.8	8.7	7.2	6.2	5.4	4.8	4.4	
150	45.7	24.6	17.0	12.9	10.4	8.7	7.4	6.5	5.8	5.2	
175	53.3	28.1	19.6	14.9	12.0	10.1	8.7	7.6	6.8	6.1	
200	61.0	31.4	22.1	17.0	13.7	11.5	9.9	8.7	7.7	7.0	
225	68.6	34.4	24.6	18.9	15.3	12.9	11.1	9.7	8.7	7.8	
250	76.2	37.3	26.9	20.9	17.0	14.3	12.3	10.8	9.6	8.7	
275	83.8	40.0	29.2	22.7	18.5	15.6	13.5	11.8	10.6	9.5	
300	91.4	42.4	31.4	24.6	20.1	17.0	14.6	12.9	11.5	10.4	
325	99.1	44.7	33.4	26.3	21.6	18.3	15.8	13.9	12.4	11.2	
350	106.7	46.9	35.4	28.1	23.1	19.6	17.0	14.9	13.3	12.0	
375	114.3	48.8	37.3	29.7	24.6	20.9	18.1	15.9	14.3	12.9	
400	121.9	50.6	39.1	31.4	26.0	22.1	19.2	17.0	15.2	13.7	
425	129.5	52.3	40.8	32.9	27.4	23.4	20.3	17.9	16.1	14.5	
450	137.2	53.9	42.4	34.4	28.8	24.6	21.4	18.9	17.0	15.3	
475	144.8	55.4	44.0	35.9	30.1	25.8	22.5	19.9	17.8	16.1	
500	152.4	56.7	45.5	37.3	31.4	26.9	23.5	20.9	18.7	17.0	
525	160.0	58.0	46.9	38.7	32.6	28.1	24.6	21.8	19.6	17.7	
550	167.6	59.2	48.2	40.0	33.8	29.2	25.6	22.7	20.4	18.5	

Example: at 200 ft. survey altitude, to achieve a 600m survey transect (300m each side of the aircraft), mark wing strut at 11.5 degrees below horizontal

To establish visual aid to maintain correct viewing angle, use clinometer while sitting in aircraft with seat adjusted properly and aircraft parked in a level position. Mark window with grease pencil or "dri-marker", have an assistant apply electrical tape to proper position on wing strut. For accurate determination of outer transect limit while flying, put plane in a level attitude, outer limit is in line with both window and strut mark.

Instructions for Loading Waypoints from Trimble Nav Card to Trimble GPS

To Load Waypoints:

Turn *GPS* OFF
Install *NAV Card*
Turn *GPS* on

Push **AUX** and repeat until **INSTALL** appears

Rotate Knob to **LOAD/SAVE RAM CARD**

Turn Outer Knob to **LOAD CONFIGURATION**

Then,

**LOAD CONFIGURATION
Clear Before Load?**

Push

ENT

Screen will scroll from "Load Configuration" 0% → 100%;
if does not reach 100, may not have all waypoints.

Request Completed