Llano Estacado Texas Master Naturalists
Ornithology and Entomology

The Birds and the Bees

Why Study Birds and Bees?

- Birds and Bees are great topics to study in order to understand ecosystems
- They are good indicators of change and harbingers of habitat loss and environmental problems
  - 3 Billion Birds lost (1 in 4) since 1970 in U.S and Canada
  - Native bees are also in decline due to pesticides and habitat loss
- They are a great way to get outside and enjoy nature, even in your own backyard!

Let's go Birding!

- Causes for bird diversity
- Bird behavioral characteristics and adaptation to environments and environmental changes
- Habits of bird migration and the primary flyways of North America and Texas
- How birds function within ecosystems
- How bird populations are monitored and managed
- Conservation concerns for birds

Recall: Naming and Classification System

- K
  - (King) Kingdom
- P
  - (Phillip) Phylum
- C
  - (Came) Class
- O
  - (Over) Order
- F
  - (For) Family
- G
  - (Good) Genus
- S
  - (Soup) Species

- Kingdom - Animal
- Phylum - Chordata
  - Subphylum - Vertebrata
- Class - Aves
- Order - 27 Orders of living birds
- Family - 163 families
- Genus - ?
- Species -10,000

Example: American Robin

Kingdom-Animalia (Animals)

Phylum-Chordata (Animals with backbones)

Class-Aves (Animals called Birds)

Order-Passeriformes (Birds that perch)

Family-Turdidae (All Thrushes)

Genus-Turdus (Similar Thrushes)

Species-*Turdus migratorius* (American Robin)

Diversity of Birds

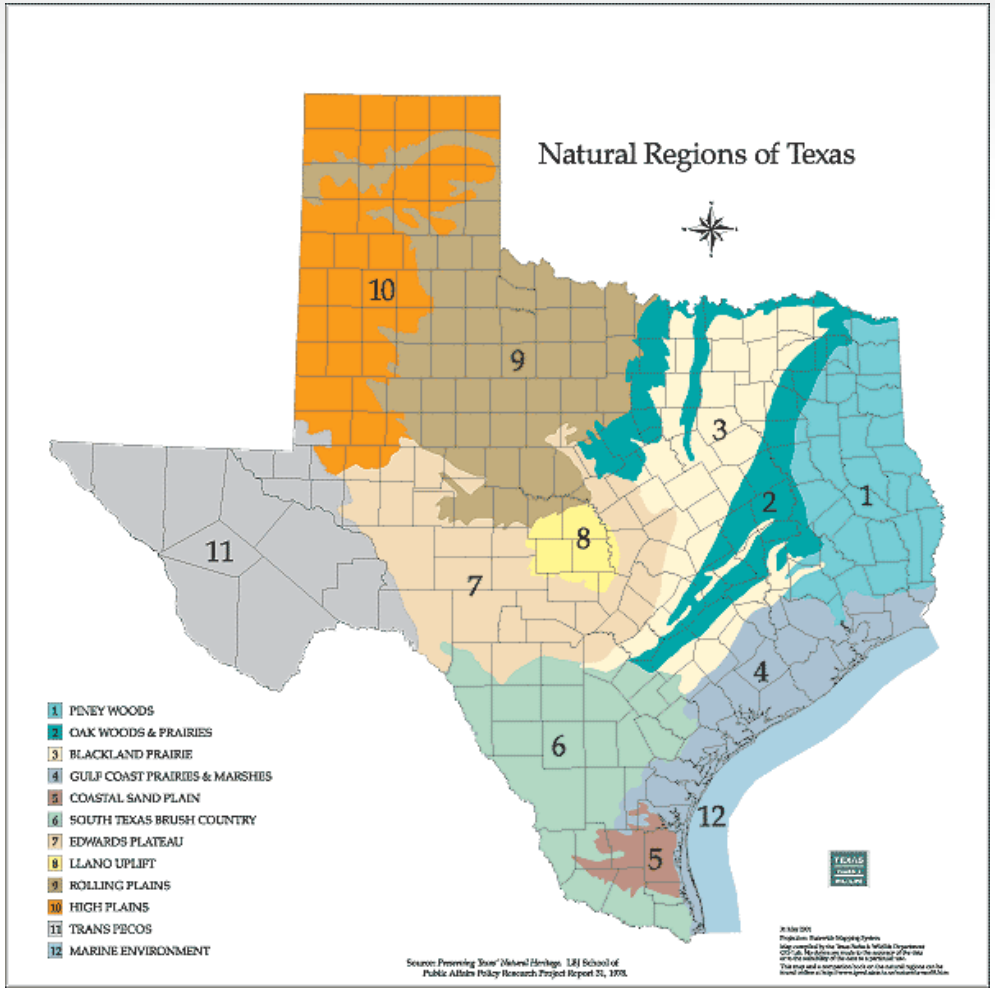
- 10,000 species worldwide
- 900+ species in the US
- 600+ species in Texas
- 341 on eBird checklist for Midland County as of April 2020

Why so Diverse?

1. Adaptation to a variety of Habitats or Biomes

- Aquatic
  - Freshwater
  - Marine
- Desert
  - Hot and dry
  - Semiarid
  - Coastal
  - Cold
- Grassland
  - Savannah
  - Temperate
- Forest
  - Tropical
  - Temperate
  - Boreal (Taiga)
- Tundra
  - Arctic
  - Alpine

Recall: Ecoregions of Texas



- **Niche**
  - Ecological niche is the particular combination of biotic and abiotic factors required by a species to live in any one location.
- **Habitat**
  - Habitat refers to the place or type of place where an organism most commonly occurs.
- **Ecosystem**
  - all biotic and abiotic components, and their interactions with each other, in some defined area

Why so Diverse?

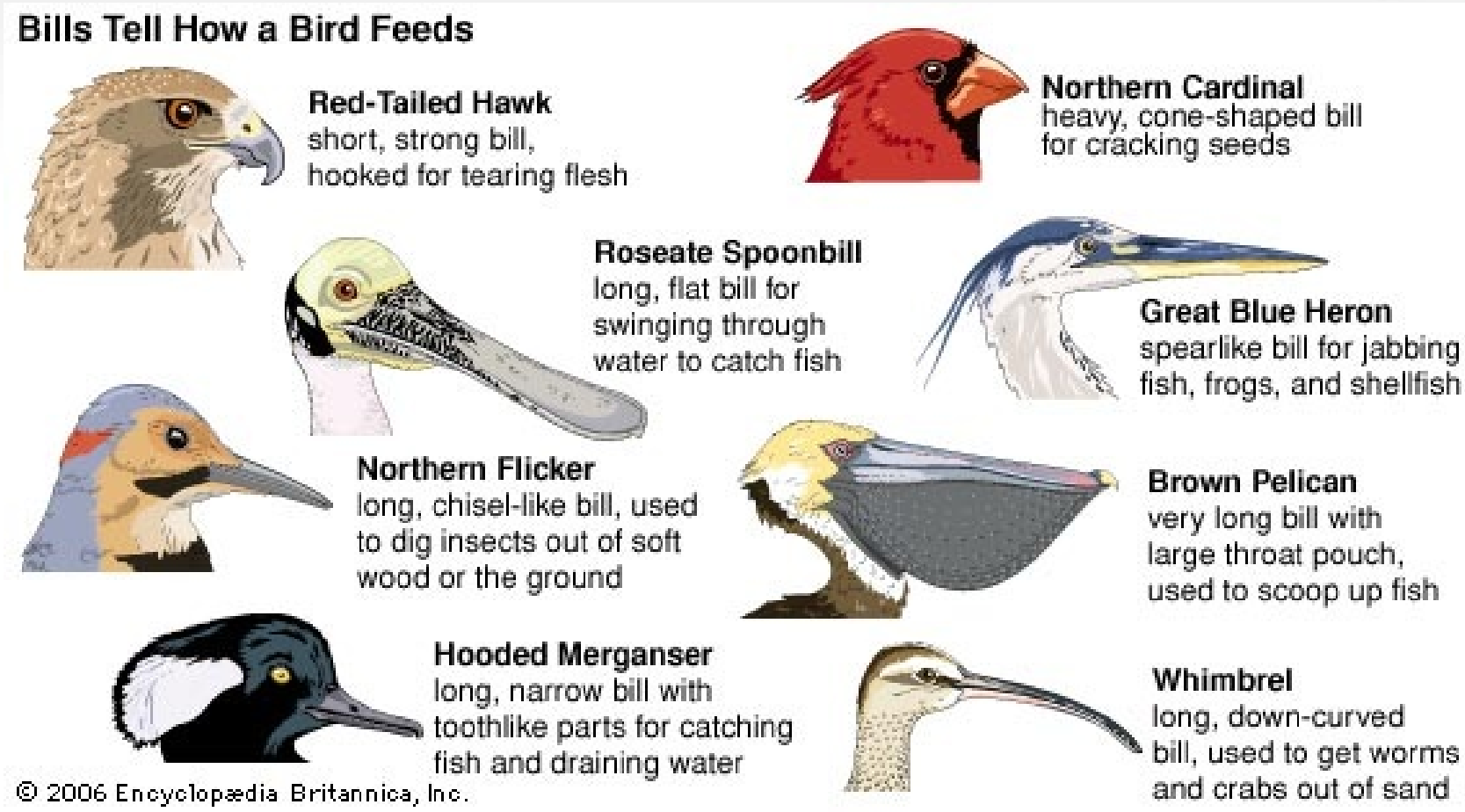
2. Adaptations to different modes of life

- 6 Features adapted to different functions or environments:
  - Beaks and bills
  - Feet
  - Legs
  - Wings
  - Diets
  - Behaviors

Beaks and Bills: Physical Adaption

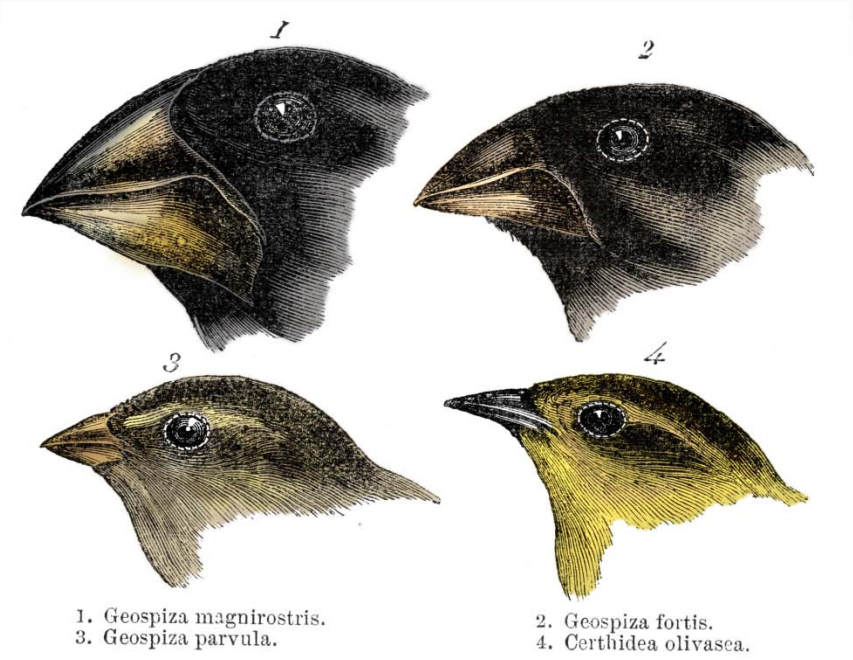
- **Conical** seed crushing beaks of sparrows and grosbeaks
- **Long spearlike** bill of herons and egrets for jabbing of fish and amphibians
- **Hooked** beak of predators like hawks and owls for tearing flesh
- **Chisel-like** bill of woodpeckers for boring holes or digging insects from wood or ground
- **Long and narrow** beaks of hummingbirds for gathering nectar

Beaks and Bills: Physical Adaptation



Darwin's Finches

- Galapagos Island birds, although nearly identical in all other ways to mainland finches, had different beaks. Their beaks had adapted to the type of food they ate in order to fill different niches on the Galapagos Islands.



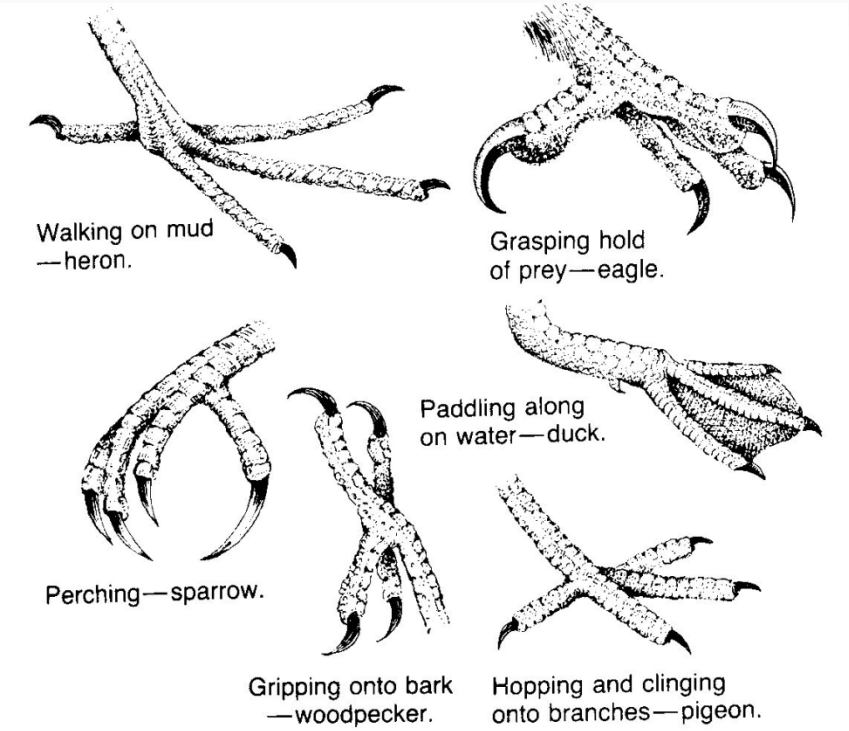
Feet: Physical Adaptation

- Perching birds like sparrows have **3 toes in front one in back (anisodactyl)** for wrapping around branches
- Hawks and owls have powerful feet with **talons** for grasping their prey
- Woodpeckers have specialized feet with **two toes forward and two behind (zygodactyls)** and use their tails as props when cling to the tree bark

Feet: Physical Adaptation

- Ducks and gulls have **webbed (palmate)** feet for swimming
- Shorebirds like a plover have partially **webbed (semi-palmate)** feet for walking and wading
- Grebes have short legs and a **partially lobed web** between the toes for swimming and to assist walking on loose surfaces.
- And more!

Bird Feet: Physical Adaptation



American Coot

I am not a duck!

from leesbirds.com

Wing Shape and Size

- Scaled and Bobwhite Quail have small, short broad wings so it must flap quickly and almost constantly to stay airborne, thus they spend and move around a great deal on the ground
- Swainson's Hawks have longer narrower wings thus they can fly slowly with infrequent flapping
- Albatrosses have very long, narrow wings and maintain a high airspeed to stay aloft gliding on high winds over the open ocean
- Penguins and Puffins use flapping wings to fly underwater
- Hummingbirds have the most specialized wings- the rotate in a figure eight pattern

Hummingbird Slow Motion

- https://www.youtube.com/watch?v=DqADeKxDAoY

Diets & food habits: Behaviorial Adaptation

- Plant eaters – flowers, pollen, nectar
- Plant eaters – fruits, seeds
- Plant eaters – leaves, stems
- Animal eaters – insects
- Animal eaters – fish, amphibians,
- Animals eaters – warm-blooded prey
- Scavengers

Behaviorial Adaptions

- Nesting
- Flocking
- Mating rituals

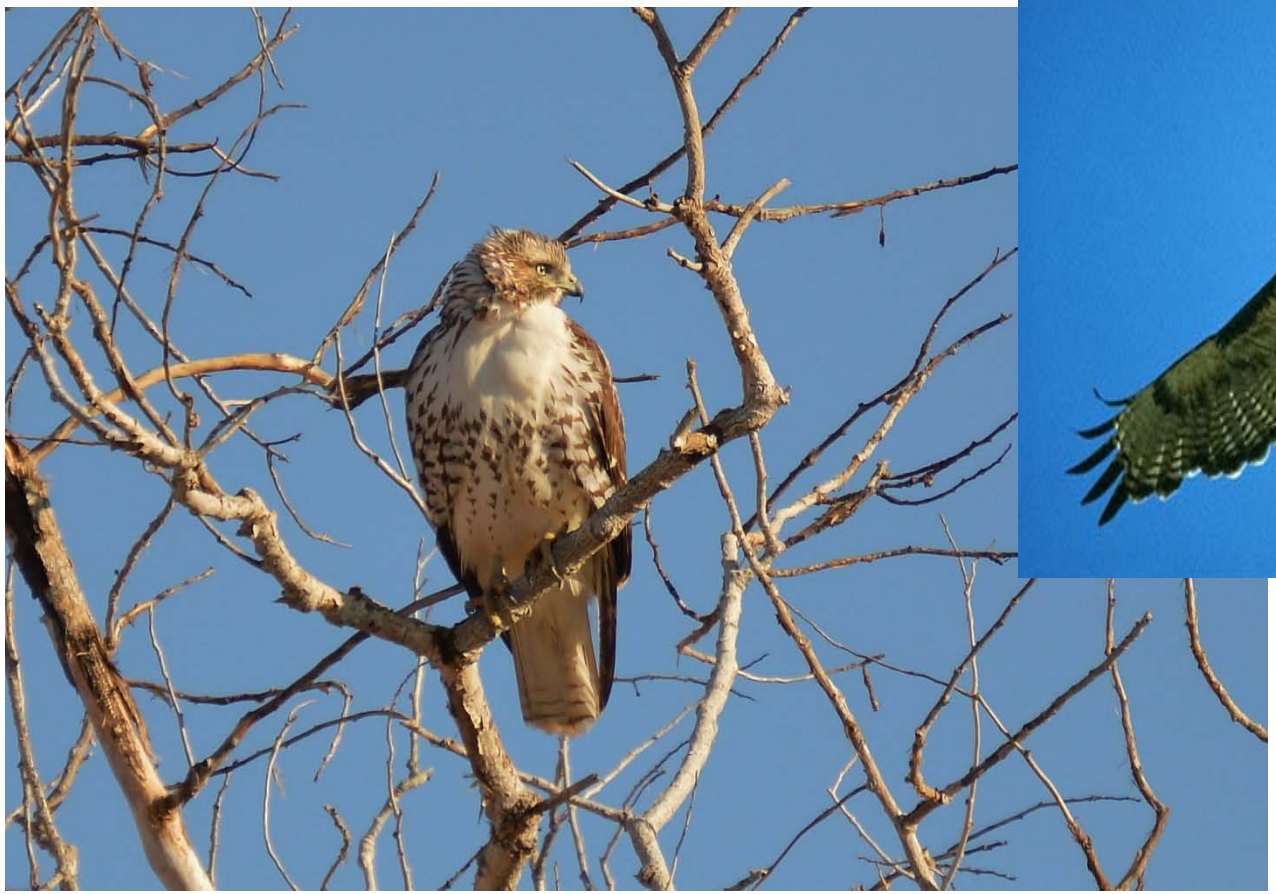
5 Bird Categories by Habitat and Lifestyles

1. Land or terrestrial birds
2. Freshwater species
3. Seabirds
4. Flightless land birds
5. Underwater fliers

Land or Terrestrial Birds

- Raptors
  - Red-tailed Hawk
- Upland Games Birds
  - Scaled Quail
- Pigeons and Doves
  - Mourning Dove
- Hummingbirds
  - Black-chinned
- Woodpeckers
  - Ladder-backed
- Songbirds
  - native sparrows
  - Orioles & Blackbirds

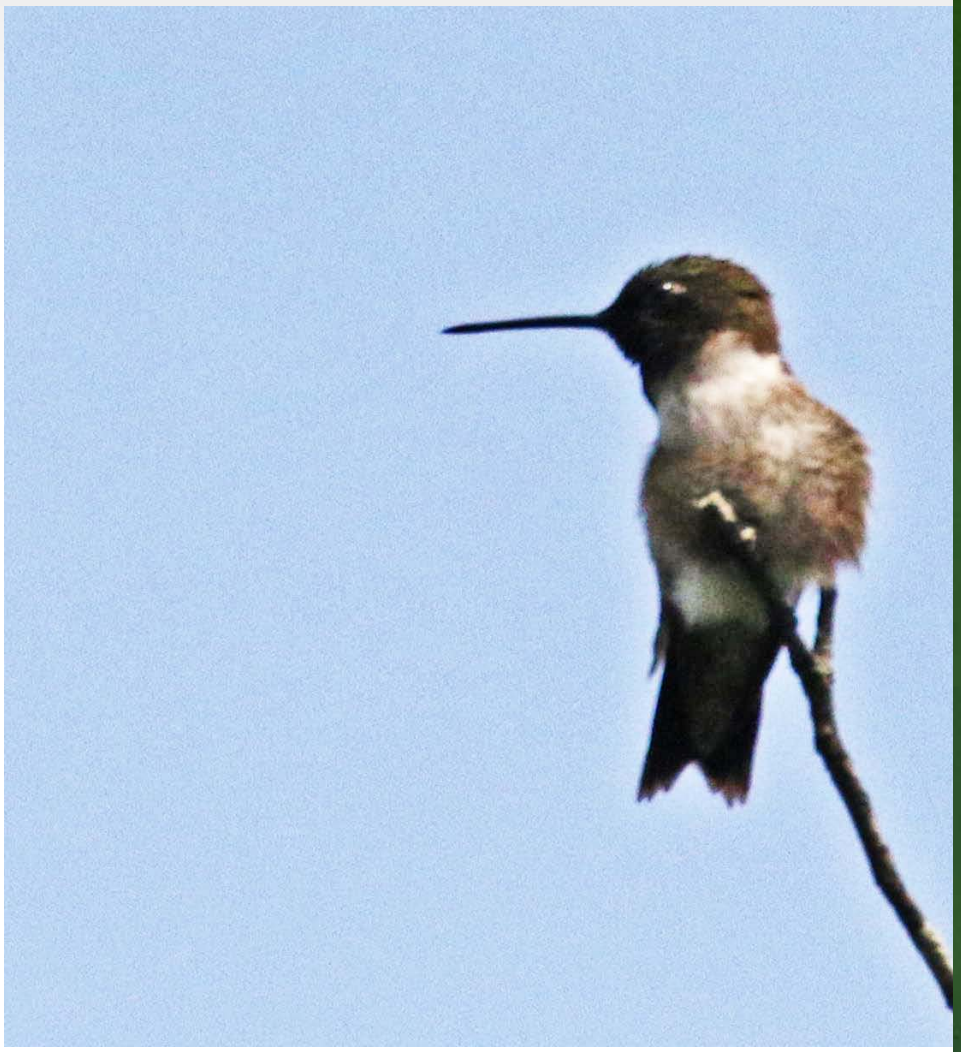
Red-Tailed Hawk



Scaled Quail

Dove

Black-chinned Hummingbird



Ladder-backed Woodpecker

White-crowned Sparrow

Bullock's Oriole

Red-winged Blackbird

Fresh Water

- Dabbling Ducks
  - Mallards
- Diving Ducks
  - Buffleheads
- Fish Ducks
  - Mergansers
- Grebes
  - Pied-billed
- Herons & Egrets
  - Great Blue Heron
- Pelicans & Cormorants
  - Double-crested
- Cranes
  - Sandhill
- Rails
  - Sora
- Gallinules
- Shorebirds
  - Killdeer
- Gulls & Terns
  - Ring-billed

Mallard

Bufflehead

Hooded Merganser

Pied-billed Grebe

Great Blue Heron

Sandhill Crane

Sora

Common Moorhen

Killdeer

Ring-billed Gull

Pelicans at A Street Pond 2019

Pelagic-Open Ocean

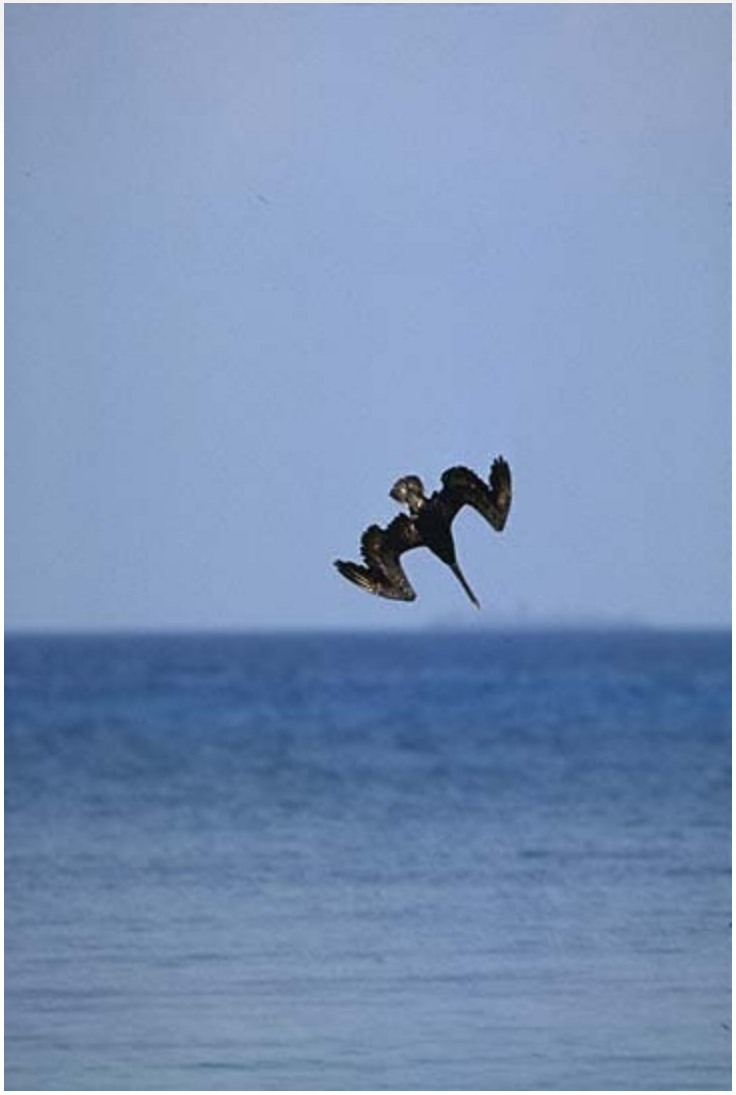
- Albatross
- Storm Petrel
- Brown Pelican

Albatross

Storm Petrel

Brown Pelican

Brown Pelican



Flightless Land Birds

- Ostrich
- Emu
- Kiwi

Underwater Fliers

- Penguins
- Puffins
- Cormorants
  - Double-crested
- Anhingas

Anhinga

Migration

“Migration is the greatest adventure in the life of a bird, the greatest risk it must take”

Roger Tory Peterson

Migration

The seasonal movement of birds at predictable times of the year between breeding and non-breeding areas

What causes birds to migrate?

- Length of daylight
- Internal hormonal changes
- Temperature changes
- Search for food sources

How high do they fly?

- 5000 feet
- 8,000 -15,000 ft
- 21,000 ft over the ocean
- Yellow-billed Chough 27,000 ft over Mt Everest
- Bar-headed Goose 30,000 ft over the Himalayas

How fast do they fly?

- Small birds 30 mph
- Hawks 30-40 mph (Diving for prey is higher)
- Ducks 50-60 mph

How far do they fly?

- Arctic Tern breeds on the Arctic Tundra in summer and winters in the Antarctic
  - 83° N to 74° S
  - 22,000 miles
- Pacific Golden Plover flies non-stop for 2000 miles between the Aleutian Islands and Hawaii.

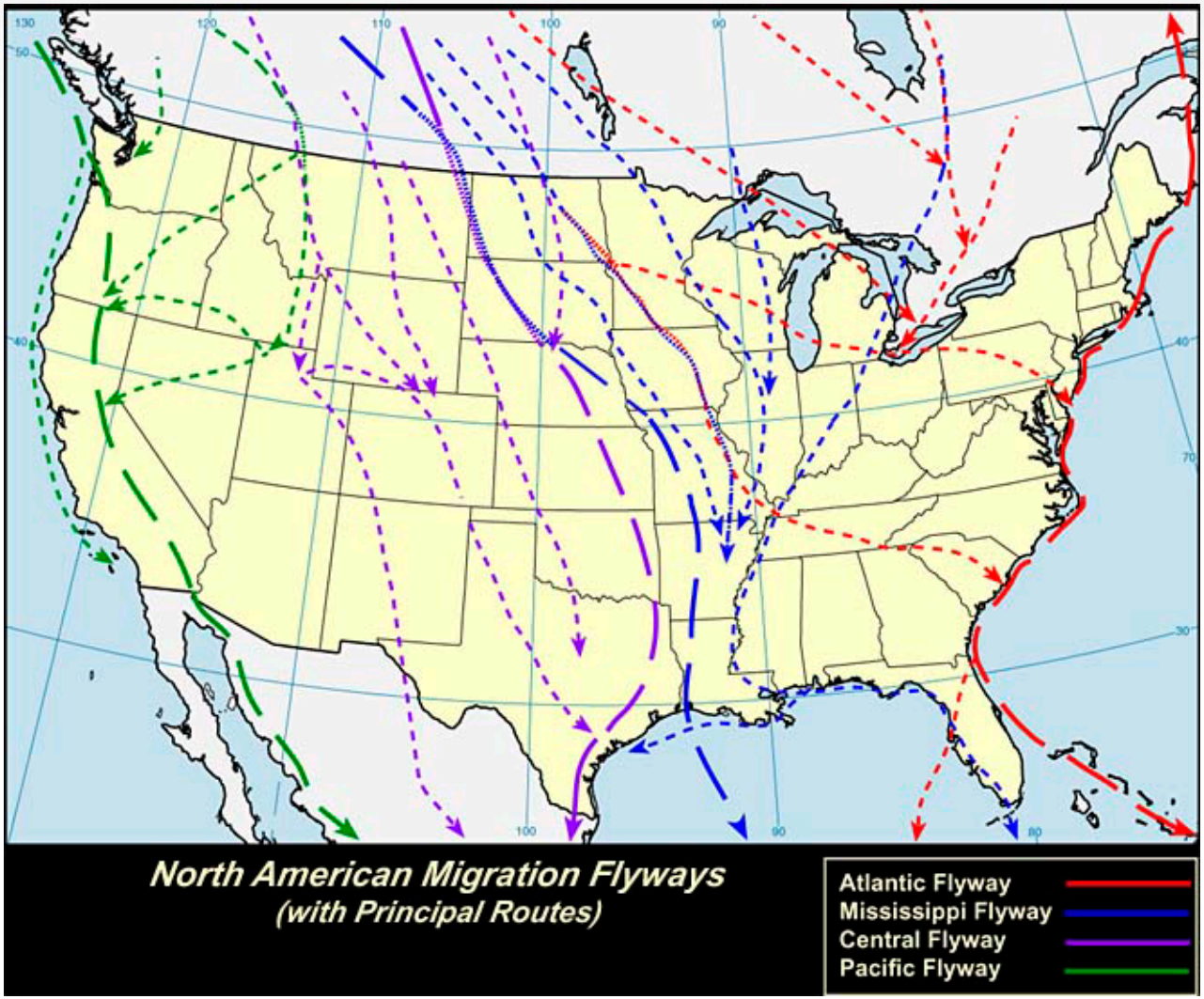
Flight Lanes

- In the continental US, birds migrate in a north-south direction as a rule because most rivers and mountains run north-south
- Fly along ridges
- Follow the coasts, large rivers, chains of lakes
- Through valleys, along peninsulas or island hop

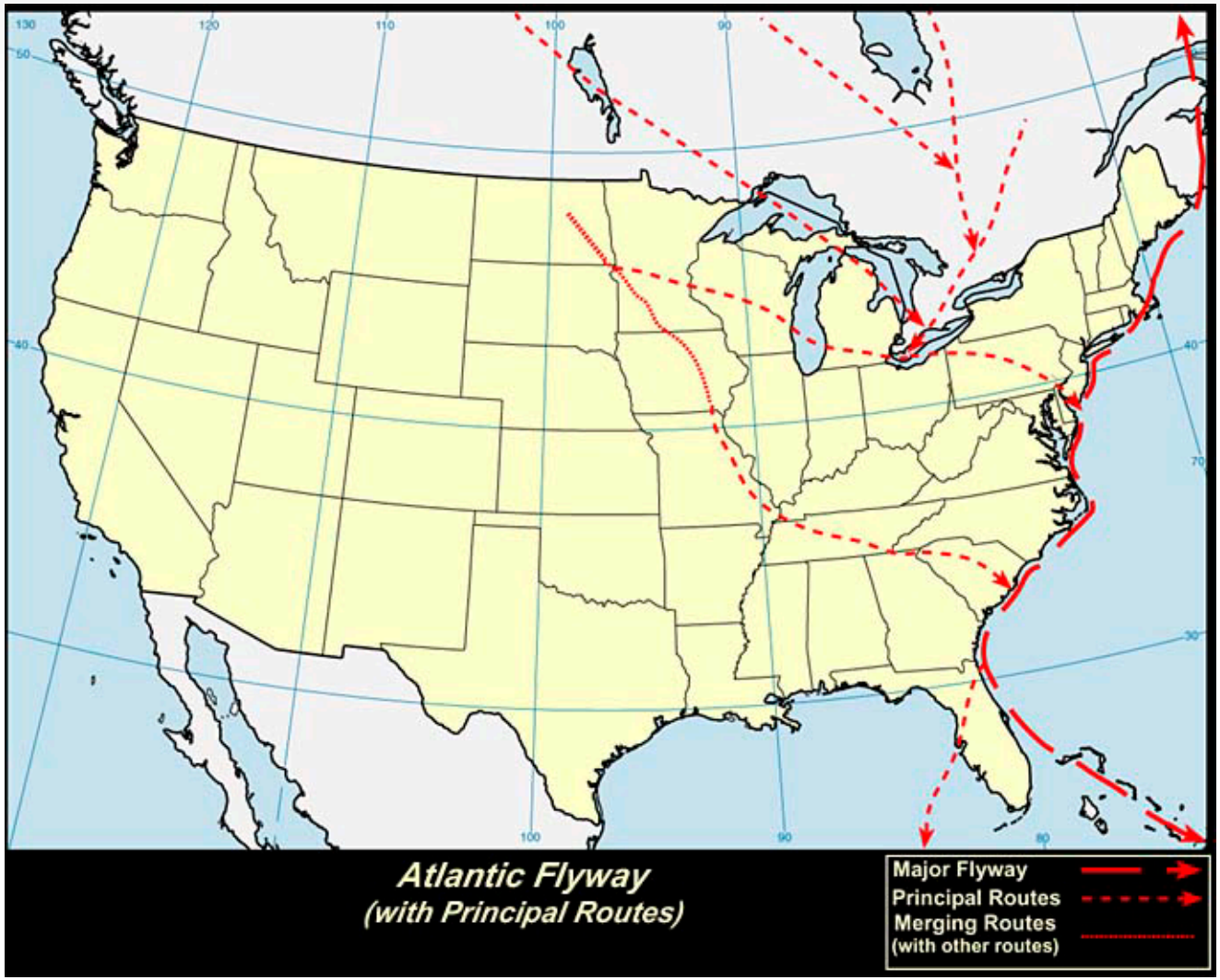
North American Flyways

- Atlantic
- Mississippi*
- Central*
- Pacific
- An exclusively oceanic route from Labrador and Nova Scotia to South America
- * Important to Texans

NA Flyways


North American Migration Flyways
(with Principal Routes)
Atlantic Flyway
Mississippi Flyway
Central Flyway
Pacific Flyway

Atlantic


Atlantic Flyway
(with Principal Routes)
Major Flyway
Principal Routes
Merging Routes
(with other routes)

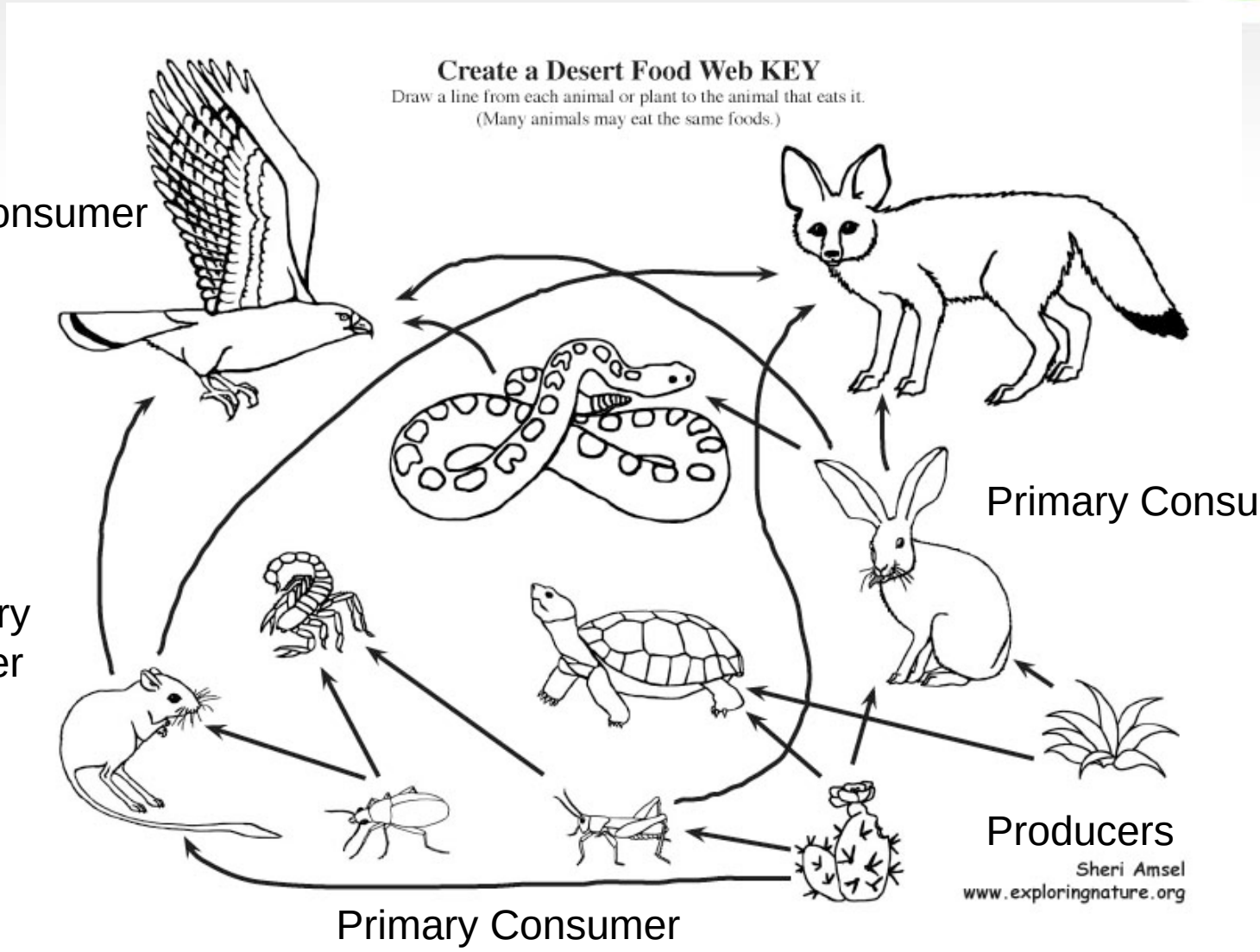
Migration Animation

https://www.audubon.org/news/see-millions-places-migrating-birds-have-gone-one-gif?ms=digital-eng-email-ea-x-engagement_20200406_eng-email_%5baudience%5d&utm_source=ea&utm_medium=email&utm_campaign=engagement_20200406_eng-email&utm_content=%5baudience%5d&e

How do birds cope with changes in their ecosystems?

- An ecosystem consists of the physical environment and the biological communities interacting with each other
- Organisms, by nature, change the ecosystem in which they live
- Physical environment may change due to abiotic factors such a climate

Recall: Food Web-Energy Flow



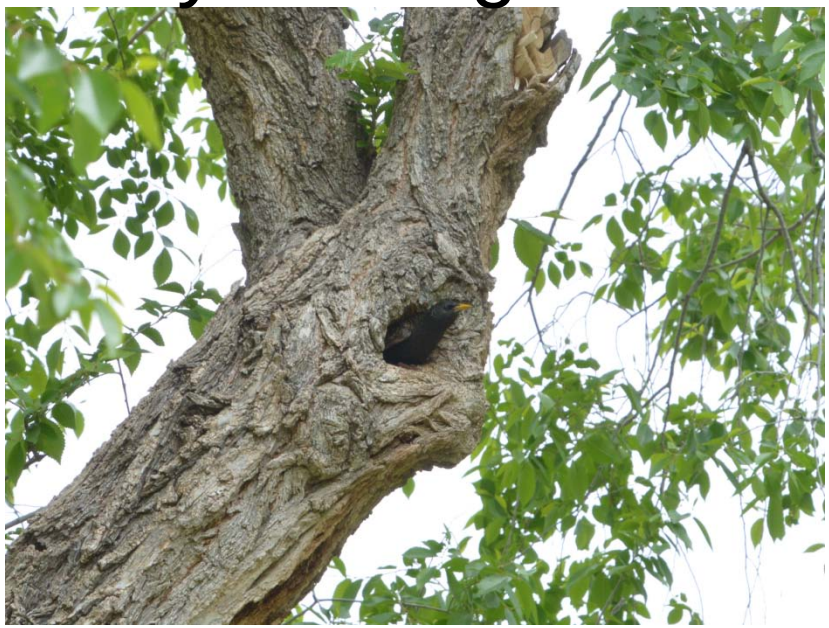
4 Factors that limit Bird Populations

- Habitat
  - Size, health
- Food and Water
- Climate
- Diseases and parasites

- Habitat Destruction or fragmentation
- Competition, rainfall, predator/prey
- Temperature tolerances
- Eye worms, lice, mites, viral infections

Strategies for Deterring Predators

- Mobbing
- Alarm calls
- Flocking
- Injury display
- Cavity nesting



Cowbird Predation

- Brown-headed Cowbird parasitizes over 140 different species
- Females can lay up to 50 eggs (compared to 10-15 for a typical passerine)
- Have cryptic movements
- Monitor several nests at once
- Egg laying in 10 seconds

Brown-headed Cowbird

Peregrine Falcon

American Kestrel

How are birds monitored?

- Point counts
- Transects
- Rare bird reports
- Public involvement

Point Counts

- A set or predetermined points, in a particular habitat, and normally monitored on a monthly or yearly basis.
  - Breeding Bird Survey
    - USGS
    - May 15- July 15
    - 25 miles long, 3 minute timed stops every ½ mile

- Midnat data collection for Big Spring State Park
  - 5th year of data collection
- Smith Point Hawk Watch
- Corpus Christi
- Benson Rio Grande State Park
  - Hawk tower

Transects

- Linear count that follows a set route
  - Length 100 yds – several miles
  - Width 15-20 m on either side of transect line
- Count depends on goal of census taker
  - Visual ID
  - Auditory ID
  - Behavior

Mega-transect

- J. Michael Fay
- Wildlife Conservation Society
- Across central Africa
- 15 months
- 2000 miles