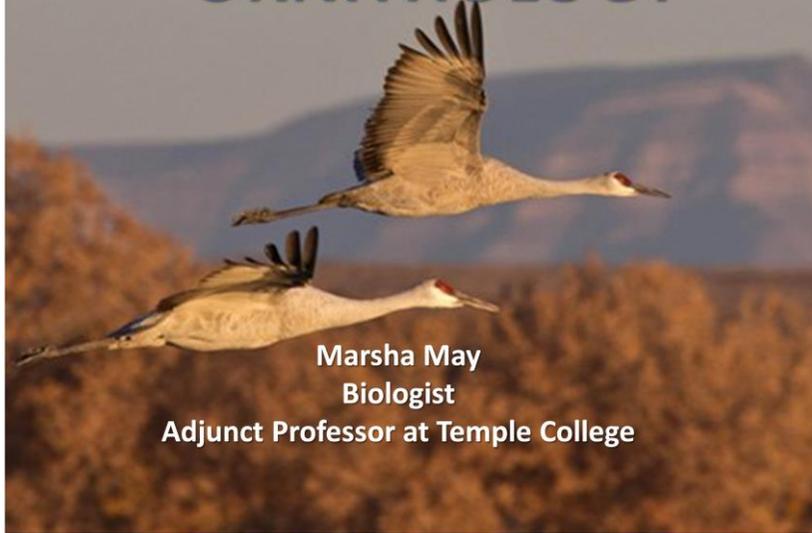


ORNITHOLOGY



Marsha May
Biologist
Adjunct Professor at Temple College



Chapter goals

Understand the causes for bird diversity

Understand and discuss the habits of bird migration

Identify the primary flyways of North America and Texas

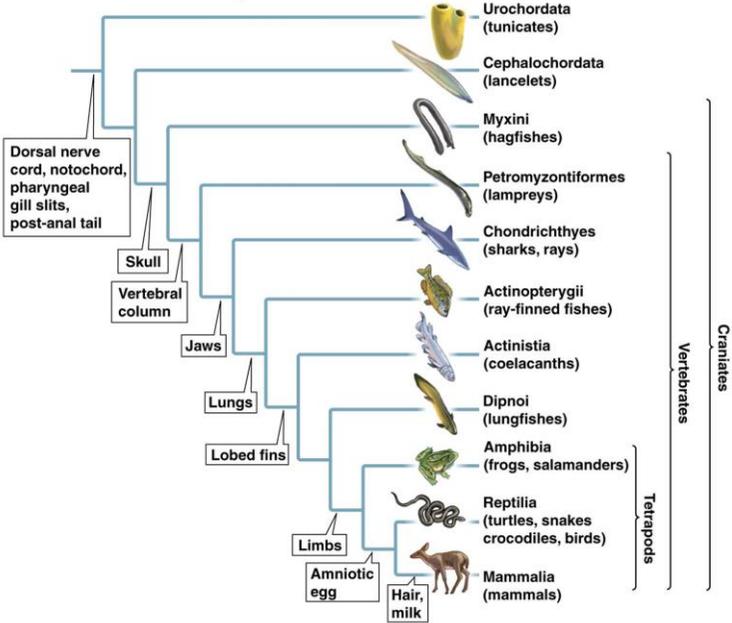
Explain bird behavioral characteristics to environments and environmental changes

Develop an awareness of how bird populations are monitored and managed

Identify and communicate how birds function within ecosystems

Become aware of, and communicate conservation concerns for birds

Phylum Chordata



© 2014 Pearson Education, Inc.

**Reptiles includes snakes, alligators,
turtles, lizards, and birds**

- **All reptiles have scales and shelled eggs**



Birds



- ~10,300 species
- They are feathered reptiles
- The first birds appear in the fossil record roughly 150 million years ago
- Distinguished from other reptiles by feathers, a highly specialized version of reptilian scales
- Modern birds retain scales on their legs

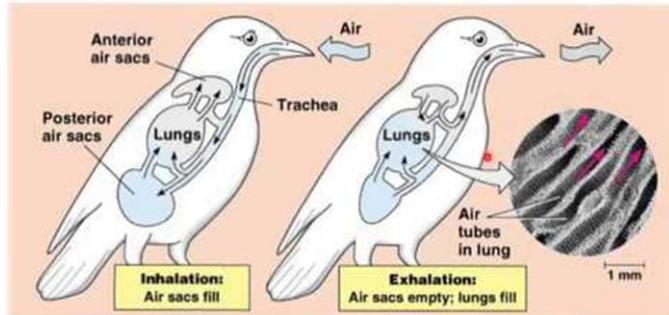
Bird Anatomy



- **Bird anatomy and physiology are dominated by adaptations that help them fly, all designed to minimize weight**
 - Hollow bones
 - Shrinking of reproductive organs during nonbreeding periods
 - Females have only one ovary
- **They are endothermic (produce their own body heat)**
- **They have a high body temperature due to their high metabolic rate (a trait that they share with mammals)**

Birds Respiratory System

- They have a high demand for energy and this requires efficient oxygenation of tissues
- The respiratory system of birds is supplemented by air sacs that provide a continuous supply of oxygenated air to the lungs, even while the bird exhales



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Human Relationships with Birds



Birds can be the gateway drug to appreciating nature

Falconry



Evidence suggests that the art of falconry may have begun in Mesopotamia, with the earliest accounts dating to approximately 2,000 BC

Birds in history

Used by sailors to find land

Used by Native Americans to find water

Used for hunting - falconry

The headdress of Motecuhzoma II, Aztec ruler 1502-1520 CE.



Used by Aztecs for headgear

Pets



Birdwatching



The Cornell University
All About Bird Biology



Diversity of Birds

- Nearly 10,000 species world-wide
- Tropics have the greatest diversity
- Texas
 - 648 species as of May 19, 2017



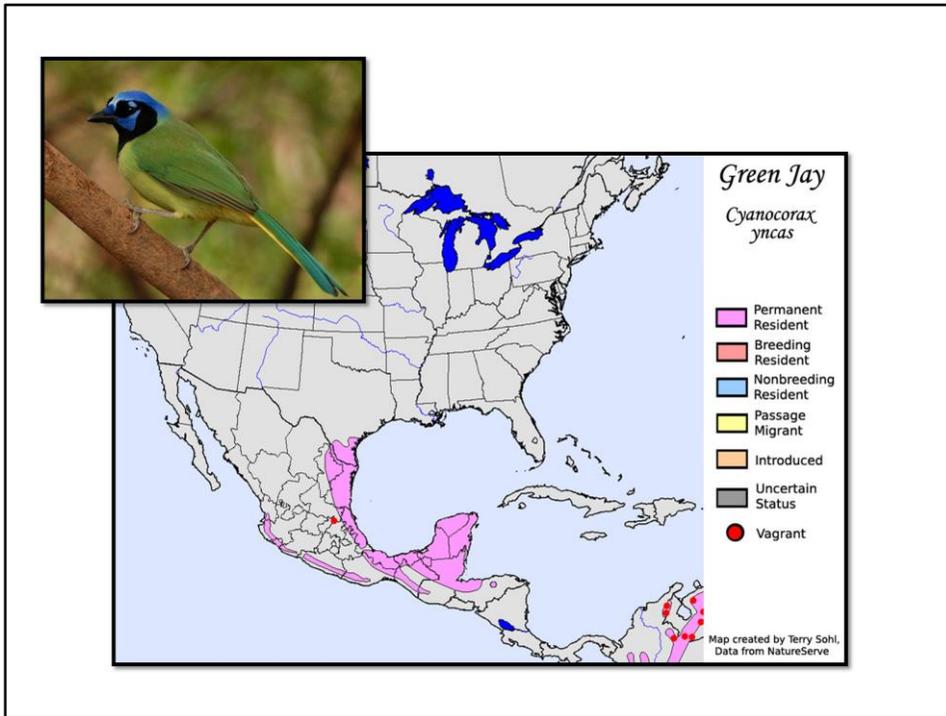
Nearly 10,000 species of birds world-wide

Bird classification – Aves or Reptilia?

Under the class Aves – birds are separated into 29 major taxonomic groups or Orders

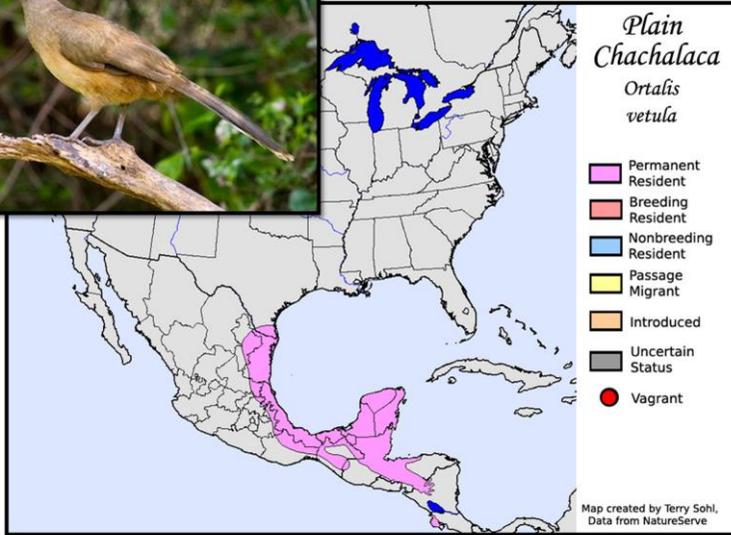
The tropics have greater species diversity and varied habitats

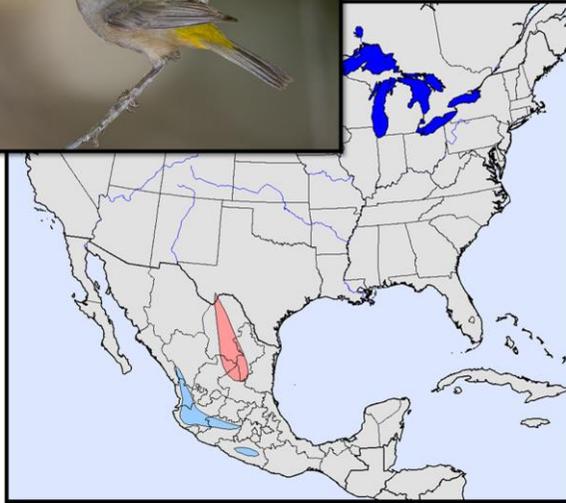
Texas has a tremendous amount of avian diversity



The following species seen in Texas cannot be found anywhere else in the US

- Green Jay
- Plain Chachalaca
- Colima Warbler





Colima Warbler
Oreothlypis crissalis

- Permanent Resident
- Breeding Resident
- Nonbreeding Resident
- Passage Migrant
- Introduced
- Uncertain Status
- Vagrant

Map created by Terry Sohl.
Data from NatureServe

Categories of Birds



• Land



Cerulean Warbler

Inca Dove

Ladder-backed Woodpecker

Montezuma's Quail

Red-tailed Hawk

Categories of Birds

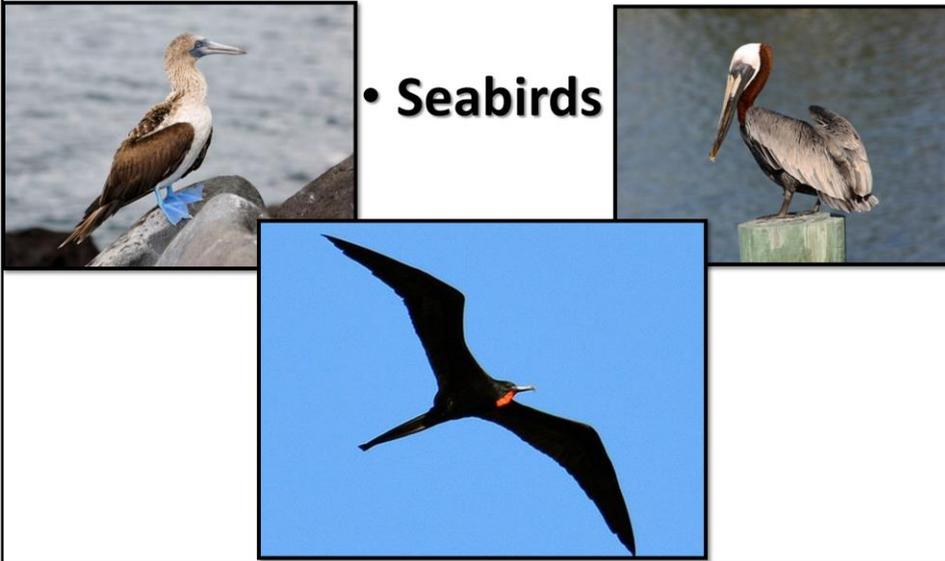


• Freshwater



Snowy Egret
Northern Pintail
Purple Gallinule

Categories of Birds



Blue-footed Booby
Magnificent Frigatebird
Brown Pelican

Categories of Birds



- **Flightless Birds**



Emu
Kiwi
Ostrich

Categories of Birds

- Underwater flyers



Anhinga
Empire Penguin
Neotropic Cormorant

Migration



Not all birds migrate and are able to utilize local resources year-round

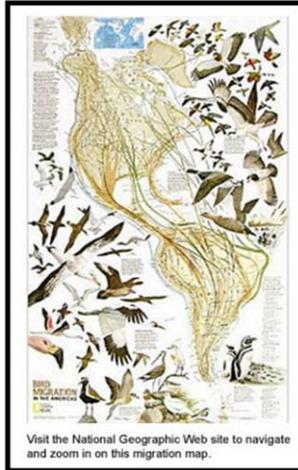
Why Birds Migrate

- For food
- For less competition for nesting space
- For a milder climate
- For longer daylight hours



Where Do Migrant Birds Go?

- **Canada and northern US → Gulf of Mexico**
- **US and Canada → Central and South America**



Where do migrant birds go?

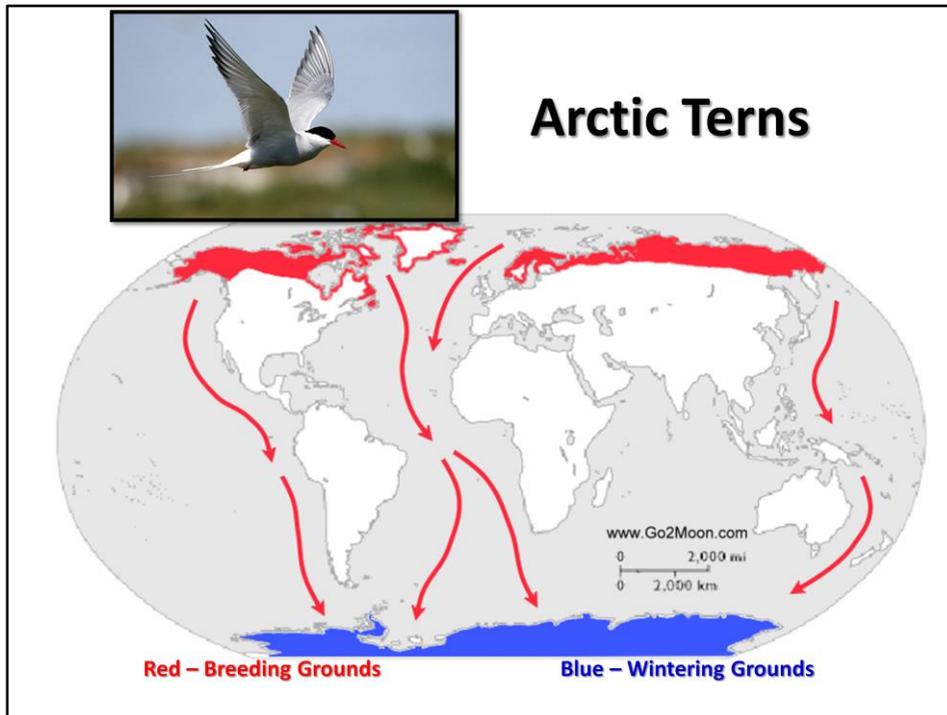
Some nesting birds in Canada and the northern US fly south to the tier of states along the Gulf of Mexico

More than 330 species of birds that nest in the US and Canada migrate to the West Indies or Central and South America

These birds are called Neartic-Neotropical Migrants

In Texas more than half of the birds recorded in this state are migrants

Texas provides important wintering habitat for migrants from the north and valuable summer nesting habitat for species from the south



Arctic Tern flies a round trip that can be as many as 20,000 miles per year
<http://www.independent.co.uk/environment/nature/pole-to-pole-the-extraordinary-migration-of-the-arctic-tern-1864824.html>

All the terns studied escaped the northern winter by flying to Antarctic waters, where it is summer at that time of year. On the return trip, they again did not take the shortest route, but traced a giant 'S' shape.

These diversions took advantage of prevailing global wind systems to help the birds preserve energy, according to Carsten Egevang, from the Greenland Institute of Natural Resources.

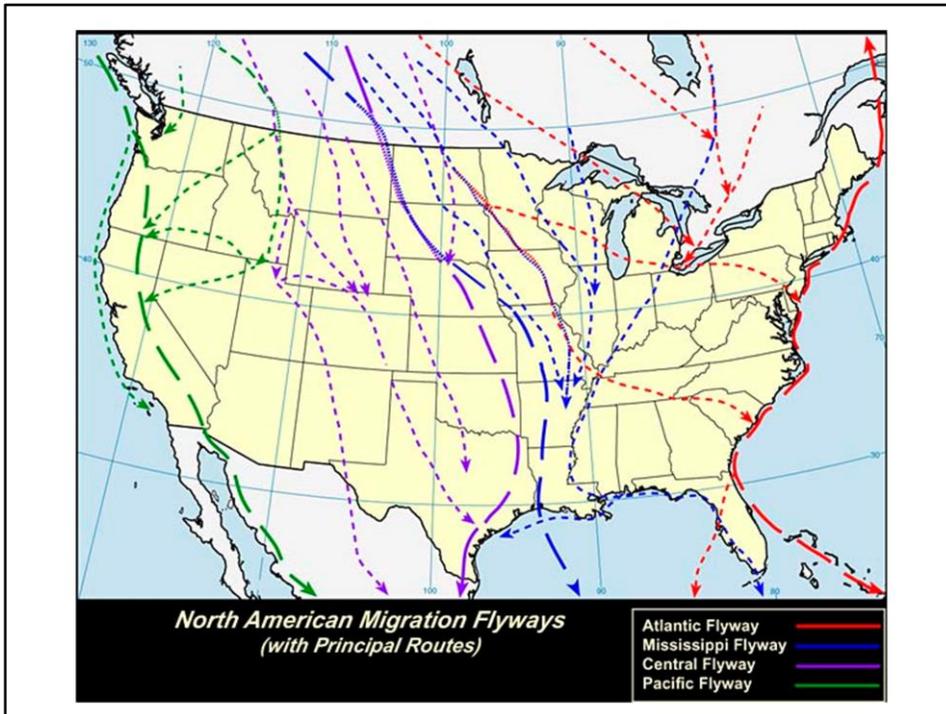
"They paused in their southward migration to spend time in highly productive waters in the middle of the Atlantic Ocean," he said. "Clearly, Arctic terns have learned to 'fuel up' before crossing areas of ocean with limited foraging options."

Arctic terns feed from the water while on the wing and can live up to 34 years. When the scientists added up the total distance each bird flew during its lifetime they found it equaled three round trips to the Moon – or more than 1.25 million miles.



Fallouts!

When northward migrating birds encounter spring storms or strong headwinds – they stop their migration abruptly at the shore and seek shelter in the gulf oak mottes



Flyways

Texas has the unique advantage of being situated in the path of two flyways



Notable Texas Migrants



Most notable Texas migrants
Golden-cheeked Warblers
Black-capped Vireos
Painted Buntings

Bird Ecology

- Bird populations are limited by four factors
 - Habitat
 - Climate
 - Food
 - Water



Pressures within Environments

- **Competition**
 - **Nest sites**
 - **Nest materials**
 - **Mates**
 - **Territories**



Competition – nest sites, nest materials, mates, and territories

Resource partitioning – different species feed in different parts of their shared habitat or take food of different sizes

Defend territories

Feeding territories of hummingbirds

Nest and small area around gull colonies

Extensive such as 2 acre territories of Black-capped Vireos

Counter-singing at territory edge

Pressures within Environments

- **Predation**
 - Mobbing
 - Alarm Calls
 - Displays
 - Flocking
 - Cavity and Colonial Nesting



Habitat Alterations - Urbanization

- Golden-cheeked Warbler
- Black-capped Vireo



Golden-cheeked Warbler habitat – 5 to 20 acre territories per pair
Black-capped Vireos habitat – use of fire

Food Availability

- Examples
 - Acorn Woodpeckers
 - Loggerhead Shrikes



Acorn Woodpeckers

Loggerhead Shrikes

Species that defend territories for food may alter the territory size depending on food availability

Temperature Changes

- **Warm Conditions**
 - **Panting**
- **Cold Conditions**
 - **Cover**
 - **Huddling**



Birds are endothermic

In warm conditions – use panting

In cold conditions – nest sites, huddling

Interactions

- Pollinators
- Brood parasites
- Predators
- Seed dispersers



Birds are plant pollinators

Brood parasites – Brown-headed cowbirds

Predators

 Peregrine Falcons – urban cities

 Harris' Hawks – hunt in packs

Seed dispersers – wax leaf ligustrum, chili piquins, hackberries, mistletoe

Identifying Birds

- **Join a local Audubon Society**
- **Need Equipment – binoculars and field guide**
- **Learn field marks and bird song**



Field Marks





Bird song is one of the wonders of the natural world.

It has uplifted and cheered human beings for as long as history has been recorded and its beauty continues to charm us more than ever in this modern technological world.

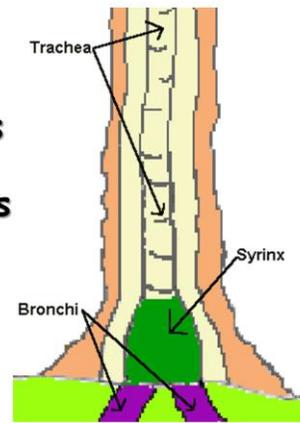
To hear the dawn chorus at the same time as watching the sunrise is a truly beautiful experience.

Song birds evolved around 60 million years ago, long before any humans were around to listen.



Larynx vs. Syrinx

- Larynx - (voice box) an organ in the neck of amphibians, reptiles, and mammals involved in breathing, sound production
- Syrinx - a vocal organ that sits deep in a bird's chest at the point where the trachea divides into two bronchi
 - Part of it rests in each bronchi
 - Each of these halves is capable of making sound
- Birds can sing two different notes at the same time, or even sing a duet with itself



syrinx, the vocal organ of birds, located at the base of the windpipe (trachea), where the trachea divides into the bronchi (tubes that connect the trachea with the lungs). The syrinx is lacking in the New World [vultures](#) (Cathartidae), which can only hiss and grunt, but reaches great complexity in the [songbirds](#), in which it consists of paired specialized cartilages and membranes (the inner, or medial, walls of the bronchi), controlled by as many as six pairs of minute muscles.

Sound vibrations in the tracheal air column are evidently initiated and modulated by the vibrating membranes, specialized parts of the bronchial or tracheal walls. Songbirds, and probably other birds, are able to control the right and left halves of the syrinx separately, thus singing with two independent voices.

All songbirds are equipped with a more complex sound producing organ than suboscines (flycatchers and their relatives) have. Called the syrinx, this structure is what allows songbirds to make such a bewildering variety of whistles, trills, and warbles.

Interestingly, not all songbirds produce complex melodic songs. Crows, for example, use their syrinx to produce only coos, caws, rattles, clicks, and grating noises instead of a melody.

Why do birds sing/call?

- Impress and attract a mate
- Declare territorial boundaries
- Identify family members
- Announce the presence of a predator
- Convey information about food

A Red-eyed Vireo sings more than 20,000 songs a day.

Some birds have large repertoires – a Brown Thrasher can sing as many as 2,000 distinct songs, whereas the Henslow's Sparrow seem to have only one song.

In North America mostly males sing

Song is not the only "keep out" signal that birds use. Although Northern Mockingbirds sing complex songs on their territories during the breeding season, they use only a loud chuck sound to declare their winter feeding territory. Some warblers also use just a simple call note on their winter feeding territory.

Some birds sing while in flight, especially species that nest in open areas such as grasslands. Male Purple Martins use a special song to attract mates. Early in the morning, the male flies hundreds of feet into the air and sings his liquid "dawnsong". Other martins up to several miles away can hear the sound. This song may attract other martins to the colony, leading to additional mating opportunities.

Dawn Chorus – many birds sing especially energetically at dawn.

Bird Song

- Limited to Passeriformes
- Males sing for two reasons
 - Proclaim territories
 - Attract mates



Singing limited to perching birds – Order - Passeriformes.

In North America, we hear mostly males singing, because they typically take the lead in defending territories and attracting mates. However, especially in the tropics, some species sing duets involving both the male and female.

Female birds may also judge the quality of the male's song when selecting a mate. Some studies have shown that males with extra food on their territories are the most persistent singers, and in some species, the most persistent singers attract females the soonest.



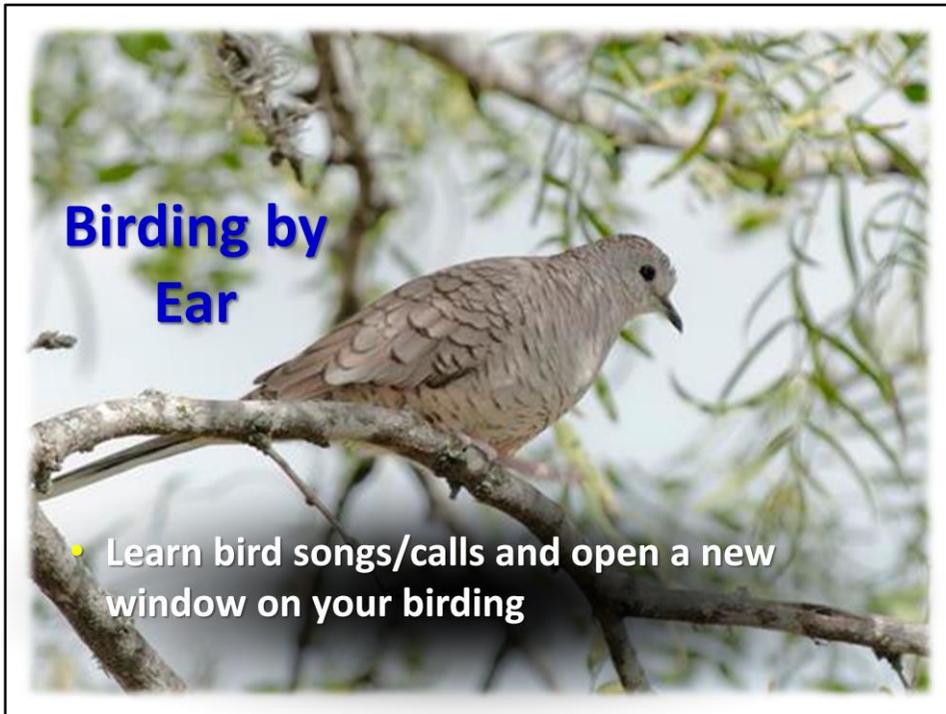
Drumming up a song – some birds sing with their bills or wings to drum up a mate's interest.

Woodpeckers – each woodpecker, in those species tested, has its own drumming pattern so male and female birds can easily recognise each other while they are out foraging.

Snipe – two feathers on either side of the tail vibrate as the bird falls out of the sky.

What is that bird deep in the woods?





You can only see straight ahead, but you can hear in all directions at once. Learning bird songs is a great way to identify birds hidden by dense foliage, faraway birds, birds at night and birds that look identical to each other. In fact, when biologists count birds in the field, the great majority of species are heard rather than seen.



Watch and Listen: When you see a bird singing, the connection between bird and song tends to stick in your mind.

Learn from an expert: It's much harder to learn bird songs from scratch than to have a fellow birder point them out to you. Check for a nearby bird club or Audubon chapter and join a field trip.

Listen to recordings: Start by listening to recordings of birds you see often. Play them often to make the sounds stick. Our online bird guide has more than 600 sounds you can listen to, with thousands more available in a searchable format at the Cornell Lab of Ornithology's Macaulay Library. You can also purchase regional audio guides produced by the Macaulay Library.

Say it to yourself: Some songs almost sound like words – who can mistake the Barred Owl's "who cooks for you all"? Mnemonics can make a song a snap to remember.

Details, details, details: Break the song apart into its different qualities, including rhythm, pitch, tone, and repetition. As you listen to the birds around you and study the recordings, try placing the songs in different categories as shown below.

http://www.allaboutbirds.org/Page.aspx?pi... Your online guide L...
 Convert Select

The Cornell Lab of Ornithology
All About Birds Like Kelly Conrad Simon, Zoe Ann Slonchcomb and 357,619 others like this

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Red-winged Blackbird © Tim J. Popwood

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 Your online guide to birds and bird watching

Search Our Bird Guide Find

Or Browse by Taxonomy, Name, or Shape

Featured This Week
 Check out our list of holiday gift ideas, guaranteed to delight your favorite bird watcher and help support the Cornell Lab's mission to conserve the birds that bring us so much joy.

Question of the Week
 Q. What can you tell us about the habitat associations of partridges and in particular whether pear trees are ever involved?
 Answer
 Ask us your own bird questions right here

Project FeederWatch

WELCOME TO ALL ABOUT BIRDS
 Your guide to birds and bird watching

Information on 594 species in our online bird guide

Latest updates: Expanded info on Rufous-crowned Sparrow, Northern Pygmy-Owl, Sage Thrasher, and Gray Hawk. More on their way!

ID tips, sound, and video for 211 species (and counting). See which species

Building Skills section and free Inside Birding videos for new bird watchers

GIVE THE ULTIMATE NIKON GIFT
 UP TO \$200
 INSTANT SAVINGS ON ELIGIBLE MONARCH BINOCULARS
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Merlin Bird ID App

The screenshot shows a web browser window with the URL <https://merlin.allaboutbirds.org/>. The page header includes "The Cornell Lab Merlin" logo and navigation links for "Get eNews", "Contact Us", and "Donate". A secondary navigation bar contains "Download", "Help & FAQs", "The Story", and "Photo ID".

The main content area features a smartphone displaying the app's interface with the question "What size was the bird?" and a selection of bird icons. To the right, the text reads: "Download Our Free Merlin Bird ID App. Free, instant bird ID help for 4,500+ birds for North and South America, Europe, Asia, and Australia." Below this text are buttons for "Download on the App Store" and "ANDROID APP ON Google play". A vibrant image of a Yellow Warbler is shown on the right side of the banner.

At the bottom of the banner, it says "What's Merlin? Watch now!". The footer of the browser window shows the Windows taskbar with the time 11:54 AM on 2/6/2020.

eBird

Report and track the birds online –
any place, any time!



Go ▶

Monitoring Birds

- Christmas Bird Counts
- Breeding Bird Surveys
- Great Texas Birding Classic
- Great Backyard Bird Count
- Point Counts and Transects
- Bird Banding



Christmas Counts - Audubon
Breeding Bird Surveys - USGS
Great Texas Birding Classic - TPWD
Great Backyard Bird Count - Cornell
Point Counts and transects

USGS Bird Banding Laboratory Patuxent Wildlife Research Center

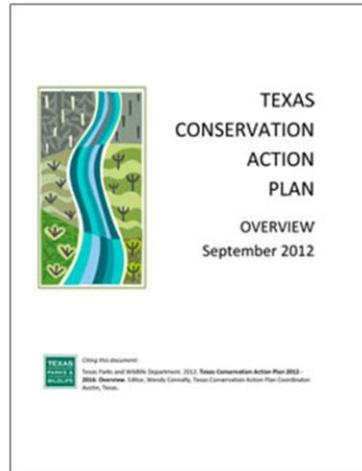
- **The Bird Banding Laboratory coordinates the banding and marking of birds across the United States and its territories**
- **Its databases house approximately 64.5 million banding records and 4.5 million recoveries of banded birds**

– Providing a wealth of information on the migratory movements of birds across the continent



Conservation Concerns

- **Species of Greatest Conservation Need**
 - **TPWD Texas Conservation Action Plan**
 - **111 SGCN Bird Species**
- **Threatened and Endangered Species**
 - **USFWS**
- **Watch List of Birds of Conservation Concern**
 - **American Bird Conservancy**



Species of Greatest Conservation Need – TPWD TCAP

Threatened and endangered species – USFWS

American Bird Conservancy – Watch List of Bird of Conservation Concern -
<http://www.abcbirds.org/abcprograms/science/watchlist/>

Texas Nature Trackers

WAYS TO PARTICIPATE IN THE TNT PROGRAM

Attend a TNT Event

Texas Nature Trackers events highlight skills and tools that will help you become a more effective naturalist. Many of our events provide opportunities to spend time in the field with expert naturalists. This is a great way to get started, see what interests you, and discover what opportunities are near you.



Join a TNT Project

Documenting your observations is a great way to learn, and your data contribute to TPWD's research and conservation efforts.



TEXAS SPECIES IN NEED OF YOUR HELP

You can contribute directly to ongoing research and conservation efforts by helping us document the distribution and seasonal activity of Texas species.

To see which species need your help, please explore these targets on the Texas Nature Trackers website:

www.tpwd.texas.gov/trackers



OPPORTUNITIES FOR INCREASED INVOLVEMENT

Whether you are focused on a single species at a single location, or you want to explore the state and see as many species as possible, the Texas Nature Trackers program is a great way to dig deeper into the natural history of Texas. Here are some more advanced opportunities with Texas Nature Trackers:

- JOIN A SURVEY ORGANIZED BY THE TNT PROGRAM
- REDISCOVER HISTORICAL POPULATIONS OF PLANTS AND ANIMALS
- MONITOR AT-RISK POPULATIONS



iNaturalist

Texas Nature Tracker Bird Projects



Birds of Texas



Red-Crowned Parrot Project



Texas Whooper Watch



Texas Eagle Nests



iNaturalist Worldwide

Observations - iNaturalist

https://www.inaturalist.org/observations

iNaturalist Explore Your Observations Community Identify More Upload

Observations

Species Location Go Filters

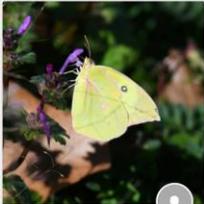
The World

31,294,519 OBSERVATIONS	254,568 SPECIES	109,863 IDENTIFIERS	848,754 OBSERVERS
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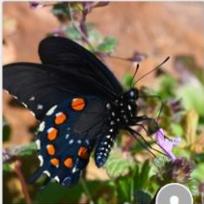
Map Grid List



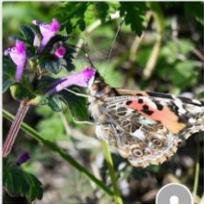
Southern Dogface



Southern Dogface



Pipevine Swallowtail



Painted Lady

Type here to search

12:33 PM 2/5/2020



iNaturalist and Texas

Observations - iNaturalist

https://www.inaturalist.org/observations?place_id=118&subview=grid

iNaturalist Search Explore Your Observations Community Identify More Upload

Observations Species Texas, USA Go Filters

Texas	2,515,155 OBSERVATIONS	19,755 SPECIES	17,238 IDENTIFIERS	53,404 OBSERVERS
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Map Grid List



Orangethroat Darter



Guadalupe Bass



Parasola auricoma



Rough Earthsnake

Type here to search 12:35 PM 2/5/2020

iNaturalist.org

An observation records an encounter with an individual organism at a particular time and location. This includes encounters with signs of organisms like tracks, nests, or things that just died. When you make an observation, you'll record:

Who you are

You'll need to make an iNaturalist account and please only post your own personal observations



What you saw

Choose a group of organisms like **butterflies** or better yet a specific organism like the **Monarch butterfly**. If you provide evidence you can leave this blank and the **community can help**



Where you saw it

Record both the coordinates of the encounter as well as their accuracy. You can obscure the location from the public



When you saw it

Record the date of your encounter, not the date you post it to iNaturalist



Evidence of what you saw

By including evidence like a **photo** or **sound**, the community can help add, improve, or confirm the identification of the organism you encountered. Help the community by taking clear well framed photos, by including multiple photos from different angles



Your observations don't need to include all of these parts, but they do in order to become research quality observations for science. Remember, you should make separate observations for each separate critter encounter. If you observed something not wild, like a lion in the zoo or a planted rose in your garden, make sure to mark it as captive/cultivated to prevent it from becoming research quality.

For more guidance, go to:

[iNaturalist.org/pages/getting+started](https://www.inaturalist.org/pages/getting+started)

You can also make observations with your camera! More instructions online.



Photo Vouchered Observations

Dickcissel (*Spiza americana*) Research Grade Edit



marshamay
46 observations

Observed: Apr 29, 2019 - 7:13 PM CDT
Submitted: Apr 29, 2019 - 7:15 PM CDT

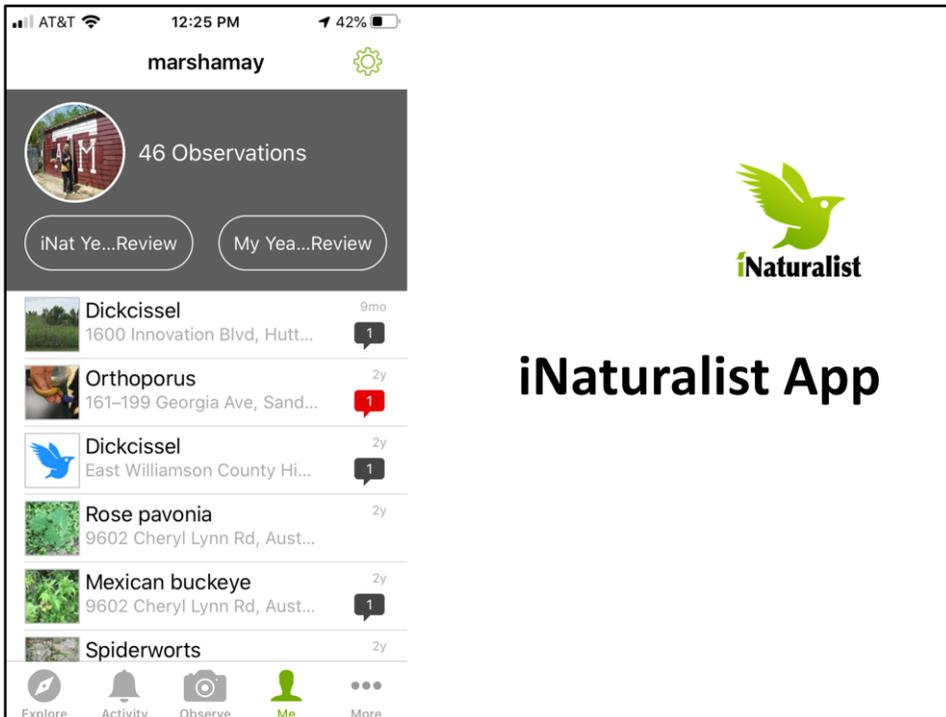


1600 Innovation Blvd, Hutto, TX... Show Details

☆ Be the first to fave this observation!

Type here to search

12:19 PM 2/6/2020





My Observation with Audio

AT&T 12:16 PM 49%

marshamay Edit

marshamay Apr 29, 2019



Dickcissel
Spiza americana

Heard Dickcissels. Photo is the habitat. I'll upload sound file tonight.

Texas State Technical 7:57

Voice Recorder

AT&T 12:32 PM 35%

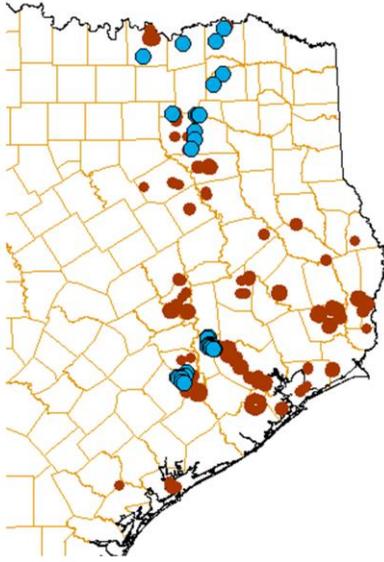
Done

A TAP TO NAME
Thursday February 06 2020 0:00

REC PLAY STOP SAVE AS



Crawfish Frog



Observed by Scott Wahlberg

- **Blue = Herps of Texas (51 obs)**
- **Brown = TXNDD (61 EOs)**

[Back to jessicaw's observations](#)

[Previous](#)

[Next](#)

Crawfish Frog (*Lithobates areolatus*) observed by jessicaw on April 3, 2014



Photo (c) Jessica

Photo © Jessica, some rig

Comments & Identifications



jessicaw's ID: Crawfish Frog (*Lithobates areolatus*)

Posted by jessicaw 4 days ago



mdwarriner's ID: Crawfish Frog (*Lithobates areolatus*)

Posted by mdwarriner 4 days ago



This is a really cool observation. We have been working with in-state researchers on this species to assess status.

Posted by mdwarriner 4 days ago



When we had the frog and mussel training here last summer, Marsha told us about it. I was really excited when I saw the picture. I've been looking and listening for it here at my place. It's a beautiful frog.

Posted by jessicaw 4 days ago



dominic's ID: Crawfish Frog (*Lithobates areolatus*)

Posted by dominic 4 days ago



toby's ID: Crawfish Frog (*Lithobates areolatus*)

Posted by toby 4 days ago



Thanks for posting this. It really helps with our research on the current distribution of the species.

Posted by toby 4 days ago

Primary

Lithobates

Lithobates

5 people agree

on

remove

Comment

agree

disagree



iNaturalist Tutorials

Getting Started

Hi and welcome to iNat! This guide will walk you through some of the main features of the site.

Posting Observations

This article describes:

- What are observations?
- How to make an observation with your iPhone
- How to make an observation with your Android
- How to make an observation from the web
- How to import observations from Flickr

What Are Observations?

An observation records an encounter with an individual organism at a particular time and location. This includes encounters with signs of organisms like tracks, nests, or things that just died. When you make an observation, you'll record:

- <https://www.inaturalist.org/pages/video+tutorials>

TPWD Resources

<http://tpwd.texas.gov/publications/>

- **Introduction to Birdwatching**
- **Texas Birds and the Vegetative Layers They Live In**
- **Bluebirds in Texas**
- **On the Warblers of Texas**
- **The Purple Martin and its Management in Texas**
- **The Birds of Texas: Occurrence and Seasonal Movements**

