Case Study:

BAIRD'S SPARROW

Motus
Wildlife Tracking System

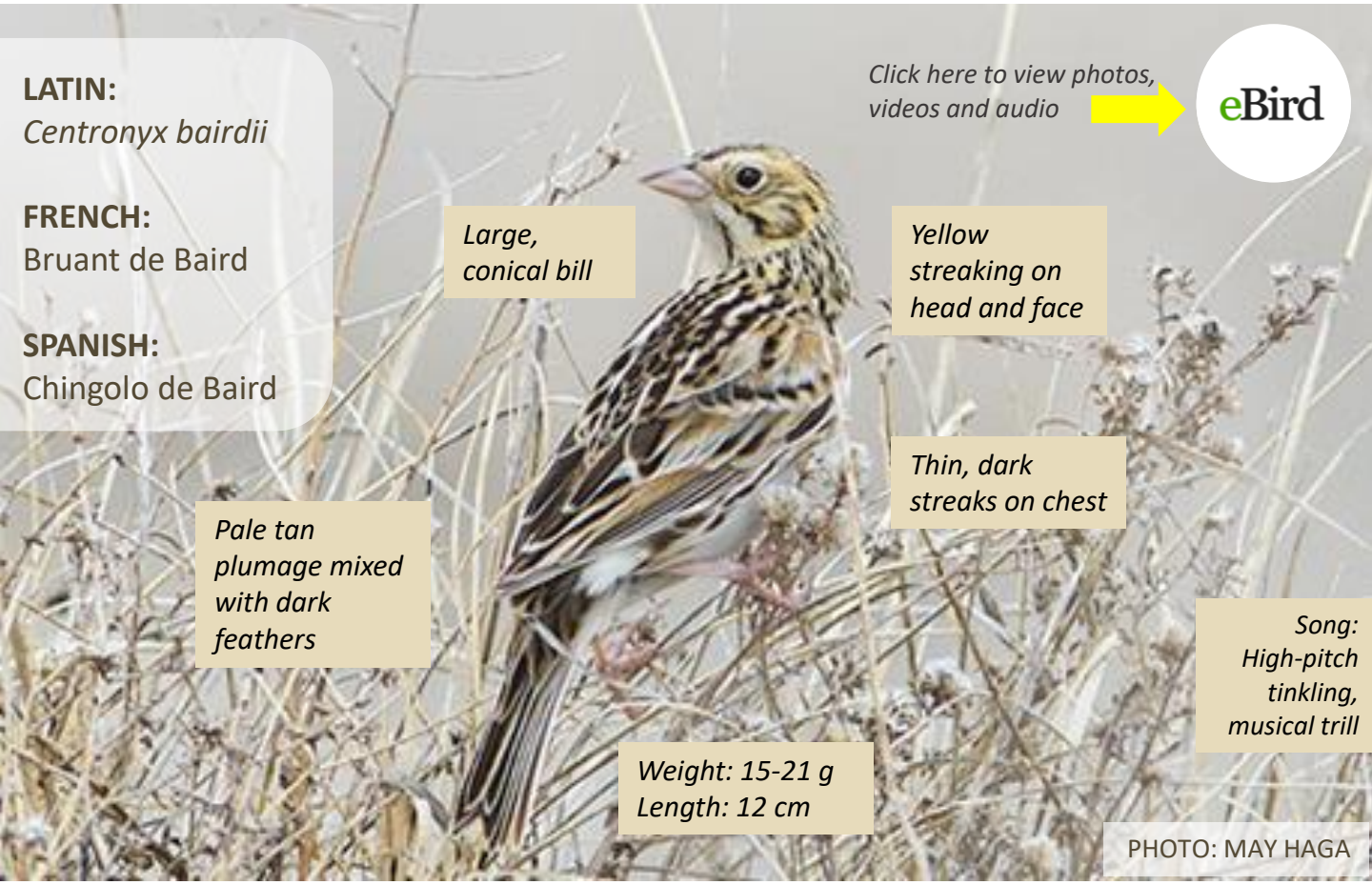
PHOTO: ANDY BANKERT

OISEAUX CANADA BIRDS CANADA

Bird Conservancy of the Rockies
Connecting People, Birds and Land

BAIRD'S SPARROW

The Baird's Sparrow is a secretive grassland sparrow, foraging for insects, spiders and seeds on the ground. Males will perch at the top of grasses to sing a high-pitched musical trill.



CONSERVATION

Grassland birds are dependent upon biodiverse, natural prairie grassland habitats across North America. Changes to this important habitat have caused grassland birds to decline more than 60% since in the 1960's. Scientists are studying grassland species to learn more about their populations, long-distance movements, breeding and non-breeding locations and habitat requirements.

Key conservation concerns include:

- Large-scale habitat loss and conversion of native prairie grasslands to cropland and development
- Suppression of natural fire cycles to prevent succession of grassland landscape to shrub and forest.
- Desertification and loss of healthy grass structure to provide birds with food, protection from predators, and adequate cover from inclement weather.

Click here for IUCN assessment

NOT EVALUATED	DATA DEFICIENT	LEAST CONCERN	NEAR THREATENED	VULNERABLE	ENDANGERED	CRITICALLY ENDANGERED	EXTINCT IN THE WILD	EXTINCT
NE	DD	LC	NT	VU	EN	CR	EW	EX

BAIRD'S SPARROW

ANNUAL CYCLE

Click here to view Bird Migration Explorer

Audubon

BREEDING

Baird's Sparrows seek nesting habitat in tallgrass or mixed grass native prairies and pastures during June and July. They nest on the ground in a shallow depression, layered with grasses. Females lay 4-5 camouflaged eggs and incubate for 10-14 days.

SPRING MIGRATION

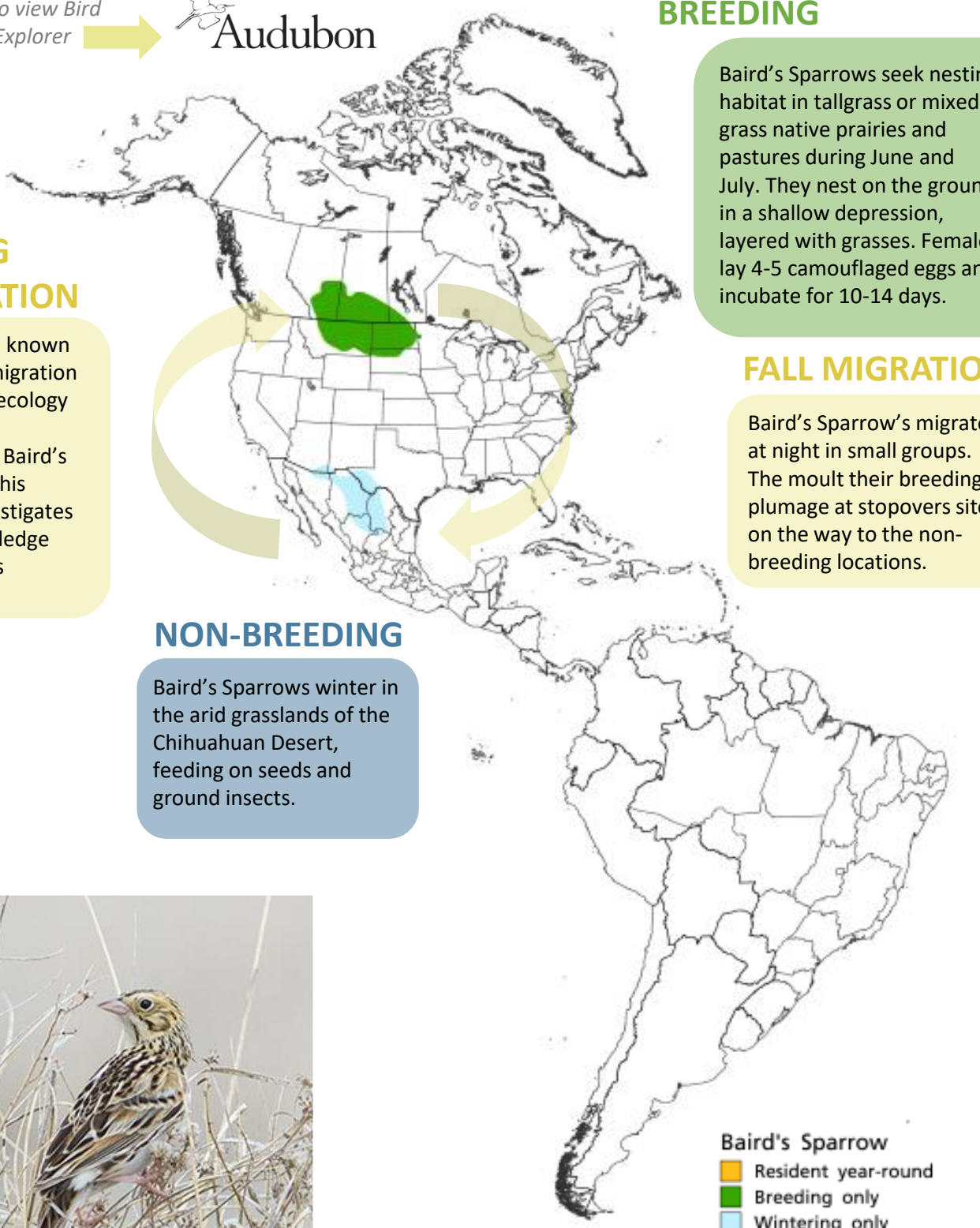
Not much is known about the migration behaviour, ecology or stopover locations of Baird's Sparrows. This project investigates these knowledge gaps for this species.

FALL MIGRATION

Baird's Sparrow's migrate at night in small groups. The moult their breeding plumage at stopovers sites on the way to the non-breeding locations.

NON-BREEDING

Baird's Sparrows winter in the arid grasslands of the Chihuahuan Desert, feeding on seeds and ground insects.



RESEARCH IN FOCUS:

Adapted from Motus Wildlife Tracking System Projects:
Great Plains Chihuahuan Desert Motus (#281)
Prairie Landbird Monitoring Project (#393)

Conserving Habitat for Baird's Sparrow

Many factors are contributing to population declines of grassland birds in North America. Scientists are researching the habitats and movements of Baird's Sparrows across the Great Plains and Chihuahuan Desert.


PHOTO: ERIN STRASSER

SCIENCE GOALS:

1. Identify important locations and habitats of non-breeding areas and breeding sites.
2. Identify stopover locations and specific habitat needs during migration.
3. Identify factors limiting populations at each stage of annual cycle.

METHODS:

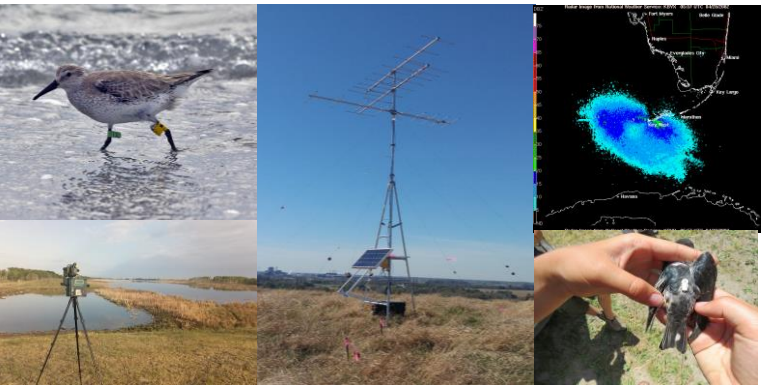
To study Baird's Sparrow's, scientists catch the birds in the wild using a 'flush-netting' technique. A series of 3-5 nets are placed in a straight line within the study area boundaries. A semi-circle of people is formed up to 200 meters away from the nets. The team slowly walks toward the nets to flush birds from the field, and into the net. Once captured, the birds are quickly and safely removed from the net, and processed before being released:


PHOTO: ERIN STRASSER

1) An aluminum leg band with a unique identification number is attached.
2) Morphometric measurements are collected: wing cord, tail length, culmen length, tarsus length, fat and weight. One tail feather is collected to genetically determine the sex.
3) A battery-powered nanotag is attached like a backpack, looped around the legs. The tag will emit a unique signal, which can be detected by the radio antennas across the landscape. This radio transmitter helps scientists track daily movements, record habitat use and monitor survival.

TRACKING BIRDS:

To learn more about the lives of birds, scientists study their movements and the habitats they require throughout the year. There are many methods and technologies used to track bird movements. Sometimes, these methods can be combined to maximize the information gathered for the question being studied.

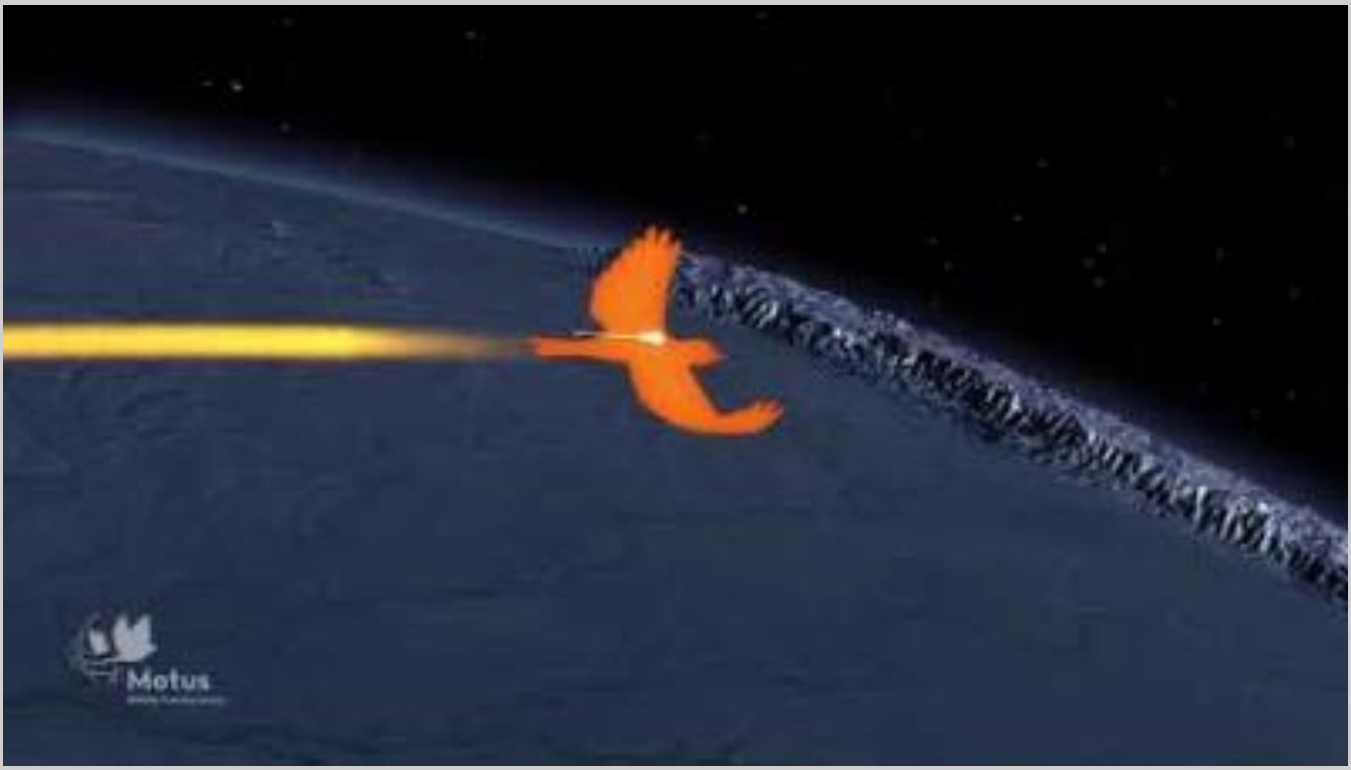


Photos (L-R): Mark Peck, Laura Stewart, Birds Canada; National Weather Service; Liza Barney

- Bird banding
- Color bands or flags
- Citizen Science
- Doppler radar
- Radio telemetry
- Satellite telemetry
- Geolocator
- Acoustic Recordings

Motus
Wildlife Tracking System

This Case Study explores bird research using radio telemetry. The Motus Wildlife Tracking System is a coordinated array of fixed receiving stations across the landscape. Small, coded tags are attached to a small, flying animal (bird, insect, bat), which is then released back into the wild. Each tag emits a unique signal that can be detected by the radio antennas at a determined frequency. If a tagged bird is within 15 km of a receiving station, the unique pulse of its tag is detected by the antenna. This information is sent to the computer stored at the base of the antenna, where it logs the tag identification with the date and time. The data is transmitted to the project scientists for analysis. This information helps to connect the dots of bird movements, identify important stopover sites for resting and feeding, how long it takes to travel, and where they stop to breed or spend the winter.



ACTIVITY INSTRUCTIONS

1. POPULATION TREND

The global population of Baird's Sparrows is estimated from Breeding Bird Survey data (~1.2 million in 2004). A Population Trend is a measure of abundance over a period of time. Annual Breeding Bird Surveys in Canada and the United States have collected abundance data of breeding Baird's Sparrows since 1970. This data represents the mean count of birds, per area, per year (Annual Index).

Follow the instructions below to observe the population trend of Baird's Sparrows as a line graph with provided data from 1970 – 2019:

a) Label the X-axis with 'Time (Years)'. Label each vertical gridline with the years in the data table.

b) Label the Y-axis with 'Annual Index'. Label each horizontal line from the bottom of the graph, starting at 0 to 12 at the top.

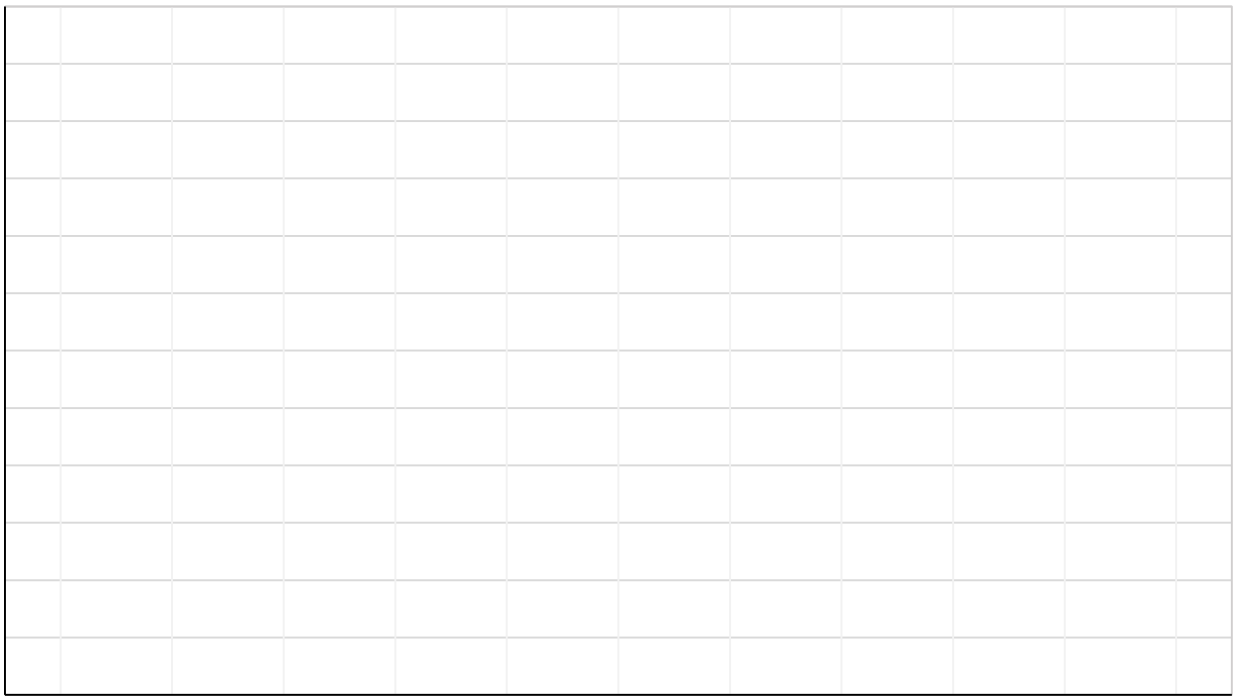
c) Plot the Annual Index values from the data table onto the graph for each year. The first data point will be on the vertical line for 1970, at the point that matches 8.13. Make a dot at this intersect. Continue for all the years.

d) Connect all the dots to observe the trend of Baird's Sparrows from 1970 – 2019.

YEAR	ANNUAL INDEX
1970	8.13
1975	9.27
1980	8.44
1985	7.20
1990	9.68
1995	6.56
2000	4.28
2005	3.96
2010	4.26
2015	4.12
2019	3.42

Data adapted from: https://wildlife-species.canada.ca/breeding-bird-survey-results

Baird's Sparrow population trend in North America based on Breeding Bird Survey data



ACTIVITY INSTRUCTIONS

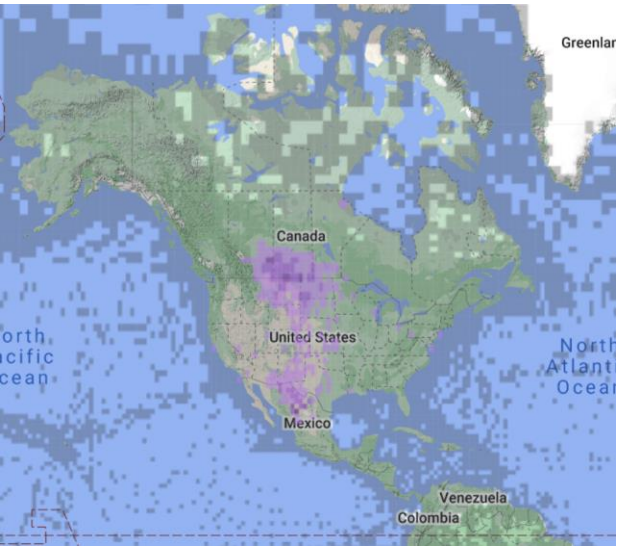
2. RANGE

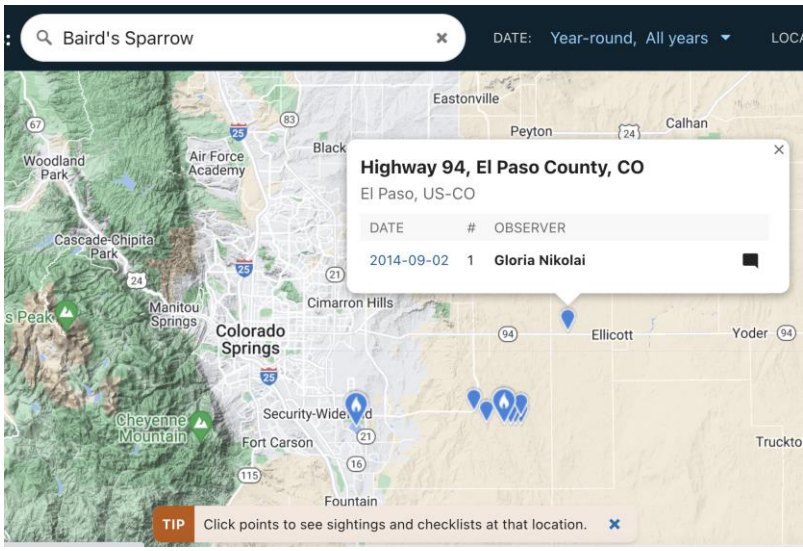
Observations reported to eBird provide information about the dates and locations of Baird's Sparrows across their range. Determine the timing of each stage following the instructions below:

a) Open the Baird's Sparrow observation map on eBird: https://ebird.org/map/baispa?neg=true&env.minX=&env.minY=&env.maxX=&env.maxY=&zh=false&gp=false&ev=Z&excludeExX=false&excludeExAll=false&mr=1-12&bmo=1&emo=12&yr=all&byr=1900&eyr=2023

b) The purple squares highlight the locations where Baird's Sparrows have been observed and reported. Zoom in to the dark purple squares to observe the blue sighting pins.

c) Click **10 pins in each range** (breeding, non-breeding and migration sites)**.** Shade in the month of observation for each sighting in the table below.





Seasonal Timeline of Baird's Sparrow's based on eBird observation data

	JAN	FEB	MAR	APRIL	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC
NON-BREEDING												
MIGRATION												
BREEDING												

Check your results with the eBird observation map here (Zoom map):
https://science.ebird.org/en/status-and-trends/species/baispa/range-map?week=12

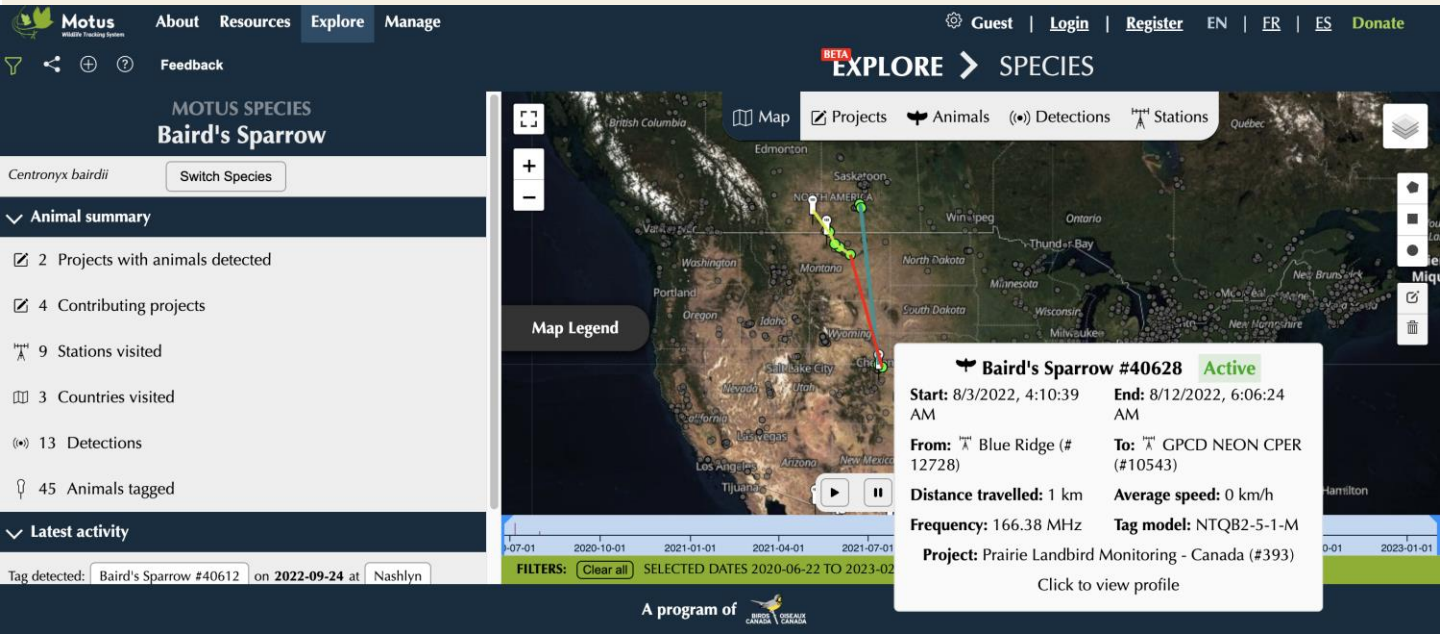
View the Annual Cycle animation with weekly abundance data here (Zoom map and press play):
https://science.ebird.org/en/status-and-trends/species/baispa/abundance-map-weekly?week=1

ACTIVITY INSTRUCTIONS

3. TRACKING BAIRD'S SPARROWS

Tracking an individual bird provides detailed information about its location and movements over time, helping scientists answer specific questions about behaviours and habitat use.

1. Visit the Motus Wildlife Tracking System map for Baird's Sparrow detections: https://motus.org/dashboard/#e=profile&d=species&selections=18910
2. Click on a track. This will isolate the individual tagged bird.
3. Push 'Play' to observe the animation and direction of movement.
4. Hover over the track line for movement details of the bird.



Tagged Baird's Sparrow data from Motus Wildlife Tracking System

Tag ID #:	
First detection date:	
Last detection date:	
Movement direction:	
What stage of its annual cycle is the bird moving from and to?	
What is the maximum flight speed detected?	
At what location does the bird spend the longest time?	
How long does the bird spend at this site?	
What habitat and resources might be at this site?	

DISCUSSION

Identify a human-related threat, and a stewardship activity that might impact survival at each stage below.

NON-BREEDING (winter)

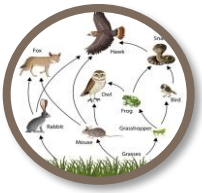
MIGRATION (spring and fall)

BREEDING (summer)

EXTENSION ACTIVITIES

LEARN ABOUT BIRDS NEAR YOU:

Explore and observe local birds. Take note of field marks, colors and patterns, size and shapes, habitats and behaviors. Use field guides, websites and local expertise to help with identification. Have fun!



ECOLOGICAL CONNECTIONS:

Design a food web model to display connections of selected bird species to their ecological community.

BIRD ART:

Sketch or model a selected bird species using pencil; paints; clay; or using computer graphics (using software such as Adobe Illustrator).

SCIENTIFIC LITERATURE:

Use the school library database, or Google Scholar, to explore the peer-reviewed scientific literature related to this Case Study. Search by 'key words' or research personnel, and select one article to review. Summarize each section of the scientific method conducted in this research.

MEET AN ORNITHOLOGIST:

Scientists are excited to share their research! Contact the project team to inquire about a virtual meeting with your classroom.

CITIZEN SCIENCE:

Participate in Citizen Science to learn more about birds in your area and contribute observations for science and conservation. Explore:

- **Great Backyard Bird Count**
- **Global Big Day**

SCIENCE COMMUNICATION:

Investigate a research topic and present information in a creative communication. For example, an infographic, news article, comic, brochure, slide show, poem, short story, or blogpost.

CELEBRATE BIRDS:

Participate in nature and bird festivals in your community, or visit World Migratory Bird Day for ideas!

STEWARDSHIP AND CONSERVATION:

Initiate or participate in a stewardship activity that helps reduce or mitigate impacts of threats to birds in your community.

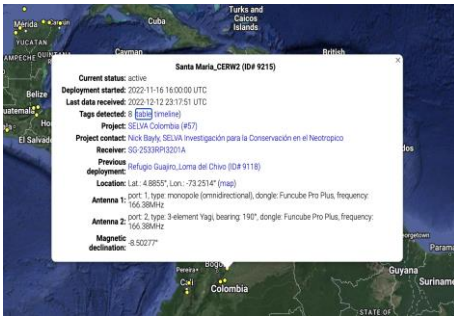
EXPLORE:

MOTUS WILDLIFE TRACKING SYSTEM

Motus Wildlife Tracking System

FIND A STATION

1. Visit: www.motus.org
2. Click: **Explore data**
3. Select: **Receiver Locations**
4. Explore map. Click on dots to view station information.



- *What is the location of the station closest to you?*
- *Click on the 'Project' name. What is the research investigating at this station?*
- *Click on 'Tags Detected'. What species have been detected at this station?*

TRACK A BIRD

SEARCH BY SPECIES:
motus.org/data/species

1. Choose a location
2. Click on a station dot
3. Find 'Tags Detected'
4. Click 'table' view
5. Select a species
6. Show detections in 'map'

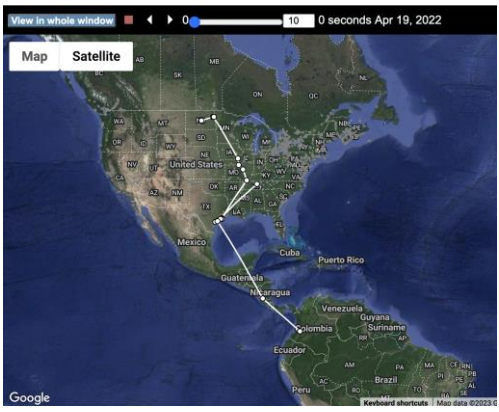
SEARCH BY LOCATION:
motus.org/data/receiversMap

1. Select a species
2. Find 'Tags' and Select 'Table'
3. Select a bird that has a high number of 'receiver locations'
4. Show detections in 'map'

SEARCH BY TAG:
motus.org/education/activities

1. Click 'Explore Motus' activity
2. Click 'Find a Tag'
3. Enter Tag ID #'s:

Taxonomic Order ID	Species ID	Common Name	Scientific Name	Deployments	Projects	Type
154	230	Canada Goose	Branta canadensis	37	1	1
238	360	Wood Duck	Aix sponsa	37	2	1
716	1260	Sharp-tailed Grouse	Tympanuchus phasianellus	72	1	1
955	1650	Western Grebe	Aechmophorus occidentalis	3	1	1
956	1660	Clark's Grebe	Aechmophorus clarkii	1	1	1
962	5970	Rock Pigeon (Feral Pigeon)	Columba livia (Feral Pigeon)	34	4	1
1635	7060	Yellow-billed Cuckoo	Coccyzus americanus	73	5	1
1640	7100	Black-billed Cuckoo	Coccyzus erythropthalmus	3	2	1
1784	7720	Common Nighthawk	Chordeiles minor	216	6	1
1827	7750	Common Poorwill	Phalaenoptilus nuttallii	44	1	1
1828	7810	Chuck-will's-widow	Antrostomus carolinensis	3	1	1
1840	7871	Eastern Whip-poor-will	Antrostomus vociferus	165	5	1
1854	32874	Eurasian Nightjar	Caprimulgus europaeus	60	1	1
1948	8040	Chimney Swift	Chaetura pelagica	161	3	1
2643	3761	King Rail	Rallus elegans	3	2	1
2647	3751	Clapper Rail	Rallus crepitans	55	2	1
2657	3770	Virginia Rail	Rallus limicola	186	6	1
2734	3830	Sora	Porzana carolina	346	4	1
2743	41203	Common Gallinule	Gallinula galeata	6	1	1
2838	3680	Yellow Rail	Coturnicops noveboracensis	16	1	1



- *What is the species name? What project is studying this bird?*
- *Click on the flight track. Where and when was the bird tagged?*
- *Select the longest section of the track. How far did the bird travel? How long did it take? What speed did the bird fly on this track?*