



47.

Who Flew Where?

Description: Students explore bird migration using actual banded bird recovery data; students measure a scaled distance of where 20 different birds were found from where they were originally banded. A second part has students locating those places on a map of western North America.

Objective: Students will see and understand the distances some birds fly in their migration. Students will be able to identify that appropriate habitat is critical to birds' survival in breeding, migrating and wintering locations.

Materials: **Part A**

- Bird Recapture Data cards showing 20 different individual birds on the Rio Grande Bird Research recapture list (there are 11 species included)
- Measuring tape (25 - 50 meter is best)
- Master copy of data page for teacher
- Space that is at least 43 meters / 130 feet long; could be hallway, gym, school yard.

Part B

- Copies of map for each student or small group
- Copies of "Who Flew Where" Banded Bird Recaptures data sheets for each student or group
- Maps, atlases, computer for map search-- for student use
- Bird Recapture Data cards used in Part A
- Scissors
- Tape and/or glue

47. Who Flew Where?

Grades: 4-8

Time: at least 2 class periods

Subjects: science, social studies / geography, math

Standards: see end of migration activities

Terms: *migration, bird banding, habitat, ornithologist, range*



Background: Through bird banding, biologists are documenting the health, size, age, and travels of birds. The Bird Banding Laboratory makes this statement about what has been learned through banding birds:

“In this way we have learned that some species go south in one pathway and return north by another pathway. Nesting and wintering grounds have been located for some species, and specific nesting grounds have been connected to specific wintering areas. The Arctic Tern makes the longest migration flight of any living species, making an annual round trip flight of 40,234 km (25,000 miles). The migration routes used by this species have been determined by band recoveries in part.”

This activity uses data from Rio Grande Bird Research and their long-term banding project at the Rio Grande Nature Center State Park, in Albuquerque’s bosque. They do band a few other places such as Bosque del Apache National Wildlife Refuge, Capilla Peak in the Manzano Mountains, and beginning in 2014, Valle de Oro National Wildlife Refuge.

NOTE: Rio Grande Bird Research primarily bands birds during the fall and early spring. The majority of birds they band are migrating or wintering and that is shown in the map the students create. *Birds that breed in the Albuquerque area and fly south for the winter are typically not banded*, because the group does not band during the nesting season and they are already headed south when banding starts in the fall.

Procedure:

- ♣ Class discussion about migration and bird banding:

What is the connection between people and birds? What is important about birds?

Think, pair share: Give a few minutes for students to individually think about this. Then have them discuss in small groups, finally ask the whole class to share their ideas.

Why do scientists study birds? What can we learn by studying birds?

Bird scientists or **ornithologists** use different techniques to study birds. Field ornithologists may observe birds in the wild using binoculars. **Bird banding** is one way field ornithologists monitor wild birds. We can determine the **range** of that species, where that type of bird can be found through its lifetime.



How can we define migration?

♣ Warm-up activity.

Some of the birds are wintering in this area, some are nesting, some are migrating through, and some are here year-round.

Can you think of birds you have seen only in the summer here?

Can you think of birds you have seen only in the winter in New Mexico?

Can you think of birds that you can see all year round in your neighborhood?

Put the following bird names on the board, ask the students to match the bird with its migratory status.

Greater Roadrunner -- (year-round resident in New Mexico)

Black-chinned Hummingbirds -- (nest in New Mexico, migrates south for the winter)

Sandhill Crane -- (nests far to the north, migrates to New Mexico and stays the winter)

You can share information from the Introduction section about each of these three species and additional species from the selected bosque bird information cards.

What is bird banding?

Bird banders catch birds in large nets called mist nets. They then observe the birds closely and record data about them. Banders put a ring around the bird's leg that is imprinted with a unique number. If someone finds a banded bird they should report it to the US Fish and Wildlife Service; the information is then relayed back to the original banders.

What are scientists learning by catching the birds and banding them that they wouldn't know just by looking at them? (Also, see Introduction).

Bird Banders find out the age, sex of the bird, measure their wing & tail length, weight, amount of fat & muscle, and the amount of feather wear. This provides information about the health of each bird.

If a banded bird is recaptured, what can we find out from that?

This is the activity we will be doing now--focusing on bird banding recapture data from the Rio Grande Bird Research team.

This activity focuses on the scaled distances between where birds were banded and later recaptured. The second section has students locate those places on a map. Students can see that birds do not stay in a narrow corridor--they have wings and can fly in many directions.



Part A

- Hand each student a Bird Recapture Data card. There are 20 different cards, make additional copies to duplicate a few species, if needed for your class size.

Have the students look at the distance between the location banded and location recaptured.

- Have everyone line up by distance.

Spread out according to the scaled distance for the activity.

Determine a starting point at one end of your large space--that will be Albuquerque.

Tip: if the area has standard floor tiles that are one-foot square, use the "feet" measurement for this activity--with students counting the tiles for the distance. Otherwise, students will need to use meter sticks or measuring tape; the longest / farthest is 43 meters / 130 feet.

- Pull the group back and have each student tell:

Kind of bird?

Where banded?

Where recaptured?

How many kilometers between location banded and location recaptured?

There are several birds of the same species that have been recaptured. Have students with the same species gather together and compare similarities and differences of each one--Where were they banded and recaptured? It lived at least how long, etc?

What do birds need to survive?

- All animals need appropriate **habitat**. Review what habitat is:

Food, water, shelter, space in the appropriate arrangement

Finding these birds where they were first banded shows that there was appropriate habitat for them at that time.

Identify elements of appropriate habitat for some of the species of banded birds.

How can we as citizens and land managers ensure that appropriate habitat is here when birds migrate through? Answers will vary.

What is the furthest distance for any band recovery related to Rio Grande Bird Research? Note: it was banded elsewhere and recovered in Albuquerque.

Originally banded in Fairbanks, Alaska, recaptured by RGBR in Albuquerque: 4319 kilometers, 2684 miles away.



Which bird banded by Rio Grande Bird Research in Albuquerque was recovered the greatest distance away? How far was this? Where was it recovered?

Leduc, Alberta, Canada: 2110 kilometers, 1311 miles

Two birds were banded elsewhere in New Mexico—Where? Where were they later found?

White-crowned Sparrow: Banded at Bosque del Apache, New Mexico on 11-21-1999, found in Quincy, California on 11-6-2002

Ferruginous Hawk: Banded in Catron County, New Mexico on June 18, 1997, found in San Carlos, Arizona on August 8, 1997

Part B

- ♣ Hand out the map page to each student or small group. Printing the map on 11 x 17 paper makes it large enough for the activity.
- ♣ Hand out the one page “Who Flew Where” Banded Bird Recaptures data sheet.

There are circles with bird silhouettes and a four-letter name on each circle along the right and left margins of the paper. Students will be cutting out those circles and placing them on the map in the proper location where they were found.

The locations are noted with the name of the nearest town, as well as longitude and latitude. There are two versions of the map of Western North America: one with stars showing the locations where birds were found, and one without the stars--students will need to use the latitude / longitude lines to correctly place them.

- ♣ Students should glue or tape the icon of the bird to the location where they were found on the map. Draw arrows from the banding location to the recapture location.

You may want students to use maps, atlases or the internet to find the communities where some of the birds were found.

Have students add the names of the states (and Canadian Provinces) to their map.

Have students color-code the bird species icon and the appropriate star, and place the icon near the star. There are 11 species, pick colors for each.

Is this a map of birds that typically nest in Albuquerque? Reside year-round in Albuquerque? Winter in Albuquerque?

- ♣ Using the Bird Recapture Data cards from Part A section above, look at the dates when the birds were banded and the dates when recaptured.

Rio Grande Bird Research primarily bands birds during the fall and early spring. The majority of birds they band are migrating or wintering and that is shown in the map. Birds that breed in the Albuquerque area and fly south for the winter are typically not banded because they are not present at this time of the year.



What patterns can you see by looking at your finished map?

Answers will vary, but most go north to south. Most birds nest in the north and fly south for the winter.

What areas need appropriate habitat for birds that are residents or migrants?

Answers will vary--but good habitat at stopover spots during migration are extremely important. They must be able to feed and build up their fat stores for continued flight. So there must be proper habitat throughout their migration path.

Assessment:

- Have students describe the seasonal pattern of bird migration.
- Have students draw their own bird migration map.
- Are students able to find locations by longitude and latitude?
- Have students write an argument about the human impacts on migrating birds. [Construct an argument supported by empirical evidence that changes to physical or biological components of an ecosystem affect populations.]
- Have students write an argument about the behaviors of birds to allow them to survive different seasons. [Use argument based on empirical evidence and scientific reasoning to support an explanation for how characteristic animal behaviors affect the probability of successful reproduction.]

Extensions:

- **Phenology Challenge:**
Have students record when they see the first migrating Sandhill Cranes arriving in the fall, and heading north in the spring.
When do the first hummingbirds arrive in the spring?
- Students can research a variety of New Mexico migrants using the list in the Introduction.
- Visit the eBird website. Students can click on “Explore Data” and there are options to look for information in various ways. Probably the most “student-friendly” would be “Species Maps” and “Bar Charts.” By clicking on “Species Maps” students can explore where in the world a particular species of bird is found and then can narrow the search to certain times of the year or certain locations in the world. By clicking on “Bar Charts,” students can explore shifts in numbers of birds seen at a particular location throughout the year.
- Compare the map the students made with maps of other bird migration flyway maps. How does theirs compare? There are 20 data points on the map they made, many, many more records are assembled to make the national maps. But it takes years of research to be able to make such a map.
- Compare the age of the birds--find the longest to shortest time between banding and recapture. Recapture does not necessarily indicate death, but does give a hard number to researchers to know that an individual bird lived at least that long.



- Calculate the number of months between banding and recapture, and list the birds in the order of how long we know they lived. Here are some of the answers:

What is the longest time between banding and recapture?

American Kestrel: 57 months, May 29, 1996 to March 21, 2001

White-crowned Sparrow: 35 months, November 21, 1999 to November 6, 2002

Song Sparrow: 29 months, October 1, 1996 to March 10, 1999

White-crowned Sparrow: 27 months, October 7, 1996 to January 28, 1999

House Finch: 26 months November 6, 1988 to January 21, 1991

- Students can research each species to identify where each one breeds--which were banded on likely breeding locations?
- Students can research bird migration records--some birds fly from the far north to the far south two times a year--an astounding feat for a small animal.
- Research bird banding--look for images of the nets, pliers, bands etc., used to band birds. Who bands birds?
- Research the type of habitat the birds needed where they travelled to or from--for example, an AMGO (American Goldfinch) was banded in Albuquerque in the bosque, but found in Heber, Utah. What habitat is in the area of Heber, Utah?
- Students can research threats to birds: habitat reduction, predation by pets, collisions with windows and wind turbines, disorientation due to light pollution and climate change.

Resources/References:

eBird is a searchable online database of bird sightings throughout the world. Many of the sightings were entered by citizen scientists. Teachers and students may be familiar with eBird because of the annual Great Backyard Bird Count. <http://ebird.org/content/ebird/>

National Geographic publishes a map, Migration Flyways of North America, that can be purchased here (in the past it was a supplement to the magazine)

<http://shop.nationalgeographic.com/ngs/product/maps/wall-maps/specialty-maps/bird-migration-in-the-americas-thematic-map?npd&npd&code=SR50002&code=>

Interactive map documenting migratory movements of bird populations spanning the entire year for 118 species throughout the Western Hemisphere prepared by

Cornell Lab of Ornithology

<https://www.allaboutbirds.org/mesmerizing-migration-watch-118-bird-species-migrate-across-a-map-of-the-western-hemisphere/>

Partners in Flight / Compañeros en Vuelo / Partenaires d'Envol was launched in 1990 in response to growing concerns about declines in the populations of many land bird species at their wintering grounds. <http://www.partnersinflight.org>

Who Flew Where?

Banded Bird Recaptures, Rio Grande Bird Research, Inc.



(1) **Sharp-shinned Hawk** Williamsburg, NM (33°N 107°W)
Banded: October 12, 1995 · Recaptured: October 27, 1997



Fairbanks, Alaska (64°N 147°W) **White-crowned Sparrow (11)**
Banded: August 26, 1991 · Recaptured: October 30, 1993



(2) **Cooper's Hawk** Salt Lake City, UT (40°N 111°W)
Banded: August 28, 1995 · Recaptured: April 12, 1996



Quincy, California (40°N 121°W) **White-crowned Sparrow (12)**
Banded November 21, 1999 · Recaptured November 6, 2002



(3) **Ferruginous Hawk** San Carlos, Arizona (33°N 110°W)
Banded: June 18, 1997 · Recaptured: August 8, 1997



Ogden, UT (41°N 111°W) **Lazuli Bunting (13)**
Banded: August 20, 1989 · Recaptured: May 4, 1991



(4) **American Kestrel** Albuquerque, NM (35°N 106°W)
Banded: May 29, 1996 · Recaptured: March 21, 2001



Albuquerque, NM (35°N 106°W) **House Finch (14)**
Banded: November 6, 1988 · Recaptured: January 21, 1991



(5) **Song Sparrow** Lander, WY (42°N 108°W)
Banded: October 26, 1997 · Recaptured: April 8, 1998



Tijeras, NM (35.08°N 106.37°W) **Pine Siskin (15)**
Banded: November 6, 1996 · Recaptured: December 30, 1996



(6) **Song Sparrow** Durango, CO (37°N 107°W)
Banded: October 1, 1996 · Recaptured: March 10, 1999



Tijeras, NM (35°N 106°W) **Pine Siskin (16)**
Banded: October 13, 1995 · Recaptured: February 1, 1996



(7) **White-crowned Sparrow** Bosque del Apache, NM (33°N 106°W)
Banded: November 17, 1990 · Recaptured: April 7, 1991



Pojoaque, NM (35.89°N 106.00°W) **Lesser Goldfinch (17)**
Banded: September 30, 1996 · Recaptured: August 19, 1998



(8) **White-crowned Sparrow** Leduc, Alberta, Canada (53°N 113°W)
Banded: January 10, 1978 · Recaptured: May 12, 1978



Raton, NM (36.89°N 104.44°W) **Lesser Goldfinch (18)**
Banded: September 6, 1996 · Recaptured: August 9, 1998



(9) **White-crowned Sparrow** Prescott, AZ (34°N 112°W)
Banded: October 7, 1996 · Recaptured: January 28, 1999



West Jordan, UT (40°N 111°W) **American Goldfinch (19)**
Banded: January 25, 2003 · Recaptured: August 16, 2004



(10) **White-crowned Sparrow** Evans, CO (40°N 104°W)
Banded: April 15, 1994 · Recaptured: later in 1994



Heber, UT (40°N 111°W) **American Goldfinch (20)**
Banded: October 12, 1996 · Recaptured: June 15, 1997

Bird Banding Codes Demystified:

One word names: first four letters (MALL for Mallard).

Two word names: usually the first two letters of each name (COHA for Cooper's Hawk).

Hyphenated first name: the first letter of the first hyphenated word, the first letter of the second hyphenated word and the first two letters of the second word (WCSP for White-crowned Sparrow).

[Exceptions are: LAZB for Lazuli Bunting which differentiates it from LARB for Lark Bunting...otherwise they'd both be LABU.]





Bird Species:
Sharp-shinned Hawk

1

Bird banded at this location:

Albuquerque, New Mexico (35.13°N 110.67°W)

Bird banded on this date: **October 12 1995**

Bird recaptured at this location:

Williamsburg, New Mexico (33°N 107°W)

Bird recaptured on this date: **October 27, 1997**

Distance between banding & recapture locations:

~225 km (140 miles)

Scaled distance for activity: **~2.25 meters (8 feet)**



Bird Species:
Cooper's Hawk

2

Bird banded at this location:

Albuquerque, New Mexico (35.13°N 110.67°W)

Bird banded on this date: **August, 28, 1995**

Bird recaptured at this location:

Salt Lake City, Utah (40°N 111°W)

Bird recaptured on this date: **April 12, 1996**

Distance between banding & recapture locations:

~800 km (500 miles)

Scaled distance for activity: **~8 meters (26 feet)**



Bird Species:
Ferruginous Hawk

3

Bird banded at this location:

Catron County, New Mexico (33°N 108°W)

Bird banded on this date: **June 18, 1997**

Bird recaptured at this location:

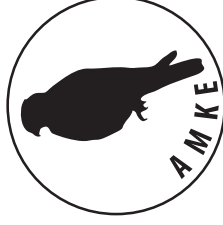
San Carlos, Arizona (33°N 110°W)

Bird recaptured on this date: **August 8, 1997**

Distance between banding & recapture locations:

~200 km (125 miles)

Scaled distance for activity: **~2 meters (7 feet)**



Bird Species:
American Kestrel

4

Bird banded at this location:

Albuquerque, New Mexico (35.13°N 110.67°W)

Bird banded on this date: **May 29, 1996**

Bird recaptured at this location:

Albuquerque, New Mexico (35°N 106°W)

Bird recaptured on this date: **March 21, 2001**

Distance between banding & recapture locations:

~0 km (0 miles)

Scaled distance for activity: **~0 meters (0 feet)**

5

**Bird Species:
Song Sparrow**



Bird banded at this location:

Albuquerque, New Mexico (35.13°N 110.67°W)

Bird banded on this date: **October 26, 1997**

Bird recaptured at this location:

Lander, Wyoming (42°N 108°W)

Bird recaptured: **April 8, 1998**

Distance between banding & recapture locations:

~925 km (575 miles)

Scaled distance for activity: **~9.25 meters (30 feet)**

6

**Bird Species:
Song Sparrow**



Bird banded at this location:

Albuquerque, New Mexico (35.13°N 110.67°W)

Bird banded on this date: **October 1, 1996**

Bird recaptured at this location:

Durango, Colorado (37°N 107°W)

Bird recaptured on this date: **March 10, 1999**

Distance between banding & recapture locations:

~300 km (190 miles)

Scaled distance for activity: **~3 meters (9 feet)**

7

**Bird Species:
White-crowned Sparrow**



Bird banded at this location:

Albuquerque, New Mexico (35.13°N 110.67°W)

Bird banded on this date: **November 17, 1990**

Bird recaptured at this location:

Bosque del Apache, New Mexico (33°N 106°W)

Bird recaptured on this date: **April 7, 1991**

Distance between banding & recapture locations:

~144 km (90 miles)

Scaled distance for activity: **~1.44 meters (5 feet)**

8

**Bird Species:
White-crowned Sparrow**



Bird banded at this location:

Albuquerque, New Mexico (35.13°N 110.67°W)

Bird banded on this date: **January 10, 1978**

Bird recaptured at this location:

Leduc, Alberta, Canada (53°N 113°W)

Bird recaptured on this date: **May 12, 1978**

Distance between banding & recapture locations:

~2100 km (1300 miles)

Scaled distance for activity: **~21 meters (69 feet)**

9

Bird Species:

White-crowned Sparrow



Bird banded at this location:

Albuquerque, New Mexico (35.13°N 110.67°W)

Bird banded on this date: **October 7, 1996**

Bird recaptured at this location:

Prescott, Arizona (34°N 112°W)

Bird recaptured on this date: **January 28, 1999**

Distance between banding & recapture locations:

~540 km (335 miles)

Scaled distance for activity: **~5.4 meters (18 feet)**

10

Bird Species:

White-crowned Sparrow



Bird banded at this location:

Albuquerque, New Mexico (35.13°N 110.67°W)

Bird banded on this date: **April 15, 1994**

Bird recaptured at this location:

Evans, Colorado (40°N 104°W)

Bird recaptured: **1994**

Distance between banding & recapture locations:

~650 km (400 miles)

Scaled distance for activity: **~6.5 meters (21 feet)**

11

Bird Species:

White-crowned Sparrow



Bird banded at this location:

Fairbanks, Alaska (64°N 147°W)

Bird banded on this date: **August 26, 1991**

Bird recaptured at this location:

Albuquerque, New Mexico (35.13°N 110.67°W)

Bird recaptured on this date: **October 30, 1993**

Distance between banding & recapture locations:

~4300 km (2677 miles)

Scaled distance for activity: **~43 meters (130 feet)**

12

Bird Species:

White-crowned Sparrow



Bird banded at this location:

Bosque del Apache, New Mexico (33°N 106°W)

Bird banded on this date: **November 21, 1999**

Bird recaptured at this location:

Quincy, California (40°N 121°W)

Bird recaptured on this date: **November 6, 2002**

Distance between banding & recapture locations:

~1425 km (885 miles)

Scaled distance for activity: **~14.25 meters (47 feet)**

13

**Bird Species:
Lazuli Bunting**



Bird banded at this location:

Albuquerque, New Mexico (35.13°N 110.67°W)

Bird banded on this date: **August 20, 1989**

Bird recaptured at this location:

Ogden, Utah (41°N 111°W)

Bird recaptured: **May 4, 1991**

Distance between banding & recapture locations: ~

~825 km (512 miles)

Scaled distance for activity: **~8.25 meters (27 feet)**

14

**Bird Species:
House Finch**



Bird banded at this location:

Albuquerque, New Mexico (35.13°N 110.67°W)

Bird banded on this date: **November 6, 1988**

Bird recaptured at this location:

Albuquerque, New Mexico (35°N 106°W)

Bird recaptured: **January 21, 1991**

Distance between banding & recapture locations:

~0 km (0 miles)

Scaled distance for activity: **~0 meters (0 feet)**

15

**Bird Species:
Pine Siskin**



Bird banded at this location:

Albuquerque, New Mexico (35.13°N 110.67°W)

Bird banded on this date: **November 6, 1996**

Bird recaptured at this location:

Tijeras, New Mexico (35.08°N 106.37°W)

Bird recaptured: **December 30, 1996**

Distance between banding & recapture locations:

~25 km (17 miles)

Scaled distance for activity: **~0.25 meters (1 foot)**

16

**Bird Species:
Pine Siskin**



Bird banded at this location:

Albuquerque, New Mexico (35.13°N 110.67°W)

Bird banded on this date: **October 13, 1995**

Bird recaptured at this location:

Tijeras, New Mexico (35°N 106°W)

Bird recaptured: **February 1, 1996**

Distance between banding & recapture locations:

~25 km (17 miles)

Scaled distance for activity: **~0.25 meters (1 foot)**

17

**Bird Species:
Lesser Goldfinch**



Bird banded at this location:

Albuquerque, New Mexico (35.13°N 110.67°W)

Bird banded on this date: **September 30, 1996**

Bird recaptured at this location:

Pojoaque, New Mexico (35.89°N 106.00°W)

Bird recaptured: **August 19, 1998**

Distance between banding & recapture locations:

~100 km (64 miles)

Scaled distance for activity: **~1 meter (3 feet)**

18

**Bird Species:
Lesser Goldfinch**



Bird banded at this location:

Albuquerque, New Mexico (35.13°N 110.67°W)

Bird banded on this date: **September 6, 1996**

Bird recaptured at this location:

Raton, New Mexico (36.89°N 104.44°W)

Bird recaptured: **August 9, 1998**

Distance between banding & recapture locations:

~275 km (175 miles)

Scaled distance for activity: **~2.75 meters (9 feet)**

19

**Bird Species:
American Goldfinch**



Bird banded at this location:

Albuquerque, New Mexico (35.13°N 110.67°W)

Bird banded on this date: **January 25, 2003**

Bird recaptured at this location:

West Jordan, Utah (40°N 111°W)

Bird recaptured: **August 16, 2004**

Distance between banding & recapture locations:

~775 km (480 miles)

Scaled distance for activity: **~7.75 meters (25 feet)**

20

**Bird Species:
American Goldfinch**



Bird banded at this location:

Albuquerque, New Mexico (35.13°N 110.67°W)

Bird banded on this date: **October 12, 1996**

Bird recaptured at this location:

Heber, Utah (40°N 111°W)

Bird recaptured: **June 15, 1997**

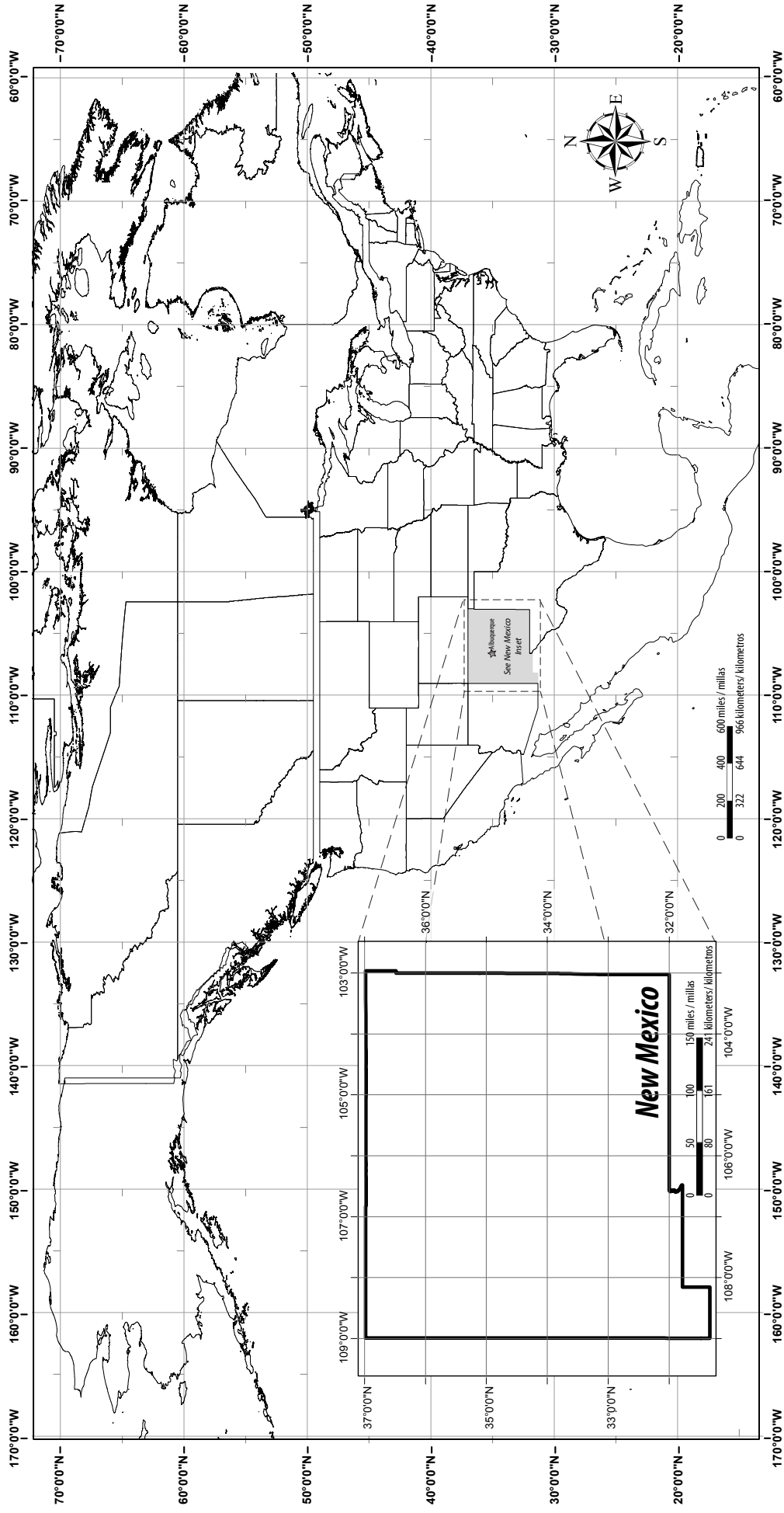
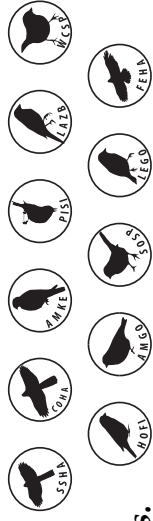
Distance between banding & recapture locations:

~725 km (450 miles)

Scaled distance for activity: **~7.25 meters (24 feet)**

Who Flew Where? ¿Quién voló a dónde?

Add icons of banded recaptured birds to the locations where they were found.
Añadir iconos de aves anilladas recapturadas a los lugares donde fueron encontrados.



Who Flew Where? ¿Quién voló a dónde?

Add icons of banded recaptured birds to the locations where they were found.
Añadir iconos de aves anilladas recapturadas a los lugares donde fueron encontrados.

