



## Bird Protocol & CAP LTER:

The goals of the CAP LTER bird project are (1) to document the changes in avian richness and abundance over time and space, and (2) to determine the biotic/abiotic and socio-economic/political factors that cause these changes to occur. To accomplish these goals, the CAP LTER scientists are conducting bird censuses in four key habitats in the CAP LTER study area. The scientists are sampling bird diversity using the point count method. This is the same method Ecology Explorers recommends for schoolyards and backyards. Locations for 40 of the CAP LTER point count sites were randomly selected from 200 sites that CAP LTER had previously studied. An additional 10 riparian habitat sites were chosen for their ecological importance and accessibility. Counting birds allows CAP LTER scientists to directly relate bird densities to other environmental variables being monitored. The point count surveys are conducted 4 times a year (January, April, July and October) to document the abundance and distribution of birds in 4 habitats in 51 sites: urban (18), desert (15), riparian (11), and agricultural (7). During each session each point is visited by 3 birders who count all birds seen or heard for 15 minutes. Our goal is to study how different land-use forms affect bird abundance, distribution and diversity in the greater Phoenix area. From this information we may be able to predict and preserve high bird species diversity as urban development is proceeding. Satellite images, high aerial photography, and vegetative ground surveys will also be used to study the effects of landscape structure on avian populations. In addition, research will be coordinated with that of the land-use change team to analyze how zoning ordinances and city regulations in and around the point counts influence bird abundance and richness.

The CAP LTER scientists are particularly interested in learning the abundance of the seven common birds: House Finches, Starlings, House Sparrows, Mourning Doves, Inca Doves, Rock Doves (pigeons) and Great-tailed Grackles. One hypothesis that they are investigating is whether the number of these birds in an area is a useful indicator of species diversity. For example they might find that an area with large numbers of these 7 bird species will have fewer native bird species. Of these seven common species, House Sparrows, Starlings and Rock Doves (pigeons) were brought to this country from Europe, the other species are native to America.



## Comments on the Protocol:

The Ecology Explorers Bird Survey protocol uses the point count method because it is more appropriate for smaller areas such as schoolyards and backyards. Bird surveys done in schoolyards reflects the desire of the LTER Project to sample many urban habitats. Schools are located throughout differently landscaped neighborhoods in the Phoenix metropolitan area and consequently each school may find different bird communities in their location.

If one of the areas you select to do a point count is a large grassy area, then you should randomly select the point count site within that area. The easiest way to do this is to face away from the grassy area and then toss a coin/rock over your back. The center of the point count will be where the coin/rock landed in the grassy area.

## Grade Level:

Identifying birds may be most appropriate for grades 4 and up. Younger children might find it too difficult to count and identify small moving objects. All students should practice identifying birds before doing bird counts. Learning to identify silhouettes, size, beak shape and habits are key characteristics for identifying birds.



## web page content

### Birds

#### What birds are flying around your neighborhood?

The Sonoran Desert has one of the most diverse native plant and animal species of any desert in the world. Many birds are uniquely adapted to living here and they are part of food webs that include animals and plants that also are adapted to desert living.

Phoenix is an ever-expanding urban area located in the Sonoran Desert. CAP LTER scientists are studying the impact of this urbanization on bird communities.

#### Questions CAP LTER scientists are asking about our urban birds:

- Which birds are living in the Phoenix metropolitan area?
- Which landscape designs attract which types of birds?
- Are there different kinds of birds in different urban landscapes (residential, commercial, parks)?

To answer these questions ecologists are conducting surveys of bird populations throughout the Phoenix metropolitan area. Your school can be part of this process by conducting your own bird surveys within your schoolyard and sending that information to CAP LTER scientists at ASU.



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### Bird Study

#### What birds are flying around your school yard?

#### Why study birds?

- Birds play important roles in many ecosystems.
- Birds are relatively easy to identify.
- The disappearance and/or appearance of certain species may reflect major habitat changes.
- Some birds are considered pests, others beneficial and each may be attracted to different habitats.

#### Which birds should we study?

Bird researchers have found over 50 bird species in the Phoenix metropolitan area. The most numerous of these bird species are the: House Finch, Starling, House Sparrow, Mourning Dove, Inca Dove, Pigeon (Rock Dove) and Great-tailed Grackle. (see identification key)

After you become familiar with these 7 bird species and any other birds that are common in your area, you can begin making scientific observations.

#### What do they tell us about our urban ecosystem?

Data from the bird surveys, as well as experiments you design, will help CAP LTER scientists identify which urban areas attracts what types of birds. This information may help people living in Phoenix design landscapes that attract a wider variety of bird species. CAP LTER scientists will be able to analyze how city zoning ordinances and regulations might influence bird abundance and diversity.

CAP LTER scientists will also be able to create a data base of the number and kinds birds in the Phoenix area. They can use this data to document changes over time and space and to investigate why these changes occur.

#### What Materials Will You Need?

- Meter Sticks
- String
- Location Markers
- Timer
- Binoculars (useful, but not necessary)
- Data Sheets
- Pencil



## web page content

### Bird Survey Protocol

Ecologists use Point Counts as one method for surveying birds. In a Point Count, one person counts all the birds located within a circle with the radius of 20 meters for 10 minutes. Follow these steps before can actually do a Point Count survey:

1. Decide on a location or several locations in your schoolyard to conduct the survey. Assign a number to each location. Position the sampling points in different areas, such as in the middle of a lawn, near trees and bushes, near asphalt, near the edge of the property, etc.
2. Mark out a circle with a 20-meter radius at each of the points you intend to survey. Make sure there are no large obstructions within the circle. For example, if a block wall were near the center of the circle you might not be able to see over it to count birds on the other side. You could position the circle so the block wall was near the perimeter of the circle. If you just don't have enough space for a 20-meter radius circle, then you need to note the size of the study area on the data sheet.
3. Complete a habitat description for each of your point count locations. Record your findings on the habitat description datasheet. You will need to do this before entering data into the CAP LTER database. **YOU ONLY NEED TO DO THIS ONCE PER POINT COUNT SITE.**
4. Become familiar with the most common bird species (see the identification key).
5. Decide on a time of day to do the survey and always do it at the same time of day. The best time of day is in the early morning (before 9:30 am), but if several classes are doing it throughout the day they can see how time of day affects the census.
6. Census the point twice per week for at least 4 consecutive weeks.
7. Have only **1** person count the birds in a point count (nobody else should help locate birds). This person will count all the birds within the survey area for **10** minutes.  
Other students can help by keeping time and recording the counts on the data sheet.
8. Use the data sheet to record the number of individuals from each species that you have seen. Count each bird only once.



## Describing Habitat Structure: Estimating Land Cover in Your Point Count Circle

The following technique can be used to estimate the coverage in your 20m radius circular study area:

1. Take two pieces of string and divide the plot into 4 equal sections, so the strings cross in the middle.
2. Mark the string every four meters. Start marking the first string at meter zero, and the second string at meter 1.
3. At each point place a meter stick. In the first column of the data table, record the type of cover beneath your feet and less than 0.15m. Also, in the appropriate column, record the vegetation that is between 0.15m to 1.5m tall and/or that which is taller than 1.5m. Only write down the type of land cover that is at that point and touching your meter stick. The land cover type can be “building” or “cement” as well as plants.
4. For each type of ground cover, add the number of times it was recorded, divide by the total number of points and multiply by 100. For example if you recorded “shrubs” at 5 of the points and there were 20 points, then shrubs would be 25% of the land cover ( $5/20 \times 100$ ).

# Teacher's Guide



## Data Table for Describing Land Cover in your Point Count Circle

Point	0 - 0.15 m				0.15m – 1.5m	>1.5m
	Lawn	Gravel	Pavement or Building	Other Vegetation	Shrubs	Tree Canopy
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						

### TOTALS:

Lawn  $\frac{\quad}{20} \times 100 = \quad\%$

Other Vegetation  $\frac{\quad}{20} \times 100 = \quad\%$

Gravel/Soil  $\frac{\quad}{20} \times 100 = \quad\%$

Pavement/Building  $\frac{\quad}{20} \times 100 = \quad\%$

Shrubs  $\frac{\quad}{20} \times 100 = \quad\%$

Tree Canopy  $\frac{\quad}{20} \times 100 = \quad\%$



## Site and Habitat Description

### Protocol: Birds

Provide a site and habitat description of your point count location. For example, if you are collecting data at seven locations on your campus, you will enter seven different sites. The description includes the amount and type of vegetation (or non-vegetation) at different heights in your point count circle.

#### SITE DESCRIPTION

Teacher: \_\_\_\_\_ Class: \_\_\_\_\_

School: \_\_\_\_\_

Street Address: \_\_\_\_\_

City: \_\_\_\_\_ Zip code: \_\_\_\_\_

Site Name: \_\_\_\_\_

Create a name to identify the point count for which you are collecting data. (e.g. Playground South Corner)

Site ID: \_\_\_\_\_

Create a 3 – 5 letter and/or number code to identify this site. (e.g. Playground South Corner – PGSC)

**Site Location** Write a brief description of where your site is located. (i.e. SW Corner of playground): \_\_\_\_\_

**Description** Write a description of your site so that a visitor to your school would be able to find your point count location: \_\_\_\_\_

#### HABITAT DESCRIPTION

Recording Date: \_\_\_\_\_ Percent Observed: \_\_\_\_\_

Radius (m): \_\_\_\_\_

Vegetation >1.5 m	_____ % Tree Canopy
Vegetation 0.15m—1.5 m	_____ % Shrub
Vegetation and non-Vegetation <1.5m (should be equal to 100%)	_____ % Gravel or soil
	_____ % Lawn
	_____ % Paved or Building
	_____ % Other Vegetation





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### Key to the Common Bird Species

*House Finch*: A small finch (13 cm), male has a red breast during the breeding season, females and males have a streaked breast (one difference between house finches and house sparrows: only finches have a streaked breast).

Food: seeds

*House Sparrow*: A small bird (15 cm), male has a black throat and white cheeks, females and young are have a dingy breast, rusty wings, and dull eyestripe.

Food: feeds on anything, especially seeds and handouts.

*Great-tailed Grackle*: A larger bird (46 cm), males have a purple (almost black), glossy color and have a large tail; females are much smaller (35 cm) and are brown with a pale breast (also have a long tail).

Food: feeds on anything, especially on insects and handouts found on the ground.

*Starling*: A chunky blackbird (20 cm) that has a shorter tail and longer bill than other blackbirds of the same size. Feathers become speckled during the fall and winter (one difference between starlings and great-tailed grackles: starlings have much shorter tails).

Food: primarily insects found in lawns, some fruits and seeds.

*Mourning Dove*: A relatively large dove (30 cm), a pointed tail with white along the edges (one difference between mourning doves and white-winged doves: mourning doves do not have large white patches on the wing).

Food: seeds, grains, buds and other vegetation on the ground.

*Inca Dove*: Relatively small dove (19 cm), feathers have a scaly look and the primary feathers are reddish brown (much smaller than the Mourning Dove).

Food: seeds, grains, buds and other vegetation on the ground.

*Pigeon (Rock Dove)*: A large (30 cm) gray bird with a white patch on the rump.

Food: seeds, grains, buds, other vegetation on the ground, and handouts.



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### Other Species Likely to be Sighted

Pictures are included for the most common, for other description/pictures of these birds use one of the field guides to western birds (such as Peterson's Field Guide)

#### A. Perching birds (that fly from one perch to another)

1. Birds that catch flying bugs and have relatively wide bills: *Cedar Waxwing, Phainopepla, Western Kingbird, Ash-throated Flycatcher, Brown-crested Flycatcher, Loggerhead Shrike*
2. Birds that have curved bills: *Curve-billed Thrasher, Cactus Wren*
3. Jay-size or larger birds with straight bills: *Common Raven, Northern Mockingbird*
4. Blackbird-size birds with straight bills: *Brown-headed Cowbird, Bronzed Cowbird, Bullock's Oriole, American Robin*
5. Warbler-size birds with straight bills: *Yellow Warbler, Yellow-rumped Warbler, Lucy's Warbler, Black-tailed Gnatcatcher, Verdin*
6. Cardinal-size cone-shaped bills: *Pyrrhuloxia, Cardinal, Abert's Towhee*
7. Sparrow-size cone-shaped bills: *American Goldfinch, White-crowned Sparrow, Black-throated Sparrow*

#### B. Tree-climbers

*Northern Flicker, Gila Woodpecker, Ladder-backed Woodpecker*

#### C. Birds that primarily obtain food while flying

*Barn Swallow, Chimney Swift, Black-chinned Hummingbird, Anna's Hummingbird, Costa's Hummingbird*

#### D. Birds that forage primarily by walking on the ground

*Greater Roadrunner, Gambel's Quail, White-winged Dove, Killdeer*

#### E. Day-time Birds of Prey

*Red-tailed Hawk, Turkey Vulture, Harris Hawk, American Kestrel*

#### F. Waterbirds

*Mallard, Canada Goose, Black-crowned Night Heron, Great Blue Heron*

#### G. Nocturnal predators

*Great-Horned Owl, Burrowing Owl, Barn Owl*