

Feed the Birds

CAP LTER Data Explorations



Author: Ecology Explorers Team, adapted from work by Lermann and Warren

Time: 15-30 minutes

Grade Level: 9-12

Background:

The Phoenix urban core is composed of several contiguous cities and is situated within the Sonoran Desert. This area is being studied by scientists as part of the long-term ecological research network (LTER) funded by the National Science Foundation. Our project, the Central Arizona-Phoenix LTER (CAP LTER) is focusing on researching the effects of urbanization on the surrounding desert ecosystem and vice versa. The Phoenix area is growing rapidly with a population of 300,000 people in 1950 and 3 million+ in 2005. The area receives annual precipitation of 180 mm (6 inches) and can experience summer temperatures as high as 48 C (115 F). The rain comes twice a year (winter & summer), which contributes to the high species diversity of the Sonoran Desert as compared to the North American deserts. Urbanization of this area has led to decreased agricultural development (formerly focused to the west, south, and southeast of the urban core) and increased water control via dams, reservoirs, and canals.

Mesic (watered) yards and xeric (usually drip irrigated) yards provide very different bird habitats in terms of food supply and shelter. Adding bird feeders (seed or nectar) can also change the number and type of birds that visit a backyard, how often they visit, and how long they stay. CAP LTER scientists are trying to figure out why urban environments support higher bird densities but lower bird diversity.

Objective:

Students will analyze bird feeding patterns.

Standards:

Science

Advanced Preparation:

Students should have been introduced to basic information about population and community ecology. Students should have an understanding of different land-use types in the Phoenix area.

Materials:

Student Worksheets

Evaluation:

Observation during the activity and participation in discussion.

Student responses to reflection questions.

Extensions:

Have student conduct their own bird investigation projects at <http://ecoplexity.org> or <http://ecologyexplorers.asu.edu/our-ecosystem/birds-protocols/>

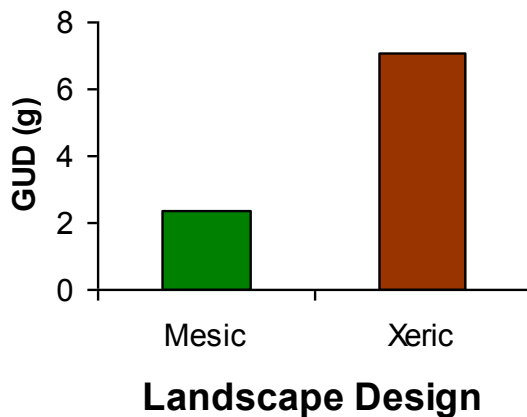
Student Worksheet

Feeding Birds



The following graphs relate to a study conducted in differently landscaped backyards in Phoenix. In this experiment the scientist set out trays with 20 grams of seed mixed into 6 pounds of sand. When a bird first arrives at the tray, seed is easy to find since the ratio of seed to sand is relatively high. It does not take much time to find seeds. However, as the bird eats more and more seed, it becomes increasingly difficult to find seed since the seed to sand ratio is now lower. Eventually, it will take too much time to find seed buried in the sand and the bird will decide to leave the tray and find a different place to forage. This is called the “quitting time” and the scientist measures the amount of seed that remains in the trays. This number is called Giving Up Density or GUD. So the lower the GUD, the more seeds were eaten which means that the birds stayed on the tray for a longer time period.

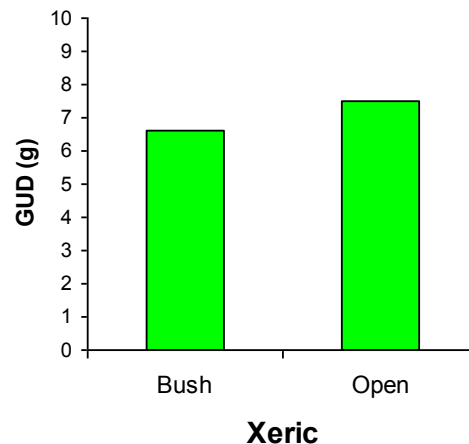
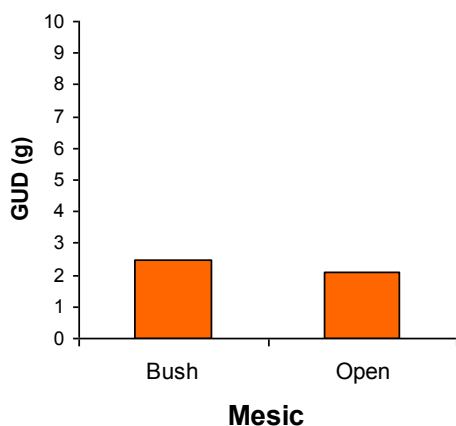
Graph 1. Average GUD per land use type for all birds observed



The backyards were either mesic or xeric. Mesic yards typically have a lot of grass and vegetation that requires a lot of water, xeric yards typically have drought-tolerant plants and are drip-irrigated.

By placing the trays either close to bushes (safe from predators) or out in the open (at risk of predation) and measuring the GUD, we can see if the birds quit feeding at one of these food sources earlier than the other. See Graphs 2 & 3

Graphs 2 & 3 Average GUD for microhabitats within each habitat type



Student Worksheet

Feeding Birds



1. Based on what you now know about GUD and using Graph 1, which habitat are the birds willing to take greater risks in for the food, mesic or xeric? Explain.

2. The hypothesis that CAP LTER scientists tested in Graphs 2 & 3 was: 'Denser vegetation reduces a birds exposure to predators (or perceived exposure) resulting in changes in the birds foraging (food collection) behavior'. Looking at the graphs 2 & 3 how does the type of microhabitat (bush vs. open) affect the seed-eating birds?