Habitat characteristics & nest success of the Western burrowing owl (*Athene cunicularia*) in Lake Havasu City, AZ

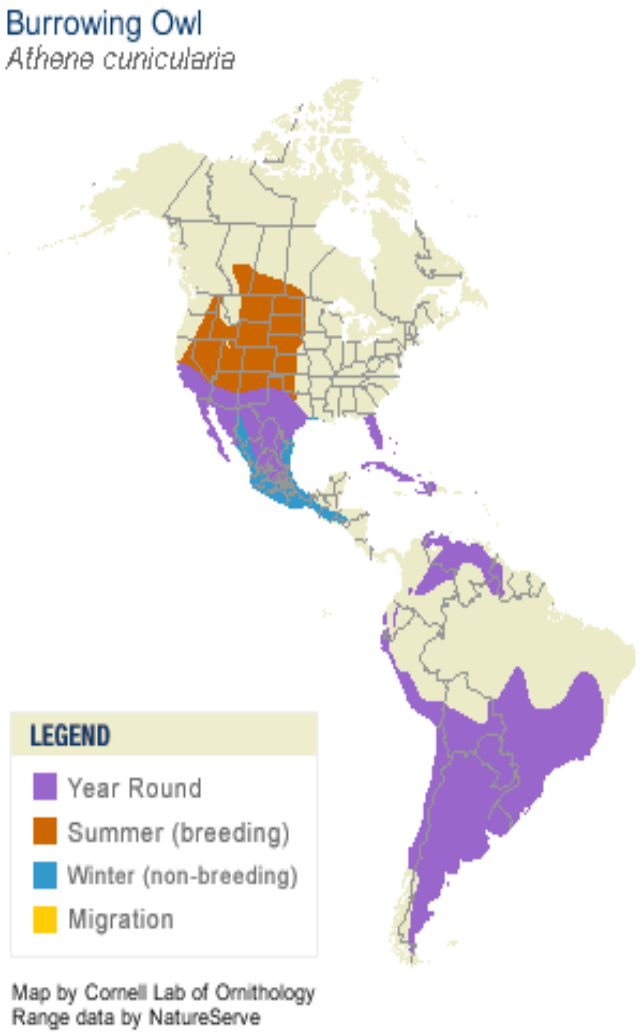
Kerrie Anne T. Loyd, PhD
ASU Lake Havasu City
Havasu.asu.edu

Burrowing owl natural history

The only owl to live underground

Primary prey: small mammals and arthropods

Active both day and night



Species of conservation concern

- Declining across western North America due to loss of natural habitat
  - programs to decrease prairie dogs and other burrowing rodents
- Shift to more developed landscapes- agricultural areas, managed landscapes like golf courses
- Population trends decreasing over range
- Only 1 brood per year with 3-5 surviving fledglings

Typical habitat

Grassroots travel.com

Birderfrommaricopa.com

Habitat in LHC

Research goals

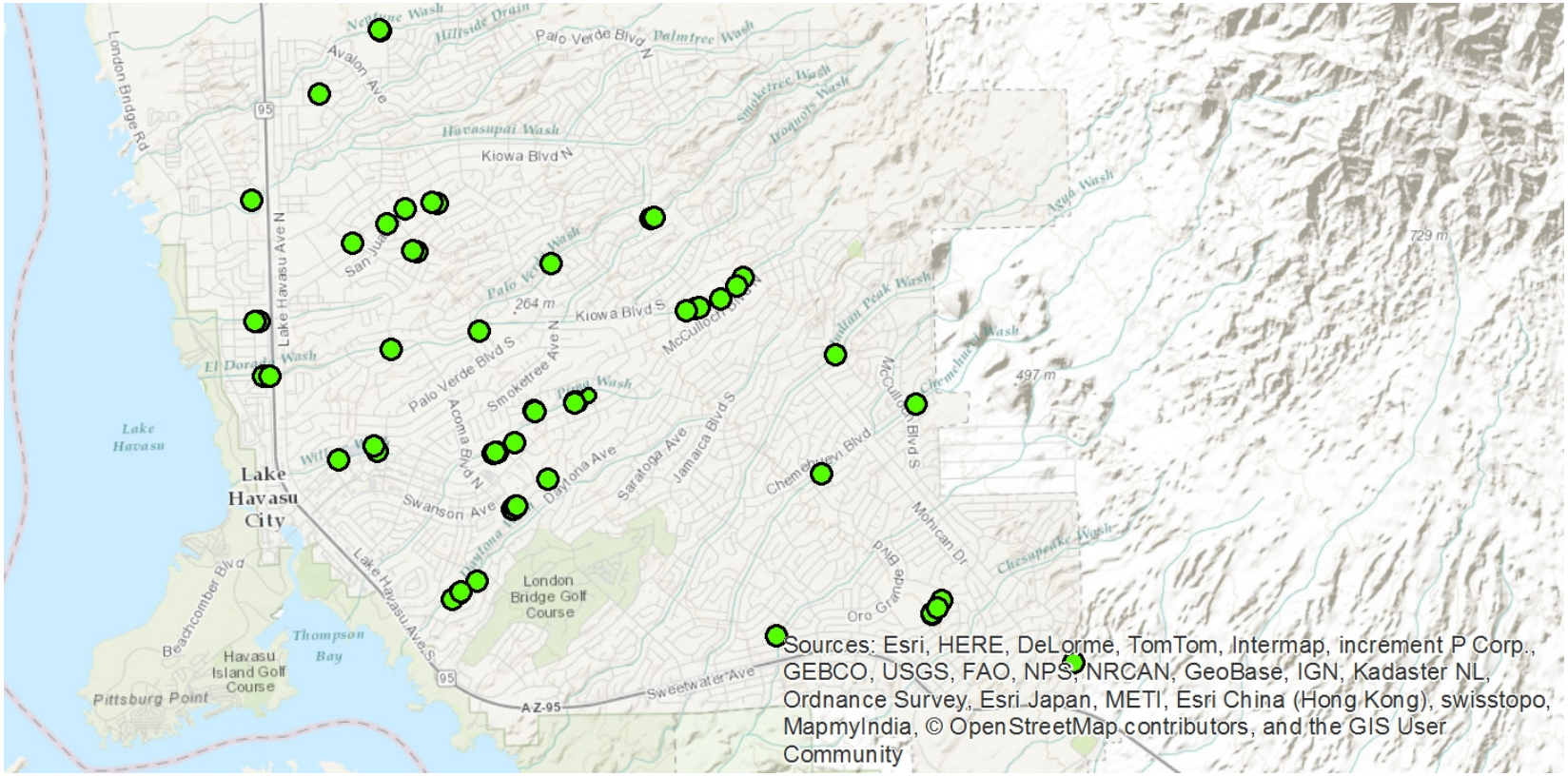
- Characterize habitat
  - Burrow height, diameter, % cover, # satellite burrows
- Examine population trends
- Identify predictors of nest success
  - Urban living:

Advantages	Disadvantages
Available burrows More vegetation Food resources	Predator density Development Washes flood Consume contaminated prey

Research methods

- Passive searches for signs of activity
- Burrow and site characteristics
- Prey availability: small mammal and arthropod surveys, pellet dissections
- Presence of predators: remote cameras
- Monitored 45 mated pairs spr. 2014-2015
- Predictors of nest success: Poisson regression, AICc model selection

Mated pairs monitored 2014-2015



Results: habitat characteristics

- Burrow height from wash floor (indicator of susceptibility to flooding) (mean=167 cm, range 5-500 cm)
- Burrow diameter (mean= 41.7 cm, range 14-90 cm)
- Percent plant cover within 5m of burrow entrance (mean= 16.9, range 0-50%)
- Vegetation most commonly observed included creosote bush (*Larrea tridentata*), and palo verde (*Cercidium microphyllum*)

Results: prey availability and predators

- Pocket mice (*Chaetodipus penicillatus*) and beetles are owls' preferred prey and are abundant in our suburban habitat
- 75% of burrow sites hosted predators (coyotes and/or free-roaming dogs)

Results: nest success

- 44% (13/25) of mated pairs produced 1 or more fledglings in 2014, 75% (15/20) in 2015
- Mean # fledglings = 3.5, range= 1-7
- 9 of 45 burrows were abandoned for unknown reasons and 16 of 45 experienced a mortality of one or more adults and chicks
  - ***22 individual adult owls were found dead within 2m of their burrow between Aug 2013 and July 2015 due to suspected secondary poisoning***

Statistical results

Coefficients:						
	Estimate	SE	z value	P	Lower CI	Upper CI
(Intercept)	1.1027	1.5256	0.723	0.4698		
elevation	-0.0009	0.0019	-0.466	0.6413	-0.0039	0.0022
diameter	-0.0001	0.0044	-0.029	0.9772	-0.0074	0.0071
height	-0.0012	0.0019	-0.651	0.5151	-0.0044	0.0019
plant_cover	0.0069	0.0156	0.441	0.6589	-0.0187	0.0324
slope	-0.0045	0.0177	-0.257	0.7972	-0.0336	0.0245
satellite	-0.0125	0.0823	-0.152	0.8789	-0.1479	0.1229
prey	0.0296	0.0959	0.308	0.7578	-0.1282	0.1874
as.factor(predators)1	0.2631	0.7373	0.357	0.7212	-0.9498	1.4759
mortality	-0.6762	0.4027	-1.679	0.0931	-1.3387	-0.0138

Global model GOF: p=0.000

- *Burrows experiencing a mortality were less likely to produce fledglings*
- No significant differences were found when comparing plant cover, prey availability, number of satellite burrows or height from wash floor at successful vs. failed nest sites (Mann-Whitney tests) however successful nests had larger average diameters.

Rodenticides

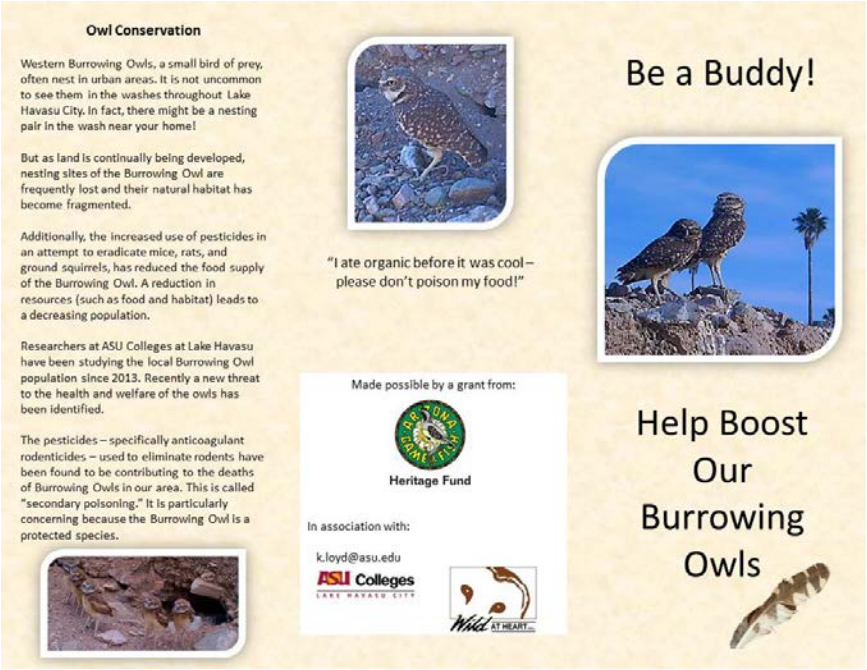
- Livers from 4 fresh carcasses were tested by AZGFD confirmed to be contaminated with brodifacoum
- (Justice-Allen & Loyd, in review J Wildlife Diseases)

Additional observations: ornamentation

– Domestic dog feces, office paper and newspaper, corncob, balloons, styrofoam, brillo pad, exam gloves, carcasses

Is scattering dog waste maladaptive?

Grant to support creation of public education materials- interpretive signs and brochures



Owl Conservation

Western Burrowing Owls, a small bird of prey, often nest in urban areas. It is not uncommon to see them in the washes throughout Lake Havasu City. In fact, there might be a nesting pair in the wash near your home!

But as land is continually being developed, nesting sites of the Burrowing Owl are frequently lost and their natural habitat has become fragmented.

Additionally, the increased use of pesticides in an attempt to eradicate mice, rats, and ground squirrels, has reduced the food supply of the Burrowing Owl. A reduction in resources (such as food and habitat) leads to a decreasing population.

Researchers at ASU Colleges at Lake Havasu have been studying the local Burrowing Owl population since 2013. Recently a new threat to the health and welfare of the owls has been identified.

The pesticides – specifically anticoagulant rodenticides – used to eliminate rodents have been found to be contributing to the deaths of Burrowing Owls in our area. This is called "secondary poisoning." It is particularly concerning because the Burrowing Owl is a protected species.

"I ate organic before it was cool – please don't poison my food!"

Made possible by a grant from:

Heritage Fund

In association with:

k.loyd@asu.edu

ASU Colleges

Be a Buddy!

Help Boost Our Burrowing Owls

Encourage Birds of Prey – Natural Pest Control!

What You Can Do

Through community awareness we hope to reduce wildlife mortalities due to secondary poisoning caused by consuming poisoned prey.

The most effective way is to not use rat poison for controlling pests because of these unintended victims.

There are several nontoxic ways you can deal with rodents on your property.

- **Eliminate Food Sources & Attractants**
  Remove what the rodents are eating or make it inaccessible. Change how and where you are feeding birds or pets so they can still eat, but the rodents don't have access.
- **Remove Shelter**
  Get rid of anything that the rodents are living in, under, or behind. Put anything you are storing long-term into a container that rodents cannot get into, like plastic bins. Seal up cracks and gaps around doors, windows, and pipes to prevent entry to your home.
- **Encourage Natural Predators**
  Attract owls to your property by allowing them to perch. Install an artificial burrow if there are no natural burrows nearby - this has been effective in the Phoenix area. Contact Wild at Heart for information on how to construct artificial burrows.

Did you know?

A Burrowing Owl family can eat up to 1,800 rodents and 7,000 arthropods, which include scorpions and beetles, in a single summer.

WHO IS BEING POISONED?

Intended Target: Rodents

Rodents pose a health hazard for humans and destroy property, so it is understandable that you would want to make sure they don't invade your home.

The most common tool used against these pests are rat baits/poisons (rodenticides) which contain compounds called anticoagulants.

How Anticoagulant Rodenticides Kill

These chemicals work by preventing the blood from clotting. This results in uncontrolled bleeding, eventually leading to death.

In addition to internal bleeding, there may be visible blood on the animal. Other symptoms include lethargy and altered behavior, putting them at increased risk of being preyed upon.

Unintended Victims

Owls, cats, dogs, and other predators will consume poisoned rodents and also suffer the ill effects of the rodenticide.

Researchers believe an estimated 20% of the Lake Havasu Burrowing Owl population have been victims of secondary poisoning. Other confirmed victims include members of the local Kestrel population.

As of October, 2015

Other ways you can be an owl-friendly neighbor:

- Don't disturb or harass burrows when you're out enjoying nature
- Don't dump dirt or construction materials over the sides of washes
- Keep pets on a leash so they don't disturb burrows
- Say something if you see someone else disturbing a burrow

Acknowledgements: ASU Lake Havasu & AZGFD Heritage Grant program for funding
Student assistants: Roodie Ford, Joe Osinski, Morgan Beckwith, Savannah Bailey, Garret Hansen, Brian Hazel

Questions?

ASU Colleges
LAKE HAVASU CITY

Heritage Fund

k.loyd@asu.edu
928-854-9718

ASU