

Natural pest control: Barn Owls and diurnal raptors

Ground Squirrel & Gopher Management Workshop
Ryan Bourbour & Emily Phillips
September 11, 2018



UC DAVIS
UNIVERSITY OF CALIFORNIA



SACRAMENTO
STATE





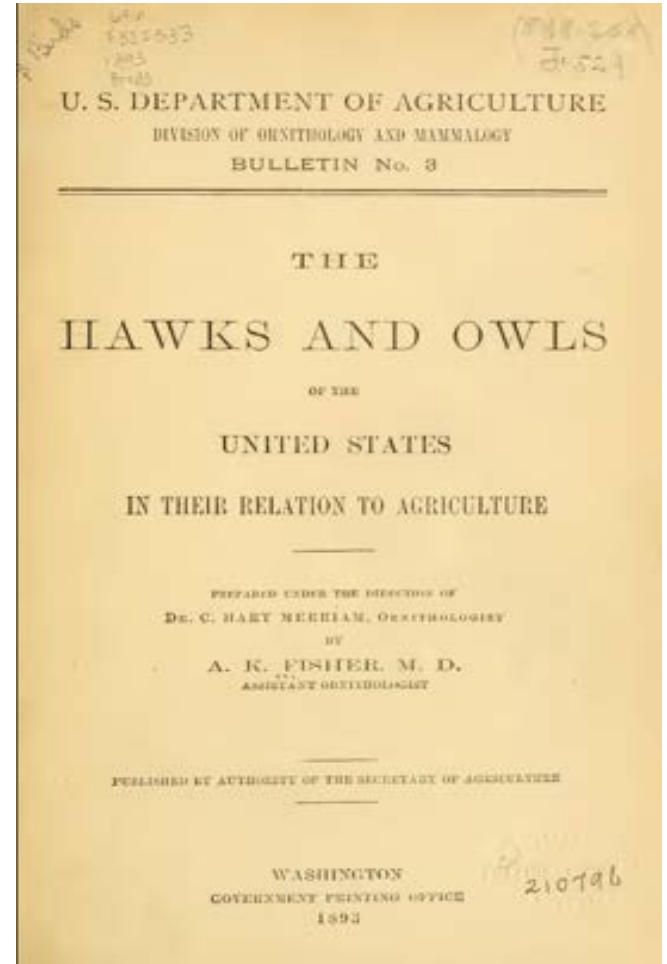
Information to share with you today

1. Barn Owls and natural pest control
 - a) Practical uses
 - b) Limitations
 - c) Artificial Barn Owl nest box information

2. Diurnal raptors and natural pest control
 - a) Practical uses
 - b) Limitations
 - c) Attracting raptors with perches

Use of Barn Owls in the 1800s

“All testimony goes to show that the Barn Owl is one of the most beneficial of rapacious birds”



Why are Barn Owls useful for natural pest control?

Widespread in temperate regions of the world

Easy to attract with boxes & can live in high densities

High reproductive rates

Each owl **eats thousands of rodents** per year

Diet of **gophers, voles, mice, & rats** -- rodents that humans consider pests!



Rodent pests are Barn Owl food!

A nesting pair and their young
consume estimated 220 lbs of prey
each year!

In CA vineyards, on **average 843**
pocket gophers, 578 voles, and
1,540 mice per nest

Reduce the number of pocket gopher
burrows

(Kross & Baldwin 2016; Browning et al. 2016)





Habitats appropriate for Barn Owls boxes

Agriculture - Owls diet was 99.5% ag pest rodents, in perennial (orchards and vineyards) gophers were consumed in higher proportions

Urban - More rats consumed in urban habitats

Grasslands and other open habitats – parks and open spaces

(Kross, Bourbour, & Martinico 2016; Hindmarch & Elliot 2015)



Limitations of Barn Owls as natural pest control

Unclear whether Barn Owls **significantly reduce** rodent populations

Reduction of **rodent damage** is unpredictable in a given area

Barn Owls may only be a single **component of an IPM**



Rodenticides & Barn Owls

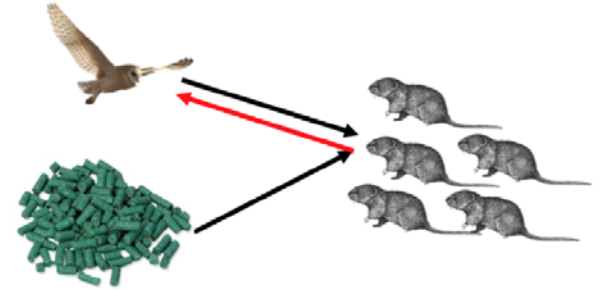
Use of rodenticides can reduce the natural pest control services owls provide

65% of owls tested positive for anticoagulant rodenticides (75 necropsies from 2013-2017; S. McMillin of CDFW, pers. comm)



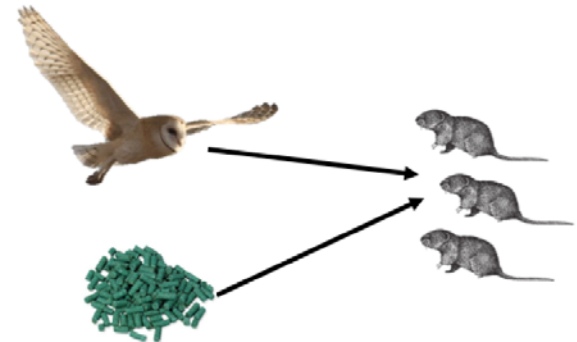
Without planned IPM, secondary poisoning reduces pest control services from owls through lethal and sub-lethal exposure- resulting in more reliance on ARs

Current scenario



Barn owls and rodenticides have an additive effect on rodent pests through planned IPM

Project Goal



Installing artificial nest boxes attracts Barn Owls

Best choice:

Wood, partition, grooves but no perch on front, sawdust applied as a base layer

Artificial nest box instructions and guidelines are available at Santa Clara Valley Audubon: http://www.scvas.org/page.php?page_id=6565



2nd best:

Premade plastic boxes with sawdust



www.barnowlbox.com

Artificial nest box placement

Box openings should be **north or east facing** ***For the owls' safety, do not have opening facing west or south. The heat of the day can be detrimental to owls.

Heights from **8 to 15 feet** off the ground Consider ability to access safely for cleaning

Stand-alone pole is best Higher potential for rodent infestation and Great-horned owl depredation in trees

Appropriate habitat, away from roads and from houses--
loud nestlings!

Need to be **cleaned once per year** to avoid build up of excrement and pellets Use dust masks to avoid pathogens

(Wendt & Johnson 2017)



Diurnal raptors consume rodent pests, too!

Species that hunt pest rodents Red-tailed hawks, American kestrels, Golden eagles, Prairie falcon, White-tailed kite (Raptor species depends on your location)



Attract raptors with artificial perches



Height and placement of perches

(Wong and Kross 2018)

15 feet is preferred raptors prefer high perches, but not too high

Hill tops or flat land gives raptors more area to view for hunting

Avoid hill bottoms that do not give raptors a good view of the landscape



Limitations of diurnal raptors as natural pest control

Many raptors are migratory Density of raptors in your area may change with the seasons

Human activity Perches near constant human activity may not attract raptors as successfully – should consider more natural areas



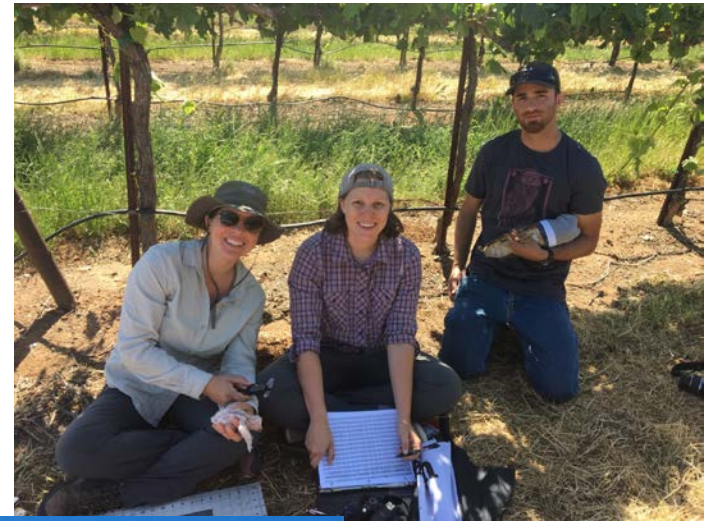
Raptors can be a successful
part of an IPM plan!



Our ongoing Barn Owl research:

Objectives:

- Understand how pest control services provided by Barn Owls can be maximized.
- Develop recommendations for a more harmonious IPM framework between natural pest control and rodenticide application.



Summary: Attracting raptors for natural pest control

Install artificial Barn Owl nest boxes in open habitats to attract Barn Owls

Nest box plans can be found at Santa Clara Valley Audubon Society: http://www.scvas.org/page.php?page_id=6565

It is estimated that a pair of nesting barn owls and their progeny will consume 220lbs of prey in one year (Kross & Baldwin 2016). An 'average' barn owl nest in a CA vineyard will consume 843 pocket gophers, 578 voles, and 1,540 other prey items (most of which are mice). One field study in California demonstrated that barn owls reduced the number of pocket gopher burrows (Browning et al. 2016).



Wooden nest boxes, boxes near natural grasslands, and boxes that were at least 3m tall were more likely to be occupied in Napa valley vineyards (Wendt & Johnson 2017). Occupancy appears to be higher in Yolo county and boxes as low as 8ft off the ground are regularly occupied. Box openings should face North or East to reduce sun exposure.

Barn Owls nest as early as January in CA, so nest box maintenance should occur before the new year. Avoid disturbing owls that are potentially incubating eggs as they may abandon their nest.

Preserve trees or install artificial perches to encourage hunting raptors

Many birds of prey rely on perches for hunting and resting. Trees provide natural perches and cover, and should be preserved where possible. Artificial perches can be installed in areas where there are no trees (such as in agricultural fields!)



Install perches that are 15-feet tall, that have a wooden crossbeam with rounded edges for a perch, and in locations with a good view (along hilltops, on flat ground). Avoid installing perches amongst trees or at the bottom of a hill.

Resources:

Artificial nest boxes for Barn Owls:

Nest box plans can be found at Santa Clara Valley Audubon Society: http://www.scvas.org/page.php?page_id=6565

Nest boxes can be purchased: <http://www.barnowlbox.com>

Ask your local scouts if they need a project!

Our Barn Owl research

Helping Barn Owls Help Farmers: <http://westernipm.org/index.cfm/ipm-in-the-west/agriculture/helping-barn-owls-help-farmers/>

Big, Beautiful Biocontrol: <https://www.youtube.com/watch?v=bM0VfvZ2Ak&feature=youtu.be>

UC Davis Hull Lab Website: <http://hulllabucd.wixsite.com/hulllab>

If you find a sick or injured raptor:

Wildlife Center of Silicon Valley <https://wcsv.org/>

Wildlife hotline: (408) 929-9453

About us



Ryan Bourbour
rpbourbour[at]ucdavis.edu



Emily Phillips
emphillips[at]ucdavis.edu



UCD Barn Owl Project



**@barn_owlproject
#WildAg**



**@barnowlproject
#WildAg**

Thanks for listening!



Questions?