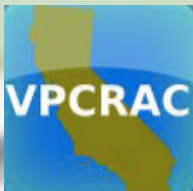


Feathered friends: Barn Owls and other raptors as natural pest control agents

Ground Squirrel & Gopher Management Workshop
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December 6, 2018





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UCD Barn Owl Project



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About Us



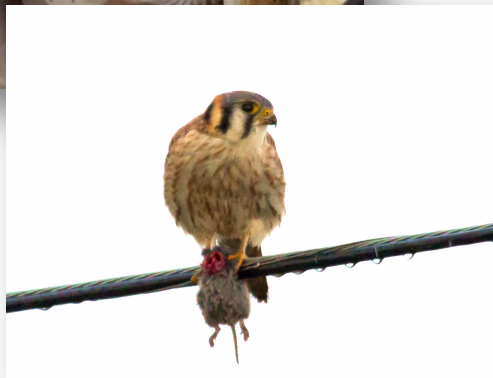
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Information to share with you:

1. Raptors and natural pest control

a. Barn Owls

- i. Practical uses
- ii. Limitations
- iii. Attracting Barn Owls to the landscape

b. Other raptors

- i. Practical uses
- ii. Limitations
- iii. Attracting other raptors to the landscape

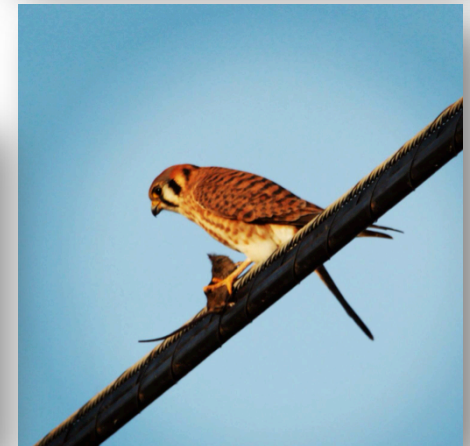
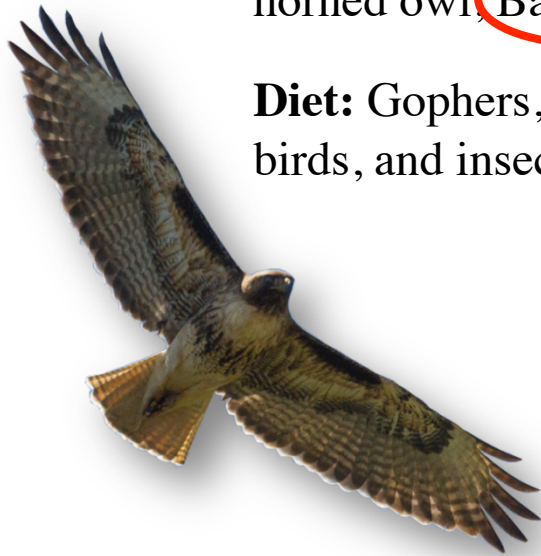
2. Resources

3. Current research

Raptors provide valuable natural pest control by consuming pests

Species: Red-tailed hawk, American kestrel, Western Screech-owl, Golden eagle, Northern harrier, Peregrine falcon, Prairie falcon, Merlin, White-tailed kite, Great-horned owl, **Barn owl** (Raptor species will depend on location)

Diet: Gophers, ground squirrels, mice, voles, rabbits, birds, and insects.

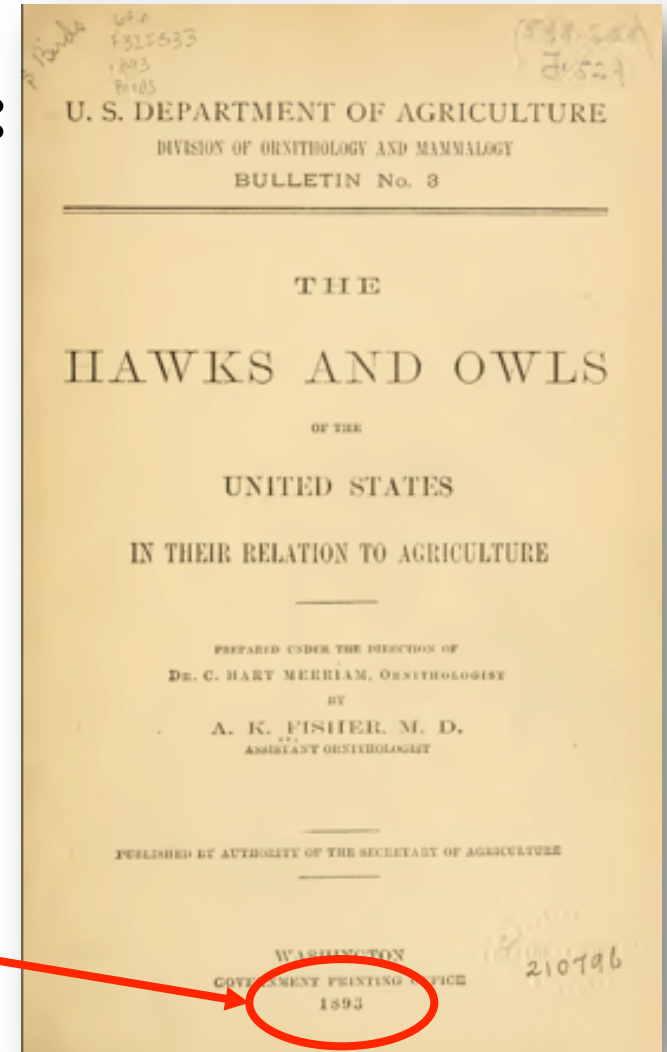


USDA on Barn Owls in the 1800s:

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

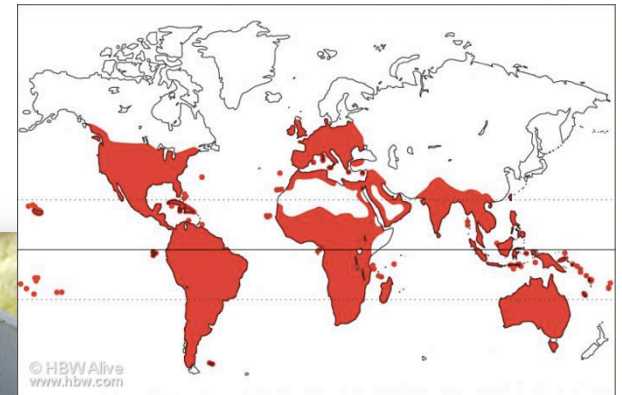


1893!



Why are Barn Owls great for natural pest control?

- **Worldwide** except at high latitudes
- Attracted to artificial **nest boxes**
- **High reproductive rates**
- Can live in **high densities**
- 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!** (Kross & Baldwin 2016)

In CA vineyards, on average **843 pocket gophers, 578 voles, and 1,540 mice** are consumed per nest. (Kross & Baldwin 2016)

Vineyards with Barn Owl nest boxes had **fewer pocket gopher burrows.** (Browning et al. 2016)





Habitats that Barn Owls use

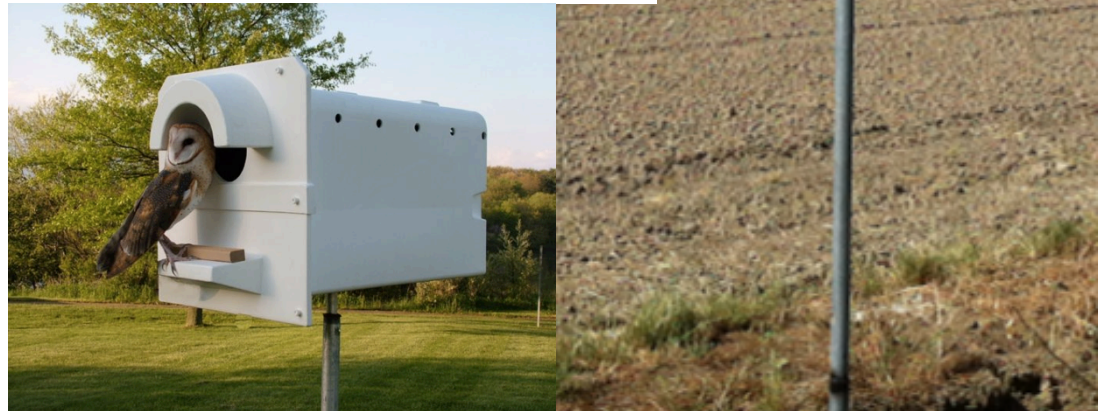
- **Available nesting and roosting habitat in proximity to preferred hunting habitat is key.**
- **Agriculture** - Owls diets were 99.5% ag pest rodents, in perennial (orchards and vineyards) gophers were consumed in higher proportions. (Kross, Bourbour & Martinico 2016)
- **Urban** - More rats consumed. (Hindmarch & Elliot 2015)
- **Grasslands and other open habitats.** Riparian or heavily forested areas are less suitable.
- Hunting in adjacent habitats can still be beneficial.

Artificial nest boxes can attract Barn Owls

Best choice: Wood, partition, grooves but no perch on front, appropriately sized opening, sawdust applied as a base layer, easy access for cleaning

Instructions are available at Santa Clara Valley Audubon:
http://www.scvas.org/page.php?page_id=6565

2nd best: Pre-made plastic box with sawdust as base layer
www.barnowlbox.com



Nest box considerations

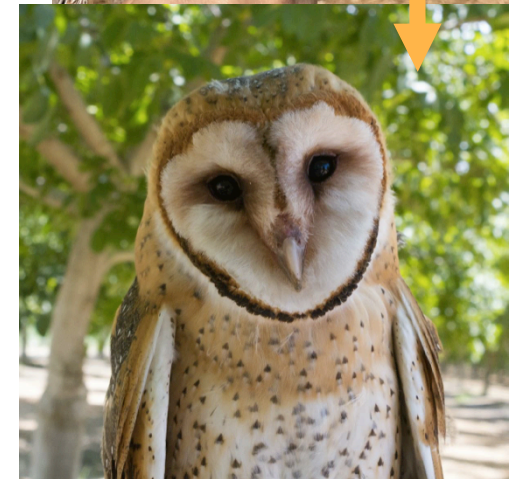
Box openings should be north or east facing -- Do not face west or south, as heat of the day can be detrimental.

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

Stand-alone pole is best – In trees there is higher potential for rodent infestation and Great-horned owl depredation.

**Place in appropriate habitat, away from roads and houses--
*loud nestlings!***

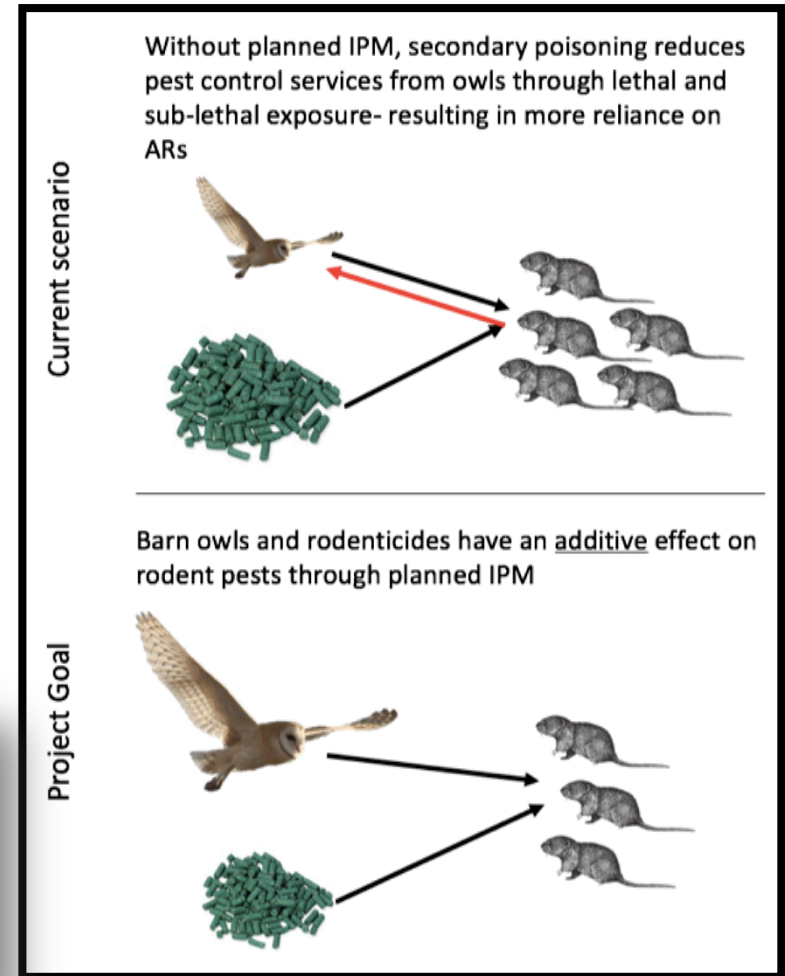
Clean every year to avoid build up of pellets -- Use dust masks to avoid pathogens. (Wendt & Johnson 2017)



Rodenticide considerations

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

Use of **rodenticides can reduce the natural pest control services** raptors provide -- minimizing impacts on raptors can preserve their ability to provide these services.



Limitations of Barn Owls as natural pest control

While a healthy population of Barn Owls may reduce rodent numbers, **they are not likely to eliminate rodent populations** altogether.

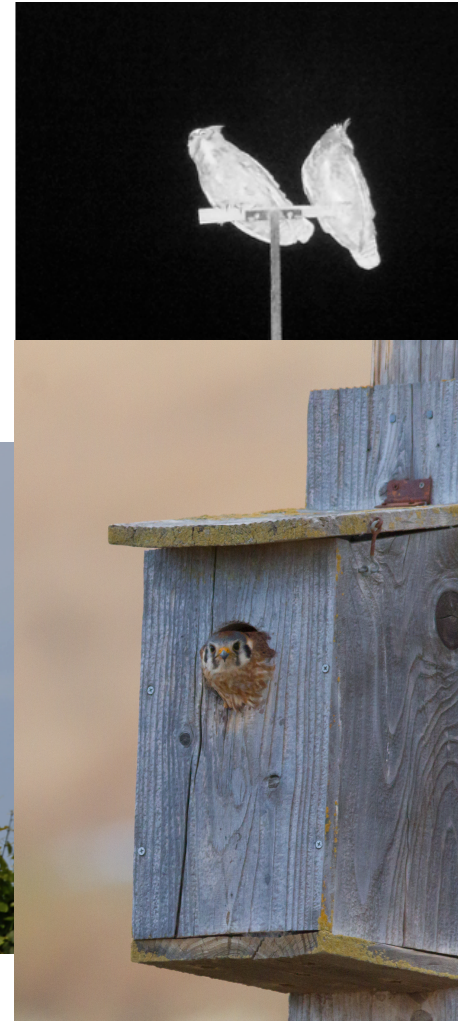
Recruitment of owls and actual **reduction of rodent damage in any given area may vary.**

Barn Owls may only be a **single component of an integrated pest management strategy.**



Other raptors consume rodent pests, too!

A variety of raptors can be attracted to the landscape with trees, artificial perches, and nest boxes.



Other Cavity Nesting Raptors

Both **American Kestrels** and **Western Screech-Owls** can also be attracted to agricultural fields or open spaces with smaller nest boxes.

While they do not consume gophers and ground squirrels, **their diet consists of mice, voles**, insects, small birds, and small reptiles.

The same considerations should be taken when installing these nest boxes as Barn Owl nest boxes.



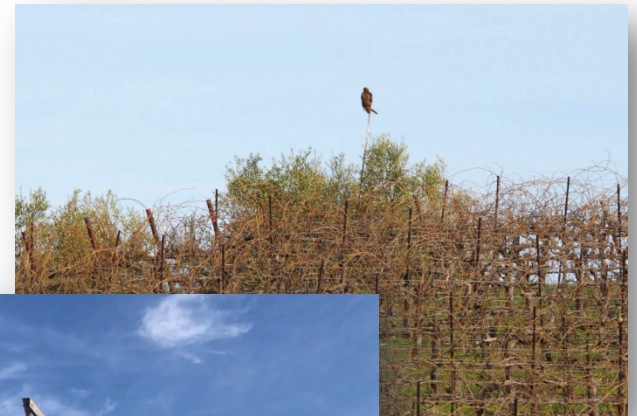
Height and placement of perches

15 feet preferred over taller -- raptors prefer high perches, but not too high. They have binocular vision!

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

Avoid trees and hill bottoms -- perches among trees and at the bottom of hills were utilized less than those in more optimal locations.

(Wong & Kross 2018)



Limitations of raptors as natural pest control

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

Some habitats do not need perches, ie, marsh habitats -- Native raptor species have associations with naturally treeless habitats (Northern Harriers and Short-eared Owls).

Human activity -- Constant human activity may deter raptors.



Conclusions

Barn Owls, as well as other raptors, provide valuable natural pest control by **consuming rodent pests**.

Land managers can **facilitate raptor presence** through installation of artificial nest boxes, perches, and/or preserving trees.

Attracting raptors to the landscape can be **part of a successful IPM strategy!**



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 97.85kg 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:

If you find a sick or injured raptor:

San Jose: Wildlife Center of Silicon Valley <https://wcsv.org/> (408) 929-9453

Morgan Hill: Wildlife Education and Rehabilitation Center (W.E.R.C.) <http://www.werc-ca.org/> (408) 779-9372

Artificial nest boxes:

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

Barn owl nest boxes can be purchased: <http://www.barnowlbox.com> OR Ask your local scouts if they need a project!

American Kestrel Nest boxes: American Kestrel Partnership <https://kestrel.peregrinefund.org/home>

Barn Owl research in the press!

Helping Barn Owls Help Farmers:

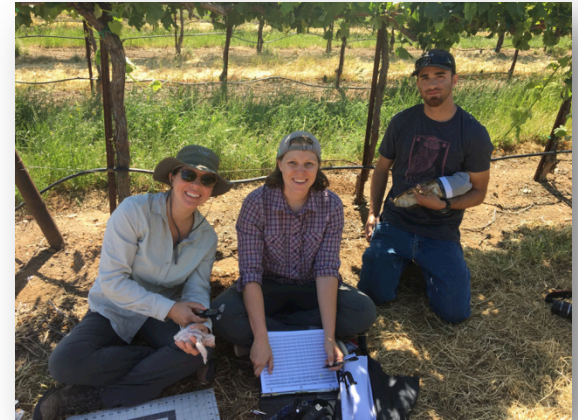
<http://westernipm.org/index.cfm/ipm-in-the-west/agriculture/helping-barn-owls-help-farmers/>

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

Current research

The Barn Owl Project is focused on learning how to maximize benefits from owls while minimizing impacts from rodenticides in an integrated pest management framework. We are investigating rodent populations during Barn Owl breeding and nonbreeding seasons, hunting locations and habitat, diet, and growth of Barn Owls in the agricultural landscape of the Central Valley, CA.

The American Kestrel Project is interested in the diet and foraging behavior of American Kestrels in different agricultural habitats in the Central Valley. The hope is to understand their pest control capabilities and promote nest box programs in agricultural regions.



Thanks for listening!



Questions?