

## Managing raptors for increased pest control on farms

*Raptors contribute to biological control of common pests, and their presence can be enhanced through the installation and maintenance of nest boxes and raptor perches.*

### Do raptors help with pests?

#### Raptor presence is correlated with decreased pest activity and increased yields.

Raptors eat common agricultural rodent pests, such as gophers, voles, mice, and rats, and respond to pest outbreaks by consuming the most abundant pest species around<sup>1</sup>. It is estimated that a Barn Owl nesting pair and their young can consume over 220 lbs of prey in a single year, or up to 3,400 rodents<sup>2,3</sup>.

Nesting Barn Owls in vineyards have been shown to reduce gopher activity in the vicinity by 14% compared to an 18% increase in gopher activity in areas without active Barn Owl nests<sup>4</sup>. Alfalfa fields with hunting Barn Owls had a 3% increase in yields<sup>5</sup>.

#### Enhancing raptor presence can be more cost-effective than using rodenticides.

Damage from ground squirrels on a levee system was reduced 50% in areas where Barn Owl nest boxes and raptor perches were installed compared to areas where only rodenticides were applied and saved \$7,400 per mile per year in rodenticide costs<sup>6</sup>. Nest box networks were also cheaper and similarly effective as rodenticides in reducing crop damage in oil palm<sup>7</sup>. Pest management strategies that are toxin-free are becoming more popular because of the growing consumer demand and motivation to use sustainable practices that benefit the environment, soils, and crops<sup>8</sup>.

#### Maintaining habitat and infrastructure for raptors can increase raptor presence.

Fields with raptor perches have higher densities of hunting raptors than fields without perches during years with pest outbreaks<sup>9</sup>. Raptors can be migratory or year-round residents, so different raptors may be present at different times of the year. Numbers of raptors naturally fluctuate year-to-year due to environmental factors and abundance of prey.

#### THREE COMMON RAPTOR SPECIES THAT CONTRIBUTE TO PEST MANAGEMENT.

Top left: Barn Owl, Top right: Red-tailed Hawk, Bottom: American Kestrel. Photos: Ryan Bourbour



## Barn Owl nest box networks

**Nest boxes with specific attributes can increase occupancy and nest success<sup>10</sup>.**

**Prevent predators:** Installing boxes on a metal pole, having grooves with an appropriately sized opening and a partition near entrance can exclude mammalian and larger avian predators. Nest boxes can be hung approximately 9-10 feet high.

**Nestling safety:** Have the opening closer to the top of the box to prevent nestlings from accidentally falling out, larger boxes (24 inches in height) are preferred by owls and allow more room for nestlings to stretch and exercise their wings before leaving the nest box.

**Heat:** Face the opening to the north or east, drill small holes near the top of the box for ventilation, and using sun shields can reduce dangerously hot temperatures in the nest box.

**Place nest boxes in strategic locations to maximize occupancy<sup>10</sup>.**

**Location:** Nest boxes should be placed in open areas with natural habitat nearby, such as in or around vineyards and crop fields or on the edges of orchards with adjacent grasslands or oak savannah. Barn Owls are not very territorial so nest boxes can be as close as 100-300 feet apart. There is no optimal number of nest boxes per acre but aim to create a network that supports a breeding population. Monitor nest boxes and add more once you see 60-80% occupancy.

**Timing:** Install new boxes by late summer to fall before the nesting season begins and to accommodate dispersing young. It may take 2-3 years for colonization depending on location and nearby owl populations.

**Avoid:** Dense forests, busy roads, houses, loud pumps, generators, lights and places that could impede farm equipment.

### Note on Barn Owl safety

It is important to choose safe nest box designs, install nest boxes securely, and keep them well maintained. Barn Owls and their nestlings are tied to a single nest box for three months at a time—1 month incubating eggs and 2 months during nestling development. Left photo is an example of a safe well-maintained nest box, the nest box on the right needs maintenance.



**Nest box maintenance is most effective if carried out before winter.**

The best time for regularly scheduled maintenance is in late summer and fall because breeding activity is the lowest<sup>11</sup>. Pairs are more sensitive to disturbance in winter and early spring when they are starting their nests. Completing maintenance before winter prevents owls from initiating nests in overfilled or unsafe nest boxes.

#### Annual maintenance checklist:

- Thoroughly inspect nest boxes in late summer-fall
- Fix normal deterioration, check hardware and the sturdiness of pole
- Clean out pellet debris when it accumulates so nest boxes do not become over filled, this can be detrimental to nestlings (Wear an n95 mask)
- Leave a layer of pellets or replace with non-treated wood chips so eggs won't roll around
- Don't disturb boxes with owls
- Keep a log!

## The Landscape of Fear

Raptors contribute to pest control by directly consuming pests and by influencing pest behavior, a concept referred to as ‘The Landscape of Fear’. When natural predators are present, prey must spend more time being vigilant and staying safe from their predators. This can result in reduced pest activity because pests spend less time and energy foraging, reproducing, or causing damage. **Photo:** Red-tailed Hawk perched above a vineyard causing a large flock of blackbirds to fly away. Photo credit: Ryan Bourbour



## Raptor perches

### Raptors will take advantage of a good perch.

While raptors use a variety of hunting methods, many raptor species are commonly found hunting from elevated perches. They will also use perches to consume their prey, rest, and to preen their feathers. Installing perches can increase raptor diversity and abundance and the toxin-free pest control they provide<sup>9</sup>.

Photo: Red-tailed Hawk hunting from a raptor perch on a vineyard. Photo credit: Ryan Bourbour



### Perches can be constructed out of a variety of materials and are easier to maintain than nest boxes.

**Location:** Perches can be installed in any open area and can be useful in and around crop fields. Perches located at the highest points on the landscape, such as hill tops and ridgelines, will be used more often<sup>12</sup>. Place perches away from trees, buildings, power poles, transmission towers, or other perching substrate. Perches can be focused on problem areas, such as areas with ground squirrel colonies. Create a network of perches, with minimum of approximately 2 perches per acre<sup>9</sup>.

### Example of materials used for construction:

- Galvanized steel pole, as small as 3/4 inch
- 15 feet high is optimal<sup>13</sup>
- Wooden crossbeam ~18 inches, avoid perfectly round dowels, double cross beam not necessary
- Secure in hole ~3 feet deep with concrete or attach to existing secure fence posts with pipe grip ties

### Edge habitat to promote raptors

Planting and maintaining large trees and field edge habitat can support a variety of nesting and hunting raptors. Check with local experts about best practices for field edge habitat management.

**Photo:** a young Cooper's Hawk consumes a songbird in its nest tree with its sibling nearby.

Photo credit: Ryan Bourbour



## References

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## Resources

Barn Owl nest box plans:

[https://www.wildfarmalliance.org/barn\\_owl\\_nest\\_box\\_plans](https://www.wildfarmalliance.org/barn_owl_nest_box_plans)

Buy Barn Owl Boxes:

<http://www.napawildliferescue.org/bomp/>

<https://scwildliferescue.org/bomp>

<http://www.wildwingco.com/>