

DRAFT RAPTOR HABITAT MITIGATION AND MONITORING PLAN

Prepared for
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INTRODUCTION

PBS&J has prepared this raptor mitigation plan (plan) to mitigate for the impacts of construction and operation of the Huntington Beach Senior Center (facility) on raptor foraging habitat. This plan describes methods and standards for conservation and enhancement of five acres of open space dedicated to raptor foraging habitat (mitigation area). This plan addresses mitigation for both the permanent and temporal impacts of facility construction. The lead agency, City of Huntington Beach (City), shall enhance and protect the mitigation area as described in this plan. This plan specifies habitat enhancement actions and monitoring procedures to evaluate the success of those actions. Remedial actions could be necessary if habitat enhancement success is not demonstrated in any part of the mitigation area during a specified amount of time. This plan has been prepared in compliance with the California Department of Fish and Game (CDFG), California Environmental Quality Act (CEQA), State and Federal Endangered Species Acts, and other pertinent regulations.

DESCRIPTION OF IMPACTS ADDRESSED

The construction of the Senior Center will result in the loss of five acres of raptor foraging habitat. To mitigate these impacts the City has proposed to enhance a five acre City-owned parcel that is adjacent to the Senior Center for raptor foraging and nesting.

LOCATION

The mitigation area is located within the United States Geological Survey (USGS) 7.5-minute series topographical map for Seal Beach. It encompasses five acres of open space within Huntington Central Park in the City of Huntington Beach, approximately two miles northeast of State Route 1 (also referred to as the Pacific Coast Highway) and 2½ miles southwest of Interstate 405, adjacent to the intersection of Goldenwest Street and Talbert Avenue (refer to Figure 1 [Regional Location Map]).

DESCRIPTION OF THE MITIGATION AREA

The mitigation site is currently vacant, and is generally flat and almost completely devoid of vegetation. What little vegetation is present consists primarily of non-native, invasive species. Bordering the site to the west and south (disc golf) are open areas that are used for passive recreational uses. To the north of the site is the proposed Senior Center, and to the east is Goldenwest Street (beyond which is a parking lot and the sports complex).

This site is designated within the Huntington Beach Central Park Master Plan as a Low Intensity Recreation Area and the recreation/open space areas that are adjacent to the site provide mature trees which are known to be used by raptors for perch locations. Therefore, the mitigation site's location next to the open areas of the park that are known to be used by raptors is an ideal location to provide enhanced foraging and perching locations for raptors in an urban area (refer to Figure 2 [Proposed

Raptor Habitat Enhancement Map)). The map depicts the following characteristics, typical of raptor foraging habitat:

- Low-lying vegetation
- Perching opportunities (trees, street lights, signage, etc.)
- An abundance of small burrowing mammals and other small prey species

Calculation of the Size of the Mitigation Area

As required by mitigation measure MM 4.3-2 of the Huntington Beach Senior Center's Mitigation Monitoring Program (MMP):

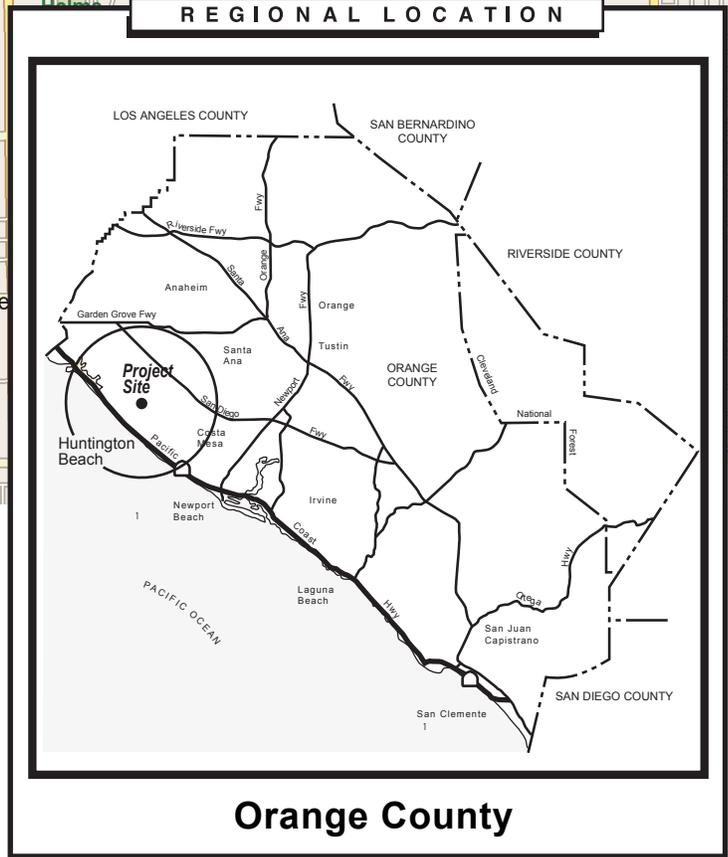
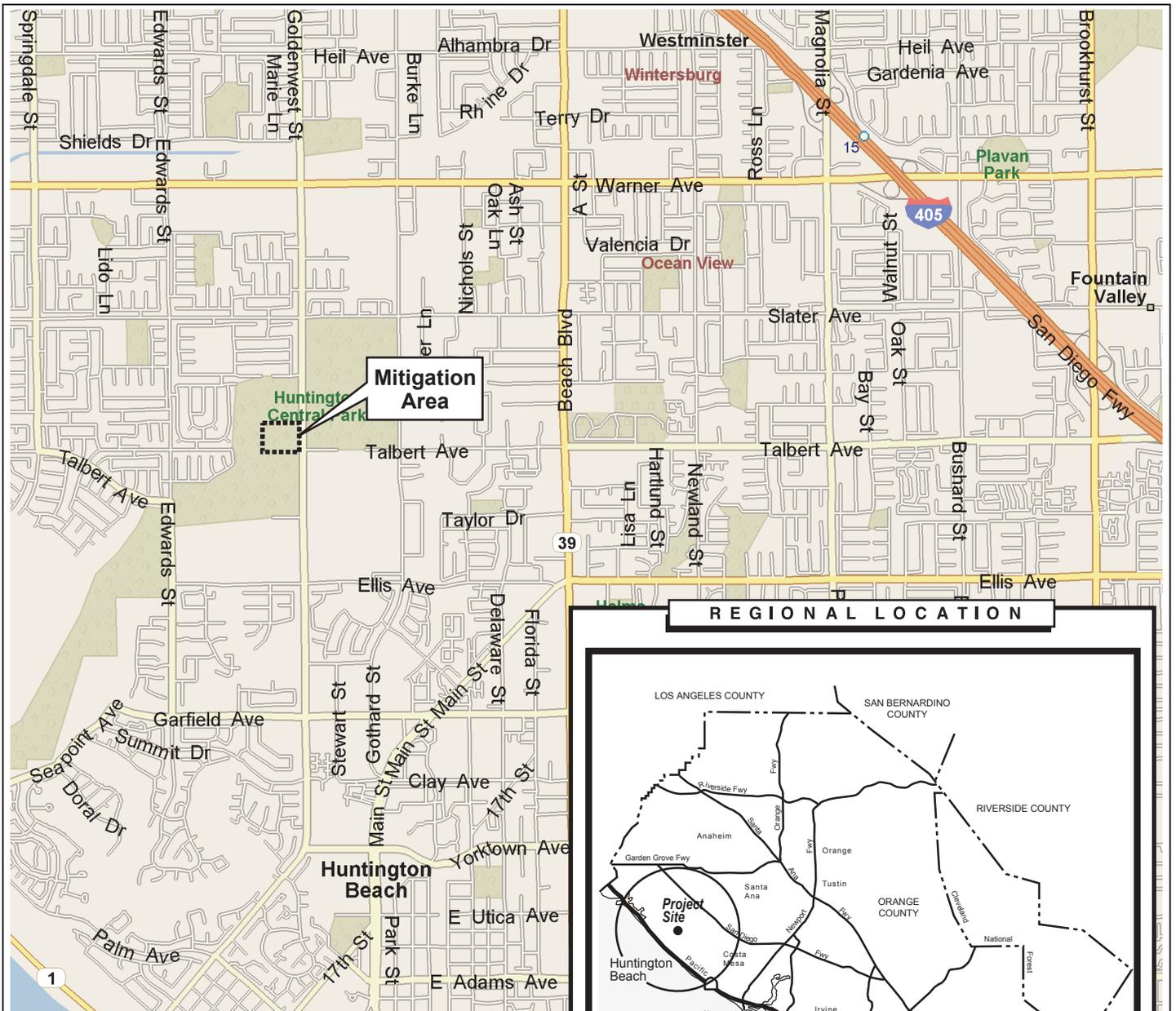
The City shall mitigate for impacts to raptor foraging habitat through dedication as open space, conservation and/or enhancing areas of raptor foraging habitat at a ratio of 1:1 for acres of impact on raptor foraging habitat to provide suitable habitat values and functions for raptors. Mitigation for impacts on raptor foraging habitat will be accomplished within suitable areas that are City-owned and preferably nearby, such as the areas in association with the Sully Miller Lake Group Facility, Low Intensity Recreation Area, Semi-Active Recreation Area, and/or Midden Area/Urban Forest/Trailhead. Enhancement would include, but not be limited to, the planting of native trees within and adjacent to conserved areas of raptor foraging habitat. Prior to ground disturbance, the City shall identify the particular site or area to be enhanced and formulate a plan to accomplish the raptor foraging habitat enhancement activities. This plan shall be reviewed for approval by a qualified biologist.

Therefore, assuming the final footprint and construction disturbance area of the Senior Center facility will remain at five acres, five acres of raptor foraging habitat will be permanently removed as a result of the development of the Senior Center. Consequently, the City is required to conserve and/or enhance a total of five acres (1:1 ratio) of raptor foraging habitat.

HABITAT ENHANCEMENT PLAN

Target Species

According to the Central Park Master Plan Environmental Impact Report (EIR), red-tailed hawk (*Buteo jamaicensis*), red-shouldered hawk (*Buteo lineatus*), and American kestrel (*Falco sparverius*) have all been observed within/adjacent to the Senior Center site. During the field survey conducted as part of the Biological Resources Technical Report prepared for the Senior Center project, a red-tailed hawk was observed foraging at the site. A biological description of each of these target species is provided below.



Orange County



Sources: Microsoft Trips and Streets, 2006; PBS&J, 2008.



FIGURE 1
Regional Location Map

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Source: Google Earth Pro, basemap, 2008; PBS7J, 2008.



FIGURE 2
Proposed Raptor Habitat Enhancement

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■ Red-tailed Hawk (*Buteo jamaicensis*)



Distribution

Red-tailed hawks occur throughout North America from the Arctic tree line to Panama (Preston and Beane 1993). They breed throughout California and winter in all areas without heavy snow cover. Red-tailed hawks are legally protected in Canada, Mexico, and the United States by the Migratory Bird Treaty Act (MBTA).

Population Status

Common nearly everywhere in its large range, the red-tailed hawk is not a species at risk. Numbers have increased in eastern portions of range due to the change of large tracts of forest to a mosaic of fields and woodlots. The population has also increased in the

plains areas of North America, in response to increased availability of nesting trees in formerly treeless areas (Preston and Beane 1993).

Habitat

The red-tailed hawk feeds in grasslands, open brush habitats, and grass/shrub stages of most habitats; and also frequents croplands, fields, and pastures. It roosts in trees, and sometimes in dense conifer stands. It nests in large trees near openings in older, mature forests, especially riparian deciduous habitats, and occasionally nests on cliffs or low ledges. It nests 30-70 feet above ground in trees and even higher on cliffs. Red-tailed hawks are usually flexible in their choice of nest sites; occasionally use human-made structures, shrubs, and cacti; and sometimes nest in isolated trees or in small groves in open habitat.

Breeding

Red-tailed hawks usually build their large stick nests in trees or more rarely on cliffs or other man made structures. Trees selected are generally taller than other nearby trees, often high on a slope with a wide view from the nest. The clutch is usually of two or three eggs, which are incubated for 28-35 days. Eggs are laid at about two- day intervals; incubation begins after the first egg is laid, resulting in uneven aged chicks. Chicks leave the nests when about 6-7 weeks after hatching but stay in the vicinity, remaining dependent on the parents for food for approximately three weeks or more (Preston and Beane 1993).

Food Habits

The red-tailed hawk eats small mammals up to hares in size, small birds, reptiles, amphibians, and some carrion (Orians and Kuhlman 1956). Small mammals often form the bulk of their diet, although their diet can vary greatly depending on the availability of prey. In the winter, it is largely dependent upon mice, but also takes medium to fairly large birds on the ground (Preston and Beane 1993).

Red-tailed hawks do most of their hunting from perches with good views of prey habitat (Preston and Beane 1993). It searches for prey by soaring; but also perches and pounces, or pounces on prey from low, quartering flights, sometimes hovering on wind or air currents.

Compatibility with Human Landscapes

Red-tailed hawks are compatible with several different urban environments that support populations of rodents such as voles, gophers, and field mice. Red-tailed hawks can coexist with humans in the rural environment if they have open grassy or shrubby areas to hunt in, large trees to nest in, and are not subject to disturbance at the nest. Red-tailed hawks are beneficial to landowners as they reduce small mammal populations. Nesting red-tailed hawks are very wary during nest construction, and will often abandon the nest during this period if disturbed. At the local level, red-tailed hawk populations are limited by both nest sites and food supply. The relative importance of each factor may be variable throughout the year. Leading causes of death of this species include collisions with automobiles, shooting, trapping, and starvation. In order to enhance the mitigation area to where it will have the potential to attract common urban raptors it will be important to limit the exposure to traffic and pedestrians. The site currently has a dirt path in the western portion of the site that is used by joggers/walkers; it is recommended that the path be re-located to the far western border situated under the drip lines of the pine trees, whereby people who are walking/jogging will be on the periphery of the mitigation area.

■ **Red-shouldered Hawk (*Buteo lineatus*)**



Distribution

Red-shouldered hawks breed in eastern North America and along the coast of California and northern Mexico. They are locally uncommon to common year-long residents along the California coast, and in the Central Valley. They are uncommon even in suitable habitat in the western Sierra Nevada foothills, and are fairly common residents in woodlands west of the southern desert region (Garrett and Dunn 1981). Red-shouldered hawks frequent low-elevation riparian woodlands, up to

5,000 feet, especially where they are interspersed with swamps and emergent wetlands.

Population Status

The clearing of forests over the last two centuries probably led to decreases in populations of the red-shouldered hawk, while increasing habitat for the red-tailed hawk. Populations appear stable, but may be declining in some areas (Cornell Lab of Ornithology 2003).

Habitat

Typical habitat for the red-shouldered hawk includes dense riparian areas, with adjacent edges, swamps, marshes, and wet meadows for hunting. They primarily use tree foliage in riparian deciduous habitats for cover. They forage mostly along edges of wet meadows, swamps, and emergent wetlands. Their diet is highly varied; they eat small mammals, snakes, lizards, amphibians, small or young birds, and large insects.

They usually nest in dense riparian habitats, and build a nest of sticks about half way up in a tall tree. Nest height averages 50 feet (range 20-80 feet). Nests are typically located next to the main tree trunk, or on old nests of squirrels, hawks, or crows; lined with strips of bark, dry leaves, and sprigs of evergreens (Call 1978).

Breeding

Their breeding habitats are deciduous and mixed wooded areas, often near water. The breeding pair builds a stick nest in a major fork of a large tree. The clutch size is typically 3 to 4 eggs. The blotchy-marked eggs are typically 54.5 x 43 mm (2.1 x 1.7 in). The incubation period can range from 28 to 33 days. The hatchlings, 35 g (1.2 oz) at first, are brooded for up to 40 days. The young leave the nest at about six weeks of age, but remain dependent on the parents until they are 17 to 19 weeks old.

Food Habits

Red-shouldered hawks search for prey from perches on trees, snags, and posts. They pounce from a perch, or glide and search, mainly below tree canopies. Usually, while in forested areas, red-shouldered hawks wait on a perch and swoop down on prey. When in clearings, they sometimes fly low in order to surprise prey. Small mammals are typically the most important prey, with voles, mice, and chipmunks locally favored. Other prey can include amphibians, reptiles (especially small snakes), small birds, and large insects. During winters, they sometimes habituate to preying around bird feeders on more common birds, such as sparrows, doves, and starlings.

Compatibility with Human Landscapes

Members of the genus *Buteo* exhibit a broad range of adaptability to human altered environments in California. The western subspecies of the red-shouldered hawk appears to be the most adaptable of the 10 North American breeding Buteos, with some pairs using urban habitats almost exclusively (Bloom et al. 1993). Red-shouldered hawks are regular components of the urban nesting avifauna in coastal southern California where land managers have preserved adequate open space and habitat. Red-shouldered hawks are compatible with several different urban environments that support populations of rodents such as voles, gophers, and field mice. Red-shouldered hawks can coexist with humans in the rural environment if they have grassy or shrubby areas to hunt in, fairly large trees to nest in, and are not subject to disturbance at the nest. At the local level, red-shouldered hawk populations are limited by both nest sites and food supply. The relative importance of each factor may be variable throughout the year. Leading causes of death of this species include collisions with automobiles, shooting, trapping, and starvation.

■ American Kestrel (*Falco sparverius*)



Distribution

The American kestrel is widely distributed in North and South America. In North America they are absent as a breeder only from tundra and northwest coastal regions. Most kestrels winter well south of Canada, wintering in all habitats except at high elevations. The American kestrel is a common resident throughout California.

Population Status

The American kestrel is not a species at risk. The total population, estimated in 1982, was about 2.5 million pairs, split about equally between North and South America (Smallwood and Bird 2002). The population of this species fluctuates rapidly in response to habitat changes. The population increases when forest is converted to more patchy or open habitats. Subsequent conversion of these agricultural and rural areas to residential and industrial developments causes a decrease in the local kestrel population.

Habitat

American kestrels use a variety of open habitats at all times of the year. In general, prime foraging habitat is within open areas with low open vegetation and suitable hunting perches. Preferred habitat in California occurs in most open habitats, in a variety of shrub and early succession forest habitats and in forest openings. Breeding birds are often seen perched on power-lines and fence posts along roads. In migration, American kestrels often fly over unsuitable foraging habitat, stopping to hunt when good habitat is available.

American kestrels seek cover in a variety of cavities in trees, snags, rocky areas, banks, and buildings. They nest in cavities in trees, snags, rock crevices, cliffs, banks, and buildings. Bent (1938) reported nests in cavities in sycamores, willows, and cottonwoods. In some areas, good foraging habitat exists but there is a lack of nesting cavities. The placement of nest boxes has allowed kestrels to use these areas.

Breeding

Cavities formed by woodpeckers or some other means in living or dead trees are the most important nesting sites for American kestrels. The usual clutch is four or five eggs, laid at two-day intervals. Eggs may be laid during early April in the south; into late June in the north. The incubation period is about 30 days. The young leave the nest when they are about one month old and depend on the parents for food for approximately another two weeks (Smallwood and Bird 2002; Campbell et al. 1990).

Food Habits

American kestrels forage in open and partially open areas of most habitats where cavities are nearby. Much of the time American kestrels search for prey by perching on elevated sites such as telephone poles and wires, trees, fence posts, buildings, and communication towers. Where there is no suitable perch, kestrels will hover. Kestrels forage by facing into the wind and, with alternating bouts of flapping and gliding, stay stationary over the ground while scanning for prey. Large insects and small rodents are the main prey, but amphibians, reptiles, and birds are also taken.

Compatibility with Human Landscapes

American kestrels eat many small prey animals that occur in urban and rural areas. Large insects such as dragonflies and grasshoppers, and small rodents such as voles and mice, make up much of their diet. Like most raptors, kestrels will take advantage of any food source. Other prey species in their diet include but are not limited to many types of small birds, reptiles, and amphibians. Human-related mortality is the most commonly reported cause of death for this species. Collisions with wires, vehicles and windows, electrocution, drowning in tanks and pools, and attacks by domestic pets are commonly reported. Removal of young and eggs by snakes, crows, and mammals occur; other raptors are known to kill adults. While known to have been affected by pesticide contamination, American kestrels may be affected more by reduced numbers of insect prey following pesticide applications.

Important Physical Characteristics of Mitigation Area

A list of the attributes and/or key components that are essential to maintaining the long-term use and integrity of the mitigation area by the target raptor species are included in Table 1 below.

Table 1 Important Features of Raptor Habitat and the Values They Present	
<i>Critical Habitat/Feature to Retain</i>	<i>Key Values for Raptors</i>
1. Large, wind firm trees (living and dead) and veteran recruit trees, particularly within 500m of large water bodies	Nesting and roosting
2. Dead and dying trees suitable for use by woodpeckers which create nest cavities for kestrels	Nesting and roosting
3. Stands of coniferous or deciduous tree cover, preferably with an inter-locking canopy	Nesting, perching (hunting/resting); rearing of young, roosting
4. Woodlots, shelterbelts, shrubby areas, hedgerows	Nesting, perching (hunting/resting), prey habitat
5. Undisturbed grasslands and scrubland	Nesting, hunting, prey habitat

Goals

The Best Management Practices (BMPs) identified in this plan strive to address the following goals/principles of raptor conservation in urban areas:

1. Where possible, retain existing, natural habitats suitable for raptors.

The best way to conserve raptors in urban environments facing possible developments is to ensure that an adequate amount of suitable habitat is left undisturbed.

2. Strive to retain, restore, or enhance key habitat features for raptors, so that no net loss of habitat occurs.

Key habitat features consist of nesting, roosting, and other sites that are essential for raptors. State and federal laws provide legal protection of birds under the Migratory Bird Treaty Act. Key habitat features should be retained, and mitigation is recommended through habitat restoration or enhancement. The best option is always to retain existing, natural features.

3. Use caution when attempting to restore or enhance raptor habitats.

Some methods for habitat enhancement are simple, such as providing artificial nest sites. Others are more complex and involve restoring key habitat features required to fulfill various life history functions and ecological needs of raptors. Caution must be used to prevent attracting raptors to otherwise unsuitable areas where survival and productivity could be reduced.

4. Avoid disturbing raptors at nesting, roosting, and feeding sites.

In some cases, it is possible to establish undisturbed buffers around active raptor nests, raptor roosts, and foraging areas.

Best Management Practices

Listed below are the Best Management Practices (BMPs) that help to achieve the goal of maintaining raptors and their habitats in urban environments. The BMPs in this raptor mitigation plan are based on ecological needs and behavioral traits of the target raptor species, and are generally applicable to urban landscapes. These specific management practices are to be implemented within the mitigation area.

BMP 1—Retain Existing Habitats and Features; Minimize Loss of Natural Vegetation

1. Preserve all trees and snags used or suspected of being used by raptors as nesting sites.
2. Where possible, retain groups of trees rather than isolated single trees to provide an inter-locking canopy.
3. Maximize retention of shelterbelts, hedgerows, brushy thickets, shrubby areas and ruderal grassland habitat.
4. Retain undisturbed grasslands, and open pastures.

BMP 2—Protect Raptor Nest Sites

1. In urban areas, maintain a minimum buffer of 50 feet, consisting of undisturbed natural vegetation, around nest sites in trees.
2. In addition to the recommended vegetated buffers, maintain even larger areas (200 m) free of loud noises and other human disturbances around occupied nests.
3. Protect existing and potential nest sites, including dead trees with snags and natural cavities.

BMP 3—Protect Raptor Roosting/Perching Sites and Foraging Areas

1. Protect any potential nest trees, or other specific sites that raptors regularly use for roosting, perching or feeding; good foraging sites include wetlands, shrubby areas, ruderal fields, and hedgerows, and riparian areas.

BMP 4—Construct Nest Boxes and Platforms

1. Construct at least two artificial raptor nest boxes and/or platform in the mitigation area tailored to the opportunities of the site, using best professional judgment of raptor use in the general area.

BMP 5—Avoid Disturbance of Sensitive Habitats During and After Development

1. Locate trails, buildings, and roads away from raptor nesting, roosting and foraging areas.
2. Keep machinery, people, and pets away from nesting, brood rearing, roosting, and foraging areas.
3. Any trails or paths through the foraging areas should use fencing (i.e., post and rope) to discourage entrance into no-trail portions of the site.

BMP 6—Manage, Restore, or Enhance Raptor Habitat and Features

1. Replace artificial raptor nest sites that are damaged or lost.
2. Pruning mature trees can make them more attractive to Red-tailed hawks and other raptors.

BMP 7—Restore Habitats Where Natural Vegetation has been Removed or Altered, Preferably by Using Native Plants

1. The City shall plant trees, shrubs, and native grasslands such that their respective vegetative cover is 10, 30, and 60 percent, respectively. The size, location, and variety of the plantings shall be based on professional judgment of a qualified biologist, and will depend on the available mitigation area and opportunity for survival of planted species.
2. The City shall obtain shrubs from a qualified nursery or grow shrubs from native seeds gathered from the vicinity of the mitigation area.
3. The City shall mark the location of the plantings at the time of planting for later monitoring purposes and shall keep a record of the number of trees and shrubs planted.

BMP 8—Trash and Weed Control

1. The City shall implement a trash and weed control program.
2. The City shall monitor the mitigation area to clean up trash and locate weed infestations.

BMP 9—Avoid the Use of Pesticides and Herbicides

1. Use integrated pest/weed management and avoid use of chemical pesticides.
2. Weeds may be controlled with herbicides or hand pulling. Spraying of herbicides is only permitted in areas where noxious weeds are present, and may not be used in areas where young desirable forbs may be present.

BMP 12—Temporary Irrigation

1. A landscape architect and botanist should discuss the use of artificial irrigation and whether the benefits will increase the percent survival rate for the planned plantings in the mitigation area.

BMP 13—Educate the Public

1. Use interpretative materials such as signs and sign posts to make the public aware of the need to protect raptor habitats and to prevent disturbances to nesting and roosting sites.

Schedule

The schedule provided in Table 2 (Planting and Monitoring Schedule) includes planting and monitoring times for the mitigation area.

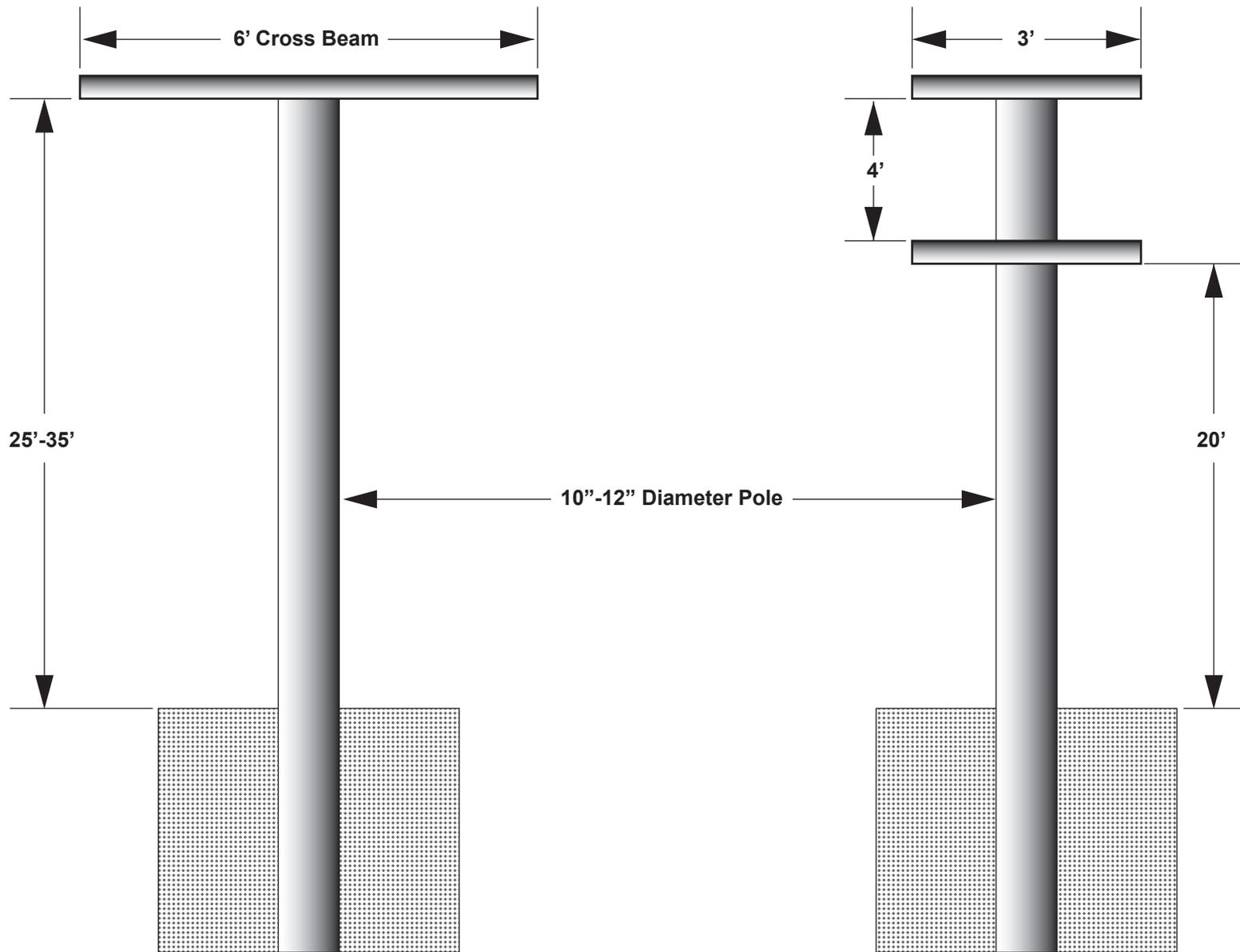
Table 2 Planting and Monitoring Schedule	
<i>Enhancement Activities</i>	<i>Timing</i>
1. Perform pre-construction avian surveys to identify and protect existing nest sites and the species and number of raptors currently using the mitigation area.	Early spring approximately March through May
2. Identify key habitat features including, but not limited to, vegetation/trees within the mitigation area that are to be protected.	Early spring
3. Construct at least two nest boxes.	During build out
4. Construct at least three artificial perches.	During build out
5. Plant trees, shrubs and native grasslands.	During build out
6. Monitor for appropriate maintenance of mitigation area, including weed infestations.	Six months after build out
7. Monitor and keep a record of the number of trees and shrubs planted	During build out
8. Monitor and identify the species and number of raptors within the mitigation area.	One year after enhancement area has been completed

Planting Palette

The location of the mitigation area is such that planting species that are commonly associated with the Coastal Sage Scrub plant community would most likely increase the survivability of the re-vegetation process. To enhance the existing plant communities that are in the mitigation area, an example of a planting palette of the following species could be planted (see Table 3). Establishment of the following plant species would significantly increase the raptor habitat functions at the site by providing foraging, nesting, and refuge areas for raptor prey species.

Nest Boxes and Perch Poles

To enhance the opportunities for common cavity nesting raptors, such as barn owl and American kestrel, it is recommended to put up one or two nest boxes. In Appendix A, there are several examples of raptor nest boxes. In addition, Figure 3 depicts how to construct raptor perch poles, which is a vertical wooden pole with a wooden crossbeam at the top.



Source: PBS&J, 2008.

FIGURE 3
Diagram of Raptor Perch Pole



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Table 3 Plant Palette	
<i>Latin Name</i>	<i>Common Name</i>
Grasses	
<i>Achnatherum (Stipa) coronatum</i>	Giant stipa
<i>Bromus carinatus</i> var. <i>carinatus</i>	California brome
<i>Elymus glaucus</i> ssp. <i>glaucus</i>	Blue wild rye
<i>Melica imperfecta</i>	Coast range melic
<i>Nassella (Stipa) lepida</i>	Foothill needlegrass
Shrubs	
<i>Artemisia californica</i>	California sagebrush
<i>Atriplex lentiformis</i> ssp. <i>lentiformis</i>	Saltbush
<i>Dendromecon rigida</i>	Bush poppy
<i>Eriogonum fasciculatum</i> var. <i>fasciculatum</i>	California buckwheat
<i>Heteromeles arbutifolia</i>	Toyon
<i>Mimulus aurantiacus</i>	Bush monkeyflower
<i>Prunus ilicifolia</i> ssp. <i>ilicifolia</i>	Hollyleaf cherry
<i>Rhus intergrifolia</i>	Lemonadeberry
Trees	
<i>Platanus racemosa</i>	California sycamore
<i>Juglans californica</i>	Southern California walnut
<i>Quercus berberidifolia</i>	Scrub Oak

Monitoring

■ Monitoring of Planting and Raptor Enhancements

To ensure proper placement of raptor habitat enhancements, PBS&J biologists will monitor the installation of the vegetation and raptor enhancements during the construction phase of the enhancement project. When not present, the biologists will be on call when construction activities are scheduled in areas requiring the monitor’s expertise. They will also take a proactive approach to assess work area conditions ahead of construction, noting concerns and construction constraints. In every instance possible, the monitors will work to provide advance notice to the construction managers and contractor of conditions and situations that require specific awareness and planning.

Figure 4 photographs depict an area where the grassland has been restored and trees have been planted. Also, it shows an example of an area with a cable and post barrier, this is similar to what could be used on this project.



Source: PBS&J, 2008.



FIGURE 4
Examples of restored grassland habitat with tree plantings

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Huntington Beach Raptor Mitigation Plan

A biologist from PBS&J will make up to two eight-hour site visits during the construction period, in addition to the twice-yearly monitoring visits described below.

■ Bi-Annual Monitoring Procedures

For five years after installation of the enhancement measures a biological monitor shall monitor the mitigation area twice yearly, beginning in the spring or fall after installation of the vegetation and raptor enhancements have been completed (whichever season comes first). The biologist shall carry out the following procedures during monitoring visits:

1. Assess vegetation cover (species, structural stage, etc.) and progress toward meeting the success criteria.
2. Record environmental factors (such as precipitation at the time of surveys and precipitation levels for months of the current year).
3. Record any wildfire that occurs within the mitigation area and any remedial actions taken to restore habitat quality in the damaged area.
4. Assess the success of the weed control program and recommend remedial action, if needed.
5. Assess the survival rate and growth of planted trees, shrubs, and grasses. At the time of planting, new plantings will be marked for the purpose of monitoring. The monitor shall select several planted clusters for photo monitoring and shall take close-up and long-distance digital images of each selected cluster during each monitoring visit.
6. The monitor shall record observations of any special status plant or wildlife species (federal or state threatened or endangered species and state sensitive species) during field monitoring.
7. Apply results of monitoring to refinement of mitigation and management measures on a continuing basis, as needed.

■ Monitoring Report

The results of the monitoring procedures identified above will be documented in a brief twice-yearly Monitoring Report that will include a discussion of the monitoring metrics, the performance of the enhancements, suggestions for any additional management or remedial needs including action steps to remediate any poor results (i.e., invasive species, vegetation failure, nest box damage, etc.).

Success Criteria

Mitigation of the raptor habitat impacts of the Senior Center facility could be considered successful if the City protects and enhances sufficient habitat within the mitigation area. The City must protect the quantity and quality of habitat within the mitigation area for the life of the Senior Center Facility and ensure the success and maintenance of the habitat enhancement measures to meet the intent of the enhancement goal.

The City may demonstrate improvement of habitat quality based on evidence of indicators such as the following:

1. **Increased avian use by a larger diversity of bird species.**
2. **Survival of planted trees and shrubs.** Shrub planting will be considered successful if a 65 percent survival rate is achieved after five years. The monitor shall recommend remedial action when, in the monitor's judgment, the survival rate of planted shrubs is inadequate to demonstrate a trend toward an improvement in raptor habitat quality. Although there are only a few trees planned to be planted, it would be expected that 100% survival rate for the trees could be accomplished at the end of three years.
3. **More abundant seed production of desirable native grasses.** Grass planting within the mitigation area will increase seed production and will be considered successful if a 65 percent survival rate within planted areas is achieved after five years. The monitor shall recommend remedial action when, in the monitor's judgment, the survival rate of planted grassland areas is inadequate to demonstrate a trend toward an improvement in raptor habitat quality.
4. **Successful weed control.** Weed clusters have been eradicated or reduced to a non-competing level (less than 5 percent of vegetation).

If the City cannot demonstrate that the habitat mitigation area is trending toward the habitat quality goals described above within five years after initial plantings, the City shall propose remedial action. The California Department of Fish and Game could require supplemental planting or other corrective measures.

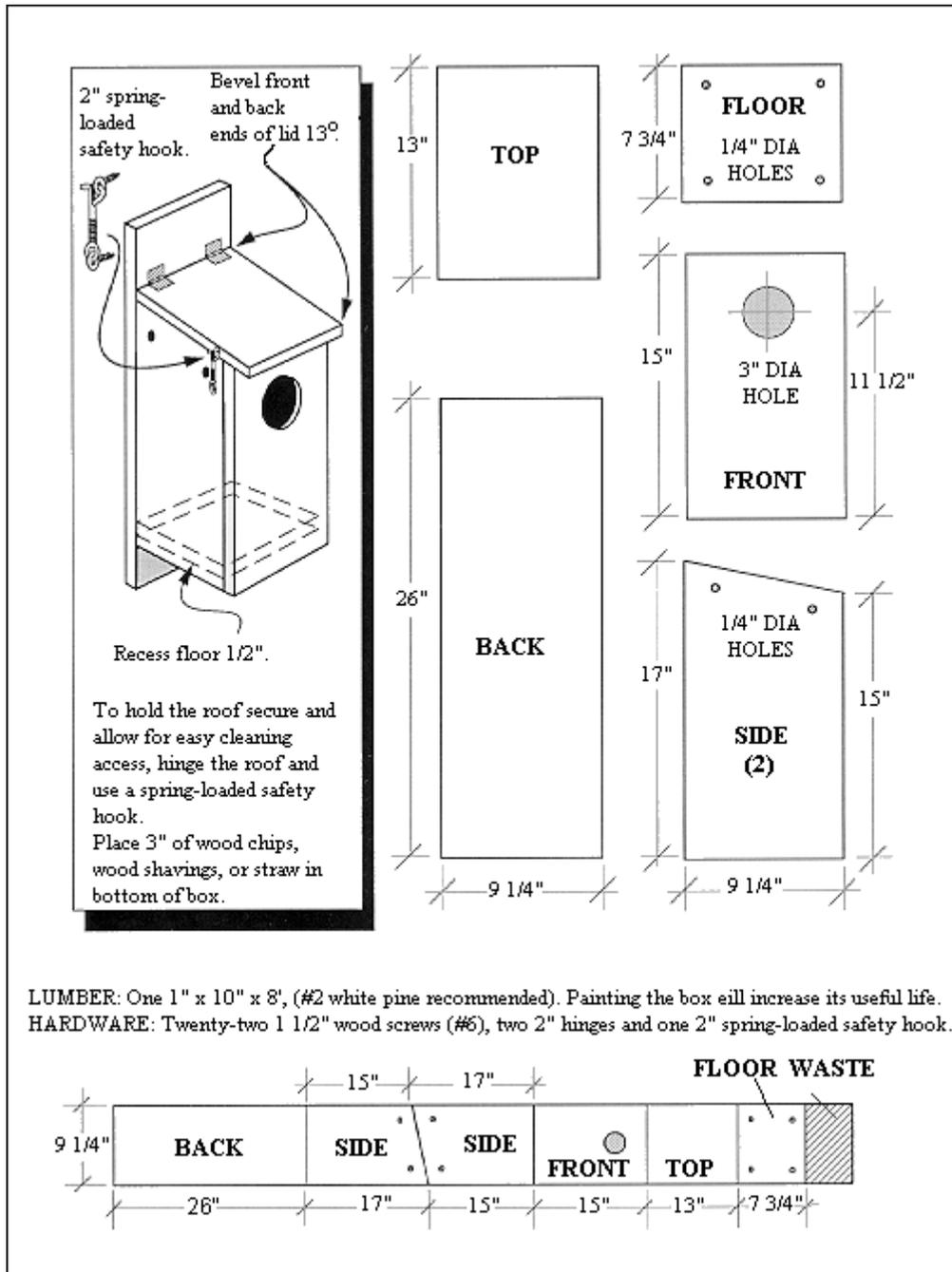
AMENDMENT OF THE PLAN

The enhancement and establishment of a successful raptor foraging area is viewed as being a dynamic process; whereby it is expected that changes to the plan will be made depending on the results of monitoring in the field. The Habitat Mitigation Plan could be amended from time to time by agreement of the City and PBS&J. Such amendments could be made without amendment of the site certificate for the Senior Center. PBS&J shall notify the City of all amendments, and the City retains the authority to approve, reject, or modify any amendment of this plan agreed to by PBS&J.

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Wild Acres - Kestrel Nest Box Plan



How to Build a Kestrel Box

Materials:

- One 1" x 10" x 8' board
- Two hinges
- 1 1/2" galvanized nails
- Wire

Construction:

1. Mark and cut out the pieces as shown.
2. Cut a 3" diameter entrance hole in the front piece, 11 ½" from the bottom edge.
3. Drill two ¼" holes near the top edge of both side pieces. Drill four ¼" holes in the floor piece, as shown, to allow for drainage.
4. Assemble the box as shown in the diagram.
5. Attach the roof on top of the box using two hinges, for easy cleaning access.
6. Place one nail in the side of the roof and one nail in the face of the adjoining side piece, as shown in the diagram, so that they line up vertically. Use wire tied around the two nails to keep the roof closed to predators.
7. Place 2-3" of sawdust on the bottom of the box.

Kestrel Nest Box Tips

Kestrel boxes have been shown to seriously increase the number of nesting kestrel pairs in an area. Here are some suggestions:

- Nest boxes should be placed in open fields, meadows or along hedgerows next to open areas. A grassy habitat should be near the box so kestrels can use it for hunting.
- Kestrel nest boxes should be firmly attached to a support structure, such as a tree or post, 10 to 30 feet above the ground and spaced at least half a mile apart.
- The support structure should have a sheet of aluminum secured around it to prevent squirrels from climbing and using the box.
- Place 2 to 3 inches of sawdust in the bottom of the nest box.
- Boxes should be installed no later than February 1st, to allow kestrels to find nest sites when first returning north.
- Since starlings may use the box, check the box once a week and remove the nest and eggs of any starlings present. Starlings are unprotected by law and thus you are permitted to do this. Starling eggs are white with a blue-green tint, but other species such as bluebirds (bright blue eggs) and tree swallows (white eggs) may also use the nest box. Be sure you can identify the eggs, but when in doubt, wait for one of the parents to return for positive identification.
- Clean out the kestrel box after each nesting season and replace the sawdust for next season's nesting pair.

Design Courtesy of Minnesota DNR
Illustration Courtesy of the USGS, Northern Prairie Wildlife Research Center

[Return to Wild Acres - American Kestrel](#)



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Thank you for your interest in owl boxes. Owls do not build their own nests. Most owls simply use the old nests of hawks, ravens, and other birds. In Marin we have several local species that are **cavity nesters**: including Barn Owls, Western Screech Owls, and Saw-whet Owls. North America's smallest falcon, the American Kestrel, is also a cavity nester. These species will readily use artificial cavities in the form of nest boxes. Barn Owls are generally found in or near open fields and meadows, but sometimes nest quite close to homes in backyards or parks. **Western Screech Owls** are generally found in oak woodlands, especially near streams or creeks. **Great Horned Owls** (they are the ones that hoot!) do not use nest boxes - they take over previously constructed nests of hawks or ravens. Examples of ideal **Barn Owl habitat** can be seen in Nicasio and West Marin, and Petaluma - agricultural areas. Also along Highway 37 in Sonoma, and any of Marin's protected open spaces that feature oak savannahs and large open areas. **Western Screech Owls** might also frequent such areas, but their ideal habitat is woodlands, especially near streams. They too have been found nesting quite close to human habitations - even in attics and under eaves. A good nesting cavity is hard to find! Old and dead trees provide homes for many species of birds and should be left standing whenever possible.

There are many owl nest boxes available for purchase, however we feel our design is the most beneficial for the protection of the owls for several reasons: the hole size is specific for Barn Owls and too small for Great Horned Owls to enter and prey on Barn Owls or their chicks, the box has a convenient clean-out flap, it is treated with a non-toxic, water-based stain that can extend the life of the box up to 10 years, there are no perches on our boxes - perches are helpful to predators, the Barn Owls don't need them, finally by purchasing a Hungry Owl Box you are supporting our non-profit, educational work. The decision to put up an owl box should not be made lightly, and should be based on [an evaluation of whether you actually have good habitat for any of the cavity nesting owl species](#).

PRICE LIST



Barn Owl Box \$90
(includes tax)

Dimensions: 21.5" X 17" X 17"



Screech Owl/ American Kestrel Box \$45
(includes tax)

Dimensions: 19" X 9.5" X 10"

The Hungry Owl Project, run by dedicated volunteers, is administered by WildCare. WildCare advocates for wildlife for a sustainable world through programs in wildlife rehabilitation and environmental education, and is a 501(c)(3) nonprofit organization, tax identification #51-0172331. For that reason, a small percentage (7%) of your purchase price or donation to the Hungry Owl Project will be applied to administrative expenses.



We also sell bat houses for \$65 and bluebird boxes for \$18. Both bats and bluebirds provide excellent natural insect control - especially for mosquitos. Bats require a very warm setting in order for bat boxes to succeed. Please visit [Bat Conservation International](#) to learn more about the habitat requirements of bats. Bluebirds use habitat similar to that of the Barn Owl: open fields and meadows, edges of forests, etc. and like bats, can be adversely impacted by the use of pesticides and herbicides, such as Roundup. To learn more about bluebirds visit the [North American Bluebird Society](#). Good information on the habitat requirements of

American Kestrels (North America's smallest falcon, and a cavity nester) can be found at skyhunters.org as well as

http://www.enviro-explorers.com/kestrel_web_pages/iowas_nest_box_program_page.htm.



A hungry Barn Owl in suburban Novato. Photo: David Goodman

There are responsibilities involved, especially with Barn Owl boxes. These include:

- Annual cleaning out of the Barn Owl box within a narrow window of time (October-December). **How to clean your owl box.**
- Commitment to *not* disturb nesting owls. All native birds are protected by State & Federal Law, especially when nesting. Any disturbance is a Federal & State offense. So if you decide that your tree needs cutting down, or trimming, and there are owls using your box, you will have to wait until the Fall to make any changes to the tree.
- Barn Owls can be quite noisy at night during breeding and nesting seasons. Be sure to talk to your nearest neighbors and assess their noise tolerance before encouraging Barn Owls to nest on your property, because once they start nesting they are protected from disturbance and if you or your neighbors don't like the noise, you will have to put up with it for a few months until nesting is over. Only then could you remove, or move, the owl box!
- Protecting the owls from poisoning by not using **rodenticides** (rat, gopher, poisons) and pesticides on your property and confirming that they are not in use on adjacent properties. Screech Owls eat many insects and can be harmed by pesticides and herbicides.
- Notifying the Hungry Owl Project if you plan to move and whether you are taking the box or leaving it behind. Remember the box cannot be disturbed during the nesting season (January - October).
- Contacting a licensed wildlife hospital, the Hungry Owl Project, or your local humane society if you find an injured or orphaned owl.
- **Determining whether you have the right habitat for an owl box.**

If you feel comfortable with these responsibilities, and **have the right habitat** for barn or screech owls, we encourage you to install an owl box to help provide homes and

protection for these beautiful, and beneficial, predators. Please note that the best way to benefit from the amazing hunting prowess of Barn Owls on your local rodent and gopher populations is to install more than one box, as the owl will not hunt directly beneath its nest because this could attract the attention of predators, such as the Great Horned Owl. If feasible, we also recommend placing a three-foot wide band of metal flashing around the tree trunk, under the box, for additional protection from climbing predators, such as raccoons, cats, and bobcats. The owl boxes can also be pole-mounted, which is a bit more effort and requires the addition of a sun roof if placed away from the shade provided by trees. Owl boxes can be installed at any time of the year. The breeding season starts around February/March, but the boxes may become occupied as roosting sites at any time of year.



We are often asked: "Are you sure the owl can fit through that small hole?" Yes, we are sure!
Photo copyright David Goodman

Picking up Owl Boxes

For pickup in Novato, call Maggie at 415-898-7721, during business hours (Pacific Time).

For pickup in San Anselmo, or San Rafael, call Alex at 415-454-4587, during business hours (Pacific Time).

Please read this first! [Determining whether you have the right habitat for an owl box.](#)

Note: we are volunteers with full-time jobs, so please give us a few days to

get back to you. If we do not get back to you within five working days, please call again!

Hungry Owl boxes are made of sturdy untreated 1/2" plywood. They are carefully designed for the specific breeding habits of the owls, and for their protection against predators. They come complete with air holes, drainage holes, and have a trap door for easy cleaning. They are treated with water-based deck stain and will last for many years. Community volunteers, including local schools and Boy Scout troops, make all boxes. All proceeds from the sale of these boxes go back into research and the promotion of safe habitat for owls. **If you would like to purchase a box, please call 415-454-4587, during business hours. It may take us several days to return your call and there may be a waiting list for the boxes as demand almost always exceeds supply! You will be notified when your box is ready for pickup, usually at a designated owl box sale at WildCare in San Rafael. Owl boxes can be installed at any time of year, but the most likely time for them to become inhabited is over the winter months. There is no guarantee that owls will find and inhabit an owl box, and it may take one or more seasons for habitation for owls to move in. No, we cannot provide an owl with your box! You put up the box and nature does the rest.**

If you already have an owl box and need information on proper installation of the box (how high, where, how to clean, etc), please read this document: [How to Install a Barn Owl Box \(pdf format\)](#). If you would like a professional arborist to install the box for you, for a fee, please contact Jim Cairnes of [Small World Tree Service](#) at 415-455-0909 or 717-1885, or Judd Corbin at 415-595-9232 (both are Marin only). Free installation is offered by Zach Wilder, [Sonoma-Marin Arborists](#) at 415-455-TREE.

The Hungry Owl Project sells boxes locally within Marin County and surrounding areas. **Please note that we are not able to ship owl boxes.** For anyone interested in building their own box, we can provide detailed box plans and installation instructions. Power tools are needed, including a router and table saw. We can send the plans via email (pdf), if you write us at webmaster@hungryowl.org and tell us what type of habitat you live in or near, and pledge to not use poisons to control rodents, or pesticides to control insects. Please include your mailing address with the request and let us know if you want Barn Owl, Western screech Owl or American Kestrel box plans.

San Francisco peninsula residents can contact **The Birder's Garden** in San Carlos for purchase of Hungry Owl Project designed Barn Owl boxes. Call (650) 595-0300.

To request box plans by U.S. mail, please send a check for \$7.00 (to cover printing and postage), payable to "WildCare/HOP" to:

HOP BOX PLANS
c/o 403 Scotia Lane
Novato, CA 94947

Be sure to include the address where the plans should be sent, as well as your phone number—in case we need to talk with you to determine if your habitat is

appropriate for attracting barn or screech owls. It is critical that no poisons are being used on the property or adjacent properties. Please allow a few weeks for delivery.

Box Building

We are looking for volunteers to help us build boxes for **bats, owls, bluebirds and kestrels!** This project is perfect for middle school or high school wood shop class projects, Eagle & Boy Scouts, Girl Scouts, and interested individuals. We love working with Eagle Scouts as they always do quality work. We are also looking for donations of 1/2" untreated plywood from construction sites or recycling centers. We'd love to recycle unused wood into homes for birds! You may be able to get community service credit for building boxes for our non-profit group. We also have our box building parties from time to time and volunteers are welcome. [Here are some pictures](#) from one of our action-packed and fun-filled box building extravaganzas!

Special thanks to the following for building boxes for HOP:

Bryan Stitt, Eagle Scout -50 barn owl boxes! [View photos of Bryan's project for HOP](#)

Zachary Michael Fiore, and Troops 505 & 515

Aaron Bardo, Eagle Scout

Chad Marino, Eagle Scout

Ryan Falk & helpers - Eagle Scout project

Billy Talmadge & helpers - Eagle Scout project

Matt Staricha

Bill Londereé

Bill Martin, Napa

Mill Valley Eagle Scouts

Davidson Middle School

Hall Middle School

San Rafael High School

Darren Davis

Michael Buck & The Junior Woodchucks of San Francisco

Fireman's Fund Day of Sharing Volunteers

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