A.9 SWAINSON'S HAWK (*BUTEO SWAINSONI*)

photo courtesy BCAG

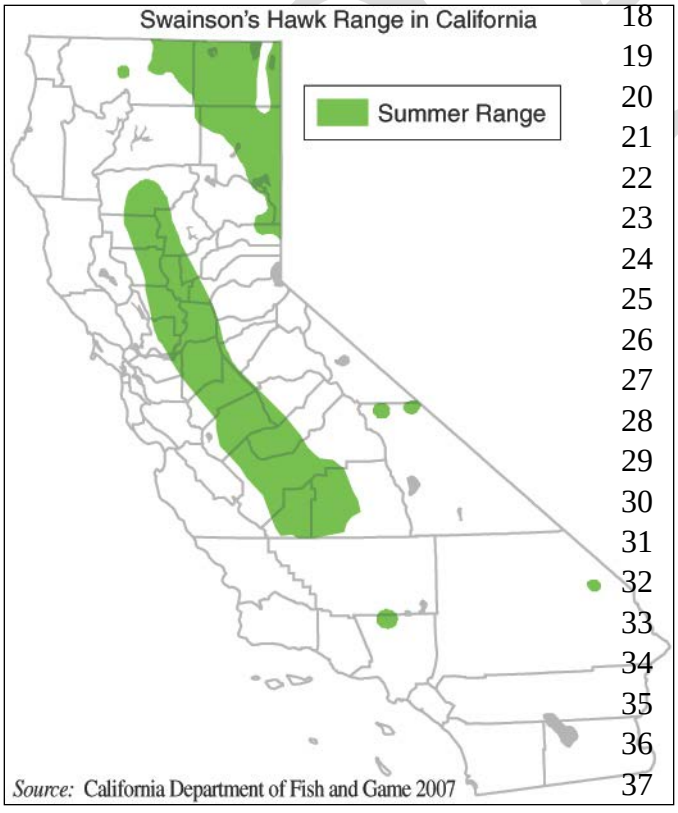
A.9.1 Legal and Other Status

The Swainson's hawk (*Buteo swainsoni)* is listed as threatened under the California ESA. The Swainson's hawk has no federal regulatory status; however, the species is included on the USFWS list of Birds of Conservation Concern (BCC) for Region 1. BCC species are those that the USFWS considers potential candidates for federal listing.

A.9.2 Species Distribution and Status

A.9.2.1 Range and Status

The Swainson's hawk inhabits grassland plains and agricultural regions of western North America during the breeding season and winters in grassland and agricultural regions from Central Mexico to southern South America (England et al. 1997, Bradbury et al. in preparation). Early accounts described Swainson's hawk as one of the most common raptors in California, occurring throughout much of lowland California including the Central Valley, coastal valleys, Southern California deserts, and Great Basin deserts east of the Sierra Nevada (Sharp 1902).



Since the mid-1800s, native grassland foraging habitats and woodland nesting habitats that supported the species have been converted for agricultural and urban uses. Today, native grassland habitats, riparian forests, and oak woodlands have been substantially reduced (Katibah 1983), which has caused a substantial reduction in the breeding range and in the size of the breeding population of Swainson's hawk in California (Bloom 1980, England et al. 1997). Formerly occurring through all of the lowland areas of the state, the current range is restricted primarily to the Central Valley and Great Basin deserts of northeast and eastern California. The most recent statewide population estimate for California is 2,081 breeding pairs, based on a statistically valid statewide survey effort conducted in

2005 and 2006 (Anderson et al. 2007).

In California, the majority of nesting Swainson's hawks are found in the Central Valley (estimated at between 600 and 900 breeding pairs) from Tehama County south to Tulare and Kings Counties. The optimum foraging and nesting habitat conditions in portions of Yolo, Solano, Sacramento, and San Joaquin Counties support the bulk of the Central Valley population (Estep 1989, Estep in prep., Anderson et al. 2006), with relatively large populations extending north to Butte County and south to Stanislaus County. While intensively farmed for over 100 years, much of this area retains a relative abundance of nesting habitat – narrow riparian corridors along rivers and streams, remnant oak groves and trees, roadside trees – and an agricultural pattern that is conducive to Swainson's hawk foraging. Thus, the species is relatively common in the central portion of the Central Valley and, perhaps on a local basis, even more common than it was historically.

Surrounded by the Sierra Nevada on the east and the Cascade Range on the north, the Central Valley is geographically isolated from the rest of the species' range, and may also be reproductively isolated based on banding data (Anderson, Bloom, Estep, Woodbridge unpublished data) and satellite radio telemetry studies of migratory patterns (Bradbury et al. in preparation).

A.9.2.2 Distribution and Status in the Plan Area

Within the Plan Area, nesting Swainson's hawks occur primarily west of State Route 99. Available nesting habitat is more abundant in this area, which includes portions of the Sacramento River, the Feather River, and their tributaries, and agricultural land use patterns are more compatible with Swainson's hawk foraging requirements. Nest sites have been documented along the Sacramento River, Feather River, Butte Creek, and other riparian corridors, and in non-riparian habitats associated with farmlands. It is likely that nesting Swainson's hawks also occur east of State Route 99, particularly in the grassland habitats along the edge of the valley. CNDDB and local nesting records from the Plan Area are shown in Figure A-9.

A.9.3 Habitat Requirements and Special Considerations

A.9.3.1 Nesting

Swainson's hawks usually nest in large native trees such as cottonwood (*Populus fremontia*), valley oak (*Quercus lobata*), walnut (*Juglans californica*), and willow (*Salix* spp.). They occasionally nest in nonnative trees such as eucalyptus (*Eucalyptus* spp.). Swainson's hawk nests occur in riparian woodlands, roadside trees, trees along field borders, isolated trees, small groves, and on the edges of remnant oak woodlands. Remnant riparian forests along drainages contain the majority of known nests in the Central Valley (Estep 1984; Schlorff and Bloom 1984; England et al. 1997); however, this is a function of nest tree availability rather than dependence on riparian forest.

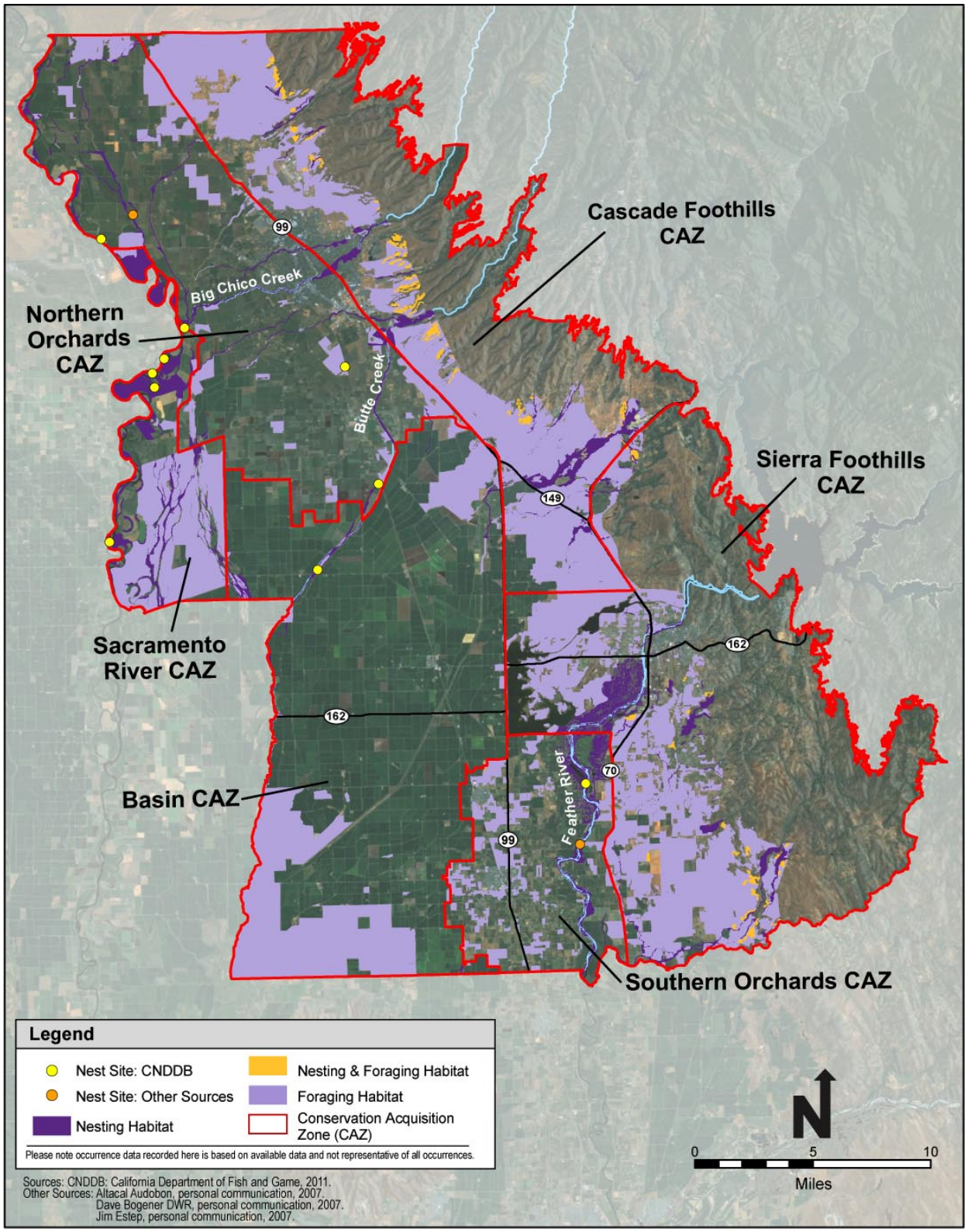


Figure A-9. Swainson's Hawk Modeled Habitat and Recorded Occurrences

Nest trees are usually tall (mean height = 57.7 feet [17.6 meters (m)]), and nests are usually constructed in the upper one-third of the tree (mean height = 47.2 feet [14.4 m]) (Estep 1989), providing protection to the nest as well as visibility from it. Nesting pairs are highly traditional in their use of nesting trees and territories. Many Central Valley nest sites have been occupied annually since 1979, and banding studies conducted since 1986 confirm a high degree of nest and mate fidelity (Estep in preparation).

A.9.3.2 Foraging

Central Valley foraging habitat consists primarily of farm and pasturelands. Swainson's hawks feed primarily on small rodents, usually in large fields that support low vegetation cover (i.e., provides easy access to the ground) and high densities of prey (Bechard 1982; Estep 1989). Foraging habitats include hay fields, grain crops, certain row crops, and lightly grazed pasturelands. Fields that lack adequate prey populations (e.g., flooded rice fields) or are inaccessible to foraging birds (e.g., vineyards and orchards) are rarely used (Estep 1989, Babcock 1995, Swolsgard 2003). Urban expansion and conversion to unsuitable crop types (e.g., vineyards and orchards) are responsible for a continuing reduction of available Swainson's hawk foraging habitat in the Central Valley.

The value of foraging habitat for Swainson's hawk is determined by several factors. Swainson's hawk is sensitive to fragmented landscapes, and use of an area for foraging will decline as the parcel size decreases (Estep and Teresa 1992). The ability of hawks to access prey is important and is dependent upon the vegetation structure of the parcel. Prey availability (i.e., the abundance of prey populations in a field) also determines the value of foraging habitat. In the Central Valley, agricultural land use or the planting of a specific crop type can determine the foraging value of a field at any given time. Cover types were evaluated by Estep (1989) and ranked based on these factors; however, suitability ranking is based on a variety of site-specific issues and at a landscape level should be characterized only on a general basis. On a site-specific level – important for land management purposes to maximize foraging value – individual cover types can be assessed based on site-specific and management conditions.

In general, hay crops – particularly alfalfa – provide the highest value as Swainson's hawk foraging habitat because of their low vegetation structure which creates high prey accessibility, the presence of relatively large prey populations, and because farming operations (e.g., weekly irrigation and monthly mowing during the growing season) enhance prey accessibility. Most grain and row crops are planted in winter or spring and have high foraging value while the vegetation remains low, but become less suitable as vegetative cover and density increase. During harvest, vegetation cover is eliminated while prey populations are highest, dramatically enhancing their suitability during this period. Some crop types, such as rice, orchards, and vineyards, provide little to no foraging habitat value because of reduced accessibility and relatively low prey populations. Uncultivated annual grasslands also provide suitable foraging habitat, but are considered less suitable than hay and some irrigated croplands due to lower prey densities of voles (*Microtus)* and other small mammal species.

A.9.4 Life History

A.9.4.1 Seasonal Patterns

Swainson's hawks arrive at the breeding grounds from early March to early April. Breeding pairs immediately begin constructing new nests or repairing old ones. Eggs are usually laid in mid- to late April, and incubation continues until mid-May when young begin to hatch. The brooding period typically continues through early to mid-July when young begin to fledge (England et al. 1997). By mid-August, breeding territories are no longer defended and Swainson's hawks begin to form communal groups. These groups begin their fall migration from late August to mid-September. Unlike the rest of the species, which migrates to southern Argentina for the winter, the Central Valley population winters primarily in Central Mexico and, to a lesser extent, throughout portions of Central and South America (Bradbury et al. in preparation).

A.9.4.2 Nest Site Selection

Factors that influence nest site selection include tree height and structure (for nest construction and security), proximity to disturbances, and available foraging habitat. Tall, mature trees are most often selected (averaging approximately 57.7 feet) and nests are usually constructed high in the nest tree (averaging approximately 47.2 feet) to maximize visibility (Estep in preparation, Estep 1989).

A.9.4.3 Reproduction

Clutch size is usually three to four eggs. Eggs are incubated primarily by the female. The male provisions the female and the young during brooding. Studies conducted in the Sacramento Valley indicate that one or two, and occasionally three young typically fledge from successful nests, with an average of 1.4–1.8 young per successful nest (Estep in preparation). After fledging, young remain near the nest and are dependent on the adults for about 4 weeks, after which they permanently leave the breeding territory (Anderson et al. in progress).

A.9.4.4 Foraging Behavior and Diet

The Swainson's hawk forages primarily on the wing. Foraging range sizes are highly variable depending on cover type, and fluctuate seasonally and annually with changes in vegetation structure (e.g., growth, harvest) (Estep 1989). Foraging ranges of Central Valley Swainson's hawks range from 830 to 21,543 acres (336 to 8,718 hectares [ha]) (Estep 1989, Babcock 1995), which is quite large compared with other buteos. Data from Estep (1989) and England et al. (1995) indicate that it remains energetically feasible for Swainson's hawks to successfully reproduce when food resources are limited around the nest and large foraging ranges are required.

Meadow vole (*Microtus californicus*) is the principal prey item taken by Swainson's hawks in the Central Valley (Estep 1989), but Pocket gopher (*Thomomys bottae*) is also an important prey item. Other small rodents, including deer mouse (*Peromyscus californicus*) and house mouse (*Mus musculus*) are also taken, along with a variety of small birds, reptiles, and insects.

A.9.5 Threats

A.9.5.1 Urbanization

Agricultural lands continue to be converted to urban uses at a high rate throughout the Swainson's hawk's range. This results in permanent loss of habitat and fragmentation of landscapes, resulting in a reduction of available foraging habitat for the Swainson's hawk.

A.9.5.2 Agricultural Crop Conversion

Conversion from compatible to incompatible crop patterns reduces available foraging habitat and influences the distribution of nesting Swainson's hawks. Large regions of the Central Valley have been converted to rice, vineyards, orchards, cotton, and other incompatible crop types that support few nesting hawks. Continued conversion of hay, row, and grain crop agriculture to vineyards, orchards, and other incompatible crop types reduces available foraging habitat on a local and regional basis. The inundation of agricultural lands or seasonal wetland habitats in the spring and summer also reduces foraging habitat availability.

A.9.5.3 Other Threats

Other threats to local and regional Swainson's hawk populations include the following:

- Loss and lack of regeneration of valley oak and other native trees;
- Loss of riparian vegetation from levee projects, agricultural practices, and local development along watercourses;
- Shooting; and
- Disturbances related to proximity to expanding urban areas.

A.9.6 Relevant Conservation Efforts

Swainson's hawk conservation efforts focus on the development and implementation of habitat conservation plans/natural community conservation plans. These regional conservation approaches can be effective at managing and sustaining Swainson's hawk populations if sufficient suitable landscape is preserved (Estep and Teresa 1992). Swainson's hawk is a covered species or a proposed covered species in several regional conservation plans in the Central Valley region of California including the the Placer County Conservation Plan, San Joaquin County Multi-species Habitat Conservation and Open Space Plan, the East Contra Costa County Habitat Conservation Plan/Natural Community Conservation Plan, the Natomas Basin

Habitat Conservation Plan, the South Sacramento County Habitat Conservation Plan, the Solano County Multi-species Habitat Conservation Plan, the Yolo County Natural Heritage Program Plan, and the Bay Delta Conservation Plan.

DFG is currently finalizing a management strategy for the Swainson's hawk that is designed to coordinate conservation planning efforts to facilitate a comprehensive and consistent approach to managing landscapes to sustain Swainson's hawk populations in the Central Valley (DFG in preparation).

A.9.7 Species Habitat Suitability Model

A.9.7.1 Nesting Habitat

Nesting habitat includes all cottonwood-willow riparian forest, valley oak riparian forest, willow scrub, and dredger tailings with riparian located in open terrain. Open terrain is defined as areas where these land cover types are located west of the slope break between the eastern foothills and the valley floor. East of this slope break, these land cover types are primarily confined by steeply sloped terrain that would not be expected to be used for nesting by Swainson's hawks. Because this slope break does not correspond to a consistent elevation from north to south within the Plan Area, it was visually delineated from topographic maps.

A.9.7.2 Assumptions

In the Central Valley, Swainson's hawks typically nest in large native trees such as cottonwood, willow, and valley oak. These trees (and thus most nest sites) are most often found along stringers of remnant valley and foothill riparian forest and the edges of oak woodland habitats (Estep 1984, Schlorff and Bloom 1984, England et al. 1997). However, Swainson's hawks also nest in a variety of other native and nonnative trees and habitats such as roadside trees, windbreaks, oak groves, isolated trees, and trees around rural residences. These potential nesting sites are not captured in the habitat model if their spatial extent is smaller than the minimum HCP/NCCP land cover type mapping unit. Consequently, this model may not encompass every possible nesting site. The extent of nesting habitat not captured by the model is considered to be relatively small compared to the extent of nesting habitat that is captured by the model.

A.9.7.3 Foraging Habitat

Swainson's hawk foraging habitat includes all irrigated cropland, irrigated pasture, grassland (all types), vernal and altered vernal pools contained by grassland (all types), and managed wetland land cover types within 10 miles of known nest sites and modeled nesting habitat.

A.9.7.4 Assumptions

In the Central Valley, foraging habitat consists primarily of crop lands and pasturelands. Swainson's hawks feed primarily on small rodents, usually in large fields that support low

vegetative cover (to provide access to the ground) and high densities of prey (Bechard 1982; Estep 1989). These habitats include hay fields, grain crops, certain row crops, and lightly grazed pasturelands. Fields lacking adequate prey populations (e.g., flooded rice fields) or those that are inaccessible to foraging birds (e.g., vineyards and orchards) are rarely used (Estep 1989, Babcock 1995, Swolsgard 2003). Although nesting Swainson's hawks may forage to distances greater than 10 miles from nest sites, the California Department of Fish and Game uses a flight distance of 10 miles between active nest sites and foraging habitat as a standard for conducting analysis of impacts on foraging habitat.

A.9.7.5 Nesting and Foraging Habitat

Swainson's hawk nesting and foraging habitat consists of blue oak savanna. Blue oak savanna provides Swainson's hawks with nesting trees immediately adjacent to suitable grassland foraging habitat due to the scattered distribution of trees and openness of the surrounding terrain.

A.9.7.6 Assumptions

In the Central Valley, while Swainson's hawks typically nest in large native trees such as cottonwood, willow, and valley oak that are commonly associated with riparian habitat, other trees and habitats including, oak groves and isolated trees are also used. Rees in blue oak savanna would fall into the latter categories. These potential nesting sites are not captured in the habitat model if their spatial extent is smaller than the minimum HCP/NCCP land cover type mapping unit. Consequently, this model may not encompass every possible nesting site. The extent of nesting habitat not captured by the model is considered to be relatively small compared to the extent of nesting habitat that is captured by the model. Suitable foraging habitat for Swainson's hawk is characterized by low vegetative cover (to provide access to the ground) and high densities of prey (Bechard 1982; Estep 1989). Grasslands immediately adjacent blue oak savanna have these characteristics.

A.9.8 Recovery Plan Goals

A recovery plan has not been prepared for the Swainson's hawk and recovery goals have not been established for the species.

A.9.9 References

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