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Importance of Riparian Systems to Nesting Swainson's Hawks in the Central Valley of California1

Importance of Riparian Systems to Nesting Swainson's Hawks in the Central Valley of California[1]

Ronald W. Schlorff and Peter H. Bloom[2]

Abstract.—Once a common breeding bird of the Central Valley and elsewhere in California, the Swainson's Hawk (Buteoswainsoni) has experienced a severe population decline due to, among other things, loss of the riparian systems that provided trees for nest sites. The pattern of land use prevalent over the past 130 years has reduced riparian systems of the Central Valley to a tiny fraction of their former extent. It will be necessary to maintain and restore stands of vegetation in riparian systems if the Swainson's Hawk is to continue as a breeding species in the Central Valley.

Introduction

The Swainson's Hawk (Buteoswainsoni) (fig. 1) was once assumed to be so common in California that most historical reporters felt it did not warrant special mention (Bloom 1980). It was variously described as the most abundant hawk in the southern Transverse Ranges (Sharp 1902) and common in spring, summer, and fall from the foothills to the ocean (Willett 1912). Willet (ibid .) also reported a population of Swainson's Hawks breeding on Santa Catalina Island. Historic accounts provide some qualitative data on the former abundance of the species, but no quantitative studies of Swainson's Hawk population size or breeding distribution in California were published from the late nineteenth and early twentieth centuries. Thus, today, it is difficult to assess the status when quantitative data on the historic population are lacking. Fortunately, however, early records of the egg-collectors do provide useful information on historic distribution of the species.

Figure 1.
Adult male dark-phase Swainson's Hawk marked with colored leg band and USDI Fish and Wildlife Service band.

Bloom (1980) used a combination of factors to arrive at a historic statewide nesting population estimate of between 4,300 and 17,100 pairs of Swainson's Hawks. The method involved taking observed nesting densities in relatively undisturbed habitat at the present and extrapolating backward to include all suitable nesting and foraging habitat assumed to be available to the species historically. By comparing estimated historic population levels with that observed today, it is evident that the Swainson's Hawk has suffered a population decline of enormous proportions, perhaps greater than a 90% statewide decline since 1900 (Bloom ibid .).

Comparison of historic and present range reveals the species is now absent from many regions of California where it once was a common breeding bird (figs. 2 and 3). Historic population estimates for

the Central Valley ranged from 1,656 to 6,624 pairs. During 1979, a breeding population of 280 pairs was estimated inhabiting the area from 40 km. (25 mi.) south of Fresno in the San Joaquin Valley north to the vicinity of Chico in the Sacramento Valley.

Valley populations of Swainson's Hawks frequently nested in valley oaks (Quercuslob -

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Figure 2.
Historic range of the Swainson's Hawk in California. This is the approximate range during the late nineteenth and early twentieth centuries (shaded area).

Figure 3.
Current range of the Swainson's Hawk in California.
This range was delineated from results of surveys
conducted during 1979–81 (shaded area).

ata) and Fremont cottonwoods (Populus fremontii) historically and at the present time. Often, trees chosen as nest sites are within 90 m. (100 yd.) of a major Valley stream, creek, or slough in the riparian zone. Today, remnants of riparian vegetation exist along portions of the Sacramento, American, and Feather Rivers and their tributaries in the Sacramento Valley, and along the San Joaquin River and tributaries in the San Joaquin Valley (fig. 4) (Thompson 1977; Conard etal . 1977). Additional riparian vegetation suitable for nesting Swainson's Hawks may be found along the many miles of creeks, sloughs, and canals that crisscross the agricultural and grazing fields of the Central Valley. These habitats often support the only trees in a local agricutural area, and therefore are vital to Swainson's Hawks for nest sites.

The 1979 Swainson's Hawk study (Bloom 1980) provided the basis for subsequent investigations into the species' dependence on riparian systems for nesting in the Central Valley. Monitoring of nest sites in 1980 and 1981 confirmed the initial indication of the importance of riparian systems to Swainson's Hawks. Unfortunately, a pattern of destruction and degradation has characterized much of man's relationship with this vegetation-type in the Central Valley and elsewhere (Thompson 1977; Smith 1977). Smith (ibid .) estimated that about 314,000 ha. (775,000 ac.) of riparian vegetation existed in the Central Valley in 1850. By 1977, only 4,900 ha. (12,000 ac.)—1.5%—remained. This loss is continuing and there are plans to remove more vegetation along the Sacramento River and other riparian ecosystems in order to effect "bank protection" and for "flood control" (Jannssen 1976). If species such as Swainson's Hawks are to survive, the trend of destruction must be reversed.

Methods

Study Area

During 1979, the entire state was surveyed for nesting Swainson's Hawks. For purposes of this paper, the habitat relationships of the species in the Central Valley were investigated. An area corresponding to the Valley floor and extending from 40 km. (25 mi.) south of Fresno to the vicinity of Chico, approximately 47,700 km^2 (18,400 mi^2) constituted the study area (fig. 3). There are still significant riparian systems available to nesting Swainson's Hawks within this area. A 219 km. (135 mi.) section of the Sacramento River, from Colusa south to the Sacramento Delta, served as a riparian study area and was surveyed to determine nesting density and habitat quality. Additional riparian areas consisting of large and small streams, sloughs, and canals also provided study areas.

Habitat Description

Historic and present Central Valley riparian systems have been described in detail (Conrad etal . 1977; Michny etal . 1975; Roberts etal . 1977; Thompson 1977). Wildlife studies document habitat relationships of the

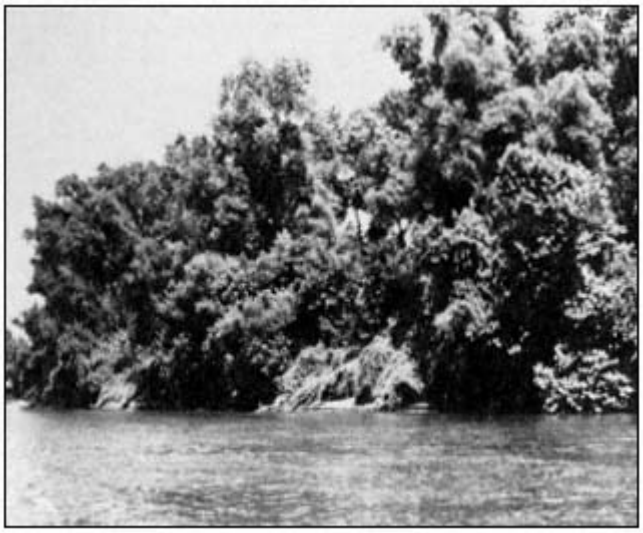

Figure 4.
Typical Swainson's Hawk nesting habitat in a Central Valley riparian system. Similar stands of vegetation exist along portions of the Sacramento River.

various species dependent on riparian systems (Brumley 1976; Gaines 1977).

The riparian zone of major Valley streams has been described as a continuum of plant communities following the topographic line from the stream channel through the low and high terrace deposits of the floodplain (Conard etal . 1977). Cottonwoods, oaks, sycamores (Platanusracemosa), and large willow trees (Salix sp.) form the dominant overstory vegetation in the zones most important to Swainson's Hawks. Cottonwoods typically dominate the lower terrace deposits closer to the stream bank while sycamores and valley oaks are found on higher terrace deposits and cut banks along the outside of meanders (Conard etal . 1977). Several species of woody and herbaceous plants comprise the understory in this riparian forest. Historically, and to a lesser extent today, a native grassland community, including oat (Avena sp.), brome-grass (Bromus sp.), ryegrass (Elymus sp.), barley (Hordeum sp.), and ryegrass (Lolium sp.) provided foraging habitat for Swainson's Hawks beyond the valley oak component of the riparian system.

Survey Techniques

Techniques used in the 1979 Swainson's Hawk survey are described in Bloom (1980). Subsequent surveys in 1980 and 1981 were made employing these same methods for automobile surveys of riparian vegetation along major watercourses and smaller streams and sloughs. Systematic search of areas known or suspected to support Swainson's Hawks provided nesting data for the two years following the 1979 survey.

In 1981, a 219 km. (136 mi.) portion of the Sacramento River was surveyed by motorboat to record sightings, territories, and nest sites of Swainson's Hawks. The boat survey was conducted over three days with approximately 64 to 80 km. (40 to 50 mi.) surveyed per day. In addition to recording data on the hawks, notes and maps were made of habitat availability and quality along the survey route. These maps and notes were compared against past and recent aerial photographs made in the study area. Automobile surveys in areas near to the boat survey route were made to ensure more complete coverage, and the automobile surveys better facilitated assessments of foraging areas near the river.

An analysis of habitat characteristics was made from nesting survey reports made during 1979–81. Data were pooled for the three years and information was summarized on the proximity of territories to

riparian systems, and tree species and heights chosen for nesting by Swainson's Hawks.

Results

Review of 1979 Survey

Providing details on habitat association was not a primary objective of the 1979 Swainson's Hawk survey but it was an important secondary goal. The first evidence of the importance of riparian systems to nesting Swainson's Hawks was apparent during the portion of the study involving the Central Valley. Elsewhere in the State, the Klamath Basin for instance, Swainson's Hawks do not appear to be dependent on riparian vegetation because nest trees were located away from the few streams in the area (Bloom 1980).

In the Central Valley, there are also many suitable nest trees available away from riparian systems; however, their continued existence is threatened in many cases. Where these trees grow in the midst of agriculture fields, regeneration is severely hampered due to land use activities. Sometimes livestock grazing prevents regeneration, and always there is the threat of removal if the space trees occupy and the water they use is required in order to expand agricultural activities. Therefore, it is important to preserve nesting habitat in riparian systems. As noted during the 1979 survey, severe destruction of habitat already has occurred in the riparian systems and is continuing at an alarming rate.

A majority of all nests and territories recorded for the Central Valley were close to riparian systems (figs. 5, 6, and 7). Nests were found most often in cottonwoods and oaks (table 1). Cottonwoods were considered an important nest tree because they provide an excellent nest site at the present and, due to rapid growth rate, will be an ideal species for restoration work. Oaks also are important; however, regeneration time will be much longer in areas where oaks are to be restored.

Tree height was an important parameter affecting nesting, and Swainson's Hawks appeared to choose relatively tall trees for nest sites.

Tree heights ranged from 6–30 m. (20–100 ft.) with a mean of 12 m. (41 ft.) (N = 36). Nests were built near the tops of oaks and cottonwoods that provided shade for the nest and also afforded a good view of the surrounding terrain.

Subsequent Surveys

During 1980 and 1981, results of surveys continued to show the importance of riparian systems to Swainson's Hawks (figs. 5, 6, and 7). Occasional nests were found a mile or more away from riparian zones, but a greater proportion but a greater proportion

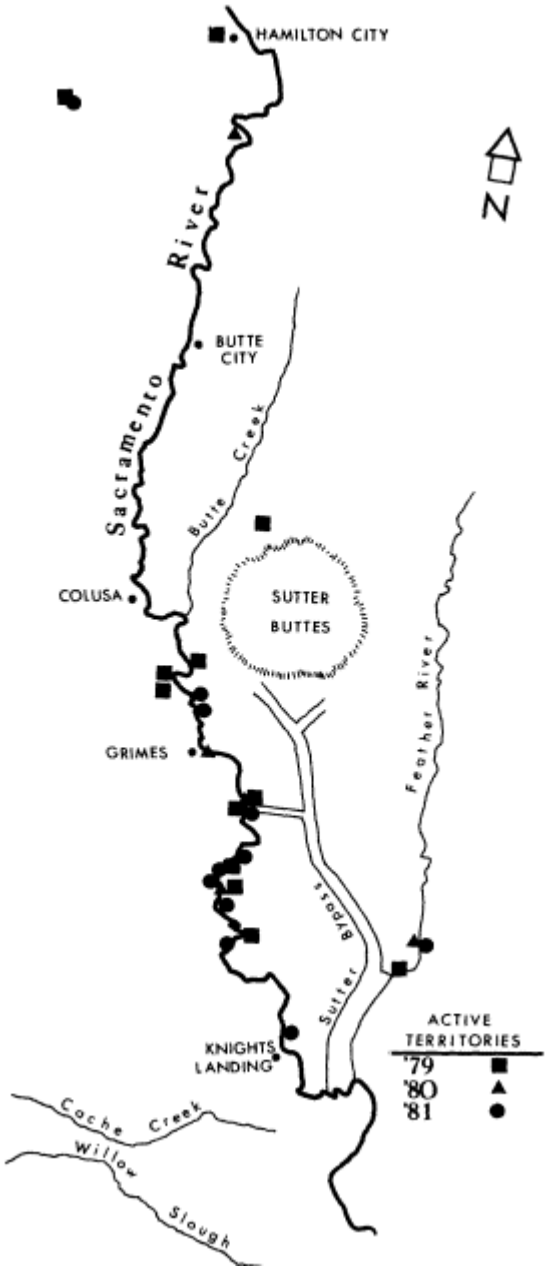

Figure 5.
Location of Swainson's Hawk nest sites in the Central Valley of California, northern section. Data derived from surveys conducted during 1979–81.

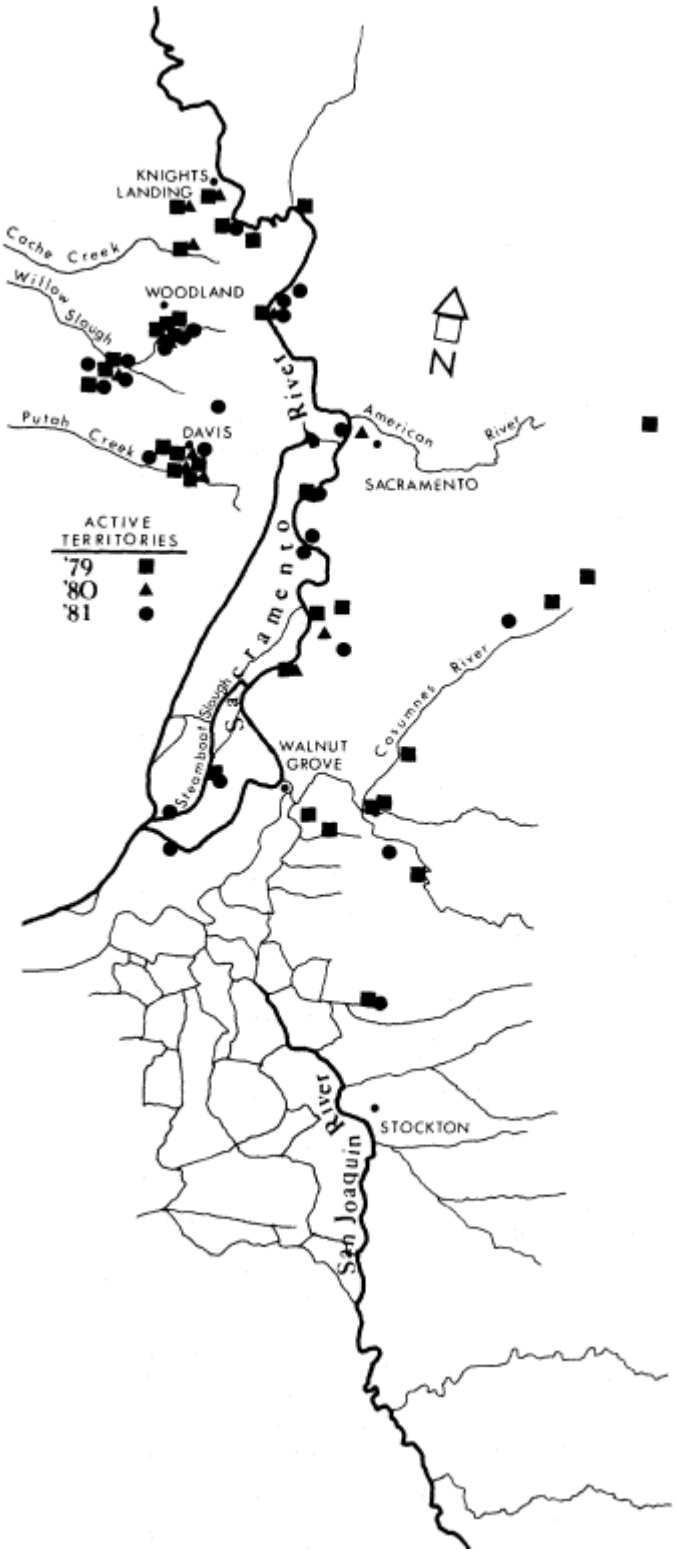

Figure 6.
Location of Swainson's Hawk nest sites in the Central Valley of California, middle section.
Data derived from surveys during 1979–81.

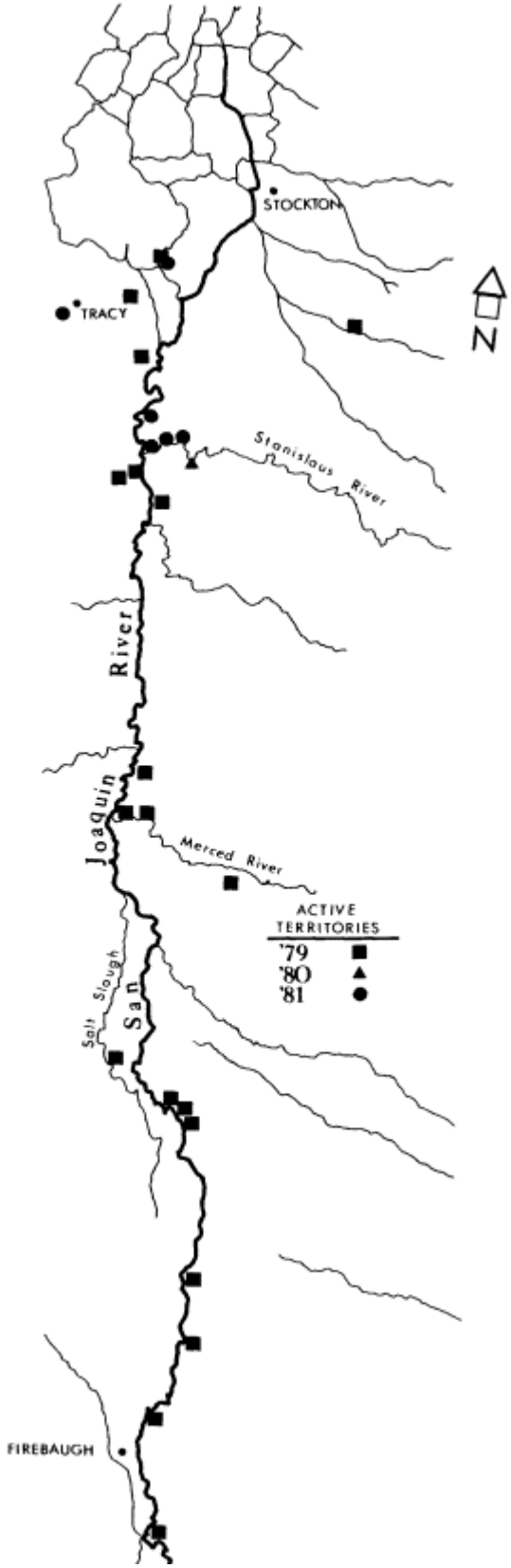

Figure 7.
Location of Swainson's Hawk nest sites in the Central Valley of California, southern section. Data derived from surveys conducted during 1979–81.

Table I.—Trees used by Swainson's Hawks for nesting in the

Central Valley of California, 1979–81.

Nest tree species	Number	Percent
Valley oak Quercuslobata	25	50.0
Fremont cottonwood Populusfremontii	21	42.0
Willow Salix spp.	1	2.0
Eucalyptus Eucalyptus spp.	3	6.0
Totals	50	100.0

were within streamside vegetation (table 2). There is a built-in bias concerning the search for nest trees. Since most suitable trees are in riparian systems in the Valley, it naturally follows that these areas supported the most nesting of Swainson's Hawks. Results of the 1981 boat survey revealed extensive habitat loss along both banks of a 219 km. (136 mi.) stretch of the Sacramento River from Colusa to the Sacramento Delta. It was estimated that 85% of the stream bank was either entirely devoid of vegetation or the vegetation that did remain was unsuitable for nesting Swainson's Hawks.

Where suitable habitat did remain and prerequisites for nesting seemed to be met, Swainson's Hawks often were found (fig. 4). Results indicate that the hawks nested in or near the riparian zone at a frequency of one pair per 13.7 river km. (8.5 river mi.); this is considerbly lower than Bloom's estimate of one territory per 6.4 km. (4.0 mi.) of suitable nesting habitat for Central Valley watercourses (Bloom 1980). The greatest nesting frequency was recorded in 1979 when three active territories were located along a 1.1 km. (0.7 mi.) stretch of Willow Slough in Yolo County. This indicates the abundance of Swainson's Hawks possible given optimum habitat conditions.

Table 2.—Proximity of Swainson's Hawk nesting territories to riparian systems in the Central Valley of California, 1979–81.

Distance from riparian zone	Number of territories[1]	Percent
Within zone	107	71.0
Less than 30 m. (100 yd.)	4	2.5
Less than 0.4 km. (0.25 mi.)	6	4.0
Less than 1.6 km. (1.0 mi.)	7	4.5
Greater than 1.6 km. (1.0 mi.)	27	18.0
Totals	151	100.0

[1] Nest trees not located in every instance.

Discussion

It has been noted that the Swainson's Hawk, although not an obligate riparian species, nevertheless is closely associated with riparian systems in certain situations (Bent 1963). The Central Valley appears to be such a situation. Elsewhere in North America, the species is often found nesting in juniper (Juniperus sp.)/sagebrush (Artemesia sp.) and prairie habitats of the Great Basin (Olendorff 1975; Dunkle 1977; Fitzner 1978). The northern California population of Swainson's Hawks exists in such habitat in the Klamath Basin (Bloom 1980).

Land use patterns prevalent over the past 125 years have destroyed the once vast riparian forests that existed. Where gallery forests 6.4- to 8.1-km. (4- to 5-mi.) wide existed there are now kilometers of riprapped banks denuded of even brushy vegetation. The loss came about as a result of man's activities to obtain fuel, building material, and farmland in an earlier era and, in recent decades, to provide for agricultural expansion, "bank protection" and "flood control" (Smith 1977; Gaines 1977; Sands 1978).

Corresponding with the time of riparian vegetation loss in the Central Valley, the Swainson's Hawk population declined catastrophically. The decline has been on the order of 80–90% of the estimated historic level, a decline equal in severity to that suffered by the endangered American Peregrine Falcon (Falcoperegrinusanatum) (Bloom 1980; Herman etal . 1970). Indeed, the Swainon's Hawk is a candidate for inclusion on the State's list of endangered species.

Besides habitat loss, other factors, such as problems relating to their migration route and wintering grounds, may have contributed to the species' decline in California. However, it seems clear that the tremendous loss of the riparian vegetation, that today appears so important to the Swainson's Hawk in the Central Valley, must have had a correspondingly tremendous impact on the population.

The solution to the problem of a declining wildlife population is never easy. There are many factors over which we may have little or no control. However, it is clear that we do have an opportunity to affect one critical factor in the Central Valley. A vigorous program to maintain and enhance remaining riparian systems may go a long way to help restore Swainson's Hawks to a more viable status. By maintaining a large and healthy Swainson's Hawk population in the Central Valley, which will serve as the core from which some of the former range may once again be repopulated, it is hoped we can mitigate for those mortality factors which we cannot control (i.e. problems on the wintering grounds in South America). Maintaining suitable nesting habitat in the Central Valley may be the key to saving the Swainson's Hawk from extirpation in California.

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