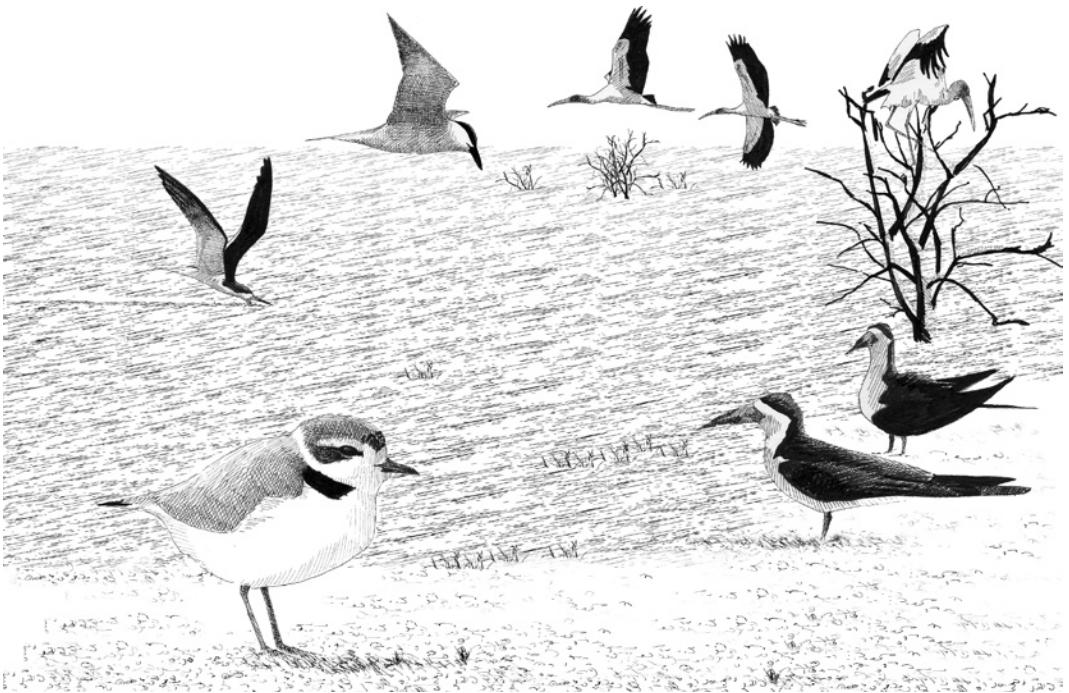


II

SPECIES ACCOUNTS



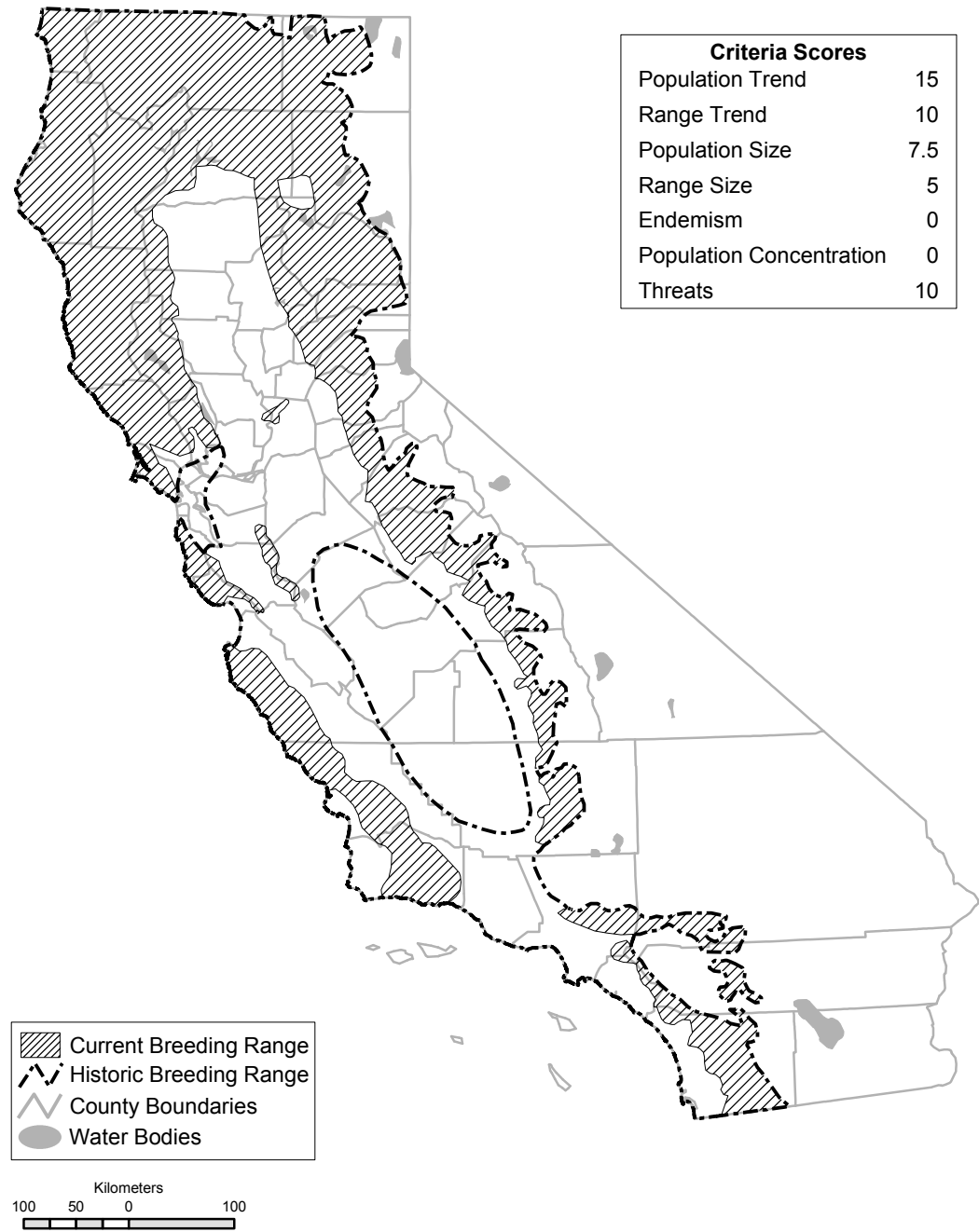
Andy Birch

PDF of Purple Martin account from:

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PURPLE MARTIN (*Progne subis*)

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Current and historic (ca. 1944) breeding range of the Purple Martin in California; occurs more widely in migration. Breeding generally is highly localized, especially inland and along the central and southern coast. Mapped range includes potential habitats (mostly forested areas with few European Starlings) where breeding may be possible now or in the future as a result of habitat creation through intense fire. Numbers have declined greatly and the range has retracted moderately, particularly in lowland areas such as the Central Valley and the southern coast; never known to breed on the floor of the central and southern San Joaquin Valley.

SPECIAL CONCERN PRIORITY

Currently considered a Bird Species of Special Concern (breeding), priority 2. Included on both prior special concern lists (Remsen 1978, 2nd priority; CDFG 1992).

GENERAL RANGE AND ABUNDANCE

The Purple Martin is broadly distributed throughout much of eastern North America and occurs locally in the Rocky Mountains, Sonoran Desert, Central Mexico, and Pacific Coast states and provinces. Of three recognized subspecies, *P. s. arboricola* was described from the Great Basin ranges (Behle 1968) and has been assumed to occur in the southern Rocky Mountains and Pacific states and British Columbia (Brown 1997). Pacific martins are considered *P. s. arboricola* by some (Phillips 1986, Pyle 1997), *P. s. subis* by others (Unitt 1984, Browning 2002). Recent mitochondrial DNA analysis shows strong differentiation between Pacific martins and eastern birds designated as *P. s. subis* (Baker et al. in press.), but subspecific taxonomy of western populations remains unclear. Regardless, about 3500 pairs breed in the Pacific states and British Columbia (WPMWG 2005). No comprehensive estimates exist for the Rocky Mountain and Intermountain regions, but 250–500 pairs are estimated to nest in Colorado (Kingery 1998). All subspecies apparently winter in South America.

SEASONAL STATUS IN CALIFORNIA

Occurs as a summer resident and migrant, primarily from mid-March to late September. Breeds from May (rarely late Apr) to mid-August (Williams 1998).

HISTORIC RANGE AND ABUNDANCE IN CALIFORNIA

Grinnell and Miller (1944) described martins as “fairly common” and widely but irregularly scattered throughout California west of the Great Basin, Mojave, and Colorado deserts and from sea level to 5900 ft (1798 m) elevation. They

noted “some indication of spreading to occupy certain districts built up by people in recent years” and that total numbers of martins were probably increasing. Populations presumably remained stable or increased from the 1940s to 1960s and 1970s, during which time occurrence was more extensively documented.

Based on William’s (1998) review of historical records, until the 1960s to 1970s martins occurred locally in greatest abundance in coastal portions of northwestern California, and breeding was confirmed at scattered localities throughout the region. Martins bred locally in the Modoc Plateau, Cascade Range, and Sierra Nevada, and throughout most of the central coast region. They occurred through much of the northern Central Valley, where they nested in riparian habitats and in urban buildings. Lack of nesting records from south of Stockton suggests they were rare or absent on the floor of the San Joaquin Valley. Martins were reported as regular in the Tehachapi Mountains and numerous locally in southern coastal counties, where they nested in conifer, woodland, and urban areas.

RECENT RANGE AND ABUNDANCE IN CALIFORNIA

Purple Martins are widely but locally distributed in forest and woodland areas at low to intermediate elevations throughout much of the state. The BBS shows no significant long-term population trend for California (Sauer et al. 2005), possibly in part because martins are too rare to be reliably surveyed by this technique (i.e., recorded on only 19 routes, 1968–2004, and averaging <6 individuals per year on all surveys). The decline during 1968–1979, the period of increase of the non-native European Starling (*Sturnus vulgaris*) is marginally significant, and martin detections ceased on southern California routes during this period. Populations are densest in central and northern coastal conifer forests and smaller and more localized in the Sierra Nevada, interior foothills, and southern California. The species’ range has contracted substantially on the central and southern coastal slope and in the Central Valley (see map), and probably,

BREEDING BIRD SURVEY STATISTICS FOR CALIFORNIA

1968–2004					1968–1979			1980–2004			All data from Sauer et al. (2005)
Trend	<i>P</i>	<i>n</i>	(95% CI)	R.A.	Trend	<i>P</i>	<i>n</i>	Trend	<i>P</i>	<i>n</i>	Credibility
0.6	0.87	19	–5.8, 7.0	0.28	–10.9	0.07	11	3.5	0.37	14	Medium

at least locally, in the Sierra Nevada and Cascades. Its abundance has declined substantially from that described by Grinnell and Miller (1944) in these regions and, to a lesser degree, in the Tehachapi Mountains and interior portions of the current range in northwestern California. Several regional populations have shrunk substantially, and martins are now virtually extirpated from most interior and south coastal lowland areas, presumably by nest competition from the European Starling. A significant remnant population in Sacramento, however, appears to be generally stable (Airola et al. 2004), although declines occurred annually during 2005–2007 (Airola and Kopp 2005, 2007; Airola unpubl. data).

This status discussion is based on Williams's (1998) review, unless otherwise noted. Records before about 1980 do not reliably indicate current status because of the substantial recent effects of starling competition, except perhaps in forested regions where starlings are still not abundant. The starling arrived as a breeding species in the state in the early 1960s (Garrett and Dunn 1981) and increased rapidly in many areas through the 1970s but has since remained relatively stable or declined slightly in the state overall (Sauer et al. 2005). This summary reports only individual occurrences of martins that support substantial populations (especially those since Williams's summary) and those that illustrate larger patterns of status and occurrence.

Our statewide population estimate of 900 to 1350 pairs is rough because martins are widely but locally distributed and occupy some sites that are suitable only temporarily (i.e., recently burned and logged areas). The ranges for population estimates for the state and its subregions are based mainly on records from 1980 to 1994, summarized by Williams (1998), supplemented with limited later information. The lower end of the range for each region is the known number of recent nesting pairs; the upper end is the potential nesting population. The latter is based on the availability of suitable unsurveyed habitat (Williams 1998) and the potential for underestimating numbers during casual surveys (Airola and Grantham 2003).

Northwestern California. With a population currently totaling 350–800 pairs from 14 counties, martins are more numerous and uniformly distributed in this region than elsewhere in the state. They are concentrated in Redwood (*Sequoia sempervirens*) forests near the coast but occupy many inland areas except at the highest elevations and the inner Coast Ranges. While most martins here breed as pairs or small groups, larger concen-

trations (>8 pairs) have been reported since 1980 at Red Hills Road, Lake County (Woodward and Woodward 2005); the Highway 1 bridge at Gualala River, Sonoma County; Howell Mountain and Palisades, Napa County; and Shelter Cove, Humboldt County. The Humboldt Breeding Bird Atlas found martins in 18% of all blocks, with most at low to midelevations in the coast Redwood zone in the west-central portion of the county (Hunter et al. 2005).

Northeastern California. This area supports about 18–80 pairs, with recent breeding records only in Siskiyou, Shasta, and Modoc counties. The major nesting area is Lava Beds National Monument, Siskiyou County, where 21 pairs were recorded in 1979, but not more than 14 pairs were recorded since in limited surveys (Hill et al. 2002, D. Larson pers. comm.). Otherwise, only one or a few pairs have occurred at a few sites since the 1990s, and martins may have disappeared from several known sites (e.g., Eagle Lake and Willow Creek Valley, Lassen County).

Central Valley. Martins nested in buildings and riparian habitats from Stockton in the Sacramento–San Joaquin River Delta north through the Sacramento Valley through the 1960s to early 1970s. Following the arrival and increase of the European Starling, they were extirpated in this region except in the city of Sacramento, where they have persisted by nesting in hollow-box bridges. The Sacramento colonies probably represent some of the species' largest in the western United States. From 1992 to 2004, the known Sacramento population increased 65%, from 105 pairs at 4 colonies to 173 pairs at 11 colonies (Airola and Grantham 2003, Leeman et al. 2003, Airola et al. 2004). A decline of 40% during 2005–2007 to 106 pairs (Airola and Kopp 2007, Airola unpubl. data), however, has raised renewed concerns for these urban colonies.

Cascade Range, Sierra Nevada, and Tehachapis. Currently, the total for the Cascades is about 35–125 pairs from seven counties. Recent breeding sites are primarily in Shasta County, including the Pit River arm of Shasta Lake (which consistently supported at least 14–19 pairs from 1978 to 2001; Williams 1998, Hill et al. 2004), near Burney, and a few other sites.

Martins have nested continuously in the Sierra Nevada in very small numbers and currently total about 10–140 pairs. Recent known nesting sites are widely scattered, and each supports few individuals.

The Tehachapi Mountains, with 100–200 pairs, may represent the last place in California

where martins regularly nest in oak woodland. The southern Tejon Ranch/Grapevine area supported an estimated 40–100 pairs in 1982; a partial survey of the Bear Mountain area found 56 pairs in 2000 (Williams 1998, 2002), and martins were absent in former nesting areas where starlings are now abundant.

Central and southern coast. Martins are very local now on the central coast and confined to conifer regions, primarily on the immediate coastal slope. Currently, the regional population totals about 100–220 pairs. Nesting occurs on coastal ridges of Marin County, few or no pairs still breed in the East Bay, and very few pairs still nest at various sites in the Santa Cruz Mountains. In Monterey County, martins nest mainly in the coastal Redwood forest and in bridges along Highway 1, but are gone from all other former sites (Roberson 2002). A few sites in Monterey, San Luis Obispo, and Santa Barbara counties appear to be the last places where martins still nest in Western Sycamore (*Platanus racemosa*) woodland.

In southwestern California, martins are very rare in the Transverse Ranges (western Transverse Ranges, San Gabriel, and San Bernardino Mountains). In the Peninsular Ranges, they are rare in the Santa Ana and San Jacinto mountains and most abundant in the Palomar Mountains and, particularly, the Laguna and Cuyamaca mountains of San Diego County. A county-wide survey in Los Angeles County in 2002 detected only two martins (K Garrett pers. comm.). Currently, the regional population totals about 130–190 pairs from eight counties; during the 1997–2000 San Diego County atlas, an estimated 100 pairs were confined to 7% of all atlas blocks (Unitt 2004). Use of sycamores by martins was last reported in Orange County at Irvine Park in 1962 and O'Neill Park in Trabuco Canyon in 1981, and the small lowland population of San Diego County, where nesting was in sycamores at least near San Onofre, was last reported extant in 1978 (Unitt 2004). Recent large fires in forested areas in San Diego County and elsewhere in southern California, particularly in 2003, may increase nesting habitat, but wetland habitats that produce abundant martin prey have been eliminated from much of this region.

ECOLOGICAL REQUIREMENTS

Martin requirements have been deduced from their distributional patterns and recent studies in habitat selection (Williams 1998, 2002; Airola

and Grantham 2003). Common to all nesting areas are concentrations of nesting cavities, relatively open air space above accessible nest sites, and relatively abundant aerial insect prey. Martin distribution and abundance is most consistently determined by nest-site availability. New locations are colonized following an increase in nest sites, and local extirpations usually result from loss of nest sites or competition from starlings. Martins use a wide variety of nest substrates (e.g., tree cavities, bridges, utility poles, lava tubes, and, formerly, buildings), but nonetheless are very selective of habitat conditions nearby. Typical of all sites is low canopy cover at the nest height (usually <20% within 100 m). Also, most tree nest sites are located in the upper slopes of hilly and mountainous terrain. Martins seldom use snags along canyon bottoms or sites with dense vegetation at or above nest height.

Martin distribution also appears to be influenced by the availability of aerial insects, especially large ones such as dragonflies. Thus, martins are most abundant in mesic regions, near large wetlands and other water bodies, and at upper slopes and ridges, which likely concentrate aerial insects. Starlings must be present in low densities or absent, or nest sites that discourage starling use must be available (e.g., in bridges; Airola and Grantham 2003). In conifer regions, martins are most numerous in low- to midelevation forests (from sea level to 6000 ft [1829 m]) such as Redwood, yellow pine (*Pinus ponderosa*, *P. jeffreyi*), and mixed conifer. Conifer snags (occasionally dead-top trees and hardwood snags) are the most common nesting substrate, used by perhaps >70% of the California population; martins select very tall, large trees (medians for height = 22 m and diameter [at breast height] = 119 cm; Williams 1998). Stand-replacing fire is the main process that creates martin habitat by creating snags and open terrain. In coastal areas, however, martins also use remnant Redwoods that stand above regenerating forest or are made accessible by logging, including clear-cutting (B. Williams pers. obs.). Population persistence in forested areas appears to depend on the presence of clusters of large snags or individual very large snags that can support multiple pairs.

Nearly all woodland nesting sites support concentrations of very large trees, primarily Valley Oaks (*Quercus lobata*) and sycamores. However, martins have disappeared from nearly all otherwise suitable foothill and lowland Valley Oak and sycamore riparian habitats, presumably because of starling competition. Martins persist in oak habitats only in the Tehachapi Mountains, where

large oaks occur at relatively high elevations and in prominent positions, and where starling numbers are low (Williams 2002).

Systematic data have been collected at bridge nesting areas only in Sacramento (Airola and Grantham 2003). Bridge sites are of steel and concrete box girder design that support an abundance of vertical "weep holes" on the undersides, which martins use to enter large interior chambers. Occupied bridge sites in Sacramento are longer spans (mean = 301 m, minimum = 85 m) with at least 6.5 m of vertical space beneath weep holes. They also are in open areas that provide adequate flight access and perches on utility wires, fences, and light poles (seldom trees). None are above freeways or other roadways with high traffic volumes. Starlings are absent from, or nest only in small numbers at, all occupied bridge sites. By readily using interior holes, Sacramento martins appear to avoid competition with starlings, which strongly favor holes near the outer edges of bridges (Airola and Grantham 2003, Airola unpubl. data). Coastal bridge sites along State Route 1 are generally near suitable forest habitat but are not overgrown and thus provide ample flight access.

On the Modoc Plateau, martins nest in collapsed lava tubes (Hill et al. 2002). No systematic habitat data have been collected, but martins there may respond to opening size, depth, surrounding vegetation height, availability of cavities, and landscape position.

THREATS

In midelevation forests in much of the state, removal of large snags in suitable ridge and upper slope areas continues to reduce opportunities for martin establishment. Incidence of stand-replacing fire, which is increasing following years of fire suppression, is probably sufficient to create widespread habitat for martins if adequate numbers of large trees are retained in suitable sites. Postfire salvage logging, snag removal to reduce lighting ignitions, and, due to shortened logging rotations, lack of creation of large trees reduce martins' nesting opportunities in most of their range (Williams 1998). Awareness of the importance of retaining snags and residual large trees has increased, but safety and fire considerations often appear to override nest habitat protection in upper slope and ridge areas of greatest value to martins.

Competition from starlings (Airola and Grantham 2003) is the main threat to remnant martin populations in lowland woodlands, making recolonization of most areas unlikely. Human

development of more remote areas occupied by martins may increase competition by starlings (Williams 2002). Incremental loss of sycamore woodland from age and lack of regeneration is a long-term threat in the few remaining areas occupied by martins, although starlings are also a significant threat at most of these sites.

Although some bridge nest sites are reasonably protected by underlying land uses (roads, rail lines, parking lots, rivers), some areas have been eliminated in the past and some current sites are susceptible to leasing for uses that restrict airspace or flight access (i.e., parking garages, storage facilities, bus parking; Airola and Grantham 2003). Nesting exclusion during construction projects and landscaping that restricts access also has reduced populations and suitability of occupied sites. Collisions with trains, cars, and trucks and predation by human-maintained feral cat colonies also are potentially significant sources of mortality (Airola and Kopp 2007). Otherwise, martins in urban areas are not highly sensitive to human activities and tolerate substantial levels of human presence (Airola and Grantham 2003). The relatively few sites in urban areas at which bridge-nesting martins are concentrated (e.g., 10–12 colonies in Sacramento; Airola and Kopp 2007) are not institutionally protected, leaving them susceptible to habitat changes that may reduce site suitability.

No major threats are known for martins in other habitat types. Declines have been reported, but not well documented, for the population nesting uniquely in collapsed lava tubes at Lava Beds National Monument (Laymon 1979). Casual observations suggest that martins may not use the lava tubes most frequently visited by humans (B. Williams pers. obs.).

MANAGEMENT AND RESEARCH RECOMMENDATIONS

- Retain an adequate supply of large snags on forested lands, especially on upper slopes and ridgetops, by incorporating martin habitat considerations into National Fire Plan projects, postfire burn recovery plans, and other salvage, roadside hazard tree removal, and general timber harvest plans.
- Protect occupied and suitable bridge sites from uses that restrict air space and martin access or that cause excessive human disturbance.
- Retain large trees in oak and sycamore woodlands occupied by martins, and con-

trol adjacent development that may increase starlings.

- Establish nest-box programs (see Fouts 1996, Copley et al. 1999, Horvath 2000) to diversify nesting habitats where nest-site competition threatens or has eliminated martins and where commitment to long-term management is certain. Do not foster complete conversion to nest boxes for populations that are successfully nesting in trees, bridges, or power poles.
- Evaluate martin occurrence in recently burned forests and protect occupied sites and other suitable sites in formerly occupied areas.
- Investigate and implement measures to reduce the effects of starlings on martins, through direct control locally at nest sites and by land-use protection and modifications.
- Evaluate the effects of bridge site characteristics on nest success of martins, use levels by starlings, and changes in species' use patterns over time.
- Continue to evaluate mortality factors, including vehicle collisions and predation by feral cats, that affect martins nesting under urban bridges.
- Study characteristics of lava tubes used by martins, including human visitation effects.
- Clarify systematics of martin populations within California and adjacent states.
- Acquire demographic and productivity data on California martins, for comparison with other populations, to identify sensitive reproductive parameters and limiting factors.
- Acquire information on locations, characteristics, and potential threats to premigratory communal roost sites and wintering areas.

MONITORING NEEDS

Existing bird monitoring programs do not adequately sample for martins. Performing systematic surveys to track population trends reliably is challenging because of martins' dispersed distribution, occurrence in many remote areas, tendency to occupy some ephemeral habitats (e.g., recent burns), and use of inaccessible hole nesting sites. Broad-scale monitoring to detect population trends may best be conducted through annual surveys of recently known colonies and areas of suitable

habitats (i.e., recent burns). Local and regional monitoring efforts should employ methods adopted by the Western Purple Martin Working Group (Cousins and Airola 2005) to increase consistency and allow comparison between study sites. Key natural habitats (coastal Redwood forest and oak woodlands in Tehachapi) should receive priority for periodic monitoring. It would be valuable to evaluate the use of low-level aerial surveys to identify colonies, especially in the Redwood regions, as potential nest trees are usually widely scattered but conspicuous. Geographic information system (GIS) analysis should be conducted to characterize landscape features at existing nest areas and to identify similar areas on which to focus surveys. Inventories are needed at key unstudied sites, particularly Lava Beds National Monument (including historical review of nesting populations) and coastal bridge sites. Lastly, monitoring of bridge-nesting martins should be continued in the Sacramento region and expanded to look for colonization of other bridge sites elsewhere in the Central Valley.

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