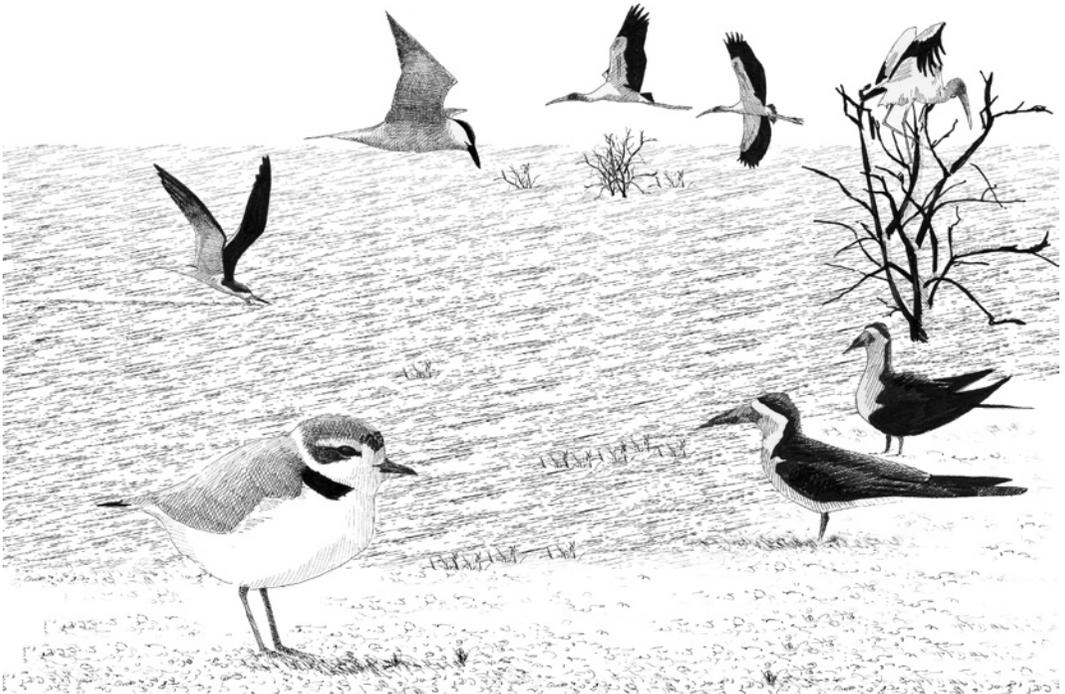


II

SPECIES ACCOUNTS



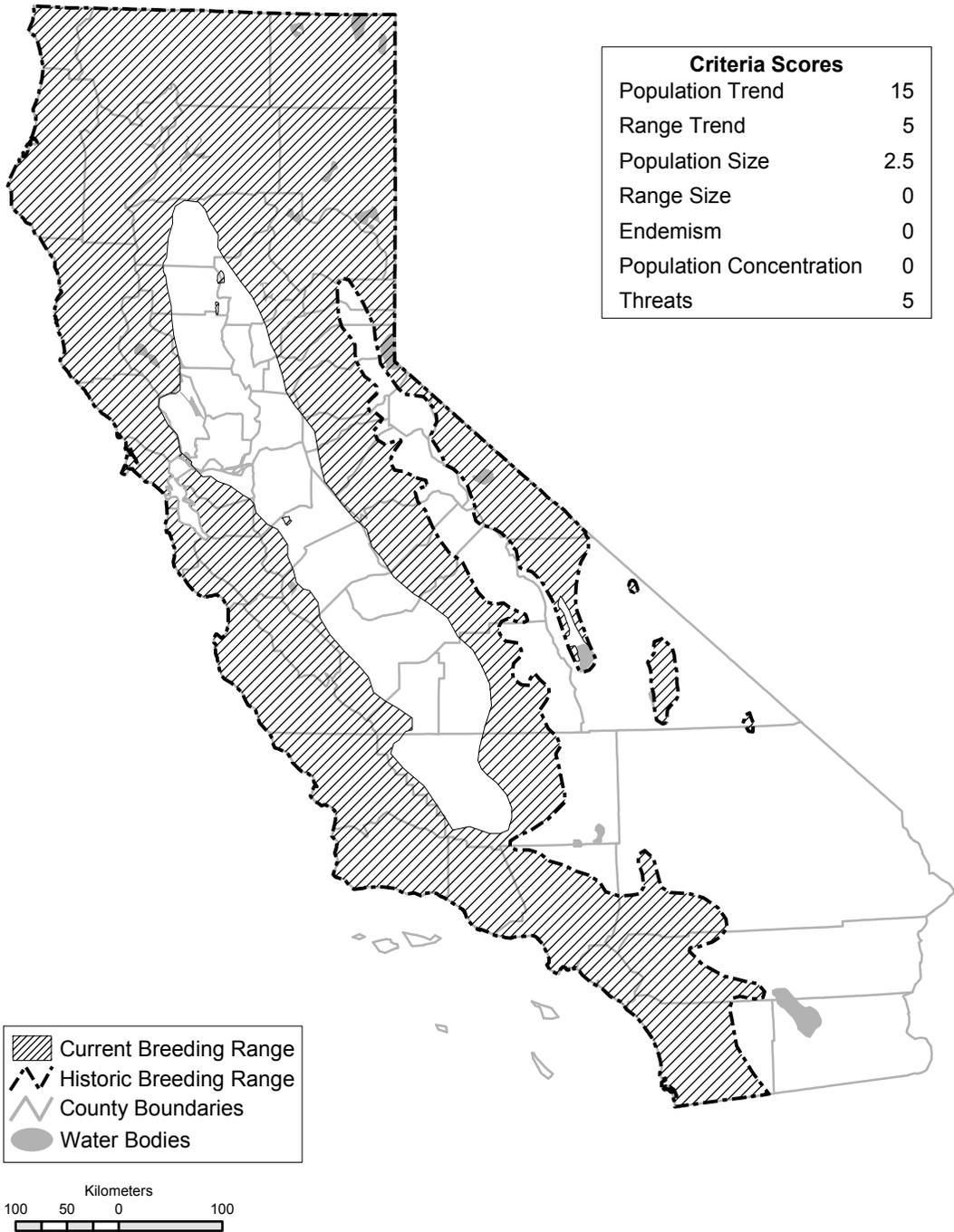
Andy Birch

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YELLOW WARBLER (*Dendroica petechia*)

SACHA K. HEATH



Current and historic (ca. 1944) breeding range of the Yellow Warbler in California; occurs much more widely in migration. Breeding numbers have declined greatly, particularly in lowland areas west of the Cascade–Sierra Nevada axis, and the range has retracted broadly in the Central Valley and locally in the Owens 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

Breeding widely in the New World, the Yellow Warbler comprises three subspecies groups: *aestiva* (continental North America), *petechia* (extreme southern Florida and Caribbean), and *erithacorides* (coastal Mexico to northern South America; Lowther et al. 1999). The *aestiva* group migrates to winter mainly from northern Mexico south to central South America. Overall considered one of the most abundant warblers in North America; published breeding density estimates range from 0.7 to 14.4 pairs per ha (Lowther et al. 1999).

Four subspecies of the *aestiva* group have previously been considered to occur in California: breeding *D. p. brewsteri*, *D. p. morcomi*, and *D. p. sonorana*, and transient *D. p. rubiginosa* (Grinnell and Miller 1944). Because *D. p. brewsteri* and *D. p. morcomi* are not consistently distinguishable (Patten et al. 2003), *brewsteri* is best considered synonymous with *morcomi* (P. Unitt pers. comm.). *Sonorana*, found only along the lower Colorado River and ranked independently as a species of special concern (see relevant account), is not considered further here.

SEASONAL STATUS IN CALIFORNIA

Occurs principally as a migrant and summer resident from late March through early October; breeds from April to late July (Dunn and Garrett 1997).

HISTORIC RANGE AND ABUNDANCE IN CALIFORNIA

Grinnell and Miller (1944) described the Yellow Warbler as a “common” to “locally abundant” breeder throughout California, except for most of the Mojave Desert (it occurred locally only in the Panamint and Grapevine mountains and the

Mojave River) and all of the Colorado Desert. Known elevational limits of breeding were 7000 ft (2134 m) on the western and 8500 ft (2591 m) on the eastern flank of the Sierra Nevada. With few exceptions, Grinnell and Miller (1944) mapped locations of individuals reported or collected during the breeding season in every county within this general range. Quantitative estimates of historic breeding abundance are scant and mostly unreliable. For example, estimates of 10 birds per 3 river mi (4.8 km) in the Sacramento Valley region (Grinnell et al. 1930) did not discern between singing migrants and breeders, both of which likely occurred during the late May surveys (T. Manolis in litt.).

RECENT RANGE AND ABUNDANCE IN CALIFORNIA

Despite many local declines, Yellow Warblers currently occupy much of their former breeding range, except in the Central Valley, where they are close to extirpation (see map). Broad-scale significant declines have been documented for the U.S. Pacific Northwest region (1979–1999, Ballard et al. 2003) and declines approaching significance in California (1968–2004, Sauer et al. 2005). Both local abundance and long-term trends, however, vary greatly by region.

Northwestern California. This species breeds locally throughout Del Norte, western Siskiyou, Humboldt, Trinity, Mendocino, and Sonoma counties, except at lower elevations along the coast in Mendocino and Sonoma (Bolander and Parmeter 2000, Harris 2005, Hunter et al. 2005, D. Tobkin pers. comm.). Breeding Bird Survey (BBS) averages vary widely, from 1.00 birds per route at Bartlett Springs, Lake County, to 71.89 birds per route at Horse Creek, Siskiyou County (Sauer et al. 2003). Breeding density was only 0.26 pair per ha at Clear Creek, Shasta County, in the northern interior Coast Ranges (PRBO unpubl. data). Breeding bird atlases found Yellow Warblers in 16% of blocks (66 of 425, 6 confirmed) in Humboldt County (Hunter et al. 2005) and in 43% of blocks (34 of 79, 11 confirmed) in Napa County (1989–1993; Berner et al. 2003). Recent

BREEDING BIRD SURVEY STATISTICS FOR CALIFORNIA

1968–2004					1968–1979			1980–2004			All data from Sauer et al. (2005)
Trend	P	n	(95% CI)	R.A.	Trend	P	n	Trend	P	n	Credibility
-1.4	0.14	128	-3.3, 0.4	1.81	-4.4	0.11	75	-2.0	0.10	112	High

efforts in Napa, however, failed to locate the species at most of its historic breeding sites—most notably at Napa River, Mill Creek, and Suisun Creek—perhaps because of wine industry thinning of riparian habitat in the Napa Valley (R. Leong and B. Grummer pers. comm.).

Northeastern California. The species breeds widely in this region. In the Modoc National Forest, the Yellow Warbler was the most numerous species detected on breeding season surveys (T. Ratcliff in litt.); it is also numerous throughout Shasta County (B. Yutzy in litt.). BBS averages ranged from 0.56 to 4.67 birds per route where the species was sampled on the Modoc Plateau, Surprise Valley, and Madeline Plain (Sauer et al. 2003). The Susan River, Lassen County, held 1.05 birds per ha (PRBO unpubl. data). On Atastra Creek in the Bodie Hills, Mono County, density was 0.26 birds per ha in 1979 (Weston and Johnston 1980), but the species was absent in 2000–2003 (PRBO unpubl. data). At Mono Lake, densities on the lower reaches of Rush and Lee Vining creeks have been as high as 2.74 and 1.71 pairs per ha, respectively, and are increasing annually (PRBO unpubl. data), presumably as a result of rewatering, removal of livestock grazing, and riparian restoration. The Glass Mountain area and the White-Inyo Range hold small and localized breeding populations (PRBO unpubl. data, Johnson and Cicero 1991).

Central Valley. The Yellow Warbler is largely extirpated as a breeder in the Sacramento Valley. Numbers were already low by the 1970s, when Gaines (1974) found the species at only 4 of 20 sites in the upper, and at none in the lower, Sacramento Valley. Intensive coverage along the Sacramento River in Glenn, Butte, and Tehama counties from 1993 to 1999 found only five nests of three pairs (PRBO unpubl. data, T. Manolis in litt.). In Placer County, individuals occur on the valley floor during the breeding season (Webb 2003). Extensive surveys in 1998 and 1999, however, failed to locate breeding Yellow Warblers along the Sacramento River and its lower tributaries in Colusa, Sutter, Yolo, and Sacramento counties, and no breeding records exist for Sacramento County as a whole (PRBO unpubl. data, T. Manolis in litt.).

The species is largely extirpated as a breeder in the Sacramento–San Joaquin River Delta and San Joaquin Valley region. Extensive surveys in 1998 and 1999 failed to locate breeders along the San Joaquin River and its lower tributaries in San Joaquin, Stanislaus, Merced, Madera, Fresno, and Kings counties. In 2002 and 2003, however, five

nests were located at Hospital Creek, Stanislaus County, on the San Joaquin River NWR (PRBO unpubl. data), and in 2005 one nest and at least three confirmed territories were found on San Luis NWR, Merced County (PRBO unpubl. data).

Cascade Range and Sierra Nevada. Yellow Warblers breed widely in this region in both riparian habitat and chaparral shrub fields (CalPIF 2003, J. Snowden and B. Williams in litt.). Abundance estimates ranged from 0.04 to 1.14 birds per ha among eight Sacramento River sites above Shasta Dam (PRBO unpubl. data) and 0.83 to 0.97 pairs per ha at one site along Gurnsey Creek, Tehama County (1998–1999; PRBO unpubl. data). A density of 0.95 birds per ha was found in xeric montane shrub fields of Lassen Volcanic National Park (PRBO unpubl. data).

On the west slope of the Sierra Nevada, Yellow Warblers breed from foothill woodlands up to the mixed-conifer zone, and at select sites in the north they may be as abundant in montane chaparral as in riparian habitat (B. Williams, J. Steele in litt.). Verner and Boss (1980) considered them “fairly common” summer residents in the late 1970s, and Beedy and Granholm (1985) reported declining numbers. They are increasing in postfire chaparral in El Dorado County (E. Harper in litt.) and have averaged 12.4 birds per BBS route since the 1992 fire (Sauer et al. 2003). In the southern Sierra, mixed-conifer forests at 5600–6601 ft (1707–2012 m) harbor small breeding populations (0.34 birds per ha; K. Purcell in litt.). Probable breeders occur in meadows around 7000 ft (2134 m) on Greenhorn Mountain, Kern County (J. Wilson in litt.). In the Kern River Valley, 142 males were counted on a valley-wide 10 July 1999 survey, far exceeding the estimated 14 pairs for the entire valley in 1985 (B. Barnes in litt.). Yellow Warblers have probably benefited from restoration and Brown-headed Cowbird (*Molothrus ater*) trapping to aid Southwestern Willow Flycatcher (*Empidonax traillii eximius*) recovery in the area (B. Barnes and S. Laymon in litt.).

On the east slope of the northern Sierra, density was 0.29 pairs per ha in postfire chaparral and regenerating conifers at Sagehen Field Station, north of Truckee (Raphael et al. 1987); numbers are higher in riparian habitat nearby at Perazzo Meadows and the upper Truckee River system (Lynn et al. 1998, J. Steele in litt.). Gaines (1992) considered Yellow Warblers “common” summer residents in the eastern Sierra of Mono County, where surveys found them at 121 (54%) of 224 riparian stations along 12 streams (Heath and Ballard 2003b). Abundance estimates were

0.17–1.73, 0.22–0.83, and 0.48–1.64 birds per ha, respectively, at the headwaters of the West and East Walker rivers, at 7159–7799 ft (2182–2377 m) on Mono Lake’s feeder streams, and at 9318 ft (2840 m) on tributaries of the Owens River (PRBO unpubl. data). At elevations <6634 ft (2022 m), mostly in Inyo County, only 15 (6%) of 256 riparian stations had breeding Yellow Warblers (Heath and Ballard 2003b). Not only were they less numerous at these elevations but they also bred inconsistently (Heath and Ballard 2003a).

Central and southern coast. Yellow Warblers breed locally in small numbers in Sonoma, Marin, Alameda, San Mateo, Santa Clara, Santa Cruz, Monterey, and San Luis Obispo counties, and there is some anecdotal evidence of historic declines (Roberson and Tenney 1993, Shuford 1993, Bolander and Parmeter 2000, Alameda, San Mateo, Santa Clara, San Luis Obispo unpubl. atlas data). Numbers have declined markedly on the Palo Alto Summer Bird Count (1981–2005), from as many as 15 during the first five years to 0 during the past two (W. G. Bousman in litt.). At several well-surveyed riparian sites in Marin County, observers found one nest and detected few to no individuals during the breeding season (PRBO unpubl. data), and Olema Marsh held 0.06 birds per ha (Evens and Stallcup 1992). Roberson and Tenney (1993) roughly estimated the total population in Monterey County at 500–900 pairs. Singing males are “locally common” on Pacheco Creek and the San Benito and Pajaro rivers, San Benito County (M. Paxton and K. Van Vuren in litt.). In Santa Barbara County, these warblers are widespread and vary by subregion from “uncommon” to “common”; numbers likely have declined historically (Lehman 1994). Densities in three drainages on Vandenberg Air Force Base, Santa Barbara County, ranged from 0.69 to 1.31 birds per ha (Gallo et al. 2000).

Yellow Warblers have been confirmed breeding widely in the Transverse and Peninsular ranges; they are less numerous overall in coastal lowlands, where they were nearly extirpated from that portion of Orange County by 1990 (Garrett and Dunn 1981, Gallagher 1997, Unitt 2004, Los Angeles County unpubl. atlas data). Density was 0.32 pairs per ha at Big Morongo Preserve, San Bernardino County (Cardiff 1992), and 1.79 pairs per ha at Fallbrook, San Diego County (Weaver 1992). In the latter county, Yellow Warblers have increased greatly on the coastal slope since the late 1980s, apparently in response to habitat restoration and cowbird trapping to aid Least Bell’s

Vireos (*Vireo bellii pusillus*; Unitt 2004). In Los Angeles County, the species expanded its range after the 1995–2000 atlas; as of 2005, there were 6–10 pairs nesting along the channelized Los Angeles River just northwest of downtown Los Angeles (K. Garrett in litt.). Similarly, the species’ range has expanded in Orange County since the early 1990s (D. Erickson fide D. R. Willick pers. comm.).

Southern deserts. Yellow Warblers occur very locally in low densities on the Owens Valley floor, Inyo County. Extensive surveys along 113 km of the lower Owens River found no breeding Yellow Warblers downstream of the Los Angeles Aqueduct intake, but density upstream was 0.32 birds per ha (2001–2004; PRBO unpubl. data). Elsewhere, the species continues to breed extremely locally as in the past. Yellow Warblers are thought to breed in canyons of the Panamint Mountains (Garrett and Dunn 1981), but infrequent excursions to the mostly inaccessible Grapevine Mountains have failed to produce any recent breeding records (T. & J. Heindel in litt.). In Death Valley, three to four breeding pairs are found annually at Scotty’s Castle, but other seemingly suitable habitat is unoccupied (T. & J. Heindel in litt.). Nesting densities were 0.18 pairs per ha along the Amargosa River, Inyo County, and 25–30 pairs along the Mojave River near Victorville, San Bernardino County (2005 PRBO unpubl. data, S. Koonce in litt.).

ECOLOGICAL REQUIREMENTS

Yellow Warblers generally occupy riparian vegetation in close proximity to water along streams and in wet meadows (Lowther et al. 1999). Throughout, they are found in willows (*Salix* spp.) and cottonwoods (*Populus* spp.), and in California they are found in numerous other species of riparian shrubs or trees, varying by biogeographic region (Grinnell and Miller 1944, Beedy and Granholm 1985, Lehman 1994, Harris 2005, PRBO unpubl. data). In northern California, willow cover and Oregon Ash (*Fraxinus latifolia*) are important predictors of high Yellow Warbler abundance (PRBO unpubl. data, Alexander 1999). East of the Sierra crest, the combined effect of elevation, percent riparian graminoid cover, and riparian corridor width was positively correlated with Yellow Warbler occurrence (Heath and Ballard 2003b).

In the Cascades and northern and western Sierra Nevada, Yellow Warblers also breed in xeric montane shrub fields and occasionally in

the shrubby understory of mixed-conifer forest (Grinnell et al. 1930, Beedy and Granholm 1985, Raphael et al. 1987, Gaines 1992). Nests have been found in Bush Chinquapin (*Chrysolepis sempervirens*) nowhere near water in the Lassen region, and in Snow Bush (*Ceanothus cordulatus*) 30 m from water in the southern Sierra (PRBO unpubl. data, K. Purcell in litt.).

At Clear Creek, Shasta County, in the interior northern Coast Ranges, Yellow Warbler nests were more successful when surrounded by a high number of large White Alders (*Alnus rhombifolia*; PRBO unpubl. data). In willow meadows of the northern Sierra, nests were more successful the farther they were from forest edges or trees (Cain et al. 2003). East of the Sierra crest, 56%, 29%, and 6% of 1086 nests were in willow, Woods' Rose (*Rosa woodsii*), and Black Cottonwood (*P. trichocarpa*), respectively, but daily nest survival was significantly higher for rose nests (PRBO unpubl. data). It is likely that habitat features associated with higher nest success are reducing exposure to predators and cowbirds (Staab and Morrison 1999, Cain et al. 2003).

As a generalist, the Yellow Warbler appears to adapt its foraging to variation in local vegetation structure (Petit et al. 1990). Its diet in California contained over 97% animal matter, including ants, bees, wasps, caterpillars, beetles, true bugs, flies, and spiders (Beal 1907).

Yellow Warblers have shown a high degree of site fidelity, with 60%–64.5% of males and 32%–44% of females returning to their previous year's breeding grounds and many to the same territory (Studd and Robertson 1989, Knopf and Sedgwick 1992). In California, they will make several nesting attempts throughout the season and will typically produce only one brood per year, although double brooding has been documented (PRBO unpubl. data).

Annual apparent adult survival probability for Yellow Warblers was 48% for the southwest region of the United States and 57% for the northwest region (IBP 2005).

THREATS

Human population growth and resulting habitat degradation in California will likely continue to pose a threat to Yellow Warblers given their sensitivity to decreases in deciduous habitat, riparian habitat heterogeneity, and riparian corridor width (Saab 1999, Tewksbury et al. 2002, Heath and Ballard 2003b). Large-scale habitat restoration projects in lowlands are sure to assist populations

in the next few decades, and the warblers are reoccupying restoration sites with and without cowbird trapping (PRBO unpubl. data; S. Laymon, B. Barnes, and P. Unitt in litt.). Conversely, in heavily populated coastal areas, increasing human demands are taxing water resources and degrading riparian drainages (Gallagher 1997, R. Leong, B. Bousman, and M. Paxton in litt.). New human dwellings and associated fire prevention activities that clear or limit regrowth of montane chaparral will likely reduce Yellow Warbler numbers in that habitat.

Brown-headed Cowbird parasitism is a commonly reported cause of Yellow Warbler declines in California (e.g., Gaines 1974, Garrett and Dunn 1981, Beedy and Granholm 1985, Johnson and Cicero 1991), though this conclusion typically is not supported by regional data on cowbird parasitism or nest success rates. The dramatic recovery of Yellow Warbler numbers in San Diego County and the South Fork Kern River Valley has coincided with cowbird trapping and restoration efforts (Unitt 2004, S. Laymon in litt.). By contrast, Yellow Warbler densities at Mono Lake restoration sites are not only the highest recorded in the state but are steadily increasing despite relatively high parasitism rates and a lack of cowbird management (PRBO unpubl. data).

Cowbirds parasitized 49% of 836 Yellow Warbler nests east of the Sierra; a minimum of 20% of 51 at Clear Creek, Shasta County; 70% of 23 at Amargosa Canyon, Inyo County; and 9% of 78 in the northern Sierra (Cain et al. 2003, PRBO unpubl. data). Yellow Warblers are somewhat resistant to the demographic effects of brood parasitism, and California birds employ antiparasite strategies such as cowbird egg burial (Clark and Robertson 1981, Sealy 1995). East of the Sierra crest, Yellow Warbler young fledged from 36% of parasitized nests, and predation accounted for the loss of 38% of 412 of parasitized nests (PRBO unpubl. data). These data suggest that even where parasitism rates are relatively high, Yellow Warblers fledge young (though fewer than in unparasitized nests) and predation also limits productivity.

Predation was the leading cause of Yellow Warbler nest failure in the northern and eastern Sierra, accounting for 93% of 40 and 76% of 521 failed nests in those regions, respectively (Cain et al. 2003, PRBO unpubl. data). In the wet willow meadows of the northern Sierra, Yellow Warbler nest success was negatively associated with the activity indices of Douglas Squirrels (*Tamiasciurus douglasii*), Steller's Jays (*Cyanocitta stelleri*), and Brown-headed Cowbirds, and nest proximity to

trees and forests edges likely increased exposure to predators (Cain et al. 2003).

MANAGEMENT AND RESEARCH RECOMMENDATIONS

- Protect, manage, and restore dynamic riparian systems that provide the mechanisms (e.g., seasonal flooding) to create early successional as well as more structurally complex vegetative components (e.g., herbaceous cover, shrub cover, and riparian tree canopy).
- Focus management and restoration efforts primarily on identifying and maintaining source populations capable of producing young in excess of adult mortality.
- Eliminate or manage cowbird feeding sites near Yellow Warbler breeding habitat.
- Cowbird trapping may be a viable option to aid warblers in some areas, but criteria outlined by experts (e.g., Smith 1999) should be met prior to the initiation of any trapping program.
- In montane meadow willow habitats, actively flood meadows and restore water tables to limit access for predators (see Cain et al. 2003).
- Initiate landscape-level studies on the ecology of nest predators and parasitism within various habitat types (including chaparral) to identify the most effective management options for increasing reproductive output at a regional level.

MONITORING NEEDS

Because Yellow Warblers quickly respond to management (e.g., cowbird trapping, removal of live-stock) and habitat restoration, monitoring is likely to validate the success of rehabilitation efforts (Taylor and Littlefield 1986, Krueper et al. 2003). Statewide BBS routes are effective but should be complemented by off-road standardized point counts and habitat assessments (Ralph et al. 1993) that target reference and restoration or managed sites. To avoid counting migrants, surveys should be conducted in June and coupled with documentation of breeding behaviors. Nest monitoring (e.g., Martin et al. 1997) should be conducted at reference sites of high warbler abundance stratified by bioregions to assess regional threats, and accompanied by assessments of habitat features at nest sites that may ease predation or parasitism pressures. If cowbird control measures are

deemed necessary, they should be preceded by baseline studies and accompanied by concurrent nest monitoring.

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