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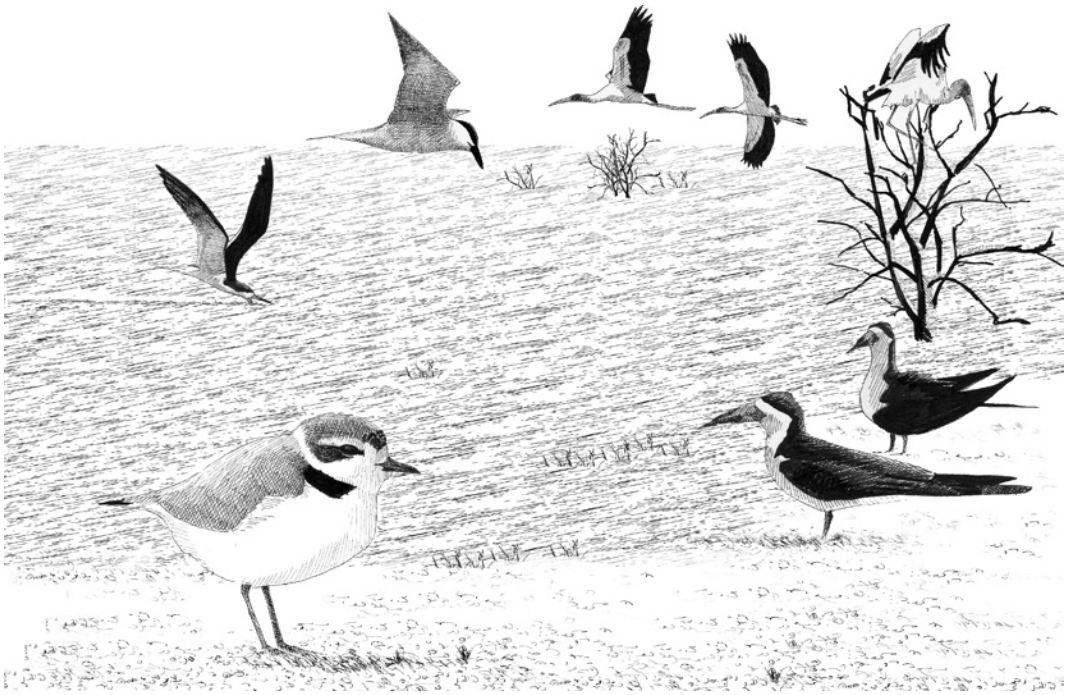

Andy Birch

PDF of Mountain Plover account from:

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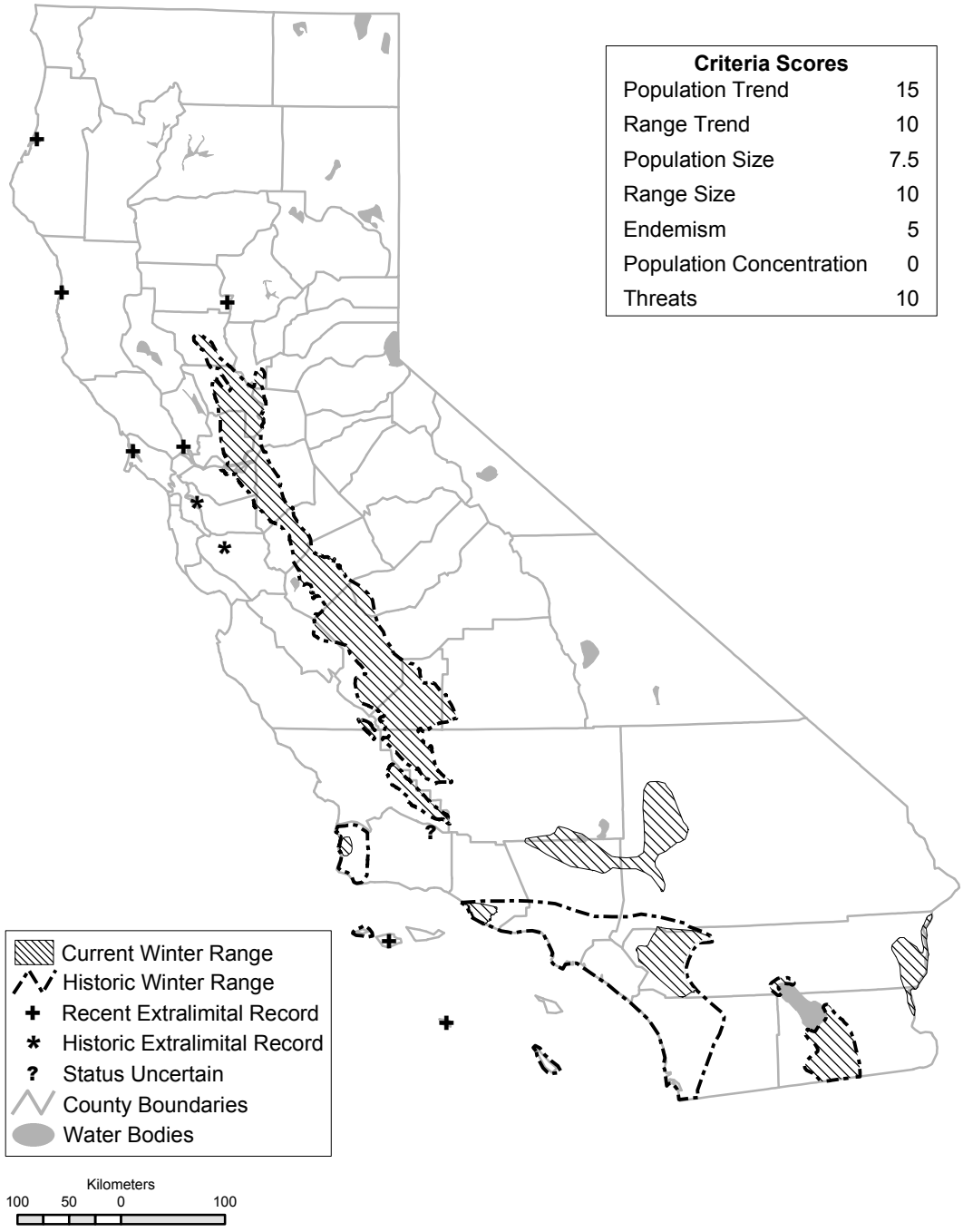
MOUNTAIN PLOVER (*Charadrius montanus*)

Kevin Hunting and Leo Edson



Current and historic (ca. 1944) winter range of the Mountain Plover in California; occurs more widely in migration. Wintering numbers have declined greatly in the Central Valley and on the coastal slope of southern California, where the range has retracted substantially; now extirpated from the Channel Islands. Populations expanded in the southern deserts, prior to and likely after 1944, to occupy areas of irrigated agriculture, including the Antelope Valley, the lower Colorado River valley, and, particularly, the Imperial Valley.

Special Concern Priority

Currently considered a Bird Species of Special Concern (wintering), priority 2. Not included on the original prioritized list (Remsen 1978), but included on CDFG's (1992) unprioritized list.

Breeding Bird Survey Statistics for California

Does not breed in California.

General Range and Abundance

Breeds in the high plains east of the Rocky Mountains from Montana to New Mexico and in western Texas and western Oklahoma south to central Mexico; formerly bred in southeastern Alberta and southwestern Saskatchewan (USFWS 2003). Most birds breed in northern Montana and in southeastern Colorado and Wyoming (USFWS 1999). Knopf (1996) estimated a current North American (world) population of 8000 to 10,000 individuals. Winters in central and southern California, southern Arizona, southern Texas, and northern Mexico; primary wintering areas are the Central and Imperial valleys of California (Knopf 1996). In 1980–1997 and 1998–2003, California accounted for 85% and 67%, respectively, of the Christmas Bird Count (CBC) circles in the United States reporting Mountain Plovers, and in both periods for 95% of the total plovers tallied (Hunting et al. 2001). Knopf (1996) estimated the California wintering population to be 4000 to 7000 birds or 50% to 88% of the entire world population. Breeding Bird Survey (BBS) data show a significant survey-wide decline of 2.7% per year from 1966 to 2004 (Sauer et al. 2005). CBC data likewise show declining numbers, especially in coastal areas (Hunting et al. 2001, Wunder and Knopf 2003).

Seasonal Status in California

Winter visitor to California, primarily from September to mid-March, with peak numbers from December through February (Garrett and Dunn 1981, Knopf and Rupert 1995, Knopf 1996). Knopf and Ruppert (1995) noted that plovers in Tulare County appeared to move to staging areas in late February and early March, where they documented flocks of 600–800 birds.

Historic Range and Abundance in California

Grinnell and Miller (1944) described the California wintering range as chiefly low elevation interior valleys and plains from the southern Sacramento Valley and inner portion of the San Francisco Bay region south to the southern coastal slope and east to the Imperial Valley. These authors noted that prior to 1880 the species was considered "abundant" in the state, by 1915 it had become "notably scarce," and by 1944 it had shown perhaps a "slight increase." Willett (1933) likewise described the species as formerly "common" on the southern coast, but at the time he wrote it was seen only "occasionally and in small numbers."

Central Valley. Grinnell and Miller (1944) noted the northernmost occurrences in this region were near Marysville, Yuba County; Knights Landing, Yolo County; and Cannon, Solano County. Tyler (1913) described the species as "common" near Raisin, Fresno County, and noted "a very large number" observed near New Hope, San Joaquin County. Indicative of the plover's former abundance, Tyler (1915) related that Central Valley hunters would flush flocks and kill as many as 65 birds with two shotgun blasts.

Central and southern coast. Historical records for the greater San Francisco Bay area, where considered "rare," are from Concord, Contra Costa County; Berryessa, Santa Clara County; and Paicines, San Benito County (Grinnell 1915, Grinnell and Wythe 1927). Locales of historic occurrence on the southern coastal slope include Point Conception, Santa Barbara County; Saticoy and Camarillo, Ventura County; Montebello and San Fernando Valley (100 or more), Los Angeles County; Buena Park, Wintersburg, and Santa Ana, Orange County; Chino (50 or more), Corona (300 birds), and Riverside, Riverside County; and Coronado Heights and the San Diego Bay area, San Diego County (Grinnell 1915, Willett 1933, Grinnell and Miller 1944, Laun 1957, Lehman 1994). In the early 1900s, this species wintered in "large numbers" on the Channel Islands, at least on San Miguel and San Clemente, but numbers were much reduced by as early as 1917 (Collins and Jones in press).

Southern deserts. Mountain Plovers were reported historically near Indio, Riverside County, in the Coachella Valley; at Brawley and Pilot Hill, Imperial County, in the Imperial Valley; and from Needles, San Bernardino County, in the lower Colorado River valley (Grinnell and Miller 1944, Laun 1957).

Recent Range and Abundance in California

Mountain Plovers continue to be found in most of the broad regions occupied ca. 1944 (see map),

though numbers have declined, particularly on the southern coastal plain, and they no longer winter on the Channel Islands or on the eastern fringes of the San Francisco Bay area (where formerly rare). Knowledge of wintering in recent decades in valleys of the interior Coast Ranges, such as Panoche Valley and the Carrizo Plain, likely reflects increasing observer coverage rather than range expansion. By contrast, the current use of agricultural areas in the Mohave and Colorado deserts likely represents either range expansion or population increase in these areas. All records of Mountain Plovers for the southern deserts prior to 1944 appear to be from agricultural areas, including the Imperial and lower Colorado River valleys (Grinnell and Miller 1944), made suitable by cultivation and irrigation practices. The timing of increases in those valleys, particularly in the Imperial, is not well documented, but these increases may have continued well into the second half of the 20th century. Knowledge of plover occurrence in agricultural areas in the Antelope Valley and near Harper Dry Lake in the Mojave Desert came after 1945, but it is unclear when these areas were first developed for agriculture.

Currently, largest numbers occur in the Imperial Valley and the portion of the Central Valley from southern Colusa County south to Kern County (Knopf and Rupert 1995, Edson and Hunting 1999, Edson 2001, Hunting et al. 2001, USFWS 2003, Shuford et al. 2004). Broad-scale surveys, covering an unknown proportion of potential habitat in the state, detected 3346 birds at 25 sites in 9 counties in 1994 (National Audubon Society [NAS] unpubl. data) and 2663 birds at 31 sites in 11 counties in 1998 (Hunting et al. 2001). In both years, about 80% of all birds were detected in southern California, but the largest flocks were in either Yolo or Imperial counties.

Central Valley and interior Coast Ranges. The region usually supporting the second largest number of wintering Mountain Plovers in the state encompasses the western Central Valley and the adjacent Panoche Valley and Carrizo Plain (Edson and Hunting 1999, Hunting et al. 2001, USFWS 2003, NAS unpubl. data). In the Central Valley, these plovers occur mainly in two distinct regions: the Sacramento Valley of (southern) Colusa, Yolo, and Solano counties, and a larger area in the San Joaquin Valley from Stanislaus County south to Kern County. Mountain Plovers were recorded regularly on the Kern NWR, Kern County, from 1961 to 1968 but have not been observed there since 1986 (J. Engler in litt.). Premigratory flocks of up to 1100 (often 600–800) birds were seen in Tulare County as late as the early 1990s (Knopf and Rupert 1995). By the late 1990s, the largest flocks in the Central Valley were limited to a few hundred individuals. From 1997 to 2001, the only counties there with flocks of up to 100 to 300 birds were Colusa, Yolo, Solano, and Kings (Edson and Hunting 1999, Edson 2001). From 2001 to 2005, plovers were reported annually in the Sacramento Valley only at traditional sites in Yolo and Solano counties (L. Edson pers. obs.). Exceptional recent reports from fields in the San Joaquin Valley were of 200–300 plovers in the winter of 2004–05 and 100–200 in the winter of 2005–06 in Madera County midway between Firebaugh (Fresno County) and Madera (J. Davis in litt.); 645 south of Allensworth, Tulare County, on 12 December 2005 (S. Summers and M. San Miguel in litt.); and about 300 in western Kings County on 6 January 2006 (J. Seay in litt.).

The median number of plovers on the Panoche Valley CBC, 1987–2004, was 20 (range = 0–630, n = 18 yrs). Median numbers on the Carrizo Plain CBC were 148 (range = 0–517, n = 8 yrs) in 1970–1977 versus 39 (range = 0–142, n = 23 yrs) in 1982–2004. Two flocks totaling 381 birds were tallied on a survey of the Carrizo Plain on 10 January 2006 (S. Fitton in litt.). Not far from the Carrizo, fairly extensive habitat occurs in the Cuyama Valley, Santa Barbara County, where status is uncertain because of few sightings but limited observer coverage (Lehman 1994, D. Compton in litt.).

Central and southern coast. Sibley (1952) reported a sighting of one plover in the vicinity of San Jose in 1949 and specimens taken on the Bolsa Plains near Hollister, San Benito County, but gave no date. In 1949–1969, small flocks of plovers (usually 2–4, up to 25) were recorded regularly in the Salinas Valley (Salinas to San Lucas), Monterey County (Roberson 2002). Seemingly suitable habitat remains in this county in Peachtree, Priest, and Cholame valleys, where observer coverage is limited. Plovers have been recorded in the former valley, but particularly in the 1980s and 1990s (up to 150) in Cholame, both in Monterey and San Luis Obispo counties.

The Mountain Plover was reported as locally "fairly common" to "very common" on the southern California coast as late as the early 1980s (Garrett and Dunn 1981, Unitt 1984). In Santa Barbara County, small numbers of plovers (up to 80) have wintered in the Santa Maria Valley and on Vandenberg Air Force Base (Lehman 1994). The species no longer winters regularly in fields in the Santa Maria Valley, and numbers on the north Vandenberg airfield ranged from 7 to 12 on the

Lompoc CBC, 2001–2004 (D. Compton in litt.). Mountain Plovers were recorded nearly annually on the Orange County (coastal) CBC from 1954 to 1975. Median numbers were 254 (range = 0–1156, *n* = 12 yrs) in 1954–1966, 14 (range = 0–70, *n* = 9 yrs) in 1967–1975, and 0 in 1976–2004 (recorded only 3 of 29 yrs, last in 1996). Plovers were recorded on the Orange County (northeastern) CBC in 14 of 18 years in 1968–1985 (median = 5, max. = 43) but not thereafter. Flocks continued to winter around Irvine through the mid-1980s, with a high count of 120 in winter 1980–81 (Hamilton and Willick 1996). Median numbers on the San Jacinto Lake CBC in western Riverside County, where plover habitat is threatened by ongoing development (J. Green and C. McGaugh in litt.), were 13 (range = 0–195, *n* = 12 yrs) for the period 1980–1991 and 3 (range = 0–121, *n* = 12 yrs) for 1992–2004. In San Diego County, flocks of up to 200–250 individuals occurred in the Tijuana River Valley and Otay Mesa in the 1970s; numbers declined in the 1980s, and the last wintering birds were observed in 1991 (Unitt 2004).

Large declines in numbers of plovers and extirpation from most of their historic range on the central and southern coast are attributed primarily to loss of habitat from urban development (Wunder and Knopf 2003) and conversion of agricultural fields to vineyards (Roberson 2002).

Southern deserts. Mountain Plovers winter in this region in just a few agricultural areas, with winter records elsewhere being essentially extralimital (e.g., a few Dec and late Jan–early Feb records for Inyo County; T. & J. Heindel in litt.). Wintering Mountain Plovers have been reported annually from the Antelope Valley area, Los Angeles County, in the western Mojave Desert, where numbers on the Lancaster CBC, 1979–2004, ranged from 10 to 39. Flocks of up to 50–100+ Mountain Plovers wintered in alfalfa fields near Harper Dry Lake, San Bernardino County, from at least the early 1980s to early 1990s, but these fields have essentially been out of agricultural production since the late 1990s (C. McGaugh, S. J. Myers in litt.).

Recent surveys of most suitable habitat in the Imperial Valley show that region supports a much larger proportion of the North American wintering population than previously documented. Counts were 2486, 2790, and 3758, respectively, on 2–3 day surveys in February, November, and December 1999 (Shuford et al. 2004) and 4037 on an 11-day survey in January 2001 (Wunder and Knopf 2003). The high counts in these two years represent roughly 40%–50% of the estimated world population of 8000–10,000 individuals (Knopf 1996).

Rosenberg et al. (1991) considered this plover an irregular winter resident in "small flocks" (maximum 205) near Blythe on the California side of the lower Colorado River valley.

Ecological Requirements

At all seasons, Mountain Plovers are strongly associated with short-grass prairie habitats, or their equivalents, that are flat and nearly devoid of vegetation (Graul and Webster 1976, Knopf 1996). They appear to respond primarily to physical characteristics of vegetation (e.g., cover, structure) rather than species composition, as is true of most grassland-associated birds (Huber and Steuter 1984, Delisle and Savidge 1997). Microrelief, substrate heterogeneity, soil moisture content, prey availability, and physiognomic factors contribute to suitability and may explain why apparently suitable cultivated lands are often unoccupied (E. Marquis-Brong in litt.). Wintering birds seek invertebrate prey in cracks and crevices in the soil (Knopf 1996), and these features contribute to higher habitat suitability for wintering birds in noncultivated lands (J. Engler in litt., S. Fitton pers. comm.).

From data at 63 sites across California, Hunting et al. (2001) found wintering plovers most frequently used fallow, grazed, or burned sites with mean vegetative heights of <6 cm and <65% cover. In the Central Valley, Knopf and Rupert (1995) observed wintering Mountain Plovers roosting and foraging in alkali flats, recently burned fields, and grasslands heavily grazed by domestic livestock or fossorial mammals. They concluded that these plovers are forced to use cultivated lands as a result of loss of native grassland and playa habitats.

In the Imperial Valley, Wunder and Knopf (2003) reported 72% of plovers observed in January 2001 were in grazed, fallow, or burned agricultural land, and an additional 15% were in recently sprouted alfalfa fields. Of 26 foraging flocks, 38% were in grazed alfalfa, 27% in burned fields (mainly bermudagrass), 19% in fields of various sprouting crops, and 15% in idle or recently tilled fields. Field use by plovers in the Imperial Valley varies seasonally, reflecting temporal and spatial variation in agricultural practices (Shuford et al. 2004). During 1999, 81% of plovers in February were in burned hay stubble fields, 19% in unburned stubble fields. In a sample of burned fields, cover was spread about equally between

residual stubble 3–5 cm tall and bare ground. In November and December, respectively, 35% and 47% of birds were in bare tilled fields, and 65% and 53% were in active fields of various crops. In both months, new growth ranged up to 95%–100% cover, and plant height was mostly <3 cm. Similarly, J. Engler (in litt.) noted mid- to late-winter shifts in the San Joaquin Valley from noncultivated to cultivated lands, perhaps reflecting a response to vegetation growth in the former habitat, reducing the plovers' ability to detect predators.

In winter and migration, plovers typically congregate in flocks of up to (exceptionally) 1200 birds. During statewide winter surveys in 1994–1999, flock size ranged from 2 to 1128; in the year of most intense coverage, average flock size was 86 birds (median = 90, range = 4–250; Hunting et al. 2001).

Individuals or flocks may travel relatively long distances each day, presumably in search of suitable foraging habitat. Knopf and Rupert (1995) noted daily travel of up to 127 km between the Carrizo Plain and the southern San Joaquin Valley. However, not all wintering Mountain Plover flocks move extensively on a daily basis. Flocks monitored in Yolo and Solano counties from 1997 through 2001 were very site-faithful, remaining in the same area for weeks or even months (L. Edson pers. obs., J. King pers. comm.); but it is uncertain whether flock membership is constant during these periods. That some fields are occupied by plovers for several consecutive winters (L. Edson pers. obs.) suggests that flocks also may be faithful to traditional wintering sites over the long term when conditions allow.

The Mountain Plover is primarily insectivorous. In Colorado in summer, 99.7% of dry matter consumed was arthropods, of which 60% were tenebrionid beetles (Baldwin 1971). Other authors indicate primary food sources on both breeding and wintering grounds are grasshoppers, crickets, beetles, and flies (Bent 1929, Graul 1976, Olson 1985, Knopf 1996). Rosenberg et al. (1991) reported stomach contents of six birds presumably wintering near Parker, Arizona, included weevils, other beetles and larvae, maggots, and earwigs.

Threats

Habitat loss and degradation on the wintering and breeding grounds appear to be the main factors responsible for population declines in Mountain Plovers (Knopf 1996, USFWS 2003). Although habitat availability and quality on the breeding grounds currently may be the primary factor limiting plover numbers (Knopf 1996), further loss of native wintering habitat may also be detrimental to the species (USFWS 2003). Despite plovers' potential susceptibility to impacts from pesticides and other contaminants on both the breeding and wintering grounds, Knopf (1996) concluded this is probably not a factor contributing to steep population declines.

Human activities that reduce the suitability of breeding habitat include conversion of native grasslands to wheat production and other agricultural uses, detrimental range management practices, oil and gas development, destruction of eggs and young from agricultural equipment, and collisions of adults with vehicles used in agriculture and industry (Knopf 1996, USFWS 2003).

Loss of traditional wintering sites on grasslands and suitable agricultural cropland to urban development, vineyards, or other incompatible land uses could continue to reduce plover populations already greatly diminished by such changes (Roberson 2002, USFWS 2003, Wunder and Knopf 2003). In the Central Valley, declines in numbers of fossorial mammals could affect plovers, given the high abundance and availability of invertebrate prey in areas occupied by these mammals (USFWS 2003, J. Engler in litt., E. Marquis-Brong in litt.). Much of the Carrizo Plain is protected public land, but current management practices, which maintain tall-stature grasslands, may reduce its suitability for Mountain Plovers (S. Fitton pers. comm.).

In the Imperial Valley, water conveyance and transfer agreements could directly affect wintering Mountain Plovers. Under current agreements, 12,000 to 32,600 ha of formerly suitable plover habitat (15%–39% of that available in 2002) would remain fallow as a result of reduced water supplies (USFWS 2003). The loss of habitat could further displace wintering plovers into less-suitable habitat. Because continued human population growth and attendant increasing demand for water may further change irrigation practices and land use in the Imperial Valley, plovers' reliance on these habitats is risky.

Management and Research Recommendations

- Protect traditional wintering sites and high-quality wintering habitat from urban development and other incompatible land-use changes by securing conservation easements and property acquisition as part of regional conservation planning efforts.

- Manage grassland habitat, where possible, to maintain low stature and cover of grass. Time controlled burns to accommodate midwinter Mountain Plover use.
- Investigate the potential impacts to plovers of chronic exposure to agrochemicals in the Central and Imperial valleys.
- Further investigate throughout the California range the differential seasonal use by plovers of native and non-native grasslands versus cultivated lands and determine the factors responsible for shifts between habitats.
- Document prey selection, availability, and abundance and the relationship between these and winter plover distribution and the use of agrochemicals on fields.
- Conduct ecological studies to determine winter survival, movement patterns, and foraging strategies and their relationships to the availability and suitability of habitat.

Monitoring Needs

Monitoring of both breeding and wintering populations is an important need (Knopf 1996). Existing monitoring programs (e.g., CBC) provide only crude measures of trends in wintering numbers. Monitoring in winter in California should focus on traditional wintering sites and high-quality habitat in the Imperial Valley, Carrizo Plain, Panoche Valley, and Central Valley. Monitoring should be based on standardized methods that facilitate trend analysis but, where feasible, also should document land-use changes, habitat suitability, and annual habitat availability in areas sampled. Because of the difficulty of censusing the entire population over its extensive range, it would be valuable, if feasible, to develop a method of population sampling that would enable estimation of the statewide wintering population within acceptable bounds. Monitoring methods should consider the species' life history and distributional characteristics and provide for population estimates at three- to five-year intervals.

Acknowledgments

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