

FERRUGINOUS HAWK

Buteo regalis

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Management Status: Federal: USFWS Species of Concern
California: Species of Special Concern (CDFG, 1998)

General Distribution:

The Ferruginous Hawk breeds in open, arid country in the western U.S. and the southern edge of the Canadian prairie provinces: southern Alberta, Saskatchewan, and southwestern Manitoba. In the continental United States the range extends from eastern Washington and Oregon through Nevada east of the Sierra Nevada Mountains, across northern Arizona to the Texas panhandle, and north to North Dakota (AOU, 1983; Olendorff, 1993; Bechard and Schmutz, 1995; Washington Dept. of Fish and Game, 1996). Strongly associated with plains and desert, Ferruginous Hawks are absent from montane forest; thus, the range is nearly bisected by the Rocky Mountains. Schmutz and Fyfe (1987) suggested that there may be two distinct sub-populations, or ecotypes, separated by the Rockies; however, Gossett (1993) studied genetic and morphological data gathered from both groups of birds and concluded that there is sufficient crossover and genetic mixing to preclude their being considered discrete populations.

Ferruginous Hawks winter in grassland and shrub-steppe habitat from the central and southern portions of the breeding range southwest through much of California (Garrison, 1990), northern Baja and irregularly to Baja California Sur (Unitt et al., 1992); south to southern Arizona, New Mexico, west Texas, and into northern Chihuahua and the central states of northern Mexico, and southeast to western Kansas, Oklahoma, and central Texas (Bent, 1961; Olendorff, 1993; Bechard and Schmutz, 1995; Washington Dept. of Fish and Game, 1996). They occur casually east to Wisconsin, Illinois, Indiana, western Ohio, and Missouri (Christmas Bird Count compilation map; Palmer, 1988).

Distribution in the West Mojave Planning Area:

With only a few recorded nests ever in California, all in the northeast part of the state, there are no breeding records for the Ferruginous Hawk in the WMPA; it occurs as a winter visitor or migrant. It is called fairly common in grasslands and agricultural regions in southern California from mid-September to early April (Garrett and Dunn, 1981). Grinnell and Miller (1944) found the Ferruginous Hawk a more or less common species in places, although they assert that it was formerly more abundant in California. In the adjacent lower Colorado River valley it is cited as an uncommon transient or winter resident from mid-October to mid-March (Rosenberg et al., 1991).

Sight records for southern California include Antelope Valley, Cuyama Valley (communal roost; Bloom, cited in Olendorff, 1993), Harper Dry Lake, Helendale, Lake Henshaw (communal roost; King, Hastings, and Hastings, 1988), and Victorville. Cardiff recorded Ferruginous Hawks in 9 of 10 years (1978-1988) at Harper Lake (cited in ERT, 1988). Ferruginous Hawks appear in the Christmas Bird Count at San Bernardino Valley, adjacent to WMPA boundaries, but primarily of a different habitat type than occurs in most of the WMPA.

Within the WMPA, Ferruginous Hawks occur in Christmas Bird Count data from China Lake, Lancaster (in the Antelope Valley, containing the highest number and density of wintering Ferruginous Hawks in southern California; Pete Bloom, Western Foundation for Vertebrate Zoology, personal communication), and Mojave River Valley. They were tallied in small numbers on migration at Apple Valley by the Mojave Desert Raptor Watch (McDermott, 1994; Anonymous, 1995).

Harper Lake has been identified as a Key Raptor Area by the BLM for the Ferruginous Hawk (Ondorff et al., 1989). This area, which contains 4,000 acres of BLM-managed lands, possesses prime foraging habitat for this species. Two portions of Harper Dry Lake were designated as Areas of Critical Environmental Concern upon adoption of the Desert Plan in 1980 (USDI, 1980). A management plan for the Harper Dry Lake ACEC was prepared in 1982 (USDI, 1982) which reduced the acreage to 480 acres and set management goals for the wetland, including removal of exotic vegetation, land exchanges with private property owners to consolidate public lands in the marsh, and supplementing the water supply to the marsh. The Ferruginous Hawk was not specifically identified as a target species for management actions.

Natural History:

The largest member of the genus *Buteo* in North America, the Ferruginous Hawk is a large, soaring bird of wide-open country. With the long, broad wings and relatively short tail characteristic of the genus, it is distinctive, nonetheless, for its size, bulk, and wing shape. Both a light and dark morph occur in the species, with dark morph individuals estimated at 1-10% of the population (Schmutz and Schmutz, 1981; Bechard and Schmutz, 1995). Light morph juveniles are mostly white underneath, with a dark comma at the carpal (wrist) joint on the extended wing. The white-feathered tarsi will often show some dark spotting. The head is light gray to brown and the shoulders and back are charcoal gray to brown, but lacking the distinctly rufous tones of the adult. The tail is very pale, washed in shades of warm brown to gray, sometimes showing a faintly dark tip, but stark white at the base and onto the uppertail coverts. Light morph adults are much like juveniles underneath except for dark red leggings sometimes barred with dark brown or black. The dark legs make a distinct "V" against the otherwise light body when the bird is seen in overhead flight. The adult light morph has a light gray to dark brown head that is usually lighter than the back but often dark-capped. The wings and back are charcoal to dark brown with rufous patches at the shoulder. The white tail is washed with rufous or gray, sometimes retaining a narrow unmarked band at the base, but with rufous uppertail coverts. Dark morph juveniles are dark brown on the head, back, wings, and covert feathers. The head, nape, and breast may be lighter, warm rufous to tawny. The legs are dark, as is the uppertail; the undertail appears gray or dirty white. Dark morph adults are dark brown overall, with the wing linings slightly rusty. The tail is gray on the dorsal surface, paler underneath. The outer primaries are tipped narrowly in black. Ferruginous Hawks are barrel-chested and stocky. The wings are broad, long, and taper gently to the tips. In soaring flight, the wings are held in a slight dihedral (Dunne et al., 1988; Wheeler and Clark, 1995).

Ferruginous Hawks are largely perch hunters, although they will also spend more time foraging on the ground than any other large raptor, course low over the ground to flush prey, and hover hunt from heights up to 300 ft. (91.5 m; Wakely, 1974; Bechard and Schmutz, 1995). In studies range-wide, mammals including thirteen-lined ground squirrel (*Spermophilus tridecemlineatus*), white-tailed jackrabbit (*Lepus townsendii*), northern pocket gopher (*Thomomys*

talpoides), prairie dogs (*Cynomys* spp.), kangaroo rats (*Dipodomys* spp.), and cottontails (*Sylvilagus* spp.) make up roughly 70-85% of the diet (up to 99% of the biomass). Birds comprise 5-13% of the diet (< 5% of the biomass), and amphibians, reptiles, and insects add the remaining proportion (Olendorff, 1993; Bechard and Schmutz, 1995). In the Antelope Valley Ferruginous Hawks prey mostly on Botta pocket gophers (*Thomomys bottae*; Pete Bloom, personal communication).

The earliest breeding age for the species is largely unsubstantiated. Palmer (1988) reported no evidence that yearlings breed. Gossett (1993) quoted ≥ 21 months (spring of the 3rd calendar year) as the minimum breeding age, and Schmutz (Bechard and Schmutz, 1995) asserts that 2 year-olds breed regularly. Ferruginous Hawks arrive on the nest territory from late February to early March and laying occurs mid-March into early June, although the bulk of laying is between mid-April and mid-May. Seasonal timing varies with fluctuations in weather and availability of prey. Palmer (1988) states that the clutch size ranges from 1-8 eggs depending on prey availability; most studies suggest 2-4 average (Weston, 1969; Loekmoen and Duebbert, 1976; Wittenhagen, 1992; Zelenak and Rotella, 1997). Incubation begins with the first egg and lasts an estimated 30-33 days (Smith and Murphy, 1978; Call, 1995) and hatching is asynchronous by 2-4 days (Bechard and Schmutz, 1995). The age at fledging is variously reported as ranging from 38-48 days, with smaller, lighter males fledging as much as 10 days ahead of females (Olendorff, 1973; Palmer, 1988; Zelenak et al., 1997).

Habitat Requirements:

Ferruginous Hawks nest in sagebrush/shrub-steppe, grassland, mixed shrub/grassland, in lone trees or sparse groves primarily in (but not restricted to) the pinyon-juniper ecotone, and in the transition zone between woodland and shrub or grassland habitats (Howard and Wolfe, 1976; Blair and Schitoskey, 1982; Perkins and Lindsey, 1983; McAnnis, 1990). In the absence of trees, the Ferruginous Hawk readily nests on the ground, favoring buttes, cutbanks, rocky pinnacles and outcrops, and cliff faces (Cameron, 1914; Roth and Marzluff, 1989; Ramakka and Woyewodziec, 1993; Ayers, 1996). There is a tendency to relocate nests off of the ground if an alternative substrate becomes available. Man-made nest substrates include haystacks, high-voltage powerline towers, abandoned buildings, gas and oil development condensation tanks, and artificial nest structures (Gaines, 1985; Call, 1995; Apple, 1997). There is a strong negative correlation with cultivated land; it seems to be tolerated near nest sites, but nests are not located in areas where cultivation represents the dominant land use (Schmutz, 1984; Gaines, 1985). Nesting density as reflected by square miles of territory per laying pair is highly variable. Olendorff (1993) summarized 35 nesting studies in the U.S. and Canada with a range of 1 laying pair per 2.7-1664 mi² (7.1-4261 km²). Additionally, minimum distance between nests varies with prey availability, habitat type, site availability, and individual behavioral preference. Lardy (1980) recorded a straight-line distance of 0.6 mi. (1 km) between nests. In Olendorff's (1993) summary of 11 studies, mean distances between nests ranged from 0.5-4.5 mi. (0.8-7.2 km), with an average of 3.4 mi. (5.4 km) between nests.

Winter and migratory habitat requirements largely overlap with breeding habitat, but without the need for trees or other elevated nest placements, although trees may be used to roost if they are available (Steenhof, 1984; King, et al., 1988). Prey availability is probably the most important factor influencing winter habitat selection. Grassland, pasture, and fallow winter

croplands in which there is an abundance of prairie dogs, lagomorphs, or gophers are used extensively (Schmutz and Fyfe, 1987; Allison, et al., 1995; Plumpton, 1996).

Population Status:

The population status of the Ferruginous Hawk is uncertain owing to a need for range-wide censusing including correlation of breeding, migration, and winter observation numbers. Many of the studies cited in this review postulated declines in Ferruginous Hawk numbers. Warkentin and James (1988) analyzed Christmas Bird Count data and found no evidence for range-wide population decline and, in fact, found several areas which showed significant local increases. In an analysis of California CBC data, Garrison (1990) concluded that apparent increases in numbers of winter Ferruginous Hawks were largely the result of newer CBCs started in areas with more of the birds, as well as increased raptor awareness and improved identification skills. Some populations have declined locally, notably in western Utah (Woffinden and Murphy, 1989; K. Gardner, BLM, personal communication) where the prey base has apparently crashed, and in southwestern California where Bloom reports substantial declines (personal communication). Simultaneous increases in numbers of Ferruginous Hawks in other parts of their range (Alberta, Idaho, and Wyoming; Olendorff, 1993) may indicate opportunistic nomadism with nearly entire local or regional populations relocating to follow prey (K. Steenhof, USGS Forest and Rangeland Ecosystem Science Center, personal communication).

In order for the BLM to maintain a national perspective on populations of the Ferruginous Hawk and the relative importance of the WMPA, it is necessary to update the Key Raptor Area Data Base. Inventory and monitoring is identified as an objective of raptor habitat management in the Fish and Wildlife 2000 plan (USDI, 1987). The goal for inventory and monitoring of raptor populations in Key Raptor Areas is to maintain a current inventory of the raptor populations and monitor their status at least every five years (USDI, 1992). The Harper Dry Lake Key Raptor Area has not met this standard. Updated surveys of winter use by Ferruginous Hawks at this and other sites are needed so that an assessment can be made of the population trends in the WMPA.

Threats Analysis:

Habitat loss probably poses the greatest threat to the Ferruginous Hawk in southern California and the WMPA. Development, recreation, and water reallocation for a growing human population put stresses on the prey base, which, in turn, affects the birds. Loss of water supply to the marsh at Harper Dry Lake and conversion of agricultural lands in the Antelope Valley to urban uses could result in loss of wintering habitat in two important localities within the WMPA. Shooting remains a problem in other parts of the country and, though undocumented, probably occurs in isolated instances in the WMPA. Pesticide contamination in agricultural areas is largely undocumented for the species but remains of concern for any top predator where bio-accumulation might occur. There is very limited interest in Ferruginous Hawks for falconry purposes (less than 1 per year harvested in California; Marc Bechard, personal communication); it is insignificant in management terms.

Biological Standards:

In the absence of nesting Ferruginous Hawks in the WMPA and the attendant human interference problems with breeding birds, maintenance of habitat and protection of the prey base are probably the principal management concerns for the species. Winter agricultural fields (alfalfa) and pasturage are adequate foraging areas (primarily providing gophers) in the Central Valley, and may be important in parts of the WMPA. Water sources and native vegetation should be protected to provide habitat for larger prey (lagomorphs) to ensure stability of the winter prey base. Management should also include maintenance of a fire regime that encourages shrub-steppe as the climax vegetation; encroachment of trees also tends to degrade the habitat for prey.

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