Short-eared Owl
(Asio flammeus)

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Legal Status
Federal: None.
State: Species of Special Concern.

Global and State Conservation Status: G5S3: Global Rank, G G5 = Secure: Common; widespread and abundant; State Rank, S3 = Vulnerable: Vulnerable in the state due to a restricted range, relatively few populations (often 80 or fewer), recent and widespread declines, or other factors making it vulnerable to extirpation.

Recovery Plan: None.

Species Description and Life History

The short-eared owl (*Asio flammeus*) is a medium-sized, ground-nesting species that inhabits marshes, grasslands, and tundra throughout much of North America, Europe, and Asia. Short-eared owl also breeds in South American grasslands and on islands such as Iceland, the Hawaiian chain, and the Galápagos (Holt and Leasure 1993).

The adult plumage is dorsally mottled brown and light, pale buff. Ventrally, short-eared owls are whitish to rust colored, with dense vertical streaking on the breast. This medium-sized owl is approximately 38.1 cm (15 in) in length with a wing span of approximately 96.5 cm (38 in). Males and females are readily distinguished during the breeding season by color and size; females are larger and generally darker than males (Village 1987, Holt 1992). The head of the short-eared owl is large and round, with small tufts arising from the center of the forehead. The face is large and is surrounded by a ruff (distinctive collar-like projection) during normal posture. The facial disk is grayish white in color, with black orbits, yellow eyes, and a black bill.

Seasonal Patterns

Pair bonding in short-eared owls begins in late winter (February-March) as communal roosts disperse. Breeding territories are established and males perform aerial courtship displays to prospective females, day or night (Hamerstrom *et al.* 1961, Carson 1962, Beske and Champion 1971).

In northern California, the breeding season cycle extends through approximately July/August when young fledge. Fall migration begins in September.

While short-eared owls are highly migratory in the northern part of their range, at mid-latitudes the species is present year-round. In California, short-eared owls occur either as residents or as winter visitors. The resident populations are small but are augmented during winter by migrants from northern populations (Roberson 2008).

Reproduction

Short-eared owls are monogamous but the pair bond is thought to last only one season. Females are thought to be primarily responsible for nest construction (Mikkola 1983), which consists of a scraped bowl lined with grasses and downy feathers (Clark 1975, Holt 1992). Nesting sites are traditionally used; however, not consistently used each year (Holt and Leasure 1993).

Clutch size ranges from 4 to 14 with a mean clutch size in North America of 5.6 (Holt and Leasure 1993). Eggs are usually laid in April-May with a 26- to 28-day incubation period. Nestlings appear from May to June and young usually fledge from June to July following a 31- to 36-day nestling period.

Home Range/Territory Size

Breeding territory size of the short-eared owl varies widely ranging from 20 to 83 ha (50 to 205 acres). Home range/territory size is also variable annually depending on prey abundance and availability in the vicinity of the nest site in any given year (Pitelka 1955, Gronlund and Mikkola 1969, Clark 1975, Holt and Melvin 1986, Village 1987).

Foraging Behavior and Diet

Short-eared owls hunt primarily at night; but during winter they are fairly active during twilight hours (Clark 1975), and daytime activity coincides with activity periods of prey (Erkinaro 1973). Short-eared owls hunt while in flight, approximately 0.3 to 30 m (1 to 100 feet) above ground (Clark 1975, Village 1987) or while perched on poles or hills.

The diet of short-eared owls varies little throughout their range, with little difference in food eaten seasonally or by sex or age of individuals. Small mammals, particularly voles (*Microtus*), are the dominant prey throughout most of North America (Craighead and Craighead 1956, Clark 1975, Colvin and Spaulding 1983, Holt 1993). However, short-eared owls consume a variety of bird species (Tomkins 1936, Johnston 1956, Fisler 1960, Holt 1993), including adult and nestling terns, shorebirds, and passerines (Holt 1993). California vole (*M. californicus*) is presumed to be the principal prey item in Yolo County. While little information is available locally, nesting and nesting success is also likely variable depending on vole population cycles (Roberson 2004).

Habitat Requirements and Ecology

Nesting

The breeding range of short-eared owl stretches from the high arctic to mid-latitudes, and to offshore islands in North America. Short-eared owls inhabit prairie and coastal grasslands, marshlands and seasonal wetlands, shrub-steppe, tundra, and agricultural areas. Nests are located on ridges and mounds within dry sites supporting vegetation to conceal an incubating female (Holt and Leasure 1993).

In California, including Yolo County, short-eared owls occur in freshwater marshlands, seasonal wetlands, fallow fields, meadows, and alfalfa fields. Suitable nesting habitat is characterized by herbaceous vegetation that is tall and dense enough to conceal the incubating female and for daytime cover, which is generally consistent with the habitat requirements of voles (Grinnell and Miller 1944, Holt and Leasure 1993).

Foraging

Foraging habitat is similar to nesting habitat, including grasslands, prairies, marshlands, and seasonal wetlands. In Yolo County, and throughout the Sacramento Valley, short-eared owls also forage in agricultural fields that are adjacent to nesting areas and winter roosting areas. Agricultural lands that are distant from occupied grassland, wetland, or pastureland habitats are likely rarely used by this species.

Species Distribution and Population Trends

Distribution

Short-eared owls are one of the world's most widely distributed owl species. This species breeds across northern North America, northern Europe, northern Asia, southern and Andean South America, and the Greater Antilles. Short-eared owls can be nomadic and occur in suitable, open country with abundant prey.

In California, short-eared owls occur as year round residents, but probably migrate locally in the state. Populations increase during winter with the influx of migrants from elsewhere in the range of the species. The species is, and perhaps always has been, generally uncommon in the state with a restricted distribution based on the presence of suitable grassland, wetland, and prairie habitats that support abundant vole populations. Zeiner *et al.* (1980) reports the breeding distribution to include coastal prairies from the Central Coast north to the Oregon border, inland valleys west of the Central Valley from Napa County south to Monterey County, the northeastern Great Basin deserts, and the north Sacramento-San Joaquin Delta from Suisun Marsh to southern Yolo County. The wintering distribution includes the breeding range, south coasts, and the Central Valley from approximately Butte County south to Kern County.

Population Trends

The short-eared owl first appeared on National Audubon's Society Blue List of declining birds in 1976 and was listed until 1986 when the Blue List was discontinued. In the most recent Blue List, all seven North American regions reported significant declines in short-eared owl numbers (Tate 1986, 1992). Breeding Bird Survey data also indicate declines in areas of southern Idaho; southeastern, central, north-central Oregon; and south-central Washington. Short-eared owls do not occupy many areas with seemingly appropriate habitat, signifying that prey abundance or predation pressures affect distribution and abundance (Holt and Leasure 1993). In California, including Yolo County, the tremendous annual variation in both breeding and wintering populations is tied to climate and other factors driving vole and other prey population cycles (Roberson 2004). This variation makes it difficult to assess overall declines and to accurately measure the populations in the state (Roberson 2004). It is likely that the population has declined largely as the result of loss of habitat due to development of agriculture, diversion of water, changes in agricultural practices, and human encroachment.

There are few recent records of breeding activity in the Central Valley. The Hunt-Wesson Hawk and Owl Reserve in Yolo County is one of the few sites in the Central Valley with relatively recently (late 1980s) reported breeding activity (Whisler pers comm.). The South Sacramento County Habitat Conservation Plan reports a 1998 detection of a breeding pair near the Cosumnes River Preserve. Wintering owls are regularly, but uncommonly reported throughout much of the Central Valley.

Distribution and Population Trends in the Plan Area

In Yolo County, limited suitable nesting habitat exists for short-eared owls. The known nesting distribution is highly restricted and in most years has been limited to a single locale: the Hunt-Wesson Hawk and Owl Reserve east of the Yolo County landfill. The spraying of industrial waste water on the reserve by Hunt-Wesson created a grassland/marsh complex that was suitable for nesting short-eared owls. There are anecdotal records of up to five nesting short-eared owls at this location from the late 1980s (Whisler pers comm.) and at least one published account of a nesting pair on adjacent agricultural lands (Wilkinson and Debban 1980). However, there are no confirmed nesting records for this site since the late 1980s, although the site remained generally suitable until the recent closing of the Hunt-Wesson facility and the termination of waste water irrigation. In the absence of regular irrigation, the site is no longer considered suitable nesting habitat for short-eared owls.

Recent possible nesting activity has been reported by the California Department of Fish and Game (Rocco pers comm.) on the Yolo Basin Wildlife Area. Small numbers of owls have been reported during the breeding season suggesting the possibility of active nests; however, nesting has not been confirmed (EDAW 2005). With the development and expansion of wetland habitats on the refuge in recent years, it could become an important and protected breeding area for short-eared owls in Yolo County.

Other possible nesting activity has been documented in the uncultivated fields south of Willow Slough east of County Road 103, and on the Conaway Ranch in the Yolo Bypass north of Interstate 80. Both of these occurrences were of adult birds during the breeding season in the early 1990s. No surveys at these locations were conducted in subsequent years (Whisler pers comm.).

Potential breeding habitat exists throughout portions of the Yolo Basin, including the wetlands and pastures in southern panhandle area in the southern Yolo Basin, on the Yolo Bypass Wildlife Refuge, and on portions of the Conaway Ranch and the Davis Wetlands north of Interstate 80. In addition, freshwater marsh, seasonal wetland, and native grassland habitats at the newly established 3,000 acre Roosevelt Ranch Preserve north of Woodland may also provide future breeding habitat for short-eared owls.

In most years, only wintering owls are observed and anecdotally reported in the county. Most reports are from the Hawk and Owl Reserve, the Yolo Basin, and at least one isolated location west of the Dunnigan Hills (Yolo Audubon Society Checklist Committee 2004, Sacramento Audubon Society 2005).

With the relatively recent development of freshwater marsh and seasonal wetland habitats at the Yolo Basin Wildlife Area, Conaway Ranch, and the Roosevelt Ranch Preserve, available potential nesting and wintering habitat may have increased in Yolo County over the last several years.

Threats to the Species and Other Conservation Issues

Threats to short-eared owls include habitat loss due to urbanization, agricultural and recreational development; disturbance of nesting sites by humans or livestock; and destruction of nests during harvesting of hayfields. Short-eared owls may also be affected by pesticide accumulation through prey items, especially during winter months when short-eared owls occur in agricultural dominated habitats. Most sources of mortality for the short-eared owl, other than predation by other raptors and carnivorous mammals, can be connected to human activities. Human-related sources of mortality include automobile and airplane strikes, and illegal hunting (Clark 1975, Holt 1992).

There are few eminent threats to short-eared owls in Yolo County. Most urbanization has and continues to occur in areas that have not supported nesting or wintering owls. Marshlands, pasturelands, and seasonal wetland habitats in the Yolo Basin are not currently threatened and as noted above, may have increased in recent years. Future management of the Hunt-Wesson Hawk and Owl Reserve is a concern due to the transfer of ownership of that property and the discontinued use of the property as a site to deposit waste water, which contributed to the marsh-like conditions.

Significant data gaps exist regarding the identification of parameters of short-eared owl habitat that support successful reproduction and survival. Further research is also needed to determine the effect of interactions with other bird species on the owl. Likewise, monitoring the cyclic nature of rodents and simultaneously monitoring associated short-

eared owls might elucidate relationships between owl and prey populations. Finally, data gaps exist regarding causes of overall population declines superimposed over cyclic changes. For example, throughout its range, suitable habitat is often not occupied, suggesting that factors other than habitat loss are affecting overall population and distribution trends.

Habitats that could be incorporated into species modeling, and ultimately assist in preserve design, include freshwater marshlands and lowland meadows located in irrigated districts. Habitat patches with tule or tall grass are needed for nesting and daytime seclusion. Conserving habitats that benefit other species, such as waterfowl, may also benefit the owl by providing the proper community-level ecological dynamics.

Management of the species should include a standardized survey protocol, the maintenance of large continuous tracts of habitat, monitoring of predation and human disturbance, public education, and continued research. Furthermore, short-eared owls have benefited indirectly from protection of nesting cover for waterfowl (Larsen 1987). Therefore, maintenance of grasslands for gallinaceous birds and waterfowl that provide nesting and foraging cover for short-eared owls should be considered (Millsap *et al.* 1987).

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References

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Beske, A. and J. Champion. 1971. Prolific nesting of Short-eared Owls in Buena Vista salt marsh. Passenger Pigeon 33:99-103.

Bryan, W.A. 1903. The Short-eared Owl (*Asio accipitrinus*) taken far out at sea. Auk 20:212-213.

Carson, R.D. 1962. Courtship behavior of Short-eared Owl. Blue Jay 20:2-3.

Clark, R.J. 1975. A field study of the Short-eared Owl (*Asio flammeus*) Pontoppidan in North America. Wildlife Monographs 47:1-67.

Colvin, A.B. and S.R. Spaulding. 1983. Winter foraging behavior of Short-eared Owls in Ohio. American Midland Naturalist 110:124-128.

Craighead, J.J. and F.C. Craighead. 1956. Hawks, owls, and wildlife. Stackpole Books, Harrisburg, PA.

Cramp, S. 1985. The birds of the western Palearctic, Vol 4. Oxford University Press, Oxford.

De Vries, T. 1973. The Galapagos Hawk, an eco-geographical study with special reference to its systematic position. Ph.D. dissertation, VU, Amsterdam, Netherlands.

EDAW. 2007. Yolo Bypass Wildlife Area Land Management Plan. Prepared for the California Department of Fish and Game, Davis CA.

Erkinaro, E. 1973. Structure of the diel activity in the Tengmalm's owl (*Aegolius funereus*) and the Short-eared Owl (*Asio flammeus*), and its seasonal changes. Aquilo Ser Zoologica 14:59-67.

Fisler, G.F. 1960. Changes in food habits of Short-eared Owls feeding in a salt marsh. Condor 62:486-487.

Gray, J.A. 1945. Land birds at sea. Condor 47:215-216.

Grinnell, J. and A.H. Miller. 1944. The distribution of the birds of California. Berkeley, CA: Cooper Ornithological Club, Pacific Coast Avifauna. Number 27. Reprinted 1986. Lee Vining, CA: Artemisia Press.

Gronlund, S. and H. Mikkola. 1969. On the ecology of the Short-eared Owl in Lapua Alajoki in 1969. Suomenselan Linnut 4:68-76.

Hamerstrom, F., F. Hamerstrom, and D.D. Berger 1961. Nesting of Short-eared Owls in Wisconsin. Passenger Pigeon 23:46-48.

Harrison, J.G. 1943. On a case of tuberculosis in a wild bird. Ibis 85:516-517.

Henshaw, H.W. 1901. Birds of prey as ocean waifs. Auk 18:162-165.

Holt, D.W. 1992. Notes on Short-eared Owl (*Asio flammeus*) nest sites, reproduction and territory sizes in coastal Massachusetts. Canadian Field-Naturalist 106:352-356.

Holt, D.W. 1993. Breeding season diet of Short-eared Owls from Massachusetts. Wilson Bulletin 105:490-496.

Holt, D.W. and S.M. Leasure. 1993. Short-eared Owl (*Asio flammeus*). In: The Birds of North America, No. 62 (A. Poole and F. Gill, Eds.). Philadelphia: The Academy of Natural Sciences; Washington, D.C.: The American Ornithologists' Union.

Holt, D.W. and S.M. Melvin. 1986. Population dynamics, habitat use, and management needs of the Short-eared Owl in Massachusetts: Summary of 1985 research. Massachusetts Division of Fish and Wildlife, National Heritage Program, Boston, MA.

Johnston, R.F. 1956. Predation by Short-eared Owls on salicornia salt marsh. Wilson Bulletin 68:91-102.

Larsen, J.C. 1987. Short-eared Owl breeding survey. California Department of Fish and Game, Non-game Wildlife, No. W-65-R-4.

Maslow, J.E. 1983. The owl papers. Vintage Books, New York, NY.

Melvin, S.M., D.G. Smith, D.W. Holt, and G.R. Tate 1989. Small owls. Pp. 88-96 In: Proceedings of the northeast raptor management symposium and workshop (B. G. Pendleton, Ed.). National Wildlife Federation, Washington, D.C.

Mikkola, H. 1983. owls of Europe. Buteo Books, Vermillion, SD.

Millsap, B.A., K.W. Kline, and B.A. Giron Pendleton. 1987. Habitat Management. Pp. 215-237 in Raptor management techniques manual (B. A. Giron Pendleton, B. A. Millsap, K. W. Kline, and D. M. Bird, Eds.). National Wildlife Federation Technical Series 10, Washington, D.C.

Pitelka, F.A., P.Q. Tomich, G.W. Treichel. 1955. Ecological relations of jeagers and owls as lemming predators near Barrow, Alaska. Ecological Monographs 25:85-117.

Roberson, D. 2008 Short-eared Owl (*Asio flammeus*). In: D. Shuford and T. Gardali (eds.), California Bird Species of Special Concern: a ranked assessment of species, subspecies, and distinct populations of birds of immediate conservation concern in California. Western Birds 1. Western Field Ornithologists, Camarillo, California,. and California Department of Fish and Game, Sacramento..

Rosen, M.N. and E.E. Morse. 1959. An interspecies chain in a fowl cholera epizootic. California Fish and Game 45:51-56.

Sacramento Audubon Society. 2005. The Observer. Volume 57: Number 3, 2005

Snyder, N.F.R. and J.W. Wiley 1976. Sexual size dimorphism in hawks and owls of North America. Ornithological Monographs 20:1-96.

Tate, J., Jr. 1986. The blue list for 1986. American Birds 40:227-236.

Tate, G.R. 1992. Short-eared Owl (*Asio flammeus*). Pp. 171-189 In: Migratory nongame birds of management concern in the northeast (K.J. Schneider and D.M. Pence, Eds.). U.S. Fish and Wildlife Service, Newton Corner, MA.

Tomkins, I.R. 1936. Notes on the winter food of the Short-eared Owl. Wilson Bulletin 48:77-79.

Village, A. 1987. Numbers, territory-size, and turnover of Short-eared Owls (*Asio flammeus*) in relation to vole abundance. Ornis Scandinavica 18:198-204.

Voous, K.H. 1988. owls of the northern hemisphere. M.I.T. Press, Cambridge, MA.

Wilkinson G.S. and K.R. Debban. 1980. Habitat preferences of wintering diurnal raptors in the Sacramento Valley. Western Birds 11: 25-34.

Yolo Audubon Society Checklist Committee. 2004. Checklist of the Birds of Yolo County, California. Revised April 2004. Yolo Audubon Society, Davis, CA.

Zeiner, D.C., W.F. Laudenslayer, Jr., K.E. Mayer, and M. White. 1990. California's wildlife. Volume II: Birds. California Department of Fish and Game, Sacramento.

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Rocco, Chris. Biologist, Vic Fazio Wildlife Area. Email correspondence to Jenny Marr, California Dept. of Fish and Game. March 2005.

Whisler, Ed. Independent local biologist. Telephone conversation, January 22, 2008.