Burrowing Owl

Athene cunicularia

REGULATORY STATUS

USFWS: Migratory Bird
USFS R2: Sensitive
USFS R4: No special status
Wyoming BLM: Sensitive
State of Wyoming: Protected Bird

CONSERVATION RANKS

USFWS: Bird of Conservation Concern
WGFD: NSSU (U), Tier I
WYNDD: G4, S3
Wyoming Contribution: LOW
IUCN: Least Concern
PIF Continental Concern Score: 12

STATUS AND RANK COMMENTS

The Wyoming Natural Diversity Database (WYNDD) has assigned Burrowing Owl (*Athene cunicularia*) a state conservation rank ranging from S3 (Vulnerable) to S4 (Apparently Stable) because of uncertainty over historic and recent population trends in Wyoming. WYNDD tracks the species at the subspecies level. Western Burrowing Owl (*A. c. hypugaea*) has the same conservation ranks as the full species.

NATURAL HISTORY

Taxonomy:

Up to twenty-five subspecies of Burrowing Owl have been described, but only fifteen are commonly accepted. *A. c. hypugaea* is the only subspecies found in Wyoming. This subspecies is found in western North America, from western Canada south to Baja California, Mexico, and Honduras. The *floridana* subspecies found in Florida and the Bahamas is the only other subspecies in North America. All other subspecies are found in South America and islands adjacent to the American continents [1].

Description:

Identification of Burrowing Owl is possible in the field. Burrowing Owl is a small owl, measuring 19–25 cm tall. Males and females are identical in appearance. The most distinguishing feature is the relatively long legs. The crown, nape, back, wings, and tail are brown, with scattered white spotting. The breast and belly are buffy-white with broad brown barring on the sides. The head is round with no ear tufts and a white chin stripe. Irises are bright yellow. The solid buff-colored chest of juveniles distinguishes them from adults [1, 2]. In the species' habitat of open plains and prairies, it is not likely to be confused with any other owl.

Distribution & Range:
The range of Burrowing Owl includes substantial portions of North, Central, and South America. During the summer breeding season, Burrowing Owl is found across western North America, including grasslands and shrub-steppe throughout Wyoming. Although the species is patchily distributed across western and central Wyoming, Burrowing Owl is most abundant in grasslands in eastern Wyoming [3]. The species' continental distribution has gradually shifted southward and the breeding range has contracted on its northern, eastern and western edges [1, 4]. The range in Canada has shrunk by two-thirds and extirpations have occurred in Iowa, Minnesota, and most of British Columbia and Manitoba [1]. Burrowing Owl has been documented in all of Wyoming's 28 latitude/longitude degree blocks, with confirmed breeding in 24 blocks [5].

Habitat:
Burrowing Owl is generally found in open terrain such as grasslands, prairies, shrub-steppe, and deserts, preferring well-draining or gently sloping areas with low vegetation and a high percentage of bare ground [1, 6]. Burrowing Owl requires burrows for nesting, escape cover, prey caching, and vigilance and prefers areas with a high density of available burrow in close proximity [6, 7]. Although some subspecies of Burrowing Owl can excavate their own burrows, Western Burrowing Owl does not. Instead, owls in western North America must nest in burrows previously excavated by mammals [1]. In Wyoming, Colorado, Nebraska, and South Dakota, Burrowing Owl is primarily found in prairie dog (*Cynomys* spp.) colonies, both active and inactive. Burrows made by ground squirrels (*Spermophilus* spp.), American Badgers (*Taxidea taxus*), marmots (*Marmota* spp.), and Coyotes (*Canis latrans*) can also be used [6]. Grasslands and similar habitats surrounding nest burrows provide foraging areas [8].

Phenology:
Burrowing Owl is migratory in the northern portion of its range, including Wyoming. Nesting phenology is expected to be similar in Wyoming as elsewhere in the species' range. In Idaho, migrants arrive in early March and leave for the winter between mid-September and October. In Montana, egg laying has been documented in early to mid-May. Incubation lasts between 28–30 days [1]. The young first begin to leave the burrows at about two weeks of age, and short flights and fledging occur at about four weeks of age [1, 9]. In Idaho, young were fully fledged at about 58 days of age, which occurred around the end of July [9].

Diet:
Burrowing Owl feeds upon any prey that it can physically handle. Although the species primarily feeds on a variety of arthropods and small mammals such as shrews, voles, and mice, Burrowing Owl will also consume amphibians, snakes, earthworms, birds, bats, and larger mammals such as ground squirrels [1].

CONSERVATION CONCERNS

Abundance:
Continental: WIDESPREAD
Wyoming: UNCOMMON
In 2013, Partners in Flight estimated the Wyoming population of Burrowing Owl to be 13,000 owls [10]. However, this estimate is extrapolated from Breeding Bird Survey (BBS) data and should be viewed with caution due to the low number of detections of the species both in Wyoming and across its range using this survey technique.

Population Trends:
Historic: UNKNOWN
Recent: UNKNOWN
Population trends for Burrowing Owl in Wyoming are largely unknown. Trend data from BBS routes in Wyoming from 1968–2013 suggest that the overall population might be stable, however, data are insufficient to provide conclusive results [11]. Burrowing Owl has declined in other parts of its range, particularly in Canada, the midwestern United States including North Dakota, Minnesota, Nebraska, Kansas, and Oklahoma, and the western edge of the species range in California and Washington [1, 4, 12].

Intrinsic Vulnerability:
HIGH VULNERABILITY
Burrowing Owl is highly vulnerable to extrinsic stressors because the species has relatively narrow habitat requirements and restricted breeding biology. In Wyoming, the species is largely restricted to prairie dog towns. Burrowing Owl requires multiple available burrows in close proximity for nesting, cover, prey caching, and vigilance [6, 7]. Furthermore, the probability that a prairie dog colony is occupied or colonized by Burrowing Owl increases with prairie dog colony size [13]. Thus, habitat, and burrow availability within habitat, can be limiting. Reproduction is also limited by prey availability. Clutch size, number of young fledged, and post-fledging survival can fluctuate significantly with prey abundance and density [1, 6, 14].

Extrinsic Stressors:
MODERATELY STRESSED
Factors that negatively impact prairie dog abundance and colony size or prey species availability threaten Burrowing Owl persistence. Prairie dog declines resulting from land development, eradication programs (usually via poisoning), recreational shooting, and Sylvatic Plague (*Yersinia pestis*) negatively affect Burrowing Owl [6]. Application of pesticides to control insect or rodent populations has both direct and indirect negative impacts on Burrowing Owl through toxicity and reduced prey availability [1]. Energy development is increasing in Burrowing Owl habitat in Wyoming and activities that impact prairie dog or ground squirrel abundance or the quality or quantity of their habitat could also affect Burrowing Owl. Additionally, wind energy development could threaten Burrowing Owl depending on proximity to prairie dog or ground squirrel colonies and owl nests, prey availability, and the type and placement of turbines [15]. At Altamont Pass Wind Resource Area in California, an estimated 600 Burrowing Owls are killed by wind turbines each year [16, 17]. Other common anthropogenic sources of mortality include vehicle collisions, shooting, and barbed wire fences [1].

KEY ACTIVITIES IN WYOMING

In 2007 and 2008, the Wyoming Game and Fish Department (WGFD) Landowner Incentive Program funded eight projects to maintain and conserve prairie dog colonies on private lands in the Shirley Basin and Thunder Basin [18]. This program benefits multiple species, including Burrowing Owl. In 2008, WGFD surveyed 16 prairie dog towns near Lysite but did not detect any Burrowing Owls [19]. Annual monitoring surveys for Burrowing Owl have been conducted in the Pinedale Anticline oil and gas development area since 2009 [20]. Additionally, WGFD initiated a targeted grassland SGCN monitoring program in 2015 for Burrowing Owl, Mountain Plover, Upland Sandpiper, and Long-billed Curlew [22]. Annual BBS surveys are conducted in the state, and these detect Burrowing Owl in limited numbers [11, 22]. The Integrated Monitoring in Bird

Conservation Regions (IMBCR) program also detects Burrowing Owl in limited numbers in Wyoming [23, 24].

ECOLOGICAL INFORMATION NEEDS

Monitoring efforts focused on Burrowing Owl are needed to accurately assess abundance and population trends because general efforts, like BBS and IMBCR, are insufficient for this species [1, 8]. Although some information about the winter range of Wyoming's population of Burrowing Owl is known, the full extent of the winter range is unknown. A complete knowledge of the winter range and threats to the species in those areas is needed [8]. Knowledge about immigration patterns of populations is unknown, but would increase understanding of local population fluctuations [1]. Research is also needed to determine the magnitude of impacts from extrinsic threats, such as pesticide application and wind development, on this species in Wyoming.

MANAGEMENT IN WYOMING

This section authored solely by WGFD; Zachary J. Walker. Burrowing Owl is classified as a Species of Greatest Conservation Need in Wyoming due to unknown population trends, habitat loss and degradation, and incompatible land use. Two separate but compatible survey programs are in place to monitor populations of many avian species that breed in Wyoming; the North American BBS [11] and the IMBCR [23]. While these monitoring programs provide robust estimates of occupancy, density, or population trend for many species in Wyoming, a targeted, species-specific survey method is warranted to obtain these data for Burrowing Owl. The WGFD has implemented species specific surveys to provide additional data on population trends of Burrowing Owl. Best management practices or key management recommendations to benefit Burrowing Owl include retaining prairie dogs and ground squirrels within preferred Burrowing Owl habitat, preservation of Burrowing Owl nesting sites, retaining prey species where Burrowing Owl is known to occur, and avoiding habitat fragmentation in known Burrowing Owl nesting areas [25].

CONTRIBUTORS

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Figure 1: Burrowing Owl in Torrington, Goshen County, Wyoming. (Photo courtesy of Shawn Billerman)

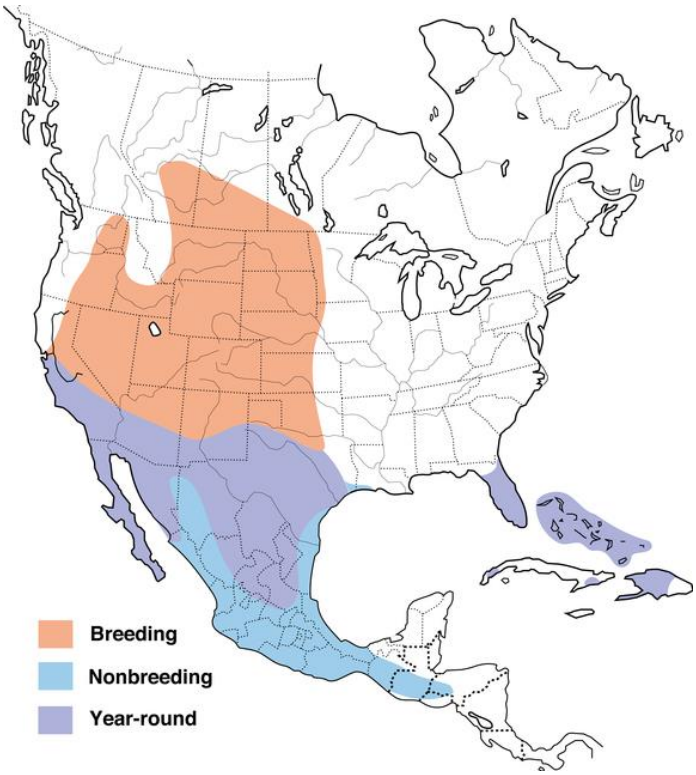

Figure 2: North American range of *Athene cunicularia*. (Map courtesy of Birds of North America, http://bna.birds.cornell.edu/bna, maintained by the Cornell Lab of Ornithology)

Figure 3: Grassland habitat of Burrowing Owl, with a prairie dog town. (Photo courtesy of Michael T. Wickens)

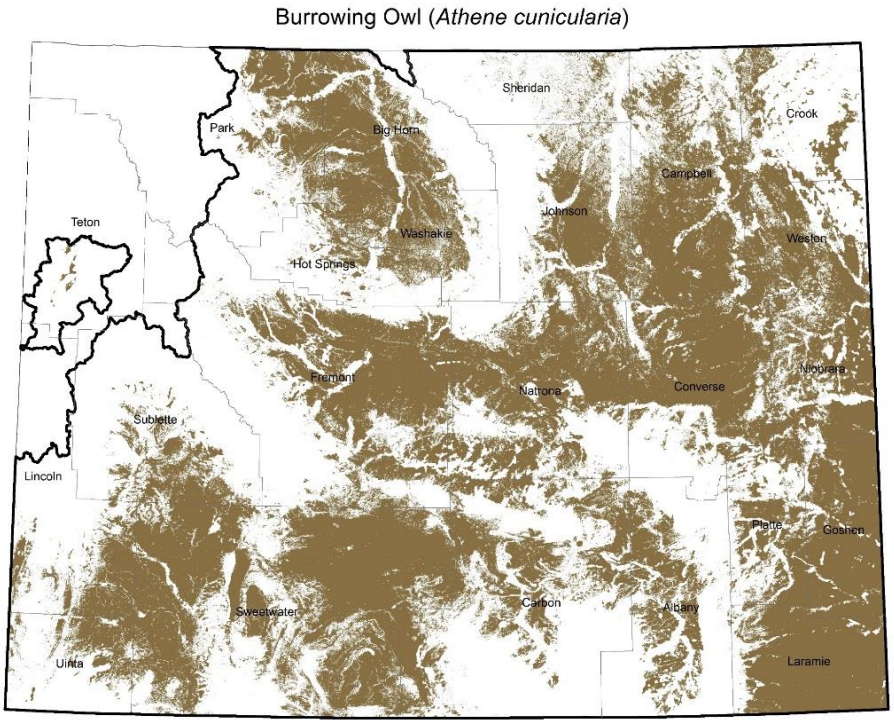

Figure 4: Range and predicted distribution of *Athene cunicularia* during the breeding season in Wyoming.

Figure 5: Burrowing Owl at a burrow of a Black-tailed Prairie Dog (*Cynomys ludovicianus*) in Thunder Basin National Grassland, Wyoming. (Photo courtesy of Michael T. Wickens)