Northern Goshawk

Accipiter gentilis

REGULATORY STATUS

USFWS: Listing Denied; Migratory Bird
USFS R2: Sensitive
UWFS R4: Sensitive
Wyoming BLM: Sensitive
State of Wyoming: Protected Bird

CONSERVATION RANKS

USFWS: No special status
WGFD: NSSU (U), Tier I
WYNDD: G5, S2S3B/S3N
Wyoming Contribution: LOW
IUCN: Least Concern
PIF Continental Concern Score: 11

STATUS AND RANK COMMENTS

Northern Goshawk (*Accipiter gentilis*) in the contiguous United States west of the 100th meridian was petitioned for protection under the Endangered Species Act in 1997. The United States Fish and Wildlife Service found that protections were not warranted in 1998. The finding indicated that the petition did not present substantial scientific evidence that the species was in danger of extinction in that portion of its range [1]. The Wyoming Natural Diversity Database has assigned Northern Goshawk a range of state conservation breeding ranks due to uncertainty regarding the intrinsic vulnerability of the species in Wyoming.

NATURAL HISTORY

Taxonomy:

Northern Goshawk occurs throughout the northern hemisphere and many subspecies are recognized across its range, most in the Old World. Two subspecies in North America are recognized by the American Ornithologists Union, with a third acknowledged by some authors [2-6]. The subspecies *A. g. atricapillus*, is found in Wyoming and is the most widely distributed subspecies in North America.

Description:

Identification of Northern Goshawk is possible in the field. It is the largest raptor in the genus *Accipiter* and is similar in size to Red-tailed Hawk (*Buteo jamaicensis*) [7]. Females are larger than males but both sexes are identical in appearance. Adults have a blackish crown and cheeks and a white streak over the eye. This white streak varies from broad to barely visible. Underparts are pale gray with fine black vertical streaks [4, 7]. Dorsally, adults are slate gray to bluish-black. The tail is rounded and dark gray above, with 3–5 dark bands on the underside, and tipped with a thin white terminal band which may be absent due to wear. The feet, cere, legs, toes, and mouth lining are yellow. The eyes are red [4]. Juveniles are dark brown to brown-black dorsally through

their first winter. Underparts are buffy brown with darker brown streaking [5]. Juvenile plumage is mostly lost in the first spring, though birds will retain some juvenile characteristics for up to four years [4, 5, 8]. Northern Goshawk is similar in appearance to sympatric *Accipiters* but can be distinguished from both Cooper's Hawk (*A. cooperii*) and Sharp-shinned Hawk (*A. striatus*), which are both smaller than Northern Goshawk, and have white underparts with russet barring[7].

Distribution & Range:

Northern Goshawk has a Holarctic distribution. The North American range encompasses most of the boreal and montane forests across the continent, extending south into western Mexico along the Sierra Madre Occidental mountain range [2, 4-6]. In Wyoming, Northern Goshawk has been found throughout the state [9, 10]. Confirmed or suspected breeding has been documented in 23 of Wyoming's 28 latitude/longitude degree blocks [10]. The species is both a year-round resident and a short-distance winter migrant. Also, periodic or cyclic winter irruptions occur, as well as limited altitudinal migrations [4-6, 11].

Habitat:

Across the species' range, Northern Goshawk uses most forest types and are considered forest habitat generalists at large spatial scales [4]. In Wyoming, the species is generally associated with mature montane coniferous forests and adjacent aspen forests during the breeding season [6, 12]. Northern Goshawk has fairly specific nesting habitat requirements. Nests are generally located in mature or old-growth forest habitat, and nest sites are characterized by forest stands with high basal area; large, tall trees; high canopy cover; and an open understory [2, 4, 6, 12]. Additionally, nest trees are often located away from forest edges on the lower to middle portions of moderate slopes [6, 12, 13]. In Wyoming, most nests have been found in Douglas Fir (*Pseudotsuga menziesii*), Lodgepole Pine (*Pinus contorta*), or Quaking Aspen (*Populus* tremuloides) trees [6, 12-14]. After fledging, young stay with the adults in the vicinity of the nest until they are entirely independent [2, 4]. While poorly understood, research indicates that Northern Goshawk forages in a wide variety of forest habitats of varying age, structure, and successional stages [2, 4]. The average area used for foraging surrounding nest sites has been estimated at over 2400 ha. [4]. In some systems, Northern Goshawk prefers forests with a relatively open canopy and understory for efficient prey pursuit and capture [2, 5, 6]. Little is known about habitat associations in winter. However, Northern Goshawk appears to use a wider variety of habitats in winter, including non-forested, open habitats such as shrublands [2, 6].

Phenology:

Adults generally return to breeding areas between late March and early April [4, 6, 15]. Incubation begins in early May and ranges from 30-44 days and hatching occurs in early June [2]. Young are dependent upon adults and remain in the nest or on the nest tree for 37–45 days [2, 4]. Young begin to feed themselves after fledging, but adults continue to provision them until they become fully independent at approximately 70 days [2, 4, 6]. Fall migration occurs between September and December [2, 4, 11].

Diet:

Northern Goshawk is an opportunistic predator [2]. Prey generally consists of medium-sized mammals and birds including tree and ground squirrels, lagomorphs, gallinaceous birds, corvids, and woodpeckers [2, 12]. Infrequently, carrion, small passerines, raptors, shrews, and other small mammals are consumed [2, 4, 6, 16]. Relatively little is known about the diet of Northern Goshawk in winter, but evidence suggests that it is often different than summer diet. Available data indicate

that birds dominate Northern Goshawk diet during the breeding season, while tree squirrels and rabbits comprise the majority of the winter diet [2].

CONSERVATION CONCERNS

Abundance:

Continental: WIDESPREAD
Wyoming: UNCOMMON
Robust estimates of abundance are not available for Northern Goshawk in Wyoming. Across the western United States, densities of nesting individuals are relatively low, ranging from 3.6 to 10.7 pairs per 100 km^2 [2]. It is assumed that densities of nesting individuals in suitable habitat are roughly similar in Wyoming. Partners in Flight (PIF) estimated a state population of 4,000 individuals in 2007 [17] and 12,000 individuals in 2013 [18]. However, these estimates should be viewed with caution because they are largely based data from the Breeding Bird Survey (BBS), which was not designed to monitor raptors and has relatively few detections of Northern Goshawk [17-19]. The recent estimate of 12,000 seems particularly questionable, since previous PIF estimates for Wyoming were generally much lower and in-line with 2013 estimates for Northern Goshawk populations in adjacent Rocky Mountain states (i.e., 4,000 in Colorado, 5,000 in Idaho, 2,000 in Montana, and 2,000 in Utah) [18].

Population Trends:

Historic: UNKNOWN
Recent: MODERTE DECLINE
Population trends for Northern Goshawk are largely inferred from changes in breeding territory occupancy. Though occupancy rates and population trends have been shown to be highly correlated, the exact nature of this relationship for Northern Goshawk is unclear [20]. Recent monitoring efforts in the Medicine Bow-Routt National Forest in Wyoming have shown a decline in territory occupancy [21]. In the Targhee National Forest in northeastern Idaho, occupancy rates of Northern Goshawk territories declined from 64% to 31%, and nest success declined from 56% to 19% from 1990–1994 and 1998–2002, respectively [22]. However, differences in land management practices and local habitat variation make it unclear how this pattern relates to population trends in Wyoming. Site occupancy and breeding success across the species' range have also declined [23, 24]. Trend estimates from BBS and Christmas Bird Count data are inconclusive because the species is infrequently detected during these surveys [19, 25]. Occupancy estimation based on the United States Forest Service (USFS) regional monitoring protocols was calculated for two study areas in Wyoming but low sample numbers hindered interpretation of results [26].

Intrinsic Vulnerability:

MODERATE VULNERABILITY
Northern Goshawk is moderately vulnerable to extrinsic stressors. While Northern Goshawk nests in most forest types across its range, nest sites are defined by relatively narrow habitat characteristics [2]. Additionally, the species requires a large home range during the breeding season, ranging from 570–5,300 ha depending on local habitat characteristics [2]. Northern Goshawk is highly territorial and defends the area around the nest, which can limit the density of nesting pairs in some systems [27]. However, in the Black Hills of South Dakota and Wyoming, evidence suggests that the locations and density of nests were limited by habitat conditions rather than by intraspecific territorial aggression [28]. It is important to note that forests in the Black Hills

are highly fragmented, limiting the availability of suitable nesting habit. Regardless of the mechanism, it is clear that nesting Northern Goshawks occur at low density across the landscape.

Extrinsic Stressors:

MODERATELY STRESSED

Extrinsic stressors to Northern Goshawk are primarily tied to the alteration of forests [2] and include both anthropogenic and natural disturbances such as timber harvest, forest thinning, fire suppression, wildfire, and pine beetle outbreaks [5]. Evidence suggests that large patches of mature or old growth forest surrounding Northern Goshawk nests are important for maintaining local populations [2] . In the Caribou-Targhee National Forest of Wyoming and Idaho, occupancy of known nesting territories was lower in timber harvest areas, which suggests that timber harvest may negatively affect Northern Goshawk [22]. Additionally, increased forest fragmentation may favor interspecific competitors and predators of Northern Goshawk such as Great Horned Owl (*Bubo virginianus*) and Red-tailed Hawk [2]. The species has experienced reduced breeding success and territory occupancy in the vicinity of trails and roads [23]. Perhaps the largest potential stressor for Northern Goshawk in Wyoming is the ongoing Mountain Pine Beetle (*Dendroctonus ponderosae*) outbreak occurring throughout much of the state in forests dominated by Lodgepole Pine (*Pinus contorta*). The pine beetle outbreak has led to nearly 100% tree mortality in affected areas of the Medicine Bow National Forest in southern Wyoming. It has been predicted that forests undergoing pine beetle infestations will become less suitable for Northern Goshawk over the next 6–20 years because the species may not breed in open canopy, needle-free forests [14]. However, Northern Goshawk in the Ashley National Forest in Utah continued to nest successfully in beetle-killed forests experiencing 80% tree mortality [14]. It is unclear if the species will respond similarly in Wyoming. Changes in forest structure and composition as a result of climate change may also reduce suitable nesting and foraging habitat for this species (Romney et. al. 2011)

KEY ACTIVITIES IN WYOMING

Monitoring known Northern Goshawk nesting territories occurs annually on the Medicine Bow-Routt National Forest [21]. Results suggest that territory occupancy is variable among years and may be experiencing a gradual decline through time [21]. In 2006, researchers implemented and tested the efficacy of the USFS "Northern Goshawk Bioregional Monitoring Design" to estimate the occupancy rates at sites across Wyoming, Colorado, and South Dakota. The researchers suggested that this monitoring plan, in conjunction with additional habitat modeling and spatial stratification, would allow land managers to detect region-wide changes in occupancy through time [29]. From 2009–2010, the Wyoming Game and Fish Department (WGFD) conducted a study on the east side of the Wyoming Range in response to proposed land-management actions in the area. The focus of this work was to locate nests, estimate nesting density, and further knowledge of habitat use of Northern Goshawk in the Wyoming Range [26, 30-32]. Results indicated that Northern Goshawk nests occur at low density in the study area and are located in diverse, mature stands on moderate slopes with a northerly aspect [32]. A number of these nest stands burned in the 2012 Fontenelle Fire that affected 9,237 hectares in the Wyoming Range. Surveys for nesting Northern Goshawk occurs on other National Forest districts in Wyoming but survey protocol and effort is inconsistent from year to year hindering any interpretation of trend or response to management treatments.

ECOLOGICAL INFORMATION NEEDS

Estimates of abundance and population trends in Wyoming and across the range of Northern Goshawk are not well known. This is in part due to inconsistent survey protocols between organizations and over time, and use of survey protocols that do not allow for accurate inferences of abundance [2]. The effects of Mountain Pine Beetle and forest treatments including forest health and fire reduction treatments on Northern Goshawk nesting and wintering habitat in Wyoming are largely unknown. Information to identify high quality foraging habitat in different habitat types across the state is also lacking.

MANAGEMENT IN WYOMING

This section authored solely by WGFD; Andrea C. Orabona and Susan M. Patla. Northern Goshawk is classified as a Species of Greatest Conservation Need in Wyoming. State Wildlife Grants funding has supported work to obtain data on nesting density and habitat use on the eastern side of the Wyoming Range to assist in planning future habitat projects in that area [33]. The WGFD is encouraging USFS and Bureau of Land Management personnel to use standardized techniques to monitor historic Northern Goshawk nest sites and inventory new project areas a minimum of two years prior to habitat management activities [33]. Best management practices to benefit Northern Goshawk in Wyoming focus on using a cooperative, statewide, multi-agency/organization approach [33, 34]. These include annual Northern Goshawk surveys using a standardized protocol to determine territory occupancy, nest success, and productivity; development of a database to track Northern Goshawk nest sites; use of GIS vegetation mapping to identify and quantify existing high quality Northern Goshawk nesting habitat; managing habitat to minimize human disturbance in nesting areas during the breeding season, protecting traditional or previously used nesting areas, and maintaining an adequate distribution of mature coniferous forest stands across the landscape. Recent improvements in satellite tracking technology will improve the ability to track foraging males in both summer and winter which should provide valuable new fine-scale information on goshawk habitat use beyond the nest site and also on adult survival rates.

CONTRIBUTORS

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Figure 1: Adult Northern Goshawk in winter, Boulder County, Colorado. (Photo courtesy of David Waltman)

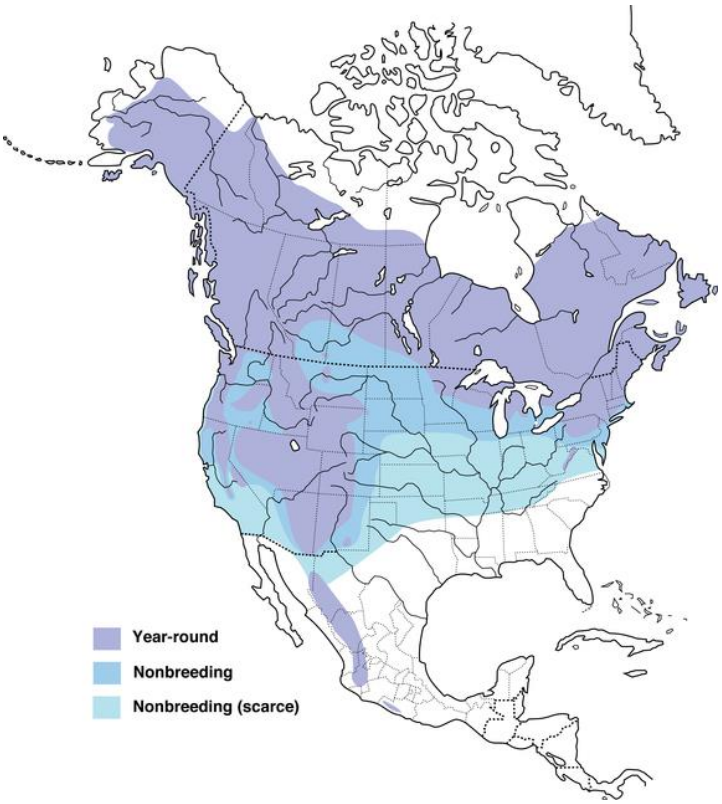

Figure 2: North American range of *Accipiter gentilis*. (Map courtesy of Birds of North America, http://bna.birds.cornell.edu/bna, maintained by the Cornell Lab of Ornithology)

Figure 3: Ponderosa Pine (*Pinus ponderosa*) forest, 1–2 years post burn, on the Kaibab Plateau, Arizona. (Photo courtesy of Terri Pope)

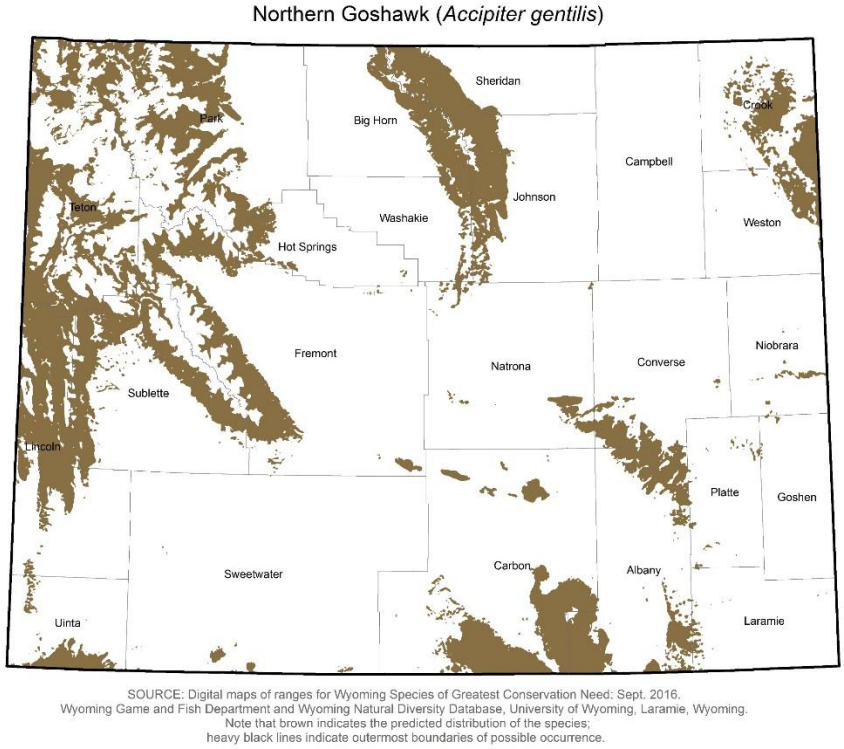

Figure 4: Range and predicted distribution of *Accipiter gentilis* in Wyoming.

Figure 5: Adult Northern Goshawk on nest in Rocky Mountain National Park, Colorado. (Photo courtesy of Phil Swanson)