Great Blue Heron

Ardea herodias

REGULATORY STATUS

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

CONSERVATION RANKS

USFWS: No special status
WGFD: NSS4 (Bc), Tier II
WYNDD: G5, S4
Wyoming Contribution: LOW
IUCN: Least Concern
PIF Continental Concern Score: Not ranked

STATUS AND RANK COMMENTS

Great Blue Heron (*Ardea herodias*) does not have any additional regulatory status or conservation rank considerations beyond those listed above.

NATURAL HISTORY

Taxonomy:

There has been much disagreement about the number of subspecies of Great Blue Heron [1-6]. The most recent assessment is that there are four subspecies in North America, with *A. h. herodias* and *A. h. wardi* being the two most common. These two subspecies are also likely found in Wyoming.

Description:

Great Blue Heron is the largest heron in North America (160 cm tall, 97–137 cm long, 2.1–2.5 kg). It is easily identifiable in the field by its large size, long legs and neck, gray upperparts, white head with a broad blue stripe running from the eyes to the back of the head, and yellowish eyes and bill. Its legs are greenish or brownish. Juveniles have solid gray crowns, whereas adults have white crowns. Both sexes are visually similar, with females averaging slightly smaller [6]. Great Blue Heron is unlikely to be confused with any other heron species in Wyoming.

Distribution & Range:

In Wyoming, Great Blue Heron can be a summer, breeding-only resident or a year-round resident [6]. Great Blue Heron has been documented in all of Wyoming's 28 latitude/longitude degree blocks, with confirmed or circumstantial evidence of breeding occurring in 27 degree blocks [7]. Great Blue Heron winters both inside and outside of Wyoming.

Habitat:
Across its range, important foraging habitat during the breeding season has been reported as shallow coastal marine waters, coastal mangrove swamps, sea beaches, pasture and cultivated fields, prairie, aquaculture ponds, and human-created foraging sites where handouts and fish scraps can be found [6]. In Wyoming, the highest concentration of breeding Great Blue Herons occurs along the major river drainages (i.e., Bighorn, Green, North Platte, Powder, and Snake) [8]. The lowest densities occur in Yellowstone National Park and in arid regions, such as the Great Divide Basin [9]. Breeding elevation has been reported up to 1,100 m in British Columbia and 610 m in Vermont [10], but is necessarily higher in Wyoming (up to 2,438 m) due to the state's overall elevation [9]. In Wyoming, the species typically creates stick nests in colonies in trees, shrubs, artificial structures, or on the ground, near water [6, 9, 11]. To avoid ground predators, Great Blue Heron prefers to nest in swamps or on islands. There is little knowledge of habitat use during migration, but it is assumed to be similar to that of the breeding season [6]. As with migration, there are little data on winter habitat use, but Great Blue Heron is reported to have the widest wintering distribution of any North American heron species [12]. Winter sightings in Wyoming generally occur along open rivers and warm springs [9].

Phenology:
Great Blue Herons that are not year-round residents of Wyoming begin to arrive in the second half of March [9]. Timing of fall dispersal is uncertain, but likely occurs between late August and mid-September [9]. Little data are available for Wyoming, but first brood of the season has been recorded as early as the third week in March in Idaho [13]. Eggs are typically laid in 2-day intervals, sometimes 3-day intervals [14-16]. Incubation period averages 27 days. Young are semi-altricial at hatching, able to walk steadily at 21 days, and able to fly at 7–8 weeks [14, 15, 17-19]. Depending on latitude, Great Blue Heron can re-nest after a failed attempt but typically chooses a new mating partner [6, 20, 21].

Diet:
Great Blue Heron eats a wide variety of organisms including mammals, fish, amphibians, birds, insects, and crustaceans [22, 23]. In some regions, voles are known to be important components in the diet of nestlings [24] and for juveniles [11, 25-27]. Diet composition is likely a function of local prey availability and abundance [25, 28-30]. Death by choking can occur when herons try to consume large prey items [31]. Great Blue Heron digests bones but cast pellets that contain mammal hair. The species obtains all water necessary for survival from its food [6].

CONSERVATION CONCERNS

Abundance:
Continental: WIDESPREAD
Wyoming: UNCOMMON
The statewide rank of UNCOMMON is based on the limited area of the state known to be occupied in any given season, and the relatively small coverage of suitable habitat within that area. However, within suitable habitat in the occupied area, Great Blue Heron appears to be common and is usually encountered during surveys that could be expected to indicate its presence [7]. Great Blue Heron density (number of birds per square km) and population size estimates for Wyoming are available from the Integrated Monitoring in Bird Conservation Regions (IMBCR) program for the years 2012–2015, although detections are limited so data must be interpreted with caution [32].

Population Trends:
Historic: UNKNOWN
Recent: MODERATE DECLINE to STABLE
Great Blue Heron population trend data from the Breeding Bird Survey (BBS) in Wyoming suggest a slight decline of 0.38 annually (*N* = 78 routes, 95% CI: -1.96–1.13) from 1968–2013 and an annual increase of 0.45 (*N* = 78 routes, 95% CI: -2.80–3.75) from 2003–2013 [33]. However, these trend estimates must be interpreted with caution, since neither is statistically significant and Wyoming falls within a regional credibility category containing data with deficiencies.

Intrinsic Vulnerability:
MODERATE VULNERABILITY
Great Blue heron has moderate intrinsic vulnerability in Wyoming due to colonial nesting behaviors that make large numbers of breeding individuals vulnerable to catastrophic weather events [34]. Nests in trees are susceptible to windfall destruction [35], and severe winters that cause sustained ice over aquatic foraging areas can reduce Great Blue Heron prey availability and cause mortality [36].

Extrinsic Stressors:
MODERATELY STRESSED
Potential extrinsic stressors to Great Blue Heron in Wyoming include habitat loss and fragmentation, human disturbance, increasing predator abundance, and climate change. Wetland and woodland habitat loss and fragmentation are a risk to all colonial nesting birds, which simultaneously exposes them to increased human disturbances [34]. Colony disturbance by human activity in Oregon, Colorado, and British Columbia has coincided with a decrease in Great Blue Heron breeding success [35, 37, 38]. Bald Eagle (*Haliaeetus leucocephalus*), an important predator of Great Blue Heron, has been increasing in abundance in Wyoming, which in turn could increase predation pressure on herons in the state [39]. Further, climate change could cause changes in the timing of precipitation events, detrimentally altering water levels in Great Blue Heron foraging areas [21].

KEY ACTIVITIES IN WYOMING

Great Blue Heron is classified as a Species of Greatest Conservation Need (SGCN) by the Wyoming Game and Fish Department (WGFD). Two separate but compatible survey programs are in place to monitor populations of many avian species that breed in Wyoming; the North American BBS [33] and the multi-partner IMBCR [32]. 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 needed to obtain these data for Great Blue Heron. Since 1984, WGFD has conducted annual or periodic monitoring at the most important and productive sites for colonial waterbird SGCN to determine species presence and distribution, and to estimate number of nesting pairs. In 2014, a multi-year cooperative agreement between the WGFD and U.S. Fish and Wildlife Service was completed on an intensive survey of all historic, known, potential, and new colonial waterbird breeding sites statewide as part of a western range-wide effort to track population size, trends, and locations of breeding colonial waterbirds in the western United States [40, 41]. An online Atlas of western colonial waterbird nesting sites was produced with data collected and submitted by participating states [42]. However, because Great Blue Heron is known to shift colony locations, the WGFD periodically conducts aerial surveys of all the major drainages in Wyoming to map the most current colony locations.

ECOLOGICAL INFORMATION NEEDS

To ensure management actions reflect actual colony locations, new information will soon be needed on up to date locations of Great Blue Heron colonies, as these are known to shift along drainages over time (A. Orabona, pers. obs.).

MANAGEMENT IN WYOMING

This section authored solely by WGFD; Andrea C. Orabona. Great Blue Heron is classified as a SGCN in Wyoming due to limited nesting habitat in the state. Riparian lands constitute a small percentage of Wyoming's landscape [43], and less than 2% of the state's total area is classified as wetland habitat [44]; yet the importance of these mesic habitats to avian migration, nesting, and foraging is well documented [45]. While local, state, and federal measures may limit certain impacts in these areas, the cumulative effects of development (e.g., grazing, timber harvesting, recreation), invasive species, and hydrologic regime change (e.g., impoundments, irrigation withdrawals, channel alterations) contribute to the degradation of riparian lands in Wyoming [43]. Two separate but compatible survey programs are in place to monitor populations of many avian species that breed in Wyoming; the North American BBS [33] and the multi-partner IMBCR [32]. While these monitoring programs provide robust estimates of occupancy, density, or population trend for many species in Wyoming, survey efforts do not tend to detect Great Blue Heron at adequate levels, suggesting targeted, species-specific monitoring efforts are needed. Approximately every 3–5 years, WGFD conducts aerial Great Blue Heron colony surveys over the state's river drainages with suitable nesting habitat to track locations of occupied heron rookeries.

CONTRIBUTORS

Brian M. Zinke, WGFD
Andrea C. Orabona, WGFD
Jarek S. Bernt, WGFD
Kaylan A. Hubbard, WYNDD

REFERENCES

[1] Oberholser, H. C. (1912) A revision of the forms of the Great Blue Heron (*Ardea herodias* Linnaeus), *Proceedings U.S. National Museum 43*, 531-559.
[2] Palmer, R. S. (1962) *Handbook of North American Birds, Volume 1*, Yale University Press, New Haven, CT.
[3] Hancock, J., and Elliot, H. (1978) *The Herons of the World*, Harper and Row, New York, NY.
[4] Payne, R. B. (1979) Ardeidae, In *Checklist of Birds of the World* (Mayr, E., and Cottrell, G. W., Eds.), pp 193-244, Museum of Comparative Zoology, Cambridge, MA.
[5] Dickerman, R. W. (2004) A review of the North American subspecies of the Great Blue Heron (*Ardea herodias*), *Proceedings of the Biological Society of Washington 117*, 242-250.
[6] Vennesland, R. G., and Butler, R. W. (2011) Great Blue Heron (*Ardea herodias*), In *The Birds of North America* (Rodewald, P. G., Ed.), Ithaca: Cornell Lab of Ornithology; Retrieved from the Birds of North America: https://birdsna.org/Species-Account/bna/species/grbher3.
[7] Orabona, A. C., Rudd, C. K., Bjornlie, N. L., Walker, Z. J., Patla, S. M., and Oakleaf, R. J. (2016) *Atlas of Birds, Mammals, Amphibians, and Reptiles in Wyoming*, Wyoming Game and Fish Department Nongame Program, Lander, Wyoming.
[8] Findholt, S. L. (1984) Status and distribution of herons, egrets, ibises, and related species in Wyoming, *Colonial Waterbirds 7*, 55-62.
[9] Faulkner, D. W. (2010) *Birds of Wyoming*, Roberts and Company Publishers, Greenwood Village, CO.
[10] Laughlin, S. B., and Kibbe, D. P. (1985) *The Atlas of Breeding Birds of Vermont*, Press of New England, Hanover, NH.

[11] Butler, R. W. (1997) *The Great Blue Heron: A Natural History and Ecology of a Seashore Sentinel*, University of British Columbia Press, Vancouver.
[12] Mikuska, T., Kushlan, J. A., and Hartley, S. (1998) Key areas for wintering North American herons, *Colonial Waterbirds 21*, 125-134.
[13] Collazo, J. A. (1981) Some aspects of the breeding ecology of the Great Blue Heron at Heyburn State Park, *Northwest Science 55*, 293-297.
[14] Vermeer, K. (1969) Great Blue Heron colonies in Alberta, *Canadian Field-Naturalist 83*, 237-242.
[15] Pratt, H. M. (1970) Breeding biology of Great Blue Herons and Common Egrets in central California, *Condor 72*, 407-416.
[16] McAloney, K. (1973) The breeding biology of the Great Blue Heron on Tobacco Island, Nova Scotia, *Canadian Field-Naturalist 87*, 137-140.
[17] Harrison, C. (1978) *A Field Guide of the Nests, Eggs, and Nestlings of North American Birds*, Collins, Glasgow, Scotland.
[18] Dowd, E. M., and Flake, L. D. (1985) Arrival and departure patterns of Great Blue Herons at a South Dakota colony, *Wilson Bulletin 97*, 374-378.
[19] Werschkul, D. F., McMahon, E., and Leitschuh, M. (1977) Observations on the reproductive ecology of the Great Blue Heron in western Oregon, *Murrelet 58*, 7-12.
[20] Simpson, K. (1984) Factors affecting reproduction in Great Blue Herons (*Ardea herodias*), University of British Columbia, Vancouver, BC.
[21] Vennesland, R. G. (2000) The effects of disturbance from humans and predators on the breeding decisions and productivity of the Great Blue Heron in south-coastal British Columbia, Simon Fraser University, British Columbia.
[22] Kushlan, J. A. (1978) Feeding ecology of wading birds, In *Wading Birds* (Sprunt, A., IV, Ogden, J. C., and Winkler, S., Eds.), pp 249-298, National Audubon Society Research Report No. 7, New York, NY.
[23] Peifer, R. W. (1979) Great Blue Herons foraging for small mammals, *Wilson Bulletin 91*, 630-631.
[24] Collazo, J. A. (1979) Breeding biology and food habits of the Great Blue Heron at Heyburn State Park, Benewah County, Idaho, University of Idaho, Moscow, ID.
[25] Butler, R. (1991) Habitat selection and time of breeding in the Great Blue Heron (*Ardea herodias*), University of British Columbia, Vancouver, BC.
[26] Butler, R. W. (1995) The patient predator: foraging and population ecology of the Great Blue Heron (*Ardea herodias*) in British Columbia, *Canadian Wildlife Service Occasional Paper 86*, 1-44.
[27] Gutsell, R. (1995) Age-related foraging behaviour and habitat use in Great Blue Herons, Simon Fraser University, British Columbia.
[28] Quinney, T. E., and Smith, P. C. (1979) Reproductive success, growth of nestlings, and foraging behaviour of the Great Blue Heron (*Ardea herodias herodias L.*), Canadian Wildlife Service, contract report No. KL229-5-7077, Ottawa, Canada.
[29] Parker, J. (1980) Great Blue Herons (*Ardea herodias*) in northwestern Montana: nesting habitat use and the effects of human disturbance, University of Montana, Missoula, MT.
[30] Hom, C. (1983) Foraging ecology of herons in a southern San Francisco Bay saltmarsh, *Colonial Waterbirds 6*, 37-44.
[31] Wolf, B. O., and Jones, S. L. (1989) Great Blue Heron deaths caused by predation on Pacific Lamprey, *Condor 91*, 482-484.
[32] Bird Conservancy of the Rockies. (2016) The Rocky Mountain Avian Data Center [web application], Brighton, CO. http://adc.rmbo.org.
[33] Sauer, J. R., Hines, J. E., Fallon, J. E., Pardieck, K. L., Ziolkowski, D. J., Jr., and Link, W. A. (2014) The North American Breeding Bird Survey, Results and Analysis 1966 - 2013. Version 01.30.2015, USGS Patuxent Wildlife Research Center, Laurel, MD.
[34] Parnell, J. F., Ainley, D. G., Blokpoel, H., Cain, B., Custer, T. W., Dusi, J. L., Kress, S., Kushlan, J. A., Southern, W. E., Stenzel, L. E., and Thompson, B. C. (1988) Colonial waterbird management in North America, *Colonial Waterbirds 11*, 129-169.
[35] Skagen, S. K., Melcher, C. P., and Muths, E. (2001) The interplay of habitat change, human disturbance, and species interactions in a waterbird colony, *American Midland Naturalist 145*, 18-28.
[36] Blus, L., and Henny, C. (1981) Suspected Great Blue Heron population decline after severe winter in the Columbia Basin, *Murrelet 62*, 16-18.
[37] Werschkul, D. F., McMahon, E., and Leitschuh, M. (1976) Some effects of human activities on the Great Blue Heron in Oregon, *Wilson Bulletin 88*, 660-662.

[38] Vennesland, R. G., and Butler, R. W. (2004) Factors influencing Great Blue Heron nesting productivity on the Pacific Coast of Canada from 1998 to 1999, *Waterbirds 27*, 289-296.
[39] Travsky, A., and Beauvais, G. P. (2004) Species assessment for Bald Eagle (*Haliaeetus leucocephalus*) in Wyoming, p 42, Wyoming Natural Diversity Database and USDI Bureau of Land Management, University of Wyoming, Laramie, WY.
[40] Jones, S. (2008) Western Colonial Waterbird Survey Protocols, U.S. Department of the Interior, Fish and Wildlife Service, Region 6, Denver, Colorado, USA.
[41] Seto, N. (2008) Coordinated Colonial Waterbird Inventory and Monitoring in the Western United States: Comprehensive Breeding Season Surveys. Project Prospectus, unpublished report, U.S. Department of the Interior, Fish and Wildlife Service, Region 1, Portland, OR.
[42] Cavitt, J. F., Jones, S. L., Wilson, N. M., Dieni, J. S., Zimmerman, T. S., Doster, R. H., and Howe, W. H. (2014) Atlas of breeding colonial waterbirds in the interior western United States, Research Report, U.S. Department of the Interior, Fish and Wildlife Service, Denver, CO.
[43] Carr, N. B., and Melcher, C. P., (Eds.) (2015) *Wyoming Basin Rapid Ecoregional Assessment: U.S. Geological Survey Open-File Report 2015-1155*, https://pubs.er.usgs.gov/publication/ofr20151155.
[44] Wyoming Joint Ventures Steering Committee (WJVSC). (2010) Wyoming wetlands conservation strategy. Version 1.0, p 109, Wyoming Game and Fish Department, Cheyenne, WY.
[45] Nicholoff, S. H., compiler. (2003) Wyoming Bird Conservation Plan, Version 2.0, Wyoming Partners In Flight, Wyoming Game and Fish Department, Lander, Wyoming.

Figure 1: Adult Great Blue Heron in Ellis County, Kansas. (Photo courtesy of Brian Zinke)

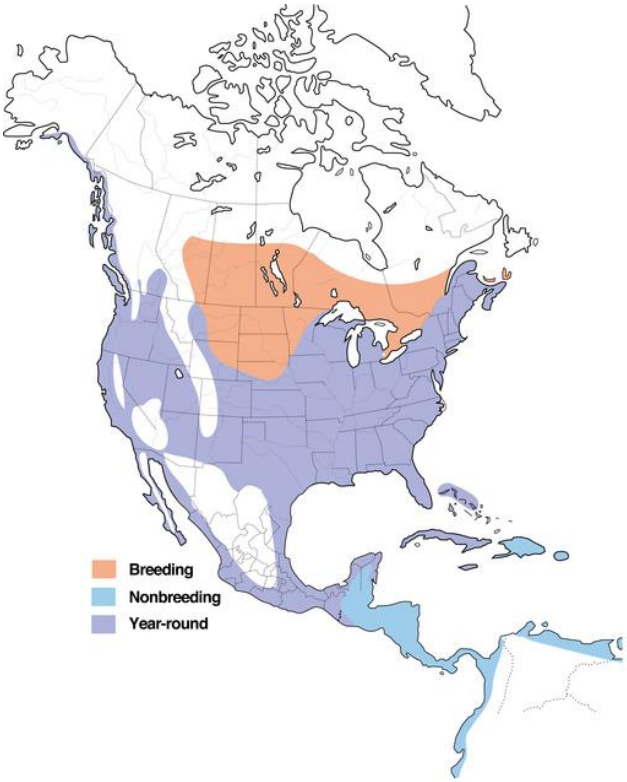

Figure 2: North American range of *Ardea herodias*. (Map courtesy of Birds of North America, http://bna.birds.cornell.edu/bna, maintained by the Cornell Lab of Ornithology)

HABITAT PHOTOGRAPH

Figure 3: Photo not available.

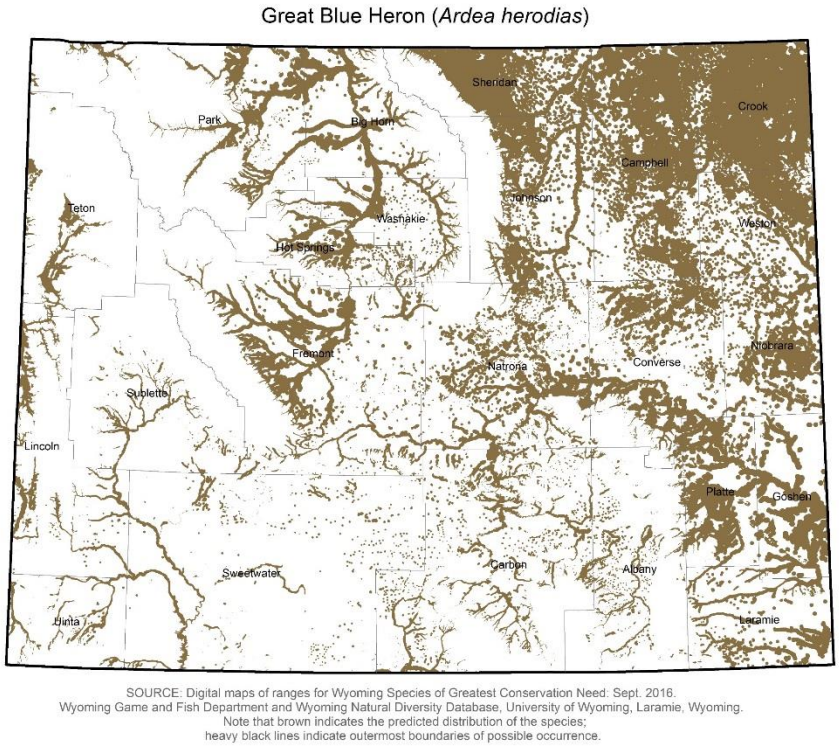

Figure 4: Range and predicted distribution of *Ardea herodias* in Wyoming.

Figure 5: Adult Great Blue Heron in flight in Weld County, Colorado. (Photo courtesy of Bill Schmoker)