

Observations of a Great Blue Heron Colony From 1987 to 1993

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Abstract. Great blue herons (*Ardea herodias*) have nested near Gunnison, Colorado, for at least 40 years. Since 1970, city expansion has forced the birds west; the colony is now located adjacent to Curecanti National Recreation Area in cottonwoods (*Populus angustifolia*) on private land. Observations of population size and reproductive success were made each year since 1987. Occupied nests more than doubled over the past 5 years, and the population seems to have stabilized at about 80 active nests. No immediate threats exist to the colony or to foraging areas, but the long-term survival of the colony is a concern. Cattle grazing under trees within the colony prevents recruitment of cottonwoods. Absence of regeneration will limit the colony as existing trees die. Future changes in land ownership or land uses could affect the colony as well.

Key words: *Ardea herodias*, land use, reproduction, threats.

Many great blue herons (*Ardea herodias*) are colonial breeders, building bulky stick nests in the crowns of large trees (Bent 1926; Hancock and Kushlan 1984; Butler 1992). In the Southwest, most colonies are located in mature cottonwoods (*Populus* spp.) in riparian gallery forests. Colonies are conspicuous and commonly attract birding enthusiasts. Despite this interest, there have been few long-term studies of the breeding biology of great blue herons (Palmer 1962; Pratt 1970; Pratt and Winkler 1985).

Hérons have nested along the Gunnison River for at least 40 years (Cook 1979*²). This colony has moved twice in the past 26 years, seemingly in response to expansion of the town of Gunnison, Colorado (Cook 1979*; Hyde 1979). The colony is currently located on private land approximately 9 km

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²Asterisk indicates unpublished material.

southwest of Gunnison in a large stand of cottonwoods surrounded by hay meadows. This site (Fig. 1), adjacent to Curecanti National Recreation Area (NRA), has been occupied since 1968 (Cook 1979*).

Observations of the Gunnison colony were made sporadically from 1975 to 1986, but quantitative data on breeding behavior, reproductive effort and success, and population size were not collected (Cook 1979*; Shaw 1982*). Volunteers observed the colony each year since 1987. Observers and methods differed in 1987 and 1988, but one of us (R.W.M.) has observed the colony since 1989. We summarized data from each year to evaluate the stability of the colony.

Methods

The colony was visited approximately once a week from March through July 1987 and in 1989–93. Observations were made from vantage points at least 100 m from the colony. Dates when great blue herons were first seen at the colony and when any courtship behavior (as described in Butler 1992) was first observed were recorded. We also recorded the dates when incubating adults were first seen, when hatchlings were first observed in nests, and when juveniles left the nests. The number of nests attended by at least one adult great blue heron

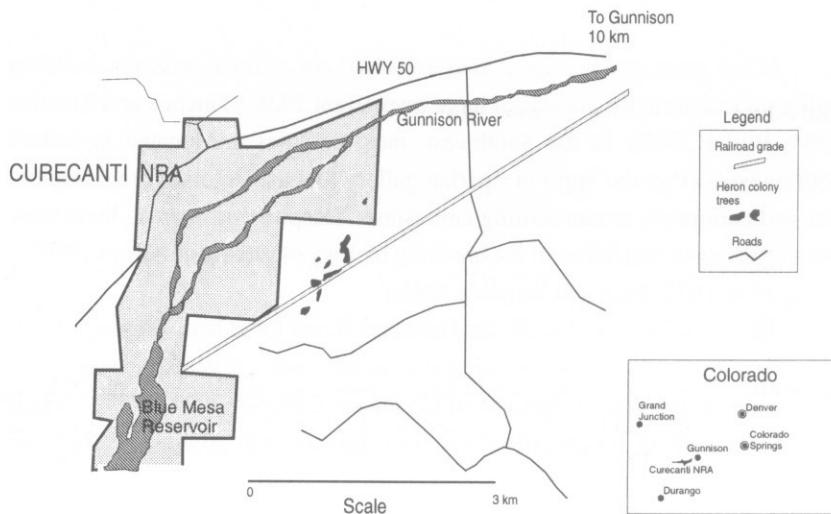


Fig. 1. Great blue heron (*Ardea herodias*) colony and surrounding land along the Gunnison River near Gunnison, Colorado.

was recorded as occupied each day of observation. The largest number of occupied nests each year was used in this analysis. This could overestimate the number of nests actually fledging young because the larger counts were often in early spring and some nests failed later. Monitoring of all nests without disturbing the birds is not possible after the trees leaf out.

Data for 1988 consist of counts of occupied nests and great blue herons on 8, 10, 15, and 19 April. Because the number of active nests was usually established by 20 April in the other 6 years of observations, we believe the maximum number of occupied nests estimated for 1988 is comparable to data from other years.

Results

Observations of breeding phenology are reported for 1989–93. Great blue herons were first seen at the colony in early- to mid-March. Courtship and nest selection began shortly thereafter. Little courtship behavior occurred after 1 April. Most birds seemed to be incubating by early April, although it was impossible to determine whether eggs were actually present. Nestlings were first seen between 7 and 18 May. Young from most nests fledged in late June or early July. Two–four young fledged each year from most nests in the colony.

The colony increased steadily between 1987 and 1990 and stabilized at about 80 active nests by 1990 (Fig. 2). In October 1989, 216 nests were counted in the colony. Occupancy of available nests varied from 12.5 to 42%; use of individual nests was inconsistent from year to year.

Discussion

Phenology of breeding activities at the colony in 1989–92 matched dates for this colony reported by Cook (1979*). Breeding phenology in the Gunnison colony was consistently 30 days later than that reported for a colony in California (Pratt 1970) and 1–2 weeks later than colonies in north-central Ohio (Burkholder and Smith 1991) but was similar to colonies in British Columbia and Nova Scotia. The Gunnison colony, at 2,300 m above sea level, may be one of the highest colonies in North America (Butler 1992). Herons arrive before winter ends and often must endure severe snowstorms through April incubation. Reproduction is difficult under these conditions. The high quality foraging

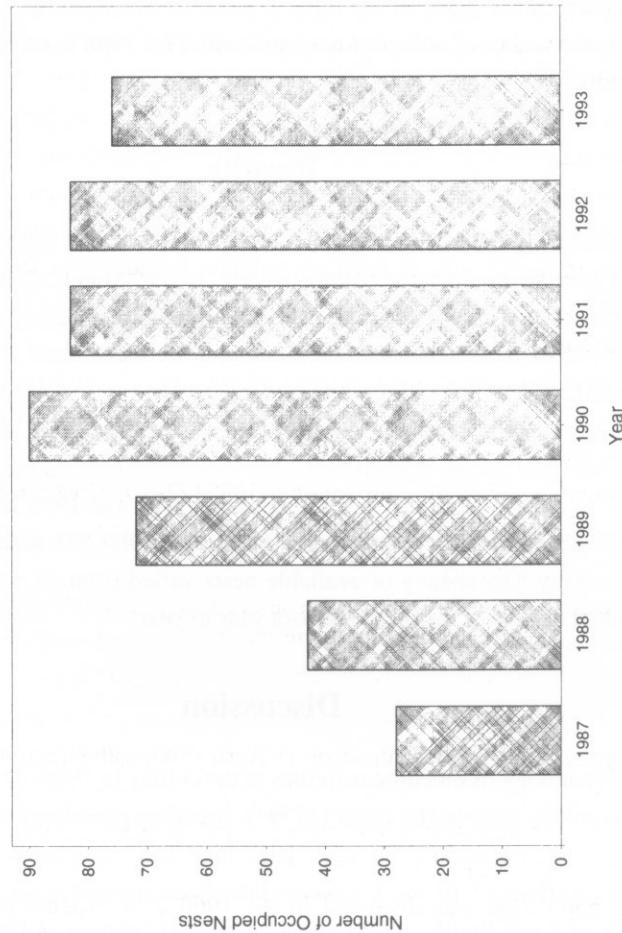


Fig. 2. Nests occupied by great blue heron (*Ardea herodias*) in the Gunnison River, Colorado, colony from 1987 to 1993.

habitat of irrigated hay meadows and Blue Mesa Reservoir may be what enables the herons to nest successfully.

The great blue heron colony on the Gunnison River grew rapidly from 1987 to 1990, and has remained fairly stable since then with about 80 occupied nests. The increase in colony size could be due to successful recruitment of offspring into the breeding population. Fledglings were not marked, thus we cannot determine whether the rapid increase in active nests was because of recruitment of offspring.

Southwestern Colorado was experiencing a drought during this study. The proximity of this colony to the vast foraging habitat of Blue Mesa Reservoir at Curecanti NRA probably ameliorated the effects of drought on the herons. Herons may have concentrated near Blue Mesa Reservoir during this time because it provided reliable foraging at a time when water levels were low elsewhere in the region. The increased number of occupied nests may have been from an influx of birds abandoning colonies because their foraging had been adversely affected by the drought rather than from recruitment of offspring into the breeding population.

Data from 1987 and especially 1988 do not reflect the same level of effort as from 1989 to the present. The low counts of active nests in these years may be a result of fewer or less systematic observations. Numbers of active nests have remained relatively constant since 1989 (72–90). Continued and consistent monitoring is needed to determine natural fluctuations in great blue heron numbers at the colony.

Data on the colony are sparse before 1987. Cook (1979*) counted herons in the colony in spring 1977 and 1978. The largest number of herons seen during a single day in each year was 52 (30 April 1977 and 14 April 1978). In 1987, when 28 active nests were observed, 52 was the largest number of herons seen during a single day. By contrast, on 18 April 1990, with 90 active nests, 88 birds were seen.

Herons are susceptible to human disturbance, especially during the breeding season (Werschkul et al. 1976; Shaw 1982*; Vos et al. 1985). The Gunnison River population was disturbed in the 1960's by expansion of the city of Gunnison (Cook 1979*; Shaw 1982*). Since becoming established at its current location in 1968, the colony has remained relatively undisturbed. No major threats to the great blue heron colony are apparent at this time, but an increase in human activity in the area could cause the herons to abandon the location.

The herons have apparently acclimated to occasional intrusions by ranch or National Park Service personnel, but the birds are still sensitive to certain types of disturbance, such as humans on foot (personal observation). Park and ranch activities near the colony during the heron breeding season are restricted to a few short visits. Should management of the area become more intensive, especially early in the season, the colony could be disrupted. The colony is probably safe in the short-term, but the future is doubtful.

Development of the Gunnison valley is increasing rapidly, and land values are rising. Ranching may not be economically viable in the near future, even in the privately owned bottom lands. The current owner of the land where the colony resides is sensitive to the herons' needs, but if uses change, or if the land were sold, activities near the colony could force the herons to leave. A change in land use of nearby meadows could alter foraging habitat and negatively affect reproductive success.

Cattle graze within the colony area from fall to spring each year and prevent recruitment of new cottonwood trees. Nests are located in stands of even-aged, mature-to-senescent cottonwoods. When these trees die, few options remain for relocation of the colony in the Gunnison Valley. To the west, large trees are sparse, are about the same age as the existing nest trees, and will probably die about the same time. Younger cottonwoods are numerous near the Gunnison River, but there is heavy year-round fishing in the area, and U.S. 50, a heavily traveled highway, is adjacent to the river near these trees. Humans on foot and motor vehicle traffic disturb nesting herons (Vos et al. 1985; Kelly et al. 1993). Expansion of this colony into trees near the Gunnison River has been limited; only one tree near the river contains nests.

In 1993, one large tree in the colony had many dead branches. This tree held about 20 active nests early in the breeding season (nests are selected before leaves emerge) but young fledged from only 3 nests. The absence of canopy cover may have prompted the herons to abandon nests in this tree. More nests than breeding pairs exist in the colony, so some expansion is possible within the colony. We do not know how many of these unused nests are acceptable to the herons. Attrition of suitable nest sites because of the death of all or part of the mature trees may have already begun. Future observations will include an assessment of tree health.

The long-term survival of the colony in its present location depends on protection of the site and a change in land use to allow establishment of new cottonwood trees. The National Park Service has expressed interest in acquiring

the colony and adjacent property. Cottonwood cuttings were planted in Curecanti NRA adjacent to the colony, and grazing was eliminated in that area in 1989 to try to establish new trees for the future. The initial plantings were largely unsuccessful, so more attempts are needed. Natural recruitment of cottonwoods may augment restoration efforts. Cottonwoods have become established near the high water level of Blue Mesa Reservoir within 1 km of the colony during the past 10 years, and they may eventually provide nest trees for the colony.

Other immediate threats to the colony are not apparent. There is time to pursue long-term protection of habitat by acquiring the colony land or by obtaining a protective easement. We plan to continue monitoring the population, to assess nest tree health, and to document tree and nest use. Other studies are needed and should include identification of the following:

1. critical foraging habitat,
2. food habits,
3. interactions between herons and shoreline fishermen at Blue Mesa Reservoir (Curecanti),
4. the relative effects of pre- and postfledging deaths on the colony's population,
5. the fidelity of individuals to the colony,
6. how the aging characteristics of the trees influence nest use, and
7. the effects of fluctuating water levels in the reservoir on reproductive success in the colony.

Acknowledgments

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