

Status and Conservation Stewardship of the Pacific Great Blue Heron in Canada

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ABSTRACT

The distribution of the Pacific subspecies of great blue heron, *Ardea herodias fannini*, is confined to the Pacific coast of North America from Prince William Sound, Alaska, south to Puget Sound, Washington, where it resides year-round. About 4,000–5,000 pairs are estimated to occupy this range, of which about 2,000 reside in British Columbia. There are about 20–30 colonies of herons around the Strait of Georgia and about 80% of the herons nest in 4 colonies near urban areas. The Strait of Georgia population has declined about 3–5% per year since the 1960s. The decline is thought to be a consequence of delayed and failed breeding arising from disturbance by humans and bald eagles (*Haliaeetus leucocephalus*).

Key words: *Ardea herodias fannini*, great blue heron, population trend, status, Strait of Georgia.

The great blue heron (*Ardea herodias*) breeds in south-coastal and southeastern Alaska, coastal and southern British Columbia, northern Alberta, central Manitoba, southern Ontario and Quebec, New Brunswick, Prince Edward Island, and Nova Scotia, south throughout the United States and coastal Mexico, and on the Galapagos (American Ornithologists' Union 1983, Butler 1992). The winter distribution is from south of the frozen regions in the north to as far south as Panama. Five subspecies are recognized within this range (Payne 1979). The *fannini* subspecies, the subject of this paper, is confined to the Pacific coast from Prince William Sound, Alaska, south to Puget Sound, Washington. The Canadian distribution encompasses the entire coast of British Columbia, including Vancouver Island and the Queen Charlotte Islands. The *herodias* subspecies breeds in the interior of British Columbia and across Canada. The Pacific subspecies, *fannini*, is darker in plumage and its populations are more sedentary compared to the pale-plumaged and largely migratory *herodias*.

The great blue heron has high public appeal as a symbol of wetland conservation and environmental quality. This species is protected from hunting and wanton disturbance by the Migratory Birds Convention Act, Migratory Birds Regulations, and the British Columbia Wildlife Act. The species inhabiting British Columbia is on the provincial Blue List of vulnerable species compiled by the British Columbia Ministry of Environment, Lands and Parks, and the Pacific subspecies is listed as Vulnerable by the Committee on the

Status of Endangered Wildlife in Canada (COSEWIC).

Three lines of evidence suggest that heron populations are threatened on the south coast of British Columbia. First, Breeding Bird Surveys (BBS) indicate significant declines of about 3–5% per year in populations of this subspecies between 1966 and 1994. Second, habitat occupied 25 years ago has remained vacant (Butler 1997). Third, nest occupancy in disturbed heron colonies was significantly lower than in colonies with little or no disturbance (Werschkul et al. 1976).

PROTECTION

The nests, eggs, young, and adults are protected from hunting by Article 11:3 of the Migratory Birds Convention Act (1994) and Section 5(4) of the Migratory Birds Regulations. Section 6(a) of the Migratory Birds Regulations forbids the disturbance, destruction, and taking of nests or eggs. The BC Wildlife Act (1982) forbids the alteration or destruction of wildlife habitat within Wildlife Management Areas (Section 7[1][a]), hunting endangered or threatened species (Section 26[1][a]), hunting outside of open season (Section 26[1][c]), harassment with motor vehicles, boats, or aircraft (Section 27[3]), and possession or injury of birds or their nests (Section 34). Scare/kill permits were provided up to 1998 where herons fed on fish stocks, but they have since been revoked.

POPULATION SIZE AND TREND

The worldwide breeding population of *A. h. fannini* is estimated to be 4,000–5,000 pairs, of which about 2,000 breed in southwestern British Columbia (Butler 1997). Censuses in

Puget Sound have not been as thorough as in British Columbia, but Butler (1997) estimated the Washington population to be about 2,000 pairs. The coast outside the Strait of Georgia and Puget Sound has not been formally censused for herons because no large concentrations are known to occur there during the breeding season. One colony of 9 pairs found near Tahsis in 1989 is the only colony reported from the west coast of Vancouver Island. The Tofino mudflats have supported up to about 100 herons in August each year but few stayed during the breeding season (A. Dorst, Tofino, pers. comm.). Butler (1997) estimated that about 400 pairs reside elsewhere along the coast of British Columbia and Alaska.

BBS data indicate a significant ($p < 0.05$) annual decline in herons on the British Columbia coast of 5.7% over the period 1966–94 (Downes and Collins 1996). However, the habit of herons to relocate colonies following a disturbance could explain a sudden decline in detections along BBS routes. Nevertheless, some regions have fewer herons now than in the recent past. In the 1970s and 1980s, the Sunshine Coast had 2 colonies, with 44 pairs near Sechelt and 94 pairs in Pender Harbour (Butler 1997). These colonies were abandoned after disturbances and relocated colonies have not been found despite repeated searches. About half of all colonies around the Strait of Georgia abandoned sites between 1987 and 1992 or suffered a significantly reduced reproductive success (Butler et al. 1995). Three large colonies with more than 100 nesting pairs are located near Chilliwack (approx 125 pairs), in Pacific Spirit Park in Vancouver (approx 140 pairs), and on Salt Spring Island (approx 122 pairs). A fourth colony (approx 350 pairs) nests about 1 km south of the Canada–United States border on Point Roberts, Washington, and forages entirely in British Columbia. A colony near Nanaimo that held about 120 pairs for many years declined to about 80 pairs by 1998. Butler (1997) showed that the source of new colonies could be explained by natal recruitment of young. About 36% of the Canadian population (approx 733 pairs) now nests in 4 large colonies (listed above), which increases their vulnerability to a single disturbance event.

HABITAT AND BIOLOGY

The habitat of the great blue heron was described by Butler (1995, 1997). The breeding habitat includes a wide variety of tree species, where nests are built often in colonies and within 8 km (most within 3 km) of coastal foraging habitats. The largest number of herons nest near large eelgrass (*Zostera marina*) meadows, along rivers, and in estuarine and freshwater marshes, where they feed on small fish. Smaller numbers of herons forage in kelp forests, from wharves, and on shallow beaches. In autumn, juvenile herons on the Fraser River delta occupy grasslands, where they eat small rodents, and elsewhere reside along coastal shores, where they eat fish. Adults occupy estuarine marshes, riverine

marshes, and grasslands on the Fraser River delta and coastal shores elsewhere in the province. Abandoned grasslands with small mammal populations are uncommon on the Fraser River delta, whereas other habitats are widespread on the delta and along the coast. Not all habitat is used by herons each year, indicating that population growth is limited by factors other than foraging habitat.

The quality of heron nesting habitat might be declining as a result of increased disturbance by humans and bald eagles (*Haliaeetus leucocephalus*). Most herons nest in quiet forest areas near foraging habitats. These sites have become increasingly scarce in southern British Columbia as a result of the rapid immigration of humans to the region. The human population around the Strait of Georgia is projected to double in the next 30 years. Under present conditions we can expect increased human disturbance at heron colonies.

The breeding biology of this subspecies is described in detail by Butler (1997). Briefly, herons arrive at colonies in February and March, lay first clutches in March and April, and raise chicks from late April to mid-August. The mean clutch size is about 4 eggs and fledging success per egg is about 47%, comparable to other North American studies (Butler 1997). Some industrial contaminants reduce chick growth and eggshell thickness (Elliott et al. 1989, 1996; Whitehead 1989) but these are local effects. Little is known about the age structure or sex ratio of the population. It is assumed that all adults breed, since large concentrations of nonbreeding herons are not evident.

CONSERVATION ISSUES

Some herons can tolerate human activities near their nests, but many are sensitive to the presence of humans. The combined effects of logging and urbanization around the Strait of Georgia have resulted in fewer places for herons to nest that are not subject to human activity. Butler et al. (1995) and Carlson and McLean (1996) showed that the number of fledglings raised in heron colonies with frequent disturbances was significantly lower than at colonies with no disturbance. Herons leave nests unguarded when humans enter colonies on foot or when loud noises occur nearby, especially early in the nesting season. Corvids are quick to take eggs when the opportunity arises (Moul 1990) and their populations have grown in the Fraser River delta (Butler and Campbell 1987).

Factors that possibly limit the maintenance of heron populations are: 1) breeding failure of adult herons that are regularly disturbed by eagles or by human activity near the colonies (Butler et al. 1995); 2) reduced juvenile survival as a result of food shortages in autumn (Butler 1994); and 3) shooting of herons. Many forested sites where herons can nest remain, but few are undisturbed by humans or eagles (Norman et al. 1989). Disturbance results in significantly fewer chicks being raised (Butler et al. 1995) and might be

the reason not all habitat is occupied. Bald eagles are implicated in some of this disturbance, when they prey on adult herons and their chicks at nests. An increase in the number of eagles on the British Columbia coast has led to increased disturbance of heron colonies (Vermeer et al. 1989, Butler 1995). Little can be done to reduce eagle disturbance, but guidelines are available to reduce human disturbance near heron colonies (reviewed by Butler 1997). Physical barriers are the most effective deterrent to human disturbances of heron colonies (Carlson and McLean 1996) and need to be considered around woodlots that hold nesting colonies. Shooting of a small number of herons that were considered pests at fish hatcheries was permitted until 1998. However, in areas with small populations of herons, hatcheries might have acted as sinks attracting herons, especially juveniles, that were subsequently shot, thereby preventing heron populations from growing. This hypothesis is conjecture and requires further evaluation.

HERON STEWARDSHIP PROGRAM

The Heron Stewardship Program (HSP) is a partnership between Environment Canada, the British Columbia Ministry of Environment, Lands and Parks, and the Wildlife Bird Trust of British Columbia. It was launched in 1997 to secure important heron habitats on the coast of British Columbia. Funds for the project were obtained from the Habitat Conservation Trust Fund and Environment Canada's Georgia Basin Ecosystem Initiative. The HSP, with assistance from the Waterbird Watch Collective, purchased 1 colony site on Salt Spring Island, and is working on agreements with owners to manage heron colonies at Chilliwack, Pacific Spirit Park, Point Roberts, Burnaby, and Sooke.

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LITERATURE CITED

- American Ornithologists' Union. 1983. Check-list of North American birds. Allen Press, Lawrence, KS.
- Butler, R. W. 1992. Great blue heron. In A. Poole, P. Stettenheim, and F. Gill, eds. The birds of North America. No. 25. Academy of Natural Sciences, Philadelphia, PA, and American Ornithologists' Union, Washington, DC.
- _____. 1994. Population regulation in wading ciconiiform birds. *Colonial Waterbirds* 17:189–199.
- _____. 1995. The patient predator: foraging and population ecology of the great blue heron in British Columbia. *Can. Wildl. Serv., Ottawa, ON. Occas. Pap.* 86.
- _____. 1997. The great blue heron. University of British Columbia Press, Vancouver, BC.
- _____, and R.W. Campbell. 1987. The birds of the Fraser River delta: populations, ecology and international significance. *Can. Wildl. Serv., Ottawa, ON. Occas. Pap.* 65.
- _____, P. W. Whitehead, A. Breault, and I. E. Moul. 1995. Colony effects on fledging success of great blue herons. *Colonial Waterbirds* 18:159–165.
- Carlson, B. A., and E. B. McLean. 1996. Buffer zone and disturbance types as predictors of fledging success in great blue herons, *Ardea herodias*. *Colonial Waterbirds* 19:124–127.
- Downes, C. M., and B. T. Collins. 1996. The Canadian Breeding Bird Survey, 1966–1994. *Can. Wildl. Serv., Ottawa, ON. Prog. Notes* 214.
- Elliott, J. E., G. D. Bellwood, P. A. Martin, R. J. Nostrom, and P. E. Whitehead. 1996. Persistent pulp mill pollutants in wildlife. Pp. 297–314 in M. R. Servos, K. R. Munkittrick, J. H. Carey, and G. J. Van der Kraak, eds. Environmental fate and effects of pulp and paper mill effluents. St. Lucie Press, Delray Beach, FL.
- _____, R. W. Butler, R. J. Nostrom, and P. E. Whitehead. 1989. Environmental contaminants and reproductive successes of great blue heron (*Ardea herodias*) in British Columbia, 1986–87. *Environ. Pollution* 59:91–114.
- Moul, I. E. 1990. Environmental contaminants, disturbance and breeding failure at a great blue heron colony on Vancouver Island. M.Sc. thesis. Univ. British Columbia, Vancouver, BC.
- Norman, D. M., A. M. Breault, and I. E. Moul. 1989. Bald eagle incursions and predation at great blue heron colonies. *Colonial Waterbirds* 12:143–230.
- Payne, R. B. 1979. *Ardeidae*. Pp. 193–244 in E. Mayr, and G. W. Cottrell, eds. Checklist of birds of the world. Mus. Comparative Zool., Cambridge, MA.
- Vermeer, K., K. H. Morgan, R. W. Butler, and G. E. Smith. 1989. Population, nesting habitat and food of bald eagles in the Gulf Islands. Pp. 123–131 in K. Vermeer, and R. W. Butler, eds. The status and ecology of marine and shoreline birds in the Strait of Georgia, British Columbia. *Can. Wildl. Serv., Ottawa, ON. Spec. Pub.*
- Werschkul, D. F., E. McMahon, and M. Leitschuh. 1976. Some effects of human activities on the great blue heron in Oregon. *Wilson Bull.* 88:660–662.
- Whitehead, P. E. 1989. Toxic chemicals in great blue heron (*Ardea herodias*) eggs in the Strait of Georgia. Pp. 177–183 in K. Vermeer, and R. W. Butler, eds. 1989. The status and ecology of marine and shoreline birds in the Strait of Georgia, British Columbia. *Can. Wildl. Serv., Ottawa, ON. Spec. Pub.*

