Harlequin Duck

Histrionicus histrionicus

REGULATORY STATUS

USFWS: Migratory Game Bird
USFS R2: Sensitive
USFS R4: Sensitive
Wyoming BLM: No special status
State of Wyoming: Game Bird (see regulations); Protected Bird

CONSERVATION RANKS

USFWS: No special status
WGFD: NSS3 (Bb), Tier II
WYNDD: G4, S1
Wyoming Contribution: LOW
IUCN: Least Concern
PIF Continental Concern Score: Not ranked

STATUS AND RANK COMMENTS

Harlequin Ducks (*Histrionicus histrionicus*) in the eastern United States were denied listing under the Endangered Species Act (ESA) in 1998, after the United States Fish and Wildlife Service found that the population which winters in the Atlantic Ocean was not in danger of extinction. Harlequin Ducks in Wyoming are part of the western population that winters in the Pacific Ocean, which was not petitioned under the ESA [1].

NATURAL HISTORY

Taxonomy:

There are no recognized subspecies of Harlequin Duck. The eastern (Atlantic) and western (Pacific) populations of the species were historically considered subspecies, and are managed as two separate populations [2].

Description:

Harlequin Duck is identifiable in the field. The species is 33 to 46 cm long, smaller than most other ducks. Males, females, and juveniles are different in plumage. The male has striking plumage, slate blue overall with chestnut flanks, and with various markings of white and chestnut on the head and wings. The adult female is brown overall, with a white belly, a round white spot behind the ear, and variable white patches in front of the eye [2, 3]. Juvenile and immature birds look similar to the female, and males may take up to 3 years to reach full adult plumage [2]. The adult male is not likely to be confused with any other species, but females and juveniles may be confused with female ducks of other species. Harlequin Duck females and juveniles are the only duck species with both a white spot behind the eye and the white in front of the eye [2, 3].

Distribution & Range:
Harlequin Duck is broadly distributed in two different geographic regions. These include the North Atlantic and the North Pacific and their associated watersheds. Individuals in Wyoming are associated with the Pacific population and represent the most eastern extension of that population [2]. The species is only found during the breeding season in northwestern Wyoming, with a few sightings extending as far east as the Bighorn Mountains [4, 5]. It formerly bred in Colorado and California, but has been extirpated from these states. Local extirpations have also occurred in portions of Idaho and Montana [6]. Harlequin Ducks in Wyoming migrate to the Pacific Ocean for the winter [2, 6].

Habitat:
During the breeding season, the Harlequin Duck uses fast flowing streams in subalpine habitats typically surrounded by undisturbed forest [2, 6]. Though habitat preference differs across the species' range, habitat characteristics include wide riparian zones, clear and clean water of low acidity, braided or multi-channel streams with islands, a rocky substrate, and a stream gradient of one to seven percent. In Grand Teton National Park, Harlequin Duck occurs along streams with a mean gradient of < 3% with dense shruby vegetation lining the banks [7]. Harlequin Duck nests on islands in streams and also in dense shrubs adjacent to streams [6, 7]. Suitable habitat in Wyoming is found in Grand Teton and Yellowstone National Parks, and in the Bridger-Teton and Shoshone National Forests [8]. During the winter, the species migrates out of the state to the Pacific coast, where it uses shallow intertidal and subtidal rocky benches and cobble beaches [2].

Phenology:
Pair bonds are formed on the winter grounds as early as October. Migration to inland breeding sites begins in late March, and continues into May [2]. The first birds arrive in Grand Teton National Park from early to mid-May [7]. In Iceland, incubation lasted an average of 28 days (Robertson and Goudie 1999). Hatching in Wyoming occurs in early-late July (S. Patla, pers. comm.) [7]. Fledging occurs 42 to 56 days after hatching [6]. Fall migration begins for males in June and July, while females and young migrate as late as September and October [2]. Two adult males implanted with satellite transmitters in May 2016 in Grand Teton National Park departed for the west coast on July 1 and July 10 and settled at molt sites near the west end of Vancouver Island, British Columbia on July 13 and July 31 (L. Savoy, Biodiversity Research Institute, pers. comm.).

Diet:
On the breeding grounds, Harlequin Duck feeds upon aquatic insects and fish roe. The species feeds upon marine invertebrates on the winter grounds [2].

CONSERVATION CONCERNS

Abundance:
Continental: WIDESPREAD BUT DISJUNCT
Wyoming: VERY RARE
A minimum of 70 Harlequin Duck breeding pairs are estimated to occur in Wyoming [9, 10].

Population Trends:
Historic: MODERATE DECLINE
Recent: STABLE

Harlequin Duck populations in Wyoming have probably remained stable in recent years although pairs have not been documented recently on some historic nesting streams in the Teton Range (S. Patla, pers. comm.) [9]. Harlequin Duck numbers in eastern North America experienced large declines during most of the 1900s, stabilizing in the 1990s, and currently may be increasing [2]. In western populations, breeding surveys suggest a stable population, while winter surveys show a declining population [6].

Intrinsic Vulnerability:

HIGH VULNERABILITY

Harlequin Duck is restricted to breeding on clear, relatively fast moving, low gradient streams that are low in acidity, with many channels and islands, and a rocky substrate [6]. Males typically do not breed until at least three years of age, while females may not successfully breed until five years of age [2]. Survival rate of fledglings may be low [11]. The species has strong site fidelity to breeding locations [2, 6]. If the breeding population in Wyoming became extirpated, recolonization of the species in the state would likely not occur.

Extrinsic Stressors:

MODERATELY STRESSED

Human recreation, including hiking, fishing, and boating may cause Harlequin Duck to abandon breeding sites [6]. Recent efforts to open up remote streams for recreational boating in national parks could result in loss of breeding habitat in both Grand Teton and Yellowstone National Parks (S. Patla, pers. comm.). Sport hunting for sea ducks, including Harlequin Duck, occurs in the winter and may have a negative impact on populations [6]. Timber harvest may cause streams to become turbid, and hence unsuitable for nesting [6]. Mining may cause pollution, increased sedimentation, and increased acidity of streams [6]. Forest fires may also result in degraded stream conditions. Livestock grazing in forest habitats can cause sedimentation in streams, trampling of nests, and trampling of vegetation that provides nest cover [6]. Density of raptors has been associated with unoccupied suitable habitat in the eastern population [12]. Aerial surveys of breeding pairs in Wyoming documented fewer ducks in 2007 when water levels were low and higher numbers of Bald Eagles were observed [10]. Based on band recoveries during the winter and on recent satellite tracking data, Wyoming's Harlequin Ducks concentrate in the Strait of Juan de Fuca in Washington state and British Columbia (Puget Sound). This area is at risk from bilge discharge and oil spills [6]. Timing of migration and routes have been documented for only two males from Wyoming so risks during migration between summer and winter habitat remain speculative but likely include shooting, predation, and habitat loss of key stop over sites.

KEY ACTIVITIES IN WYOMING

Monitoring inventories for breeding Harlequin Ducks were initiated in the late 1980s and the 1990s in Grand Teton National Park [7], Targhee National Forest [13, 14], Yellowstone National Park [15], and the Shoshone National Forest [16]. In 2002, WGFD began development of an aerial survey monitoring protocol to provide a statewide estimate of the number of breeding pairs in Wyoming. For the first survey effort, 35 suitable streams and rivers were surveyed during the pre-nesting period in the last two weeks of May and a total of 63 ducks (including 28 breeding pairs) were documented. In August, a follow-up brood survey was also completed in the Teton Wilderness area to confirm successful nesting (five female adults and 13 young of the year) in this previously undocumented nesting area [9]. WGFD completed additional aerial monitoring surveys in 2007, 2008, and 2012 [8, 10, 17]. Based on these survey efforts, WGFD estimates a minimum of 70 breeding pairs in the state that appears to be stable. WGFD also completed a

study on factors that affect detectability of Harlequin Duck [18]. Ducks foraged most intensively in the early morning and late afternoon periods in riffles with changing light conditions which made them more difficult to observe in contrast to rest periods when they hauled out on sand bars or in eddies. In 2014, WGFD initiated a project in partnership with Biodiversity Research Institute and Grand Teton National Park to trap and mark breeding pairs in the park [19]. In May 2014, a total of 3 ducks were captured and tagged with color leg bands. In May 2016, two additional pairs were trapped and marked with color leg bands. In addition, the males were implanted with satellite GPS transmitters and the female adults were tagged with geo-locator leg bands as part of a larger regional study in partnership with Environment Canada (S. Patla, pers. comm.). Tagged males left breeding sites in early July 2016 and traveled over 1500 km to Pacific Ocean molting sites near Vancouver Island in British Columbia (S. Patla, pers. comm.). Two additional pairs will be tagged in May 2017.

ECOLOGICAL INFORMATION NEEDS

Demographic information for Harlequin Duck is lacking [6]. The effects of forest management, such as fire, logging, and road development, are unknown [6]. The preferred habitat in Wyoming, and how it differs from unused habitat, is unknown [6]. Information on migration routes and timing as well as winter distribution for the interior Rocky Mountain breeding population is also needed to assess risks during the non-breeding season. For Wyoming, further work is need on distribution during the breeding season to determine the eastward extension of this species, and whether pairs have abandoned former nesting streams that were occupied in the 1980s.

MANAGEMENT IN WYOMING

This section authored solely by WGFD; Susan M. Patla. Aerial monitoring to track statewide population trends should continue in coordination with federal parks and national forests every five years at a minimum in four key areas: Teton Wilderness (Bridger-Teton and Shoshone National Forests), north end of Grand Teton National Park/south end Yellowstone National Park, Yellowstone/Larmar Rivers (Yellowstone National Park), and the Clark's Fork River and its tributaries (Shoshone National Forest). Follow up brood surveys in selected areas during survey years are also recommended. In 2016, a regional two-year satellite tracking study was initiated coordinated by Environment Canada. Objectives include tagging a few male Harlequin Ducks in Wyoming, Idaho, Montana, and interior Canada to collect data on migration routes and wintering areas for this eastern extension of the Pacific population. Coordinating population trend surveys within the Intermountain region still remains a key objective so participation in the Harlequin Duck working group (held annually in Montana) should be continued. The lack of observations of breeding pairs in recent years from some streams in Grand Teton National Park and the Caribou-Targhee National Forest requires investigation to determine if increasing human recreation has resulted in loss of nesting habitat. Management of human recreation activity (especially boating) may be required in the future in important nesting areas to preserve high quality habitat. It is recommended that additional surveys be conducted in historic nesting areas after severe wild fires occur to determine if changes in stream quality post fire may also cause pairs to abandon nesting habitat. Confirmation of pairs reported from new areas is needed to document potential additional nesting habitat. Research to help determine how climate change may affect the functioning of mountain streams and Harlequin Duck nest success, productivity, and survival will require focused study of females during the nesting and brood-rearing periods.

CONTRIBUTORS

Susan M. Patla, WGFD
Michael T. Wickens, WYNDD
Ian M. Abernethy, WYNDD
Douglas A. Keinath, WYNDD

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Figure 1: Adult male Harlequin Duck (top) in breeding plumage, British Columbia, Canada; Adult female Harlequin Duck (bottom) in winter, West Vancouver, Canada. (Photos courtesy of Tom Middleton (top) and Lanaye Baxter (bottom))

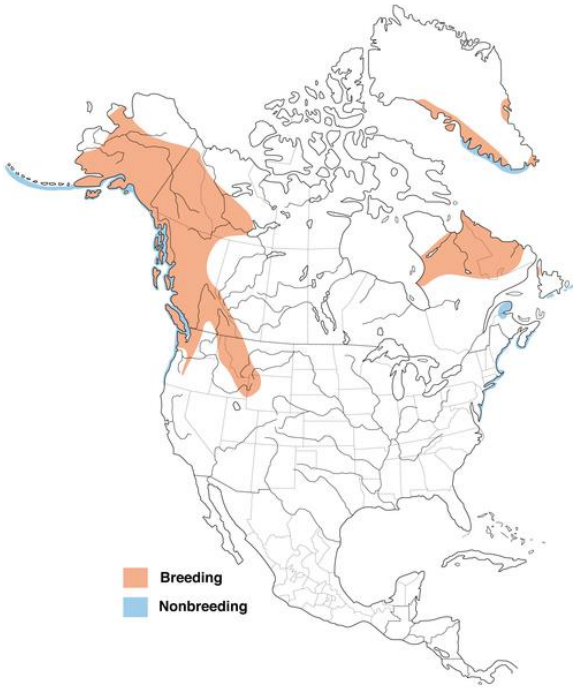

Figure 2: North American range of *Histrionicus histrionicus*. (Map courtesy of Birds of North America, http://bna.birds.cornell.edu/bna, maintained by the Cornell Lab of Ornithology)

Figure 3: Harlequin Duck habitat at Moose Creek in Grand Teton National Park, Wyoming. (Photo courtesy of Cody Bish)

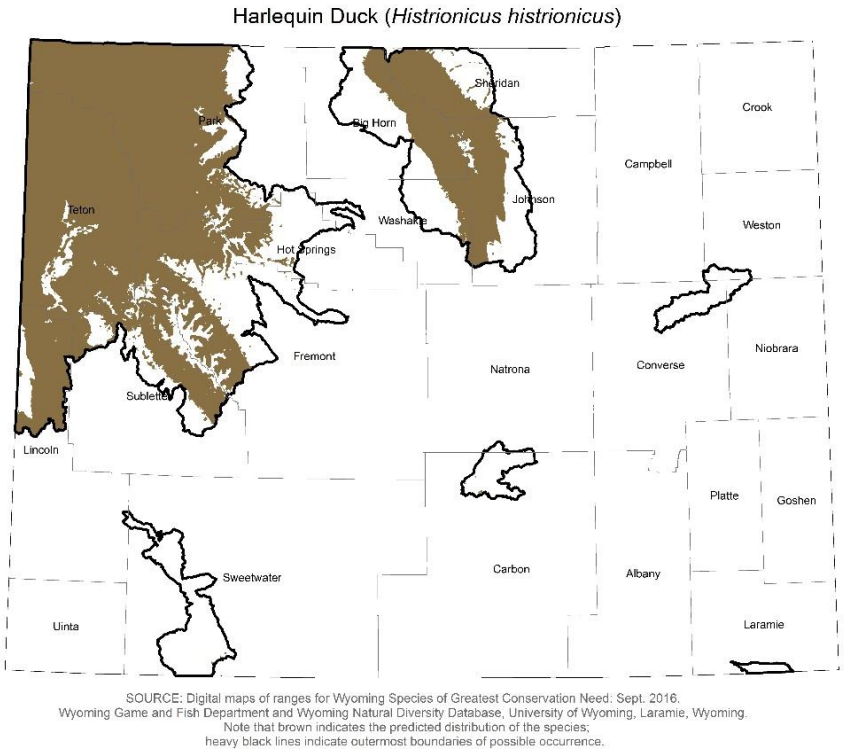

Figure 4: Range and predicted distribution of *Histrionicus histrionicus* in Wyoming.