

photographs of the Chicago specimens and for valuable comments on drafts of this paper. T. Schulenberg and an anonymous referee contributed valuable suggestions as well.

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BENT OTTO POULSEN, *The Zoological Museum, Dept. of Vertebrate Zoology, Univ. of Copenhagen, Universitetsparken 15, 2100 Copenhagen Ø, Denmark. Received 23 Sept. 1992, accepted 1 April 1993.*

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Cavity nesting by Harlequin Ducks in the Pacific Northwest.—The Holarctic Harlequin Duck (*Histrionicus histrionicus*) winters along northern coasts and breeds along swiftly flowing mountain streams. Disjunct populations occur in association with Atlantic and Pacific coastlines (AOU 1983). Most published nest records are from the Atlantic (Iceland), where 90% of nests described were on the ground in dense vegetation and 10% were in rocky hollows or lava cavities. Ninety-three percent were within 5 m of streams (Bengtson 1972). The lack of adequate data from areas outside Iceland, and conflicts in old records, have led to disagreement as to whether Harlequin Ducks are cavity nesters (Merriam 1883, Bent 1925, Johnsgard 1960, Bengtson 1966) or whether they primarily are ground nesters, nesting occasionally in areas sheltered by rocks or woody debris (Burleigh 1972). Several authors have dismissed reports of cavity nesting, particularly in trees (Gudmundsson 1971, Palmer 1976).

We are aware of only eight published nest site descriptions from the Pacific population of Harlequin Ducks. Three nests were on rocks, two were on the ground, one was in a cliff face (Bent 1925, Campbell et al. 1990), and two were in piles of woody debris adjacent to streams (Jewett 1931, Thompson 1985). We found no documentation of nesting in tree

cavities. Here we describe three Harlequin Duck cavity nests discovered in May and June 1991 in northern Idaho and northwestern Washington. Two were in tree cavities, and a third was in a rock cavity in a cliff face.

Nests were located along tributaries to 383 km² Lake Pend Oreille (elevation 629 m) in northern Idaho (48°00'N, 116°25'W) and along the Elwha River on the Olympic peninsula (47°52'N, 123°57'W) in northwestern Washington. Idaho nesting areas were along third- and fourth-order forested streams originating in the Coeur d'Alene Mountains on the Idaho Panhandle National Forests, accessible by boat or logging road. The fourth-order Elwha River flows through a steep fluvial-carved, V-shaped canyon originating in the glaciers of the Olympic Mountains. The nesting area was within Olympic National Park and accessible only by hiking trail.

We located one Idaho nest and the Washington nest during Harlequin Duck surveys conducted by walking in or along stream reaches used by Harlequin Ducks and recording all observations. Idaho surveys were conducted approximately weekly April 25–August 30. The Elwha River was surveyed once in May. We discovered the second Idaho nest using radiotelemetry.

The Washington nest was located 1.8 m above the ground in a broken-top, 3.7-m tall, 0.59-m diameter, big leaf maple (*Acer macrophyllum*) snag. The cavity opening was a 15-cm wide vertical slit extending down the trunk from the top of the snag. Interior cavity diameter was 38 cm, and depth was 61 cm, which prevented the hen from seeing out and completely hid her while incubating. The nest tree was on a 43° slope in a grand fir (*Abies grandis*) and Douglas-fir (*Pseudotsuga menziesii*) stand with an alder (*Alnus rubra*) and vine maple (*Acer circinatum*) understory. The tree was 14.1 m from a backwater oxbow of the river and 24.7 m from the main river. The main river was 17 m wide with a 6% gradient (velocity 1.3 m/sec). A pair of Harlequin Ducks was observed copulating in the backwater the day before the nest was discovered.

The adjacent Elwha River trail (1.3 m away) is a popular hiking trail used by at least 426 hikers during the May–June 1991 nesting period (Nat. Park Service, unpubl. data). The nest tree was also within a backcountry horse corral which received heavy use throughout the 1992 nesting season by stock and humans. The nest site was used in both 1991 and 1992.

Both Idaho nests were located in relatively steep, narrow stream reaches (gradient 4–11%, stream width 4.9–6.6 m) in western redcedar (*Thuja plicata*)–western hemlock (*Tsuga heterophylla*) stands. The tree cavity nest was in the base of a 0.47-m diameter, hollow, living cottonwood (*Populus trichocarpa*), 0.3 m from a rapids (velocity 1.7 m/sec). The cavity opening (40 cm high × 37 cm wide) was 55 cm above the ground, the interior was 60 cm in diameter and 90 cm high. The base of the cavity was 50 cm below the opening, nearly at ground level, which completely hid the hen from view. The nest was successful, but the hen died during 1991 and the nest was not used by another hen in 1992.

The cliff cavity nest was in a mossy crevice located 3 m directly above the stream (velocity 1.3 m/sec) in a canyon between the bottom of a waterfall and a debris jam. Cavity opening dimensions were 25 cm high × 64 cm wide; interior dimensions were 25 cm high × 30 cm wide. This nest was unsuccessful (eggs were infertile) and was not reused the following year. In 1992 the hen nested successfully on an adjacent stream.

There was almost no human activity near either Idaho nest site although logging roads were located 55–60 m above the stream and 150 m from both nests, and a power transmission line crossed the stream just below the cliff nest. The road and the transmission line were not visible from the cliff nest site. The road was visible from the tree nest site, although the hen was unable to see out while incubating.

Adults were rarely observed near the Idaho nest sites. With one exception, all Harlequin Duck observations were downstream from the tree cavity nest. Few Harlequin Ducks were

observed using the stream where the cliff cavity nest was located. Most prenesting observations of adults were on an adjacent, larger stream which the nesting hen also used during incubation breaks.

Nests were just large enough to hold the eggs (clutch sizes 5, 7, 3). They were composed primarily of gray-brown down and some white or white-tipped chest feathers. There was a minor component of moss and twigs in the cliff nest and some woody material mixed in with the feathers in the tree cavities. Authors reporting Harlequin Duck nests as being lined with white down (Harrison 1979, Bellrose 1980) were probably referring to feathers; Harlequin Duck down is not white.

These nests establish Harlequin Ducks as both cavity and ground nesters. Although ground nesting occurred in both study areas (Washington Dept. of Wildlife, Idaho Dept. of Fish and Game, unpubl. data), Harlequin Ducks also nested in tree and cliff cavities when available, even when located 14 m from water and nearly 25 m from the main stream channel.

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E. FRANCES CASSIRER, *Idaho Dept. of Fish and Game, Nongame and Endangered Wildlife Program, 1540 Warner Ave., Lewiston, Idaho 83501*; GREG SCHIRATO, *Washington Dept. of Wildlife, 905 E. Heron, Aberdeen, Washington 98520*; FRED SHARPE, *Washington Dept. of Wildlife, 905 E. Heron, Aberdeen, Washington 98520* (current address: *Dept. of Biological Sciences, Simon Fraser University, Burnaby, British Columbia V5A 1S6, Canada*); CRAIG R. GROVES, *Idaho Dept. of Fish and Game, Nongame and Endangered Wildlife Program, Box 25, Boise, Idaho 83707* (current address: *The Nature Conservancy, 2060 Broadway, Suite 230, Boulder, Colorado 80302*); AND RUSTY N. ANDERSON, *Idaho Dept. of Fish and Game, P.O. Box 428, Jerome, Idaho 83338*. Received 13 Oct. 1992, accepted 2 April 1993.

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First observations of the Blue-throated Macaw in Bolivia.—Since its discovery in the early 1800s, the Blue-throated Macaw (*Ara glaucogularis*) largely has remained an enigma (Ridgely, *Conservation of New World Parrots*, R. F. Pasquier, ed., pp. 233–384, Smithsonian Institution Press, 1980; Ingels et al., *Le Gerfaut* 71:283–294, 1981; Forshaw, *Parrots of the World*, Lansdowne Editions, 1989). Physical evidence of the species includes five museum specimens of unclear provenance (Ingels, *ibid.*) and approximately 200 live birds that Bolivian bird dealers have acquired from anonymous bird catchers. Conservationists have long assumed that this species is very rare and may be in immediate danger of extinction. There have been no published, first-hand observations of the species in the wild and no data to allow an assessment of its conservation status. Until now, there was not a single confirmed locality or habitat type in which to begin a survey.

Here we report the first observations of wild Blue-throated Macaws in the department of Beni in Amazonian Bolivia. The habitat is a seasonally-inundated mosaic of savannahs, palm groves, and low species diversity tropical forest of short stature. Late in the afternoon on 6 August 1992, C. A. Munn, Mariana V. Munn, and a local guide heard and momentarily observed a pair of macaws flying to roost in trees in a 1-ha island of trees in the savannah. Even from hundreds of meters the calls of this species were distinguishably higher in frequency and of different quality than those of the Blue-and-yellow Macaw (*A. ararauna*). Between 06:30 and 08:30 h on 7 August 1992, the Munnns and the guide photographed and observed a pair preening and allopreening on a treetop in that same forest island. They also discovered that the perch tree was above a live *Acrocomia aculeata* palm in which the pair appeared to be excavating a nest cavity. The opening of the new cavity was approximately 14 m above the ground, and a typical pile of fresh palm fiber debris lay on the ground beneath. In September 1992, a research team of NYZS the Wildlife Conservation Society (WCS) began study of this excavating pair and of three other pairs at other nests located within 10 km of the first nest site. The other nests were in cavities in the trunks of *Attalea phalerata* palms. To date, we have observed 28 birds at two adjacent sites, and we have heard local reports of two more populations of the species, each of which is more than 100 km from the present site.

The habitat where we found this species resembles that of the third-hand reports presented by Forshaw (1989): “gallery forest along watercourses,” but this description requires elaboration. Subsequent observations of feeding ecology of this macaw suggest that it requires the locally abundant palm *Attalea phalerata* at which they eat the sticky, sweet mesocarp of the ripe and nearly-ripe fruits. They also ate the ripe or nearly-ripe mesocarp of fruits of *Acrocomia aculeata* palms. On occasion the birds opened and drank the liquid from the very immature fruits of both palm species.

Until the 1980s, there was uncertainty over whether this species differed from the larger,