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GROUND-NESTING MARBLED MURRELETS IN JUNEAU, ALASKA

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The Marbled Murrelet (*Brachyramphus marmoratus*) ranges from California to the Aleutian Islands, with the center of its abundance in south-central and southeastern Alaska (Piatt and Ford 1993, Nelson 1997). In the conterminous United States, Marbled Murrelets typically nest in old-growth forest on branches in the canopy (Nelson 1997, Piatt et al. 2007). Ground nests of Marbled Murrelets in North America have been known since 1931 (above treeline at 580 m elevation on Chichagof Island in southeastern Alaska), although a ground nest was not well described until 1978 (Carter and Sealy 2005). In British Columbia and Alaska, ground nests occur with increasing frequency to the north and west of the species' distribution. DeGange (1996) reported 34 nests in Alaska, of which 15 were on the ground; in Southeast Alaska alone, two of six nests were on the ground in forested areas.

Less is known, however, about the Marbled Murrelet's ground nests than about its tree nests. Here we describe and provide a photographic record of a ground nest in forest in Juneau, with supplementary information (previously unpublished) about two other ground nests in this area. We briefly discuss the use of ground nests in forested terrain in the Juneau area.

On 30 June 2009, Hocker and Willson discovered a ground nest of the Marbled Murrelet along Eagle Creek on Douglas Island, Juneau (58° 18.335' N, 134° 28.132' W). An adult, flushed from the nest, flew rapidly downstream and did not return for at least an hour.

The nest was located on a small mossy ledge close to the top of a nearly vertical cliff adjacent to a waterfall (Figure 1), at an elevation about 127 m. Flight distance to the nearest salt water (at low tide) in Gastineau Channel was about 1400 m and to the nearest deep water, suitable for foraging, was about 6 km. The surrounding vegetation was rainforest of Sitka spruce (*Picea sitchensis*) and western hemlock (*Tsuga heterophylla*), with a few Sitka alders (*Alnus sitchensis*) along the creek and an understory of *Vaccinium* spp., *Menziesia ferruginea*, and devil's club (*Oplopanax horridus*). This area was apparently logged selectively about 100 years ago, as attested by numerous large stumps, and windthrow had also left large snags and fallen logs.

The nest held one egg on June 30 (Figure 1). When we checked the nest again on July 10, no adult was present. Although observers did not approach the nest site closer than about 25 m, the adult may have flushed again. On the other hand, adults are known to leave an egg unattended for several hours (Nelson and Hamer 1997).

On August 3, the nest held a small chick, possibly about 6 days old (S. Kim Nelson pers. comm.). Armstrong photographed the chick at various stages of development until the brown and black down was lost and the nestling, ready to fledge, had black and white juvenal plumage (Figures 2–4). Marbled Murrelet chicks begin to lose their natal down about halfway through the nestling period (27–40 days long), gradually losing the down until a day or two before fledging, when the last of it is shed (Nelson and Hamer 1997).

We observed a daytime feeding of the chick at about 11:45 on 30 August. An adult, with a fish in its bill, was at the nest when we arrived at the lookout spot. It took at least 5 more minutes to transfer the fish to the chick, which appeared to have some

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Figure 1. Marbled Murrelet egg in nest near Juneau, Alaska, 30 June 2009, photographed from about 2 m away. The nest was adjacent to a waterfall with northward access for takeoff and landing via the creek's canyon.

Photo by K. M. Hocker

difficulty in swallowing it. It is not unusual for adults delivering food to remain at the nest for some time and for feedings to last several minutes (Nelson and Hamer 1997). Although prey delivery is most common in the twilight hours, daytime feedings also occur (Nelson and Hamer 1997).

The chick fledged sometime between 16:00 on 1 September and 13:00 on 2 September, probably at night, well toward the end of the known nesting season in Alaska (Nelson and Hamer 1997), after an estimated nestling period of about 35 days. Fledglings typically weigh less than adults and have shorter wings; they are independent of their parents after they fledge (Nelson 1997). The deserted nest was surrounded by a characteristic white ring of feces and an accumulation of shed down (Figure 5).

The Marbled Murrelet's nest success appears to be low. One set of estimates is based on nests found by various means, which may include those that were easiest to find. Of 11 nests of known outcome in Alaska, only two (18%) were successful; elsewhere, only 33% of 91 nests were successful (Piatt et al. 2007). However, these values may be underestimates of success, if there is a bias toward nests that are relatively readily accessible to researchers. A study in British Columbia used radiotelemetry to find nests, reducing the potential bias of detection, and reported that 48% of 108 nests were successful (Piatt et al. 2007).

In addition to the nest we describe, two other ground nests of the Marbled Murrelet have been found in forests around Juneau. On 10 May 1999, an adult tended an egg on a cliff ledge near the junction of Nugget and Vista creeks, upstream of

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Figure 2. Downy Marbled Murrelet nestling about 23 days old, 20 August 2009. All photos of the nestling were taken through a telescope from a lookout about 25 m away.

Photo by R. H. Armstrong



Figure 3. Marbled Murrelet nestling about 31 days old, 28 August 2009. The chick has shed much of its down.

Photo by R. H. Armstrong

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Figure 4. Marbled Murrelet nestling about 35 days old in juvenal plumage and ready to fledge, 1 September 2009.

Photo by R. H. Armstrong



Figure 5. Empty nest of Marbled Murrelet after the chick fledged, with a typical ring of feces on the perimeter and an accumulation of matted, shed down.

Photo by R. H. Armstrong

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Mendenhall Lake; this nest was at an elevation of about 320 m, at a distance of 10 km from Auke Bay, the nearest probable foraging area (Gwen Baluss pers. comm.). However, on 30 May, both egg and adult were gone, so the nest apparently failed. The other nest, found on 30 August 2006, was on Shelter Island near Auke Bay, approximately 1 km from the beach, and contained a chick about ready to fledge (Gus van Vliet pers. comm.).

Marbled Murrelets are emblematic of old-growth forest in the conterminous U. S., yet they are sufficiently flexible in their nesting requirements that they nest in treeless areas in the Aleutian Islands. In Southeast Alaska, they nest both in trees and on the ground in well-forested areas. Their use of ground nests in northern Southeast Alaska is probably not related to absence of large conifers, because large spruce and hemlock trees are relatively common. Instead, we suggest that the prevalence of coastal streams with high gradients and associated openings, cliffs, and rocky outcrops in rugged terrain may offer numerous potential nest sites with good access for takeoff and landing, a criterion thought to be important to the Marbled Murrelet (e.g., Nelson and Hamer 1997).

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