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USDA Forest Service, Pacific Northwest Research Station, 3625 93rd Ave. SW, Olympia, Washington, 98512, USA. Present address (JAH): 1058 Florence St., Enumclaw, Washington, 98022, USA. Submitted 27 December 1996, accepted 16 February 1998. Corresponding editor: G. A. Green.

DIVING DEPTH OF A MARBLED MURRELET

NIGEL J. C. MATHEWS AND ALAN E. BURGER

Key words: alcid, Alcidae, *Brachyramphus marmoratus*, diving, foraging, marbled murrelet, Vancouver Island

Underwater foraging depth is an important dimension of the foraging niche of all diving birds. This is normally measured by attaching depth gauges or time-depth recorders to free-living birds that are returning repeatedly to a colony during their breeding season (Kooyman 1989, Burger 1991). Such procedures are impractical for marbled murrelets

(*Brachyramphus marmoratus*) which breed solitarily in scattered, generally inaccessible nest sites, typically in the boughs of very large trees (Nelson and Hamer 1995). Consequently, little is known about the depths at which this murrelet forages (Strachan and others 1995), and this information is important in under-

standing the accessibility of prey at various depths, the murrelet's foraging niche, and risk from gill-nets.

On 25 October 1997, while SCUBA diving in Hardy Bay, west of Daphne Point, Vancouver Island (50°44.8'N, 127°26.7'W), one of us (NJCM) observed a marbled murrelet at a depth of 13.7 m (measured with a Dacor depth gauge). The ocean was approximately 30 m deep above a mixed substrate of pebble slopes and rocky outcrops. The bird approached at an oblique angle from above and spent about 20 sec close to the observer, apparently attracted to the diver and the bubbles coming from the SCUBA. It pecked at a few bubbles. The bird had a silvery appearance resulting from air trapped in the plumage. Two species of likely prey fish were seen near the murrelet: juvenile walleye pollock (*Theragra chalcogramma*) and juvenile Pacific herring (*Clupea harengus*). The pollock were close to the bottom and the herring were scattered throughout the water column. When the bird returned to the surface, NJCM followed and confirmed its identity while the bird sat on the surface within 2 to 3 m of NJCM. NJCM is thoroughly familiar with this species in all plumages, having participated in many at-sea transects in which the murrelet was commonly recorded.

We could find no previous direct measures of diving depths in this species. Mahon and others (1992) observed marbled murrelets feeding on schools of sand lance (*Ammodytes hexapterus*) within 5 m of the surface. Carter and Sealy (1984) found that murrelets killed in floating gill-nets were caught within 3 to 5 m of the surface. Marbled murrelets typically forage in shallow (<100 m), nearshore ocean (Strachan and others 1995).

The depth reported here is well within the expected maximum depth for an alcid of this size. The equation provided by Burger (1991) predicts that a marbled murrelet of mass 220 g (Sealy 1975) should be able to reach 47 m. Slightly smaller alcids have been recorded at similar maximum depths: Cassin's auklet (*Ptychoramphus aleuticus*, 190 g) at 43 m (Burger and Powell 1990), and dovekie (*Alle alle*, 160 g) at 35 m (Prince and Harris 1988). Most diving birds typically forage well above the maximum recorded depths (Burger 1991). The observed murrelet was clearly able to remain at the observed depth for 20 sec, suggesting that it could comfortably pursue prey at this depth, or make substantially deeper dives.

Although we report only a single depth measure, the opportunities for making such measurements are scarce, making this an important observation. Accumulated opportunistic observations of this sort will ultimately provide a profile of the underwater foraging niche of the marbled murrelet, and we encourage other divers with knowledge of the murrelet to report similar incidents.

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- 3570 Telegraph Road, Cobble Hill RR2, British Columbia V0R 1L0, Canada (NJCM); Department of Biology, University of Victoria, Victoria, British Columbia V8W 3N5 Canada (AEB). Address all correspondence to AEB. Submitted 29 December 1997, accepted 31 March 1998. Corresponding editor: Kathleen A. Engel.