Notes

Apparent Predation by Gray Jays, *Perisoreus canadensis*, on Long-toed Salamanders, *Ambystoma macrodactylum*, in the Oregon Cascade Range

MICHAEL P. MURRAY[1], CHRISTOPHER A. PEARL[2], and R. BRUCE BURY[2]

[1] Crater Lake National Park, P.O. Box 7, Crater Lake, Oregon 97604 USA (e-mail: Michael_Murray@nps.gov). Author for correspondence

[2] USGS Forest and Rangeland Ecosystem Science Center, 3200 SW Jefferson Way, Corvallis, Oregon 97331 USA

Murray, Michael P., Christopher A. Pearl, and R. Bruce Bury. 2005. Apparent predation by Gray Jays, *Perisoreus canadensis*, on Long-toed Salamanders, *Ambystoma macrodactylum*, in the Oregon Cascade Range. Canadian Field-Naturalist 119(2): 291-292.

We report observations of Gray Jays (*Perisoreus canadensis*) appearing to consume larval Long-toed Salamanders (*Ambystoma macrodactylum*) in a drying subalpine pond in Oregon, USA. Corvids are known to prey upon a variety of anuran amphibians, but to our knowledge, this is the first report of predation by any corvid on aquatic salamanders. Long-toed Salamanders appear palatable to Gray Jays, and may provide a food resource to Gray Jays when salamander larvae are concentrated in drying temporary ponds.

Key Words: Gray Jay, *Perisoreus canadensis,* Long-toed Salamander, *Ambystoma macrodactylum*, amphibian, corvid, diet, larvae, pond.

Corvid birds are generalist feeders and "opportunistic" predators (Bent 1946; Marshall et al. 2003). In montane regions of western North America, corvids sometimes consume anuran amphibians, which can offer a concentrated food resource in breeding or larval rearing aggregations (Beiswenger 1981; Olson 1989; Corn 1993). Common Ravens (*Corvus corax*) and American Crows (*C. brachyrhynchos*) are predators of adult Western Toads (*Bufo boreas*) (Olson 1989; Corn 1993; Brothers 1994). Clark's Nutcrackers (*Nucifraga columbiana*) consume larval Columbia Spotted Frogs (*Rana luteiventris*) (Turner 1960; Pilliod 2002). Gray Jays (*Perisoreus canadensis*) prey upon larval *B. boreas* (Beiswenger 1981) and juvenile Boreal Chorus Frogs (*Pseudacris triseriata*) (Tordoff 1980). To our knowledge, there are no reports of corvids feeding on aquatic stages of salamanders. Here, we report Gray Jay predation on larval Long-toed Salamanders (*Ambystoma macrodactylum*) in the southern Cascade Range in Oregon.

We observed Gray Jay feeding behavior in the early afternoon of 2 October 2003 at a temporary pond on Whitehorse Bluff in Crater Lake National Park (elevation 1933 m; UTM Zone 10, E565248, N4747116; NAD27). This pond is located on a terrace with numerous other temporary ponds within a forest dominated by old-growth Mountain Hemlock (*Tsuga mertensiana*). When full after snowmelt, the observation pond covers an area of approximately 800 m^2 and has a maximum depth of 0.5 – 1 m. At the time of our observations, the pond had dried to a small pool (approximately 40 m^2) which was about 5% of the area covered when full. We observed two Gray Jays foraging at a muddy circular depression (0.3 m diameter) located 2 m from the only remaining pool in the pond basin. This depression was separated from the pool by dried mud. We observed no other similar saturated depressions within the pond basin. Each jay dipped its beak into the mud, lifted its head back, and vigorously shook its head from side to side several times. The jays flew from the pond into the forest canopy for several minutes before returning and repeating the behavior for another 1 – 2 minutes. This behavior of Gray Jays returning to perches between or after predation episodes has been noted in other observations of predation on amphibians and small mammals (Gill 1974; Tordoff 1980; Beiswenger 1981; Strickland and Ouellet 1993; Pilliod 2002). Our inspection of the muddy depression after the jays departed the vicinity revealed about 24 live Long-toed Salamander larvae. Salamanders were similarly sized (ca. 50 mm total length) and had full or partial gills. The tiny depression they occupied contained saturated mud but lacked surface water, macrophytic vegetation or any other visible material. We observed Gray Jay-sized tracks at other muddy locations within the basin of the pond. No other aggregations of stranded salamander larvae were found.

During a 70-min return visit on the afternoon of 12 October 2003, we observed no Gray Jays or Long-toed

Salamanders in or near the same pond perimeter. However, we found recent raven and Gray Jay-sized tracks at the former saturated depression (which had become flooded after an early snow) and along the margins of a separate neighboring pond, which also held shallow water. We observed no Gray Jays during a 90-min revisit on the afternoon of 21 October 2003, but fresh corvid-sized tracks were common in the muddy pond basin.

The foraging behavior of the Gray Jays, the abundance of Long-toed Salamanders, and the lack of surface water and alternative food items in the small depression lead us to conclude that the Gray Jays were consuming Long-toed Salamanders. Our observations are consistent with other descriptions of western corvids as opportunistic predators, and suggest that some salamander and anuran larvae are suitable prey for jays. Unlike some pond-breeding amphibians (see Kats et al. 1988), Long-toed Salamander larvae appear to be palatable to a variety of predators (Pilliod and Fronzuto 2005). Garter snakes (*Thamnophis* sp.) (Ferguson 1961), non-native fish (Tyler et al. 1998; Monello and Wright 2001), Northwestern Salamanders (*A. gracile*) (Hoffman and Larson 1999), conspecific larvae (Walls et al. 1993), giant water bugs (*Lethocerus* sp.) (CAP, personal observation), and dytiscid water beetles (Pilliod and Fronzuto 2005) consume larval Long-toed Salamanders.

Gray Jays are common at Crater Lake National Park and throughout much of the range of the Long-toed Salamander in mountain regions of western North America (Farner 1952; Strickland and Ouellet 1993; Marshall et al. 2003). Long-toed Salamanders often breed in temporary ponds, and larvae are likely to be stranded as water levels decline in late summer during dry years (Kezer and Farner 1955). The abundance of tracks at our observation pond suggests Gray Jays or other similarly sized birds visited this pond frequently. Long-toed Salamanders and other palatable amphibians may represent a seasonally important food resource to opportunistic corvid predators such as Gray Jays.

Acknowledgments

We thank B. McCreary, D. Olson, D. Pilliod, and A. J. Erskine for helpful reviews of the manuscript. The National Park Service Inventory and Monitoring Program provided support for portions of this research.

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Received 18 February 2004
Accepted 22 March 2005