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Bald Eagle Predation of a White-tailed Deer Fawn

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Abstract - *Haliaeetus leucocephalus* (Bald Eagle) is an adaptable predatory bird that commonly captures live prey, but regularly scavenges. Large mammalian prey (e.g., *Odocoileus virginianus* [White-tailed Deer]) have been observed in Bald Eagle diets, but were considered scavenged. To our knowledge, Bald Eagle predation of a live ungulate has only been reported once, and occurred in Menominee County, MI. In June 2009, we captured and radiocollared a female White-tailed Deer fawn (2.7 kg) in the south-central Upper Peninsula of Michigan. The fawn was last radiolocated alive 8 h after release in a short-height (20–30 cm) grassland field along a river approximately 570 m from an eagle nest. Estimated time of mortality of the fawn was 10 h post release. Approximately 27 h post release, 2 legs, >50% fawn hide, and the radiocollar were present in the nest along with 2 eagle nestlings (estimated age 9–10 wks). We believe this was a possible predation event based on the 8-h period between fawn relocations, fawn movement, foraging behavior of the nesting eagles, and presence of the carcass remains and radiocollar in the nest.

Introduction

Haliaeetus leucocephalus L. (Bald Eagle) has evolved life-history strategies that include great diet plasticity. Bald Eagles commonly capture live prey, but scavenging is regularly observed (Elliott et al. 2006, Isaacs et al. 1996, Lang et al. 2001). Bald Eagle diet varies with season and geographic region (e.g., Isaacs et al. 1996, Jackman et al. 1999) and primarily includes fish (e.g., Kozie and Anderson 1991, Lang et al. 2001), but also birds (Morris 2002, Ricca et al. 2004), reptiles (Means and Harvey 1999), invertebrates (Jackman et al. 1999, Murie 1940), and mammals (Isaacs et al. 1996, Kozie and Anderson 1991). Medium-sized mammals reported in their diet include hare and rabbit (Family Leporidae; Dominguez et al. 2003, Hunt et al. 2002, Kozie and Anderson 1991), *Enhydra lutris* L. (Sea Otter; Anthony et al. 1999, Ricca et al. 2004), *Alopex lagopus* L. (Arctic Fox; Anthony et al. 2008, Murie 1940), and *Procyon lotor* L. (Raccoon; Lang et al. 2001). Additionally *Odocoileus virginianus* Zimmermann (White-tailed Deer) (Kozie and Anderson 1991, Lang et al. 2001), *O. hemionus* Rafinesque (Mule Deer; Isaacs et al. 1996), *Cervus elaphus* L. (Elk; Isaacs et al. 1996), *Rangifer tarandus* L. (Caribou; Anthony et al. 2008), *Canis latrans* Say

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(Coyote; Isaacs et al. 1996), *Bos* spp.(domestic cattle; Isaacs et al. 1996), and *Ovis* spp. (domestic sheep; Murie 1940) have been observed in diets but were considered scavenged.

Although mammalian prey is commonly found in Bald Eagle diets, it is unclear to what extent these species, particularly larger species, are predated. To our knowledge, the only documented case of Bald Eagle ungulate predation occurred 19 June 1960 in Menominee County, MI (Line 1961). Observers stated the fawn appeared "tiny" and was thought to be several days old, weighing between 2.5–3.4 kg. In this case, the eagle appeared to capture the fawn alive and had no difficulty carrying the fawn in flight. Also, a complete fawn carcass was found on 10 June 2010 in a Bald Eagle nest along the Days River near Rapid River, MI, (G. Zuehlke, Michigan Department of Natural Resources and Environment, Escanaba, MI, pers. comm.). The fawn was estimated at 1 d of age, based on new hoof growth of the right rear leg (Sams et al. 1996) and a weight of 3.6 kg (Carstensen et al. 2009), and was found 22.3 km northeast of the fawn mortality described hereafter.

We describe Bald Eagle brood provisioning of a White-tailed Deer fawn and the circumstances surrounding a potential fawn predation.

Methods

A White-tailed Deer fawn was captured at 10:48 on 5 June 2009 in a grassland field adjacent to a primary roadway and 40-m-wide river (Fig. 1), as part of a predator-prey study in the south-central Upper Peninsula of Michigan (45°43'47"N, 87°4'48"W). This fawn was 1 of 48 captured and radiocollared during spring 2009. Immediately upon capture, we determined sex, recorded rectal temperature, estimated weight to the nearest 0.1 kg with a spring scale, and measured to the nearest mm new front right hoof growth to estimate age (Sams et al. 1996; J. Duquette et al., Mississippi State University, Mississippi State, MS, unpubl. data), body length, and right front shoulder height. The fawn was fitted with an expandable VHF radiocollar (Diefenbach et al. 2003; Advanced Telemetry Systems, Isanti, MN) with an 8-h mortality switch and precise event transmitter (PET) to estimate time of mortality to the nearest half-hour. The mortality switch is activated after the radiocollar has not moved for a period of 8 h. The PET is a sequence of coded radio pulses emitted from the collar after the mortality switch is activated, which is then decoded to approximate time of collar inactivity (e.g., mortality). We did not use immobilization drugs, and the fawn was released at the capture site immediately following handling. We attempted to locate the fawn every 8 h using a truck-mounted radiotelemetry system.

Results

At capture, the female fawn weighed 2.7 kg and had a body length of 61.1 cm and shoulder height of 46.9 cm. We estimated the fawn was 3 d old. Total

handling time was 17 min, and we did not observe or hear eagles while handling the fawn. The fawn was released at the capture site about 20 m from the road and was fully ambulatory and displayed normal behavior (i.e., bedded) upon release. The dam remained ≤150 m from the fawn during handling, appeared in good physical condition, and was vocal toward handlers.

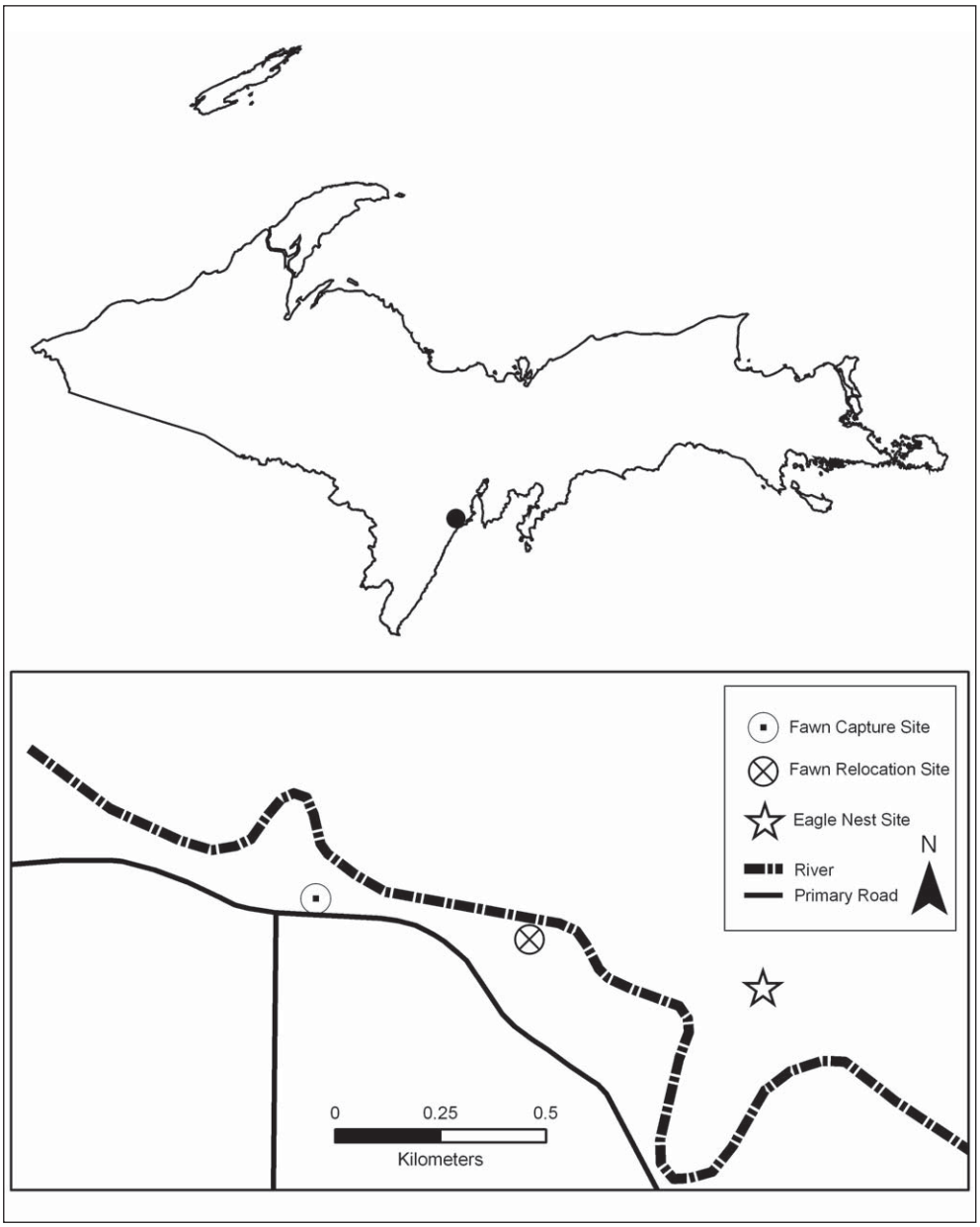

Figure 1. South-central Upper Peninsula of Michigan (top, black dot) and location (bottom) where a White-tailed Deer fawn was predated 5 June 2009 by a Bald Eagle. Fawn capture site is location where fawn was radiocollared, fawn relocation site is radiolocation of fawn 8 h after release, and eagle nest site is final location of the collar.

We radiolocated the fawn 8 h after capture (≈18:48) on the edge of a short-height (20–30 cm) grassland field (≤0.6 ha) about 30 m from the river, 190 m from the capture site (roadside), and 570 m from the eagle nest. We did not observe the fawn or detect fawn movement during this radiolocation. While obtaining a radiolocation 12 h after capture (≈22:48), we detected a 2-h mortality (PET) signal, indicating the collar was stationary since 10 h post capture and estimating mortality time around 20:48. However, upon detection of the mortality pulse, the exact location of the collar was not recorded. Approximately 27 h after capture, on 6 June 2009 at 14:23, we located the fawn radiocollar on mortality pulse in a Bald Eagle nest about 25 m above ground and 1.1 km from the fawn capture location. We climbed to the nest and observed 2 live eagle nestlings (estimated age 9–10 wks) and 2 fawn legs (1 front and 1 hind), >50% of the fawn's hide, and the radiocollar (Fig. 2). Leg bones were void of flesh and connected at the joints and the remaining hide was ripped sharply into 2 pieces; tufts of fawn hair were scattered across the nest. We retrieved the radiocollar, but did not attempt to retrieve or search for additional carcass remains to reduce disturbance to eagle nestlings. Both adult eagles were observed during the nest visit.

Discussion

White-tailed Deer dams frequently leave fawns in habitat offering concealment as an anti-predatory strategy, allowing dams to forage away from the fawns before returning to nurse every few hours (Ozoga and Verme 1986, Ozoga et al. 1982). However, dams view this concealment from ground level and may not consider vertical cover. The radiocollared fawn was located 8 h after its release in a grassland patch that provided minimal concealment from above. An eagle could have detected and attacked the fawn from the air, particularly if the dam was foraging away from the fawn.

We cannot exclude the possibility that eagles observed or were attracted to research personnel during the fawn's capture, or that our handling influenced fawn behavior potentially increasing predation risk. However, we believe it is probable the fawn presented an opportunistic prey item secured while eagles hunted the riparian area near their nest. The adjacent river was likely a common foraging area for the eagles, supported by the numerous fish remains observed in and around the nest. Very low water in the river during June may have limited fish availability, requiring eagles to hunt adjacent fields for mammalian prey. Hunt et al. (2002) suggested Bald Eagles may switch to mammalian prey when fish are less available. Upon nest investigation, we observed one of the adult eagles carrying a sciurid, which may suggest the

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Figure 2 (opposite page). Bald Eagle nest (nestlings pictured) where White-tailed Deer fawn carcass and radiocollar were retrieved 6 June 2009 following predation in south-central Upper Peninsula of Michigan. Arrows in top panel indicate fawn radiocollar (top arrow) and leg (bottom arrow).

eagles possibly were focusing their foraging around fields or wooded areas rather than water. This foraging strategy may have increased the likelihood of observing the fawn opportunistically.

The fawn may have been scavenged following a vehicle collision. However, this is unlikely due to the minimal time between capture and mortality (10 h) and the distance (about 190 m) between the 8-h radio location of the fawn and the road. Fawn mortality was estimated around 20:48, which would have provided approximately an hour to an hour and a half before sunset, thus providing a period of light for foraging and transporting the fawn to the nest. Also, although the location of the radiocollar was not obtained upon mortality pulse detection, we highly suspect it was in the nest at this time because it was on mortality pulse upon nest investigation and motion (e.g., eagle flying) would have likely put the collar on normal pulse. Nevertheless, the radiocollar could have gone into mortality mode again if the eagles did not disturb it 8 h after transporting it to the nest and nest investigation. Furthermore, it is improbable the eagles commandeered the carcass from a mammalian predator (e.g., coyotes) because Bald Eagles are subordinate to these species (McCollough et al. 1994). Also, the fawn's rectal temperature was normal (39 °C) during handling, indicating low risk of acute capture myopathy (Beringer et al. 1996, DelGiudice et al. 2001); thus, we believe it is unlikely that the fawn died before being detected by an eagle and was simply scavenged.

Whether the eagle transported the fawn to the nest in 1 or multiple trips is unknown; however, the eagle(s) would have had 25–26 h to feed on and transport the fawn to the nest. Although we only observed 2 fawn legs in the nest, we believe the fawn was taken in 1 trip because >50% of the hide and radiocollar were in the nest. Further, 1 live (Line 1961) and 1 dead (J. Duquette, unpubl. data) fawn of similar weight (2.1–6.0 kg) were observed to be taken by a Bald Eagle within 25 km of the suspected fawn predation described. Considering the aforementioned evidence, we conclude the radiocollared fawn in our study may have been predated by a Bald Eagle.

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Literature Cited

Anthony, R.G., A.K. Miles, J.A. Estes, and F.B. Isaacs. 1999. Productivity, diets, and environmental contaminants in nesting Bald Eagles from the Aleutian archipelago. Environmental Toxicology and Chemistry 18:2054–2062.

Anthony, R.G., J.A. Estes, M.A. Ricca, A.K. Miles, and E.D. Forsman. 2008. Bald Eagle and Sea Otters in the Aleutian archipelago: Indirect effects of trophic cascades. Ecology 89:2725–2735.

Beringer, J., L.P. Hansen, W. Wilding, J. Fischer, and S.L. Sheriff. 1996. Factors affecting capture myopathy in White-tailed Deer. Journal of Wildlife Management 60:373–380.

Carstensen, M., G.D. DelGiudice, B.A. Sampson, and D.W. Kuehn. 2009. Survival, birth characteristics, and cause-specific mortality of White-tailed Deer neonates. Journal of Wildlife Management 73:175–183.

Delgiudice, G.D., B.A. Mangipane, B.A. Sampson, and C.O. Kochanny. 2001. Chemical immobilization, body temperature, and post-release mortality of White-tailed Deer captured by clover trap and net-gun. Wildlife Society Bulletin 29:1147–1157.

Diefenbach, D.R., C.O. Kochanny, J.K. Vreeland, and B.D. Wallingford. 2003. Evaluation of an expandable breakaway radiocollar for White-tailed Deer fawns. Wildlife Society Bulletin 31:756–761.

Dominquez, L., W.A. Montevecchi, N.M. Burgess, J. Brazil, and K.A. Hobson. 2003. Reproductive success, environmental contaminants, and trophic status of nesting Bald Eagles in eastern Newfoundland, Canada. Journal of Raptor Research 37:209–218.

Elliott, K.H., J. Duffe, S.L. Lee, P. Mineau, and J.E. Elliott. 2006. Foraging ecology of Bald Eagles at an urban landfill. The Wilson Bulletin of Ornithology 118:380–390.

Hunt, W.G., R.E. Jackman, D.E. Driscoll, and E.W. Bianchi. 2002. Foraging ecology of nesting Bald Eagles in Arizona. The Journal of Raptor Research 36:245–255.

Isaacs, F.B., R.G. Anthony, M. Vander Heyden, C.D. Miller, and W. Weatherford. 1996. Habits of Bald Eagles wintering along the Upper John Day River, Oregon. Northwest Science 70:1–9.

Jackman, R.E., W.G. Hunt, J.M. Jenkins, and P.J. Detrich. 1999. Prey of nesting Bald Eagles in northern California. Journal of Raptor Research 33:87–96.

Kozie, K.D., and R.K. Anderson. 1991. Productivity, diet, and environmental contaminants in Bald Eagles nesting near the Wisconsin shoreline of Lake Superior. Archives of Environmental Contamination and Toxicology 20:41–48.

Lang, A.L., R.A. Andress, and P.A. Martin. 2001. Prey remains in Bald Eagle (*Haliaeetus leucocephalus*) pellets from a winter roost in the Upper St. Lawrence River, 1996 and 1997. Journal of Wildlife Rehabilitation 24:21–26.

Line, L. 1961. Bald Eagle preys on White-tailed Deer fawn. Jack-Pine Warbler 39(4):147.

McCollough, M.A., C.S. Todd, and R.B. Owen, Jr. 1994. Supplemental feeding program for winter Bald Eagles in Maine. Wildlife Society Bulletin 22:147–154.

Means, D.B., and A. Harvey. 1999. Barbours's Map Turtle in the diet of nesting Bald Eagles. Florida Field Naturalist 27:14–16.

Morris, D. 2002. Bald Eagle kills Common Loon. Loon 74:57.

Murie, O.J. 1940. Food habits of the northern Bald Eagle in the Aleutian Islands, Alaska. Condor 42:198–202.

Ozoga, J.J., and L.J. Verme. 1986. Relation of maternal age to fawn-rearing success in White-tailed Deer. Journal of Wildlife Management 50:480–486.

Ozoga, J.J., L.J. Verme, and C.S. Bienz. 1982. Parturition behavior and territoriality in White-tailed Deer: Impact on neonatal mortality. Journal of Wildlife Management 46:1–11.

Ricca, M.A., R.G. Anthony, and J.C. Williams. 2004. Bald Eagles consume Emperor Geese during late-winter in the Aleutian archipelago. Journal of Raptor Research 38:81–85.

Sams, M.G., R.L. Lochmiller, E.C. Hellgren, W.D. Warde, and L.W. Varner. 1996. Morphometric predictors of neonatal age for White-tailed Deer. Wildlife Society Bulletin 24:53–57.