south of private homes, with hopes that the adults would return and care for the young bird. When the adults did not return we recaptured the eaglet at 1400 H on 4 September for medical examination.

P. Redig determined that the injury could not be corrected and the fledgling was euthanized. Necropsy revealed that the eaglet had a severe luxation of the right tarsometatarsal joint and was emaciated.

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Wildlife Biology Program, School of Forestry, University of Montana, Missoula, MT 59812. Address of second author: U.S. National Park Service, Glacier National Park, West Glacier, MT 59936.

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PREDATION OF BALD EAGLES (*Haliaeetus leucocephalus*) ON AMERICAN COOTS (*Fulica americana*)

BAYARD H. BRATTSTROM

Observations of Bald Eagle (*Haliaeetus leucocephalus*) predation on the American Coot (*Fulica americana*) were made along the east shore of Flathead Lake, 16–22 km northeast of Polson, Lake County, Montana, between 13–22 January 1978. During this time a group of 50–1000 coots fed in Gravel Bay. The coots were in a close aggregation (Fig. 1A) with individuals separated by about 1–2 m. Occasionally coots fed by diving 3–6 m deep into this glacial, oligotrophic lake for filamentous algae attached to submerged rocks.

At night, the coots formed a tight aggregation with individual coots in contact with each other forming a raft (or a Pod 1 group, *fide* Breder 1959) (Fig. 1B). I observed these rafts near dark, 1630 H, 15 January and at 0945 H, 21 January.

On 15 January between 1430–1500 H, I observed a large feeding aggregation of about 400 coots in Gravel Bay. A Bald Eagle flew over the bay and then soared 10–

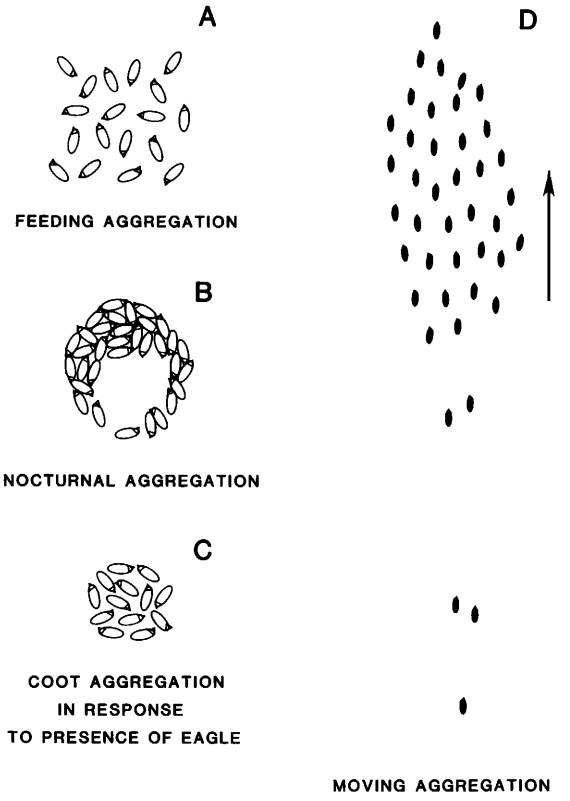

Figure 1. Behavior patterns of American Coots. (A) feeding aggregation; coots 1–2 m apart; (B) nocturnal aggregation; most coots in contact with one or more coots; (C) anti-predator aggregation in response to the presence of a Bald Eagle; coots about 10–20 cm apart; (D) moving aggregation: coots about 1 m apart; stragglers are at greater distance from main group; the eagle attack described in the text was on the last solitary coot.

30 m, circling over the end of the elongated flock where coots were more isolated. In response to the eagle these isolated coots formed a tight aggregation (Fig. 1C) with each coot only about 10–20 cm apart. The aggregation, similar to the "huddle" described by Grubb (1977), slowly swam towards the main group. The main group also began to move together into a "huddle." The eagle made no attempt to capture coots.

I observed a moving group of 800 coots on 17 January. The coots swam at about 11–16 km/hr in an elongate band of about 6 coots wide with each coot about 1 m apart (Fig. 1D). At the end of the column there were some stragglers 3–10 m behind the main group (Fig. 1D), followed by 2 coots 300 m further behind which in turn, were followed by a single coot, approximately 10 m further behind. At 1135 H, an immature Bald Eagle flew by and then dove on the single coot. The coot submerged and the eagle flew up about 6 m and dove down again as the coot surfaced. In a 3-min period, the eagle dove 11 times as the coot submerged and surfaced repeatedly. On the eleventh attempt, the eagle caught the harassed coot and flew low over the water.

On 6 January, a Bald Eagle was seen to dive on a lone coot in the water (G. and D. Buswell, pers. comm.). The eagle missed the coot on the first try but was successful in a second try as the coot surfaced. Apparently, the eagle had difficulty lifting the coot which was dragged along the water and onto ice cover. The eagle started to eat the coot but was soon harassed by 4 other eagles which unsuccessfully tried to steal the coot. The eagle finally left the dead coot. One of the other eagles then obtained the coot but also soon left. On another occasion, a Bald Eagle with a coot was being chased by 3 Common Ravens (*Corvus corax*). The ravens unsuccessfully tried to grab the coot from the eagle.

Groups of birds, fish, bats and ungulates will aggregate closely in response to a predator (Breder 1959, 1967; Seghers, 1974; Hamilton, 1978). Most authors suggest such behavior prevents a predator from separating out 1 individual upon which to focus an attack. Movement and confusion within an aggregation further prevent a predator from concentrating on 1 individual, hence predation is often unsuccessful. Aggregation behavior appears to be an effective response by the American Coot to approach of a predator such as the Bald Eagle, and eagles are thus primarily successful with predation on solitary individuals.

LITERATURE CITED

BREDER, C. M. 1959. Studies on social groupings in fishes. *Bull Amer. Mus. Nat. Hist.* 117:397–481.

———. 1967. On the survival value of fish schools. *Zoologica* 52:25–40.

GRUBB, T. C. 1977. Discrimination of aerial predators by American Coots in nature. *Anim. Beh.* 25:1065–1066.

HAMILTON, W. D. 1978. Geometry for the selfish herd. *J. Theor. Biol.* 31:142–159.

SEGHERS, G. H. 1974. Schooling behavior in the guppy (*Poecilia reticulata*): an evolutionary response to predation. *Evolution* 28:486–488.

Department of Biological Science, California State University, Fullerton, CA 92634.

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