

than during migration, and variability was greater during the breeding season. These factors may have contributed to the lack of statistical significance between bird use of shallow and deep ponds during the breeding season.

Almost 80% of the shallow ponds contained sediment bars at stream inlet channels. Wetland birds made extensive use of the mudflats and shallow water edges associated with these sediment deposits. Only 15% of the deep ponds had sediment bars extending above the water surface. In addition, the gently-sloped sides of shallow ponds contrasted sharply with the steep-sided deep ponds and lakes and contributed to the increased wetland habitat value of shallow ponds. These features also were considered important in greater use of shallow ponds by mallard pairs and broods (Adams et al. 1985).

*Implications.*—Our data indicate that man-made wetland habitat can be created in urban areas in connection with modern stormwater management practices. There is public support in Columbia, Maryland for such effort (Adams et al. 1984), and guidelines for considering wildlife in the design of urban stormwater control facilities have been published (Adams and Dove, Urban Wetlands for Stormwater Control and Wildlife Enhancement, National Institute for Urban Wildlife, Columbia, Maryland, 1984). We encourage biologists to work closely with engineers, landscape architects, municipal and other governmental officials, planners, developers, and others to create and manage such habitat.

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**Extra-pair feeding in Western Grebes.**—Among grebes only the solitarily nesting Australasian Little Grebe (*Tachybaptus novaehollandiae*) breeds cooperatively (Lane, Sunbird 9: 2, 1978). I report here three observations of extra-pair feeding in Western Grebes (*Aechmophorus occidentalis*) and discuss the possible function of that behavior.

I observed with a 15–60× spotting telescope 75 pairs of colonially breeding, dark-phase Western Grebes for 275 h between 8 May and 14 August 1983. The colony was on Duck Lake, 15 km NW of Creston, British Columbia (49°14'N, 116°37'W). I determined sex by body and bill size (Palmer, Handbook of North American Birds, Vol. 1, Yale Univ. Press, New Haven, Connecticut, 1962). Hereafter, A-male and A-female refer to paired grebes; B-male refers to unpaired, “auxilliary” male grebes (sensu Emlen, pp. 245–281 in Behavioral Ecology, Krebs and Davies, eds., Blackwell Scientific Publ., London, England, 1978).

At 17:38 on 30 June an A-female took a 6-cm yellow perch (*Perca flavescens*) from a B-male and ate it while the A-male was diving. Between 17:39 and 17:58 the A-male captured 10 fish, ate one, and gave nine to the A-female who fed eight to a <7-day old chick. At 17:58 the A-male chased the B-male away. On 18 July I observed a pair of grebes with four, 3-week old young. At 16:08, while the A-male was sleeping, the A-female took a 6-cm yellow perch from a B-male and fed it to one of the young. At 16:09 the A-male awoke and the B-male moved away from the A-pair. At 16:15 the A-female received the B-male in a “ratchet-pointing” posture (sensu Nuechterlein and Storer, Condor 84:351–369, 1982). At 16:16 the A-male caught a 4-cm yellow perch and gave it to the A-female, which in turn fed

it to one of the young. At 16:17 the A-male chased the B-male. Again on 18 July between 17:40 and 19:40, I observed a pair of grebes with three, 3-week old young. At 18:27 the A-female chased a B-male. Between 18:29 and 19:31 the A-male captured 12 fish and took two feathers. The A-male ate five fish, gave three fish and the two feathers to the young, and gave four fish to the A-female; the A-female dropped one of these and gave the other three to the young. At 19:31, while the A-male was diving about 20 m from the A-female, the A-female took a 6-cm yellow perch from the B-male and fed it to one of the young. At 19:35 the A-male returned and gave a 4-cm yellow perch to the A-female. The B-male moved away from the A-pair when the A-male returned.

Without marked birds of known genealogy the significance of this behavior cannot be known, though two possibilities seem likely: (1) B-males may be related to one or both A-pair birds and are attempting to increase their inclusive fitness by enhancing the breeding success of their kin, or perhaps by gaining experience in rearing young, or both (e.g., Brown, *Am. Zool.* 14:63–80, 1974; Woolfenden, *Auk* 92:1–15, 1975). (2) B-males may be attempting to procure mates. White-fronted Bee-eater (*Merops bulcockoides*) auxiliary males may also engage in attempted mate procurement (Emlen 1978). The second possibility is consistent with the observed aggressive behavior of A-males toward B-males.

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**An auxiliary with a mated pair and food-caching behavior in the Fish Crow.**—Auxiliaries or helpers are documented for many North American birds. Auxiliaries are especially frequent within the family Corvidae (Goodwin, *Crows of the World*, Cornell Univ. Press, Ithaca, New York, 1976; Brown, *Ann. Rev. Ecol. Syst.* 9:123–156, 1978; Verbeek and Butler, *Ibis* 123:183–189, 1981; Kilham, *Florida Field-Nat.* 12:25–31, 1984). Corvids are also known to cache food (Goodwin 1976; Roberts, *Am. Nat.* 114:418–438, 1979; Hewson, *Br. Birds* 74:509–512, 1981; James and Verbeek, *Behaviour* 85: 276–291, 1982; Kilham 1984). Neither helpers nor food caching have been documented previously for Fish Crows (*Corvus ossifragus*).

*Evidence of an auxiliary.*—Two pairs of Fish Crows nested 30 m apart in the crowns of tall (32-m) loblolly pines (*Pinus taeda*) in a small pine grove beside the Clemson University Cemetery, Clemson, South Carolina, in 1984. I watched one pair for a total of 50 hr from 12 April to 14 June. No crows were marked.

In Fish Crows only the female incubates and broods the young (Goodwin 1976). The male supplies the female with food during the period in which she is engaged in these activities. The pair was physically distinguished from a third individual (see below) by their glossier plumage, other plumage characteristics (e.g., missing right inner secondary of male), and by their behavior. In all observations described below, the pair and a third individual were seen at the same time.

While the female was brooding at 16:39 EST on 20 May, the male returned to the vicinity of the nest and a brief (2-sec) low intensity chase ensued between him and a second individual. The chase ended in a mutual display near the nest-tree. Both birds glided parallel to each other with neck and bill angled down about 45°, bodies drooped below the head and tail (which was slightly fanned), and the outer primaries slightly slotted. Ten minutes later, both birds perched on top of the nest-tree, 2 m above the nest while the female was still brooding.