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### Further Evidence of Long-term Pair Bonds in Ducks of the Genus *Bucephala*

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In holarctic ducks, pair formation occurs during the winter or the spring migration, or both, and pair bonds are seasonal, usually lasting until the onset of incubation by the female (McKinney 1986). Because males desert their mates during incubation and leave the breeding grounds for molting, it has been thought that new pair bonds are formed every year and that reparing with the same mate does not occur (Rowley 1983, McKinney 1986). In dabbling ducks, marking males on the breeding grounds has confirmed that long-term pair bonds (>1 yr) do not occur (Poston 1974, Blohm 1978), although exceptions exist (e.g. Dwyer et al. 1973). In seaducks, however, there is evidence that pairing with the same individual for more than one breeding season may be a common occurrence. Savard (1985a) recently reported that in Barrow's Goldeneye (*Bucephala islandica*) the return rates of adult males and females to the breeding grounds were similar (66% vs. 76%), and that several pairs reunited in subsequent years. I now present evidence that male Buffleheads (*B. albeola*) are also philopatric to their breeding area and that pair bonds can reform in subsequent years.

The study was conducted in the Cariboo Parkland of British Columbia. In 1983 I captured 3 male Buffleheads using a mirror trap (Savard 1985b), whereas 66 females were trapped on the nest between 1982 and 1985. All birds were marked individually with color-coded nasal saddles and a set of color bands. In

all cases the mates of marked males were marked. Retention of saddles was poor after 2 yr, but the leg bands enabled me to identify individuals up to at least 4 yr.

Pair 1 consisted of the same individuals in 1983 and 1984. This pair was not seen on the study area in 1985, but female 1 returned in 1986 with a new mate. From 1982 to 1984, and again in 1986, female 1 nested successfully in the same tree cavity, and her mate always defended the same territory, located on the pond closest to her nest. The reasons for her absence in 1985 are unknown as both the cavity and territory were unoccupied.

Pair 2 involved the same male and female for at least three consecutive seasons. Female 2 failed to hatch a clutch in all years and changed nest sites every year. The pair changed ponds from 1983 to 1984 but not in 1985. In 1986 male 2 returned unpaired for a fourth year to the same pond. His former mate did not return to the study area. For much of the nesting season he remained on the same pond, where he joined transient groups of nonbreeders and performed courtship displays to unpaired females.

Pair 3 nested successfully in 1983 but was not seen subsequently on the study area. Male 3, however, was known to be alive in the following year because he was resighted on the wintering area near San Diego, California, in December 1984 (T. Meyer pers. comm.).

Two of the three marked pairs, therefore, remained intact for 2 yr and one of them for a third year. Buffleheads are highly territorial during the breeding season (Gauthier 1987), and philopatry of females to the territory is high (Erskine 1961, Gauthier in prep.). My results show that philopatry may also be strong

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in males. Donaghey (1975) marked one male Bufflehead (but not his mate) and found that the male returned to the same pond in the following year. Male philopatry could be associated mostly with reunion with the previous mate, although the return of male 2 in 1986 showed that even if a male does not reunite with his previous mate and does not find a new female, he still may return to his previous nesting area.

The fact that male Buffleheads desert their mates during incubation and migrate for molting raises the question as to where pairs reunite. Some females join flocks of molting males in late summer (Erskine 1972), and pair reunion could occur at this time. Alternatively, pairs may reunite in winter as both male and female Buffleheads have a strong tendency to return to the same wintering area (Limpert 1980). Savard (1985a) documented such a reunion in goldeneyes when he observed the remating of a marked pair on its wintering area.

Pairing of the same individuals during more than one breeding season has now been reported in Harlequin Ducks (*Histrionicus histrionicus*; Bengston 1972), Oldsquaws (*Clangula hyemalis*; Alison 1975), Common Eiders (*Somateria mollissima*; Spurr and Milne 1976), Barrow's Goldeneyes (Savard 1985a), and Buffleheads (this study). This indicates that long-term pair bonds may be a common occurrence in seaducks. The fact that pairs reform from year to year despite a long period of separation suggests that there are significant advantages in reuniting with the same mate. Such advantages have been demonstrated in other long-lived species of birds (Rowley 1983). Male experience could be especially important in highly territorial species like Buffleheads and goldeneyes where defense of a territory by the male is a prerequisite to successful breeding by the female (Gauthier 1986, 1987). Future studies in ducks should look more for pair-bond stability and should not neglect the contribution of males to reproductive success.

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