

NEST-SITE TENACITY AND HOMING IN  
THE BUFFLEHEAD\*

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BANDING data for the Bufflehead (*Bucephala albeola*) have not previously been summarized. In this paper, nest-site tenacity and homing tendencies are discussed on the basis of evidence from banding, and some of the shortcomings of Bufflehead banding are pointed out. Many generalizations for that species may have some application to other ducks.

The Bufflehead is more suitable than most other ducks for a study of nest-site tenacity. Its nests in cavities made by Flickers (*Colaptes*) are easily found, at least in favored breeding areas in British Columbia and Alberta. Previously, such studies (*e.g.*, SOWLS, 1955) have used ground-nesting species, but tree nests have the major advantage in that they are fixed in location and may be revisited in subsequent years without need for further search. Other ducks that nest in trees require larger cavities, which, except when nest boxes are used, are much less easy to locate. The Bufflehead is relatively long-lived, so that individual birds may be recaptured in several successive years.

## SOURCES OF DATA

Banding of Buffleheads may be classified as systematic or fortuitous. Most important in the former category is the work of the Department of Zoology, University of British Columbia, and of the British Columbia Game Commission. Flightless young and molting adult Bufflehead were banded in the central plateau region of British Columbia, where the Bufflehead is an abundant breeder, using a drive-trapping technique developed for diving ducks (Cowan and Hatter, 1952). Much of the material presented in this paper is derived from retraps and recoveries of the approximately 2,000 Bufflehead banded in that area in 1948-1955 and 1957-1959. The writer studied the Bufflehead during the summers of 1958 and 1959, while preparing a thesis at the University of British Columbia (Erskine, 1960). Nests located during those summers were rechecked in 1960 by Lawson G. Sugden (formerly with the B.C. Game Commission), Canadian Wildlife Service, Edmonton, Alberta.

Other banding of Buffleheads has been classed as fortuitous in that

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those birds were caught during drive- or bait-trapping operations aimed at other species. Most work in that category was done by Ducks Unlimited co-operators in the Prairie Provinces (1939–1950), and by the state game departments of New York (1955–1959), Maryland (1956–1959), and Oregon (1947–1959). Banding by Ducks Unlimited was mostly in August and September, although a few birds were banded in late May and early June. Banding in the other regions was almost exclusively carried out from January through March.

#### USAGE OF NEST SITES

In central British Columbia a turnover of about 50 per cent was found in usage of Bufflehead nests. Table 1 presents the available data on reuse.

TABLE 1  
(a) NEST USAGE BY BUFFLEHEADS

<i>Year</i> <sup>1</sup>	<i>Nests used</i>	<i>Nests reused next year</i>	<i>Nests unusable next year</i>
1952	6	1	2
1953	2	2	—
1954	3	—	2
1955	2	—	—
1957	16	9	—
1958	39	25	2
1959	71	33	2
Total <sup>2</sup>	139	70	8

<sup>1</sup> Data for 1952–1954 were provided by Miss Mary F. Jackson, and those for 1955 and 1957 (in part) by M. Timothy Myres.

<sup>2</sup> Forty-eight nests occupied in 1960 were omitted from the table, since no data on subsequent use were available.

(b) REUSE OF INDIVIDUAL NESTS

	<i>Number of consecutive years in which nest used</i>			<i>Used more than once in broken sequence</i>
	4	3	2	
No. of nests	6	10	34	6

Table 1(a) shows that part of the annual turnover is due to nests becoming unusable, usually because the tree fell down or the cavity became unsuitable. Nests in Aspen (*Populus tremuloides*) are much less durable than nests in Douglas Fir (*Pseudotsuga menziesii*) stubs. One site in Douglas Fir was used by Bufflehead in 1941 (Munro, 1942),

and again in 1954 (Jackson, *in litt.*), and the site was still suitable for occupation by Buffleheads in 1960.

#### SITE TENACITY OF INDIVIDUAL BIRDS

Some investigators (*e.g.*, Munro, 1958; H. W. Burns, *in litt.*) have stated that Bufflehead nests may be used for many years in succession. However, that is not always true, and occupation of a given site in

TABLE 2

#### HISTORIES OF FEMALE BUFFLEHEADS

<i>Band number</i>	<i>Known history of bird</i>
38-520461	Banded as young 1949; rebanded 515-42805 on nest at same lake 1957; on same nest 1958.
38-520622	Banded as young 1950; on nest at lake 1 km. away 1952; on same nest 1954; but not 1953.
505-50120	Banded as molting adult 1952; on nest at lake 155 km. away 1957; moved 265 m. W to new (re-)nest 1958.
505-50254	Banded as subadult (?) 1955; on nest at same lake 1957; on same nest 1958; also trapped with brood on same lake 1957 and 1958; rebanded 505-50497 on new nest 67 m. E in 1959 (renest); on same nest 1960.
505-50471	Banded on nest 1958; on same nest 1959.
505-50472	Banded on nest 1958; on same nest 1959.
505-50473	Banded on nest 1958; on same nest 1959.
505-50474	Banded on nest 1958; on same nest 1959.
505-50476	Banded on nest 1958; on same nest 1959 and 1960.
505-50477	Banded on nest 1958; moved 82 m. SE to new nest 1959.
505-50478	Banded on nest 1958; moved 450 m. SSE to next lake to new (re-)nest 1959; on same nest 1960.
505-50483	Banded on nest 1958; moved 1100 m. ESE to new nest 1959.
505-50486	Banded on nest 1959; on same nest 1960.
505-50491	Banded on nest 1959; moved 5 km. ESE to next lake to new nest 1960.
505-50493	Banded on nest 1959; on same nest 1960.
505-50494	Banded on nest 1959; on same nest 1960.
505-50495	Banded on nest 1959; on same nest 1960.
505-50498	Banded on nest 1959; on same nest 1960.
515-13721	Banded as young 1955; on nest at same lake 1957 (1958?, bird on same nest not caught); moved 70 m. SE to new nest 1959; moved 1200 m. W to new nest 1960.
515-13790	Banded on nest 1959; on same nest 1960.
515-13794	Banded on nest 1959; on same nest 1960.
515-42801	Banded on nest 1957; moved 900 m. E. to new nest 1958; moved 180 m. S to new nest 1959; on same nest 1960.
515-42803	Banded on nest 1957; on same nest 1958 and 1959.
515-42804	Banded on nest 1957; moved 134 m. NW to new (re-)nest 1958; moved (from 1958) 255 m. ESE to new (re-)nest 1959; on same nest 1960.
525-19630	Banded as young 1957; on nest at same lake 1959; moved 75 m. W to new nest 1960.
525-19725	Banded on nest 1958; on same nest 1959.
545-40538	Banded as adult with brood 1958; on nest at same lake 1959; on same nest 1960.

consecutive years need not always involve the same bird. Table 2 gives the known histories of female Buffleheads captured on nests in more than one year.

Only two birds (505-50476 and 515-42803) were caught in three consecutive years on the same nest, while 19 others have been caught twice in the same nest, all but one (38-520622) in two consecutive years. One bird (505-50254 = 505-50497) was caught twice each in two nests, while two others (515-42801 and 515-42804) were also caught in four consecutive years, and one (515-13721) in three of four years in broken sequence. Those data are similar to the histories of individual birds obtained by Sowls (1955) for ground-nesting ducks.

In all, Table 2 includes 35 cases of birds caught in two consecutive years. Table 3 shows the relative numbers of previously banded Buffleheads, handled on nests in earlier years, which were found on the same nest as before or on a different nest in 1958-1960. With one exception nest trapping began in 1957.

TABLE 3  
RELATIVE SITE TENACITY OF THE BUFFLEHEAD, 1958-1960

Year	Birds caught	
	<i>in same nest as before</i>	<i>in another nest</i>
1958	3	3
1959	7	6
1960	13	3
	23	12

Actually, the proportion of birds moving is probably lower under natural conditions. In 1957 and 1958 techniques for the nest study were being developed, and much more disturbance of nests resulted in those years than in 1959. However, desertion during the 1957 and 1958 nesting seasons was no more frequent than in 1959.

#### SURVIVAL OF BUFFLEHEADS

It is worth noting that birds first trapped on the nest in 1957 were frequently recaptured in later years (see Table 2). Mortality rates calculated from shot recoveries (cf. Hickey, 1952) are impossibly high, exceeding even the most optimistic estimates of production, but the samples are too small to be satisfactory. Of eight females first trapped

on the nest in 1957, seven were alive in 1958, five in 1959, and four in 1960, a mortality rate of about 17 per cent. Smaller proportions of birds first handled in 1958 and 1959 have been recaptured in subsequent years, however, and much more data are needed before such mortality rates can be accepted as representative of that population.

#### MOVEMENTS OF BUFFLEHEADS

The most important study of the movements of female ducks dealt with the renesting of dabbling ducks (Sowls, 1955). For the Pintail (*Anas acuta*) Sowls measured movements between original nests and re-nests of the same bird in 15 cases; distances varied from 78 to 1,370 meters, and averaged 258 meters. For the Bufflehead only movements between the nests in successive years are known, but the results appear comparable to those found by Sowls. Table 2 includes data on 12 such movements. Three were of less than 100 meters, four of 100–300 meters, and three of 900–1,200 meters; two others involved movements between lakes, one of 450 meters, and one of five km. The average distance was 797 meters; since the chances of recapturing birds at distances of over two km. are so slight as to be negligible, the one such value is best omitted from the calculation, leaving an average of 428 meters. The data given here suggest that a renesting study on Bufflehead could provide much valuable data in a short time.

#### HOMING

As shown in Table 3, homing by the adult female Bufflehead is often very precise; 23 cases out of 35 cited involving returns to the precise nesting site used previously. Breeding females usually return to their natal lake. Of nine birds banded as flightless young and recaptured on nests two to nine years later, six were at the lakes where they were banded and two others at lakes within one km. of the banding lake; one bird was found nesting five km. away in the next valley. Three other birds banded by drive trapping were also recaptured on nests later, while three more were captured with broods in two consecutive years, all captures of each individual being at the same lake. As shown above, 18 females banded on nests were later captured on nests at the same lakes, while two others had moved to other lakes. The one record of a female (505–50120) having molted 155 km. from a later nesting area indicates that in Bufflehead, as in other species (cf. Hochbaum, 1955), molting may take place far from the breeding areas.

## HOMING TO MOLTING AREAS

The molting areas of the male Bufflehead in British Columbia are unknown, but some data are available for females. Fourteen females banded while molting and five banded as young were later taken as molting adults. Ten were recaptured on the same lake, and five others within five km. of the points of banding. The other four, including two banded as young, were recaptured between 25 and 65 km. away. A tendency to return to the same molting area is suggested.

## HOMING TO WINTERING AREAS

Considerable numbers of Buffleheads have been banded on wintering areas and later shot or recaptured in the same general area. Data from Oregon, New York, and Maryland are summarized in Table 4, all birds included having been recaptured or shot in subsequent winter seasons.

TABLE 4  
HOMING TO WINTERING AREAS

<i>Area</i>	<i>Sex</i>	<i>Recaptures (live)</i>	<i>Recoveries (shot)</i>		
			<i>under 15 km.</i>	<i>15-50 km.</i>	<i>50-80 km.</i>
Ore.	M	3	3		
	F	3	1	1	
N.Y.	M	24	11	3	3
	F	8	8	5	5
Md.	M	22	18		1
	F	4	4		1

For comparison, it may be worth mentioning that from New York bandings only six Buffleheads were recovered at localities more than 80 km. from the banding areas, during the months of December through March, and only one similarly from Maryland bandings.

Those data indicate that males as well as females are capable of homing to a precise locality, and males may well also home to breeding and molting areas (cf. Cartwright and Law, 1952).

## EVIDENCE AGAINST WINTER PAIRING OF BUFFLEHEADS

The most generally accepted hypothesis is that most pairing of waterfowl takes place on the wintering grounds (cf. Hochbaum, 1955), and that homing depends mainly upon the female. Banding data alone neither support nor refute that hypothesis.

One basis for the hypothesis is the repeated observation of courtship

among most species in such areas. However, it is known that courtship is also very common during migration and after birds arrive on the breeding areas. In the Bufflehead, courtship, including precopulatory displays, has been noted in wintering areas, but copulation has only been seen on the breeding grounds (Myres, 1959; Drury, verbal). This suggests that pairs are not consummated until the breeding grounds are reached, and further evidence suggests that frequently pair formation is also delayed.

Sex ratios of Buffleheads during spring migration in British Columbia provide evidence for migration of unpaired males. Such data are given in Table 5.

TABLE 5  
SEX RATIOS OF BUFFLEHEADS DURING MIGRATION

<i>Date(s)</i>	<i>No. adult males</i>	<i>No. females</i>	<i>Sex ratio (males/100 females)</i>	<i>Source of data</i>
	(a) early in migration (just after lakes became open)			
5-6 Apr. 1958	132	9	1466/100	The writer
10 Apr. 1959	149	22	677/100	Sugden, <i>in litt.</i>
	(b) later in migration (in 1959 about one week before the first eggs were laid)			
16-24 Apr. 1941	318	123	258/100	Munro, 1942
19 Apr. 1959	235	104	226/100	Sugden, <i>in litt.</i>

On 5-6 April 1958 flocks of 10-20 males were seen on several occasions unaccompanied by females, so even the possibility that several males may accompany one female (cf. Munro, 1942) does not cover the observations. The evidence presented suggests that many, if not most, male Buffleheads must commence migration before pairing.

In order to prove or disprove the homing tendency in male ducks, whether Buffleheads or other species, it will be necessary to develop methods for capturing the males on their territories. To date that problem has been generally ignored.

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#### SUMMARY

Female Buffleheads exhibit a tendency to home to their natal lake, often returning to the precise nest site used in previous years. Reuse of a given nest site may be prevented by its having become unusable, or disturbance during the previous nesting season may induce a move to another site. The homing tendency and the distance of moves between nests are similar to those established earlier for other species of ducks.

Female Buffleheads also tend to return to molting areas, while both sexes return to wintering grounds used in previous years. Evidence is presented to suggest that male Buffleheads may home to the breeding grounds, often independently of the female.

Banding male ducks on their territories seems the logical way to prove homing in drakes, but this is lacking for the Bufflehead and for other ducks.

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