

## THE OCCURRENCE OF UNUSED RING-BILLED GULL NESTS

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Bird nests are, with few exceptions, used solely for reproduction. However, male wrens (*Troglodytes aedon* and *T. troglodytes*) display and roost in nest-like structures called cock "nests" which they build in the vicinity of their active nests (Pettingill 1971). Tyrant flycatchers and woodpeckers construct refuge "nests" for roosting and shelter (Dorst 1974). Bobwhites (*Colinus virginianus*) build unused nests which probably represent structures or sites which are not suitable for the pair or they are associated with re-nesting or changes in suitable habitat (Stoddard 1936, Klimstra and Rosenberry 1975). Female Eastern Meadowlarks (*Sturnella magna*) commonly begin construction of several nests just before the female attains the sexual and physiological stage necessary for egg-laying (Saunders 1932, Rosenberry and Klimstra 1970). Tinbergen (1960) intimated a similar series of subliminal nesting drives to explain the existence of play "nests" of Herring Gulls (*Larus argentatus*). Harper (1971) reported similar structures in Western Gulls (*L. occidentalis*). Although the functional significance of unused nests is unknown in larids, they appear to represent repeated nest building activity which continues until an egg is laid (Tinbergen 1960, Harrington 1974).

During ecological studies of Ring-billed Gulls (*L. delawarensis*) I noticed that some mated individuals built nests that were not used subsequently for egg-laying. In this paper, I examine the frequency of these unused nests and their relationship to the hatching success of small groups of Ring-billed Gulls.

In 1972 and 1973 I studied Ring-billed Gulls at a colony of about 800 pairs on Granite Island (48° 43'N, 88° 29'W), Black Bay, northern Lake Superior. The island is a strongly undulating granite outcrop with a summit 30 m above the water. Soil and vegetation occur in depressions of the rock surface. Dominant plants in these depressions are Kentucky bluegrass (*Poa pratensis*), rough cinquefoil (*Potentilla norvegica*) and red raspberry (*Rubus strigosus*). Each spring Ring-billed Gulls nest in the depressions especially near the summit of the island, away from wave action and flooding. The small nesting groups in the depressions are easily separated visually into discrete units, based on habitat, within the colony.

I watched nest building activities in 11 depressions in 1972 and 16 in 1973. Hereafter I refer to the depressions as study areas. I limited my observations to areas with three or more pairs so that I could obtain a large enough sample for the study. Only six of the study areas contained three or more active nests in both 1972 and 1973. The remaining areas, five in 1972 and ten in 1973, contained three or more nests in only one of the two seasons.

In this paper I refer to and define the following terms: *nesting attempt* is any activity which results in the construction of a nest. An *active nest* is a successful nesting attempt that consists of a nest which contains one or more eggs. *Nest success* refers to the per cent of nests in which at least one egg hatches. *Hatching success* is the per cent of eggs which hatch from one or more nests. The

TABLE 1. Nesting attempts and per cent active nests of Ring-billed Gulls on Granite Island study areas, 1972 and 1973.

Study Area	Number of Nesting Attempts		Per Cent of Active Nests	
	1972	1973	1972	1973
1	—	4(2)**	—*	75.0(100.0)
2	6	—	83.3	—
3	7	—	57.1	—
4	7	—	57.1	—
5	—	7(1)	—	42.8(100.0)
6	8	6(6)	37.5	33.3(50.0)
7	4	2(6)	50.0	50.0(83.3)
8	—	5(5)	—	80.0(80.0)
9	—	13(2)	—	61.5(100.0)
10	5	9(1)	80.0	88.9(100.0)
11	6	—	83.3	—
12	3	—	100.0	—
13	15	13(7)	86.7	61.5(57.1)
14	20	13(1)	85.0	76.9(100.0)
15	7	8(4)	100.0	62.5(50.0)
16	—	21(10)	—	90.5(60.0)
17	—	18(1)	—	55.6(100.0)
18	—	10(0)	—	100.0(0)
19	—	2(8)	—	50.0(50.0)
20	—	5(0)	—	100.0(0)
21	—	3(1)	—	100.0(100.0)
Totals	88	139(55)		

\* Fewer than three active nests.

\*\* Pairs with one or more immature-plumaged birds (See Ryder 1975)

*median day of egg-laying* is the day on which 50 per cent of all pairs have begun their clutches (MacRoberts and MacRoberts 1972). An *adult pair* is one in which both individuals are in adult plumage (see Ludwig 1974, Ryder 1975). A *young pair* is one in which one or both members of a pair are in immature plumage (Ludwig 1974, Ryder 1975). Although precise ages cannot be determined in Ring-billed Gulls on the basis of plumage alone, I use the terms "adult" and "young" to designate subjectively relative age.

Table 1 shows the number of nesting attempts and per cent of active nests in 1972 and 1973. The number of pairs in each study area changed in the two seasons, suggesting that some individuals either did not return to Granite Island or they moved to other locations on the island. I do not have enough banded gulls to allow me to follow individuals but McNicholl (1975) stated that it is not uncommon for gulls in small groups to move annually with each other to more suitable nesting locations within a colony.

Table 1 includes young pairs in 1973. In that year I had the opportunity to separate pairs composed of two adult-plumaged gulls from those composed of one or more immature-plumaged birds (see Ryder 1975 for details of plumage differences). I saw no young gulls on the study area in 1972. The egg-laying period in 1972 started and peaked 3 weeks later than in 1973 (fig. 1). In the latter season, nest sites were probably at a premium and young gulls were probably driven away from nesting sites, similar to the experience of young California Gulls (*L. californicus*) noted by Johnston (1956).

In 1972, 24 per cent (21/88) of all nesting attempts resulted in nests in which no eggs were

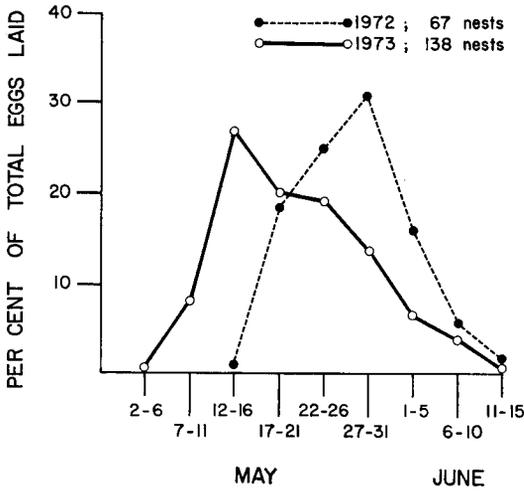


FIGURE 1. Frequency of egg-laying by Ring-billed Gulls on Granite Island, Lake Superior, 1972 and 1973.

subsequently laid. In 1973, 28 per cent (39/139) of all nesting attempts by adult pairs and 33 per cent (18/55) of nesting attempts by young pairs became unused nests.

TABLE 2. Active and unused nests by early- and late-nesting Ring-billed Gulls on Granite Island, 1972 and 1973.

	Early*		Late	
	Active Nests	Unused Nests	Active Nests	Unused Nests
<b>Adult Pairs</b>				
1972	26(86.7)**	4(13.3)	41(70.7)	17(29.3)
1973	78(78.2)	22(21.8)	22(56.4)	17(43.6)
<b>Young Pairs</b>				
1973	14(70.0)	6(30.0)	23(65.7)	12(34.3)

\* Early-starting nests are those started on or before the median day of egg-laying; 26 May 1972 and 21 May 1973.  
 \*\* Number in parentheses is per cent.

Adult pairs built twice as many nests which were unused if they started nest construction after the median date of egg-laying (table 2). In both seasons the per cent of active nests built by adult pairs was significantly correlated with the timing of egg-laying (fig. 2). This indicates that the earlier an adult pair started their nest, the greater was the chance of depositing eggs in that nest. I did not include the young pairs in the analysis in Figure 2 because the proportion of active nests built by young

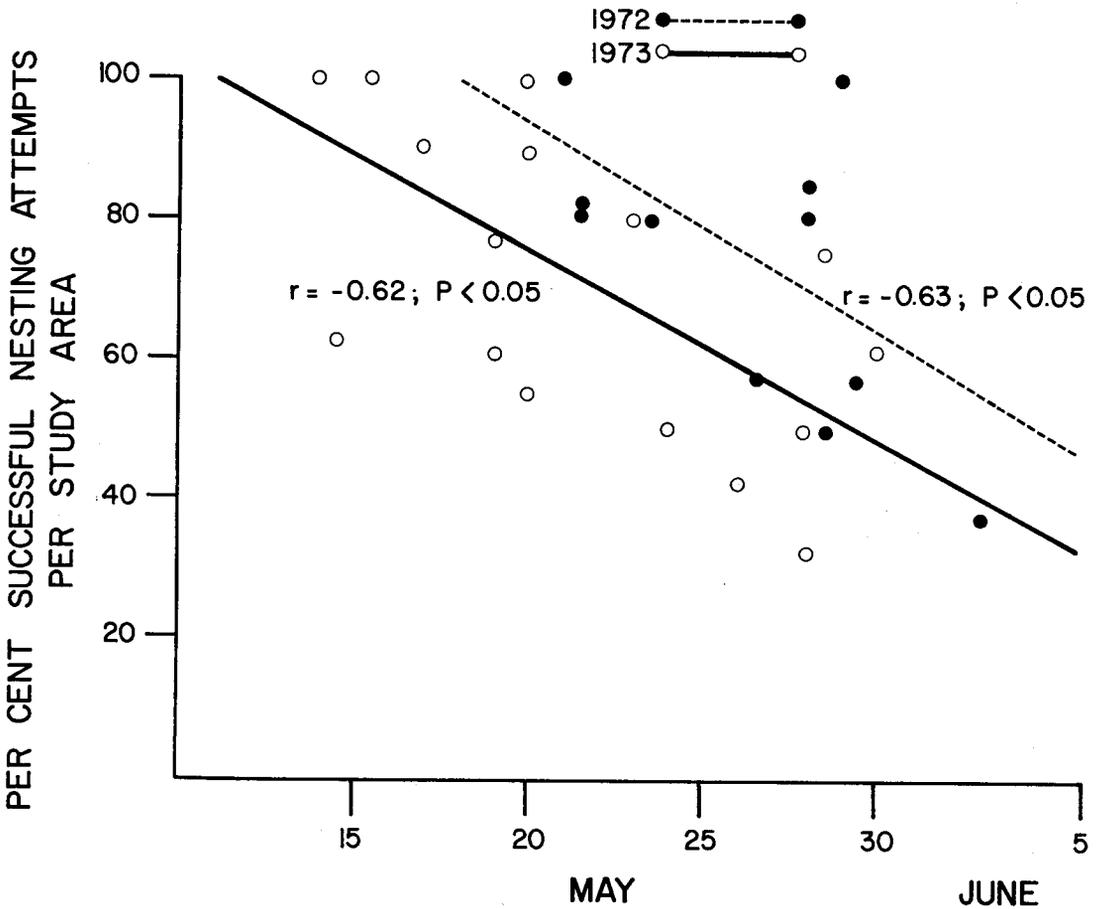


FIGURE 2. Per cent successful nesting attempts (= active nests) in relation to the median day of egg-laying in adult-plumaged Ring-billed Gulls, Granite Island, 1972 and 1973.

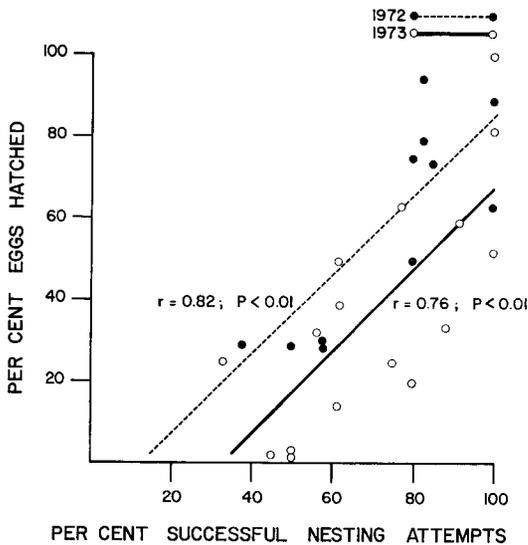


FIGURE 3. Per cent eggs hatched in relation to the proportion of successful nesting attempts by adult-plumaged Ring-billed Gulls, Granite Island, 1972 and 1973.

pairs did not change significantly with the season ( $r = 0.13$ ;  $P > 0.05$ ). Regardless of when a young pair started to nest, their chance of producing an active nest was about the same (see Table 2).

Figure 3 shows that earlier nests of adults hatched, on average, more eggs than later ones. This seasonal correlation did not hold for nests attended by young pairs ( $r = 0.29$ ;  $P > 0.05$ ). However, relatively more active nests of young pairs occurred in the study areas which had both proportionately fewer adult pairs and a median date of egg-laying after the median date for all study areas (table 3). Additionally, the later-starting nests experienced a lower nest and hatching success than nests of young pairs which started earlier in study areas where there were relatively more adult pairs.

The relatively lower proportion of unused nests by adult pairs near the beginning of the nesting period (table 2) indicates that the nest-building drive among these birds is either strong or confined to a single site. Ring-billed Gulls do not spend time constructing play "nests" as do young Herring Gulls (Tinbergen 1960) and Sooty Terns (*Sterna fuscata*; Harrington 1974). Austin (1940) reported that older terns (*S. hirundo*, *S. dougalli* and *S. paradisaea*) returned to colony sites before the younger birds and started nesting promptly, and

TABLE 3. Per cent and success of early- and late-starting nests attended by young Ring-billed Gulls on Granite Island, 1973.

	Early-starting* nests	Late-starting nests
Per Cent Young Pairs With Active Nests in Study Areas	15.2(14/92)	51.1(23/45)
Nest Success	28.6(4/14)	13.0(3/23)
Hatching Success	24.3(9/37)	14.1(9/64)

\* Same designation as in Table 2.

that even the younger birds who arrived with the older ones nested right away. Such behavior is typical of older, more experienced pairs who possibly have previously nested together in groups. Harrington (1974) stated that young Sooty Terns, during nest establishment make many nest scrapes similar to the unused nests of young Ring-billed Gulls in the earlier part of the season. Possibly the young gulls who nest early locate themselves or are accepted in the same regions in which they hatched and among some of the same pairs. If this is the case, then within study areas family groups may occur, as was implied by Austin (1940). If familial groupings exist in some of the study areas, this explains why the early-nesting young birds show a higher success than later-nesting birds. Older gulls possibly are not overtly aggressive to their young relatives and perhaps the young pairs, through social stimulation, are more attentive than later nesting members of similar age groups. The low seasonal correlation between the successful establishment of active nests and hatched eggs in young pairs, and the apparent relation between success of young birds and the proportion of adults in study areas suggest that the presence of adults increases the probability of success of young birds in hatching their eggs.

The occurrence of unused nests presents many interesting problems related to the social behavior and reproductive success of birds. In Ring-billed Gulls the frequency of these structures varies seasonally and with the apparent age and experience of the nesting pair.

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## FURTHER BIRD RECORDS FROM WESTERN MONTANA

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The following records add three species to the list of Montana birds, add three species and one subspecies to those known to occur west of the continental divide in the state, and extend the known breeding range of one species. Another record fully authenticates the occurrence within the state of another species previously known only from an unspecified specimen. All of these changes are based upon specimens in the University of Montana Zoological Museum (UMZM). One species must be dropped from the Montana list and another relegated to hypothetical status.

*Aythya marilla*. Greater Scaup. An immature female was shot by T. France 7 km west of Ronan, Lake County on 13 October 1975 (UMZM 15957). Although there are several sight records by experienced observers during fall, winter, and spring from various localities within the state, both the locality and the date of collection of the only previous specimen (Hoffmann and Hand 1962) were uncertain.

*Bucephala clangula*. Common Goldeneye. In late April of 1973, Calvin Pomrenke and Clark Smith discovered an active goldeneye nest in an artificial nest box on the Ravalli National Wildlife Refuge, Ravalli County. The incubating female was later killed by a mink and the skeleton and 8 of the 11 eggs in the clutch were recovered on 26 May. The skeleton proved to be that of *B. clangula* (UMZM 15661). This record extends the known breeding range of this species about 257 kilometers southward from near Fortine, Lincoln County, where it nests commonly (Weydemeyer 1973). Silloway (1901, 1903) described *B. clangula* as a common nesting duck in Lake and Flathead counties, but the 5 juvenile goldeneyes which he collected in 1900 and 1902 from these areas now in the UMZM are all *B. islandica*. It now seems likely that the goldeneye broods he reported with attending females were all Barrow's, which species is known to nest as far south in the Rockies as Colorado (AOU 1957).

*Buteo jamaicensis harlani*. Harlan's Red-tailed Hawk. A dark phase *Buteo* was recovered by Robert Cheeseman from a muskrat trap 2 km east of Florence, Ravalli County on 13 December 1968. John Aldrich (*in lit.*) examined color slides of the specimen (UMZM 13761) and agreed that it was

of this subspecies. Although *harlani* nests in northern British Columbia, it typically migrates east of the Rockies. There are several sight records from eastern and central Montana (Skaar *in lit.*), but this constitutes the first specimen from Montana and the first record from western Montana.

*Larus occidentalis*. Western Gull. Silloway (1903) reported a juvenile gull collected at the mouth of the Flathead River, Bigfork, Flathead County 29 August 1900 as "doubtfully" belonging to this species. Saunders (1921) repeated the record and indicated that he too believed this specimen (UMZM 5821) to be *L. occidentalis*. Although both feet and legs are now missing, the specimen is otherwise in good condition. Frank Richardson, at the University of Washington, recently compared it to known specimens of *L. occidentalis* and agreed with me that this bird is not *L. occidentalis*. Richardson believes the specimen to be that of *L. californicus* which was also collected by Silloway in 1900. Measurements of the wing and culmen correspond to those provided by Dwight (1925) for *L. californicus*. Because there is no other specimen of Western Gull from Montana and no convincing sight records, this species should be dropped from the list of Montana Birds.

*Otus flammeolus*. Flammulated Owl. In October 1971 the LeRoy Sargent family of Darby, Ravalli County picked up a live Flammulated Owl near the game farm at that town and brought it to William L. Jellison. The owl eventually died and Jellison prepared a study skin, which he donated to the Museum (UMZM 15231). The abundance of House Sparrows (*Passer domesticus*) at the game farm may have attracted the bird to this area. This west coast and southwestern species is rare in southern British Columbia (AOU 1957) and there are two records for Idaho (Burleigh 1972). Two previous sight records exist for Montana, (Skaar, *in lit.*) but this is the first specimen record for the state.

*Strix occidentalis*. Spotted Owl. Hoffmann, Hand, and Wright (1959) published a record of this species based on a monochrome photograph taken by Vernon Hawley at Anaconda Creek, Glacier National Park in the summer of 1953. The Barred Owl (*Strix varia*) now occurs regularly in several areas of the western part of Glacier National Park (Shea 1974), and has recently invaded southeastern British Columbia (Grant 1966). There are no convincing records of *S. occidentalis* during the past 20 years from western Montana. These facts prompted a re-study of the original photo and comparison with specimens of both species now in the UMZM collection. The photo shows a large owl with rounded