NEST DESERTION BY RUDDY DUCKS IN UTAH

By David E. Joyner

A number of factors may contribute to the loss of waterfowl nests: most notably, predation, the destruction of nests resulting from farming activities, and nest desertion due to flooding, receding water lines, and human disturbance. Bellrose (1976) noted that nest desertion accounts for 10-15% of the nest loss in Mallards (*Anas platyrhynchos*) and approximately 20% of that reported in the literature for Cinnamon Teal (*Anas cyanoptera*). Nesting Redheads (*Aythya americana*) and Canvasbacks (*Aythya valisineria*) invariably have high rates of nest desertion (Olsen, 1964; Lokemoen, 1966) often attributed to excessive rates of nest parasitism by the Redhead. In Ruddy Ducks (*Oxyura jamaicensis*), nest failure has been attributed to reduced maternal attentiveness, to the flooding of nests, and to dump-nesting (Williams and Marshall, 1937; Low, 1941). The purpose of this paper is to report on the occurrence of an abnormally high rate of nest desertion by Ruddy Ducks during the 1972-1974 nesting seasons at Farmington Bay Waterfowl Management Area (W.M.A.), Farmington, Utah.

STUDY AREA AND METHODS

Ruddy Duck nests were located at Farmington Bay W.M.A. during 1972-1974 by searching on foot approximately 350 ha of nesting cover within a 395 ha study area. Throughout March, April, and May of each year, segments of the 395 ha marsh bordering the Great Salt Lake were repeatedly flooded with saltwater. Natural inundation with saltwater eventually destroyed 53% of the emergent vegetation within the study area, leaving approximately 186 ha of emergent cover unaffected and available for the 1974 nesting season. Of the 209 ha of destroyed vegetation, 88% was inundated during the 1972-1973 seasons, and the remaining 25 ha of marsh was destroyed in April 1974. An undetermined amount of emergent vegetation bordering the study area was also destroyed by saltwater inundation. Emergent cover found growing within the study area during all three nesting seasons was, in descending order of abundance, alkali bulrush (*Scirpus paludosus*), saltgrass (*Distichlis stricta*), cattail (*Typha latifolia*), and hardstem bulrush (*Scirpus acutus*).

Ruddy Duck nests were categorized at the time of discovery as "active" (typical bowl-shaped nest as described by Bent, 1925: 153), "deserted" (both bowl-shaped and platform-shaped nests), or presently active but "destined-to-become-deserted" nests (see Identification of active and platform nests for descriptions). Nests were initially considered to be active if the hen was flushed from the nest site or the eggs were warm when found. Continued egg deposition, incubation, or the daily rotation of marked eggs (marked with a black marker) verified hen attendance. All nests, regardless of classification, were marked with flagging tape and with numbered flags placed 5 m from the nest. Nests were revisited twice weekly until nesting activities were terminated by abandonment, destruction, or hatching.

RESULTS AND DISCUSSION

Identification of active and platform nests. Deserted or destined-to-become-deserted platform nests were readily discerned from the presumably active (bowl-shaped) nests by examining each nest for three characteristics.

(1) Nest structure: Nests classified as active were well constructed and invariably made of dead residual vegetation from the previous year's growth, a trait also noted by Low (1941:512). Occasionally, living *Distichlis stricta* or *Scirpus paludosus* constituted a minor portion of the nest bowl, but in most instances, living emergent vegetation merely circumscribed the nest and provided protective cover for the incubating hen. Nest bowl dimensions complemented descriptions given by Low (1941:513). Deserted and destined-to-become-deserted platform nests, in contrast, consisted of nothing more than living emergent vegetation flattened into a platform-shaped structure similar to that described by Siegfried (1973). Occasionally, the nest was partially molded into a poorly constructed bowl by the hen during egg deposition; however, in most instances, the hen merely deposited her eggs on top of the flattened vegetation. Dead residual vegetation was seldom used in the construction of platform nests.

(2) Down: The presence of white down in active nests varied from trace amounts (10-15 feathers) to abundance (lined the nest bowl). As with other waterfowl (Weller, 1964:57), deposition of down occurred prior to or during early incubation. Some presumed active nests that were abandoned during egg-laying lacked down. Down was never found in deserted platform nests, thus suggesting that hens failed to deposit down during egg-laying or the feathers were not retained within the nest structure.

(3) Eggs and clutch size: Ruddy Duck eggs were readily stained during incubation, a condition not noted for eggs deposited in platform nests. Although eggs found in platform nests were occasionally covered with mud or superficially stained during nest flooding, those clutches were identifiable as such.

Egg placement also differed between active and platform nests. In active nests, eggs either were deposited in a single layer, or were stacked into two or more layers, only to be reshaped into a single layer by the hen during incubation. This occurrence has also been noted by Low (1941:509). Active nests, in which eggs were initially stacked in layers but were abandoned prior to or immediately after the initiation of incubation, retained the layered characteristic. Excess eggs in large successful clutches (> 12 eggs) were frequently pushed out of the nest or were buried in the nest material beneath the remainder of the clutch. Eggs stacked in layers were rarely found in platform nests, presumably because of the lack of support normally provided by the sides of a well-constructed nest. In addition, eggs in active nests were rotated, whereas those in platform nests were not.

I found a significant difference ($t = 2.03$, 148 *df*, $P < 0.05$) between the mean clutch size of 98 presumably active nests (9.7, SE ± 0.70) and 52 deserted platform nests (8.5, SE ± 0.07). Generally, 8 or 9 eggs are considered an average clutch size for Ruddy Ducks (Williams and Marshall, 1937; Low, 1941). However, I do not consider clutch size a valid predictor of nest status (active versus platform) because clutches in active nests ranged from 1-18 eggs, whereas those in platform nests ranged from 1-23 eggs. Excessively large (> 15 eggs) and small (< 4 eggs) clutches initially categorized as active were invariably abandoned, possibly as a result of excessive nest parasitism (which could not be verified other than as an after-the-fact occurrence) or, more likely, as a result of flooding, nest predation, and reduced maternal attentiveness (both large and small clutches).

Nest location and vegetation use. Nest location and the type of vegetation used by nesting hens were other characteristics originally considered at the initiation of this study; however, vegetational types were used equally by hens producing active nests and by those producing platform nests (Table 1). In addition, no obvious clumping of nest types (active versus platform) other than that resulting from the marked influence of water availability on nest placement was found to occur. In contrast to Low's (1941) findings, nest sites (primarily active nests) were not restricted to over-water

TABLE 1

Vegetation used by nesting Ruddy Ducks in Utah

Vegetation	Number of nests	
	Active	Platform
Scirpus paludosus	30 (31%)	20 (38%)
Distichlis stricta/Scirpus paludosus (mixed stand)	25 (26%)	11 (21%)
Distichlis stricta	23 (23%)	12 (23%)
Distichlis stricta/Typha latifolia (mixed stand)	6 (6%)	3 (6%)
Typha latifolia/Scirpus paludosus (mixed stand)	5 (5%)	3 (6%)
Typha latifolia	4 (4%)	3 (6%)
Scirpus acutus	5 (5%)	0
Totals	98 (100%)	52 (100%)

locations. I frequently found Ruddy Duck nests in dry *Distichlis stricta* stands with nothing more than a small muskrat channel (water depth ≦ 2.5 cm) leading from the nest to deeper water, a distance in some instances exceeding 200 m.

Nesting success. Data on nesting behavior were obtained while studying Ruddy Duck interspecific nest parasitism (Joyner, 1976); subsequently, 150 of the previously reported 165 Ruddy Duck nests were used in this analysis.

Of the 150 Ruddy Duck nests (1,371 eggs) found, 98 (65.3%) were categorized as active at the time of discovery (Table 2). Of the 98 nests, 31 (31.6%) contained 12 or more eggs per nest and may have been the product of two or more hens. This uncertainty originates from the lack of a characteristic or determinate clutch size for Ruddy Ducks (Cole, 1917) and from the occurrence of intraspecific nest parasitism (Low, 1941). The remaining 52 nests (34.7%) were classified at the time of discovery as either deserted platform nests, or presently active but destined-to-become-deserted platform nests. Only 9 (17.3%) of these nests contained 12 or more eggs, suggesting, but not proving, that the remaining 43 nests could have been produced by single hens.

TABLE 2

Ruddy Duck nest and egg success in Utah, 1972–1974[1]

	Active nests	Platform nests	Total
Nests			
Number	98	52	150
Successful	47 (48%)	0	47 (31%)
Abandoned	37 (38%)	49 (94%)	86 (57%)
Destroyed	14 (14%)	3 (6%)	17 (11%)
Eggs			
Number	947	424	1,371
Hatched	335 (35%)	0	335 (24%)
Abandoned	337 (36%)	401 (95%)	738 (54%)
Unhatched eggs in successful nests	137 (14%)	0	137 (10%)
Destroyed	138 (15%)	23 (5%)	161 (12%)

[1]Total sample size, mean clutch size, and overall hatching success reported elsewhere (Joyner, 1976).

Egg losses attributed solely to the formation of platform nests totalled 401 eggs, or 29% of all Ruddy Duck eggs found in Ruddy Duck nests during the three-year period. Ruddy Duck eggs found in the nests of other species (interspecific nest parasitism) or lying singly on the ground were not included in the total. An additional 337 eggs were found in 37 abandoned nests initially classified as active. Of these 37 nests, 13 had been flooded, 17 were deserted as a result of receding water lines, and 7 were abandoned for unknown reasons (most likely due to my activities). The desertion of platform nests appeared to precede nest flooding and receding water lines in most instances.

The construction of platform nests was most evident during 1972 when flooding first became extensive. In 1973, much of the remaining 209 ha of emergent cover was flooded and eventually destroyed. As a result, 1973 nest counts (both active and platform nests) were substantially lower than those of 1972. In 1974 only 186 ha of emergent cover remained within the study area, most of which was not readily used by nesting Ruddy Ducks. Platform nest construction appeared minimal. During the 1973-1974 nesting seasons, Ruddy Ducks did not respond to the reduction in available nesting cover by moving onto and nesting within unaffected segments of marsh, but rather, remained in the flooded areas and apparently made no attempt to nest.

Ruddy Ducks are generally noted for having exceptionally high rates of nest success. Bellrose (1976:472), for example, indicated an average success rate of 69.9% for 356 Ruddy Duck nests reported in the literature. Of the 86 nest failures reported, 60% was caused by desertion; the reasons for the high rate of desertion were reported unknown. The nest success rate observed at Farmington Bay W.M.A. during 1972-1974 was markedly less than that summarized by Bellrose, with 31% of 150 Ruddy Duck nests successful.

My findings, when compared with those of earlier investigators, suggest that the 57% desertion rate observed at Farmington Bay W.M.A. was abnormally high, primarily resulting from the desertion of 49 of 52 platform nests (3 platform nests were destroyed by predators prior to my discovery). Accordingly, I suggest that the formation of platform nests was stimulated, in part, by the rapid deterioration and loss of suitable nesting cover augmented by drastic fluctuations in water levels during March, April, and May 1972-1974. Thus, it appears that some hen Ruddy Ducks responded to the loss of suitable nesting cover and to fluctuating water levels by producing poorly constructed nests into which eggs were "dumped" and then abandoned prior to incubation. Hochbaum (1944:41) also noted the use of poorly-constructed nests by Ruddy Ducks for the deposition of "unwanted eggs." Therefore, I conclude that Ruddy Ducks may respond to the loss of nesting habitat and to concurrent fluctuations in water levels by (1) abandoning active nests, (2) building up the base of their nests so as to compensate for rising water levels (Bellrose, 1976: 472), (3) increasing rates of intraspecific and interspecific nest parasitism (Low, 1941), (4) and by producing platform nests into which are deposited "unwanted eggs."

SUMMARY

Of 150 Ruddy Duck nests found at Farmington Bay W.M.A. during 1972-1974, 98 nests (65.3%) were considered to have been active (bowl-shaped nest with eggs being deposited or under incubation) at the time of discovery. The remaining 52 nests (34.7%) were classified as either deserted platform-shaped nests or platform-shaped nests into which eggs were currently being deposited. Nesting success was 31%. Platform nests averaged

smaller clutch sizes than active nests, lacked down, and were poorly constructed. Platform nests were invariably constructed of living vegetation rather than from dead residual vegetation typical of active bowl-shaped nests. It was hypothesized that the formation of platform nests by Ruddy Ducks resulted in response to rapid fluctuations in water depth and to the rapid deterioration and loss of suitable nesting cover.

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