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FACTORS AFFECTING NESTING SUCCESS OF THE CANVASBACK IN THE ASPEN PARKLANDS

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Description of Study Area

The Minnedosa study area is located in the southwestern portion of Manitoba just south of the town of Minnedosa. It is 90 square miles in size and roughly square in shape. The Aspen Parkland, in which the study area is located, is characterized by gently rolling terrain and black soils. Mixed farming is the rule with emphasis on small grain production consisting of wheat, barley, and oats. Roughly 50 percent of the water areas in the parkland are ringed with aspen, Populus tremuloides, and large blocks of aspen are interspersed throughout the area. The Minnedosa area differs because of more intensive farming practices which have reduced many of the aspen stands to small islands or "bluffs," or to trees ringing the shorelines.

During the canvasback nesting seasons of 1961-65, the number of ponds per square mile averaged about 60, but some sections contained as many as 120 ponds. Average pond size was 1.1 acres. About 15 percent of the water areas had one-third or more of the shoreline covered by aspen and willows with some burr oak, chokecherry, and pin cherry. Whitetop, Scholochloa festucacea, was the most abundant emergent aquatic and usually made up about 40 percent of the emergent cover on the area.

Because the study area is square in shape, most of the intensive survey work was done along transects which intersect the area on nearly every section line. Breeding pair data, brood data and vegetative data were collected on one-fourth mile wide transects totaling 20 square miles. In addition three sections were beat-out each year to provide data comparable with transect data. Nest hunting was also done on the beat-out sections and on other areas both on and adjacent to the roadside transects. Some nest hunting was done in the area between Minnedosa and Shoal Lake, Manitoba, in order to provide comparative data. Shoal Lake is approximately 40 miles west of Minnedosa. The study period included approximately the months of May, June and July each year, with occa-

sional work in April and August during years when the breeding season began earlier than usual or extended later than normal.

Habitat Types

When the canvasbacks started to nest in early May only a small portion of the previous season's growth of whitetop remained standing and the new growth was just showing above the water. Therefore cattail, Typha latifolia, and hard-stemmed bulrush, Scirpus acutus, provided the main over-water nesting cover. Cattail cover was approximately twice as abundant as bulrush. In some years flooded willows provided important nesting habitat.

Slide 1:

The canvasbacks usually arrived on the area about April 20. At that time the ponds most heavily used by breeding pairs or flocked birds were those areas over one-half acre in size, with a depth of 2 to 3 feet and with less than one-third of their surfaces covered by emergent vegetation. These are the more permanent ponds.

Slide 2:

Soon after arriving on the breeding grounds, the hens began to search for nesting sites on the smaller ponds, most of which were less than one acre in size. Heaviest use was of ponds less than one-half acre in size. Often the drake could be observed on the open water of a pond while the hen was swimming in the heavy cover searching for a nest site. Cattail and bulrush were equally important as nesting cover. Cattail was used more during the early part of the season; while in late May and June nesting emphasis was shifted to bulrush, and to some extent to new stands of whitetop which by mid-June were luxuriant and rank. In contrast to the ponds used by breeding pairs, nesting ponds were not only smaller but were often almost completely filled with emergent vegetation. Wooded ponds were used more heavily than ponds with open shorelines, but this was due to the fact that many of the open ponds were temporary in nature and occurred in open fields containing little or no nesting cover.

Slide 3:

Usually a hen canvasback moved her brood off the small nesting pond within a few hours after hatching. Brood use was heaviest on permanent ponds from one-half to 10 acres in size with depths of two feet or more. As with breeding pairs, hens with broods preferred ponds with less than one-third of their surface covered by emergent vegetation and preferred ponds with open shorelines.

Slide 4:

Brood ponds and breeding pair ponds were usually somewhat similar in respect to size, depth, and type of emergent vegetation. Climatic extremes and changing habitat are common on the prairies, and it is important that we evaluate their effects on waterfowl breeding and production. Lower water levels in the fall of 1964 permitted land owners to burn stands of cattail and bulrush, which are prime nesting habitat for the canvasback. Although plenty of nesting cover was still available in the spring of 1965, the acreage of cover was materially reduced and this may have resulted in increased predation and increased nest parasitism by the redhead. A wet, cold period during May 23-26, 1965 also adversely affected nesting success.

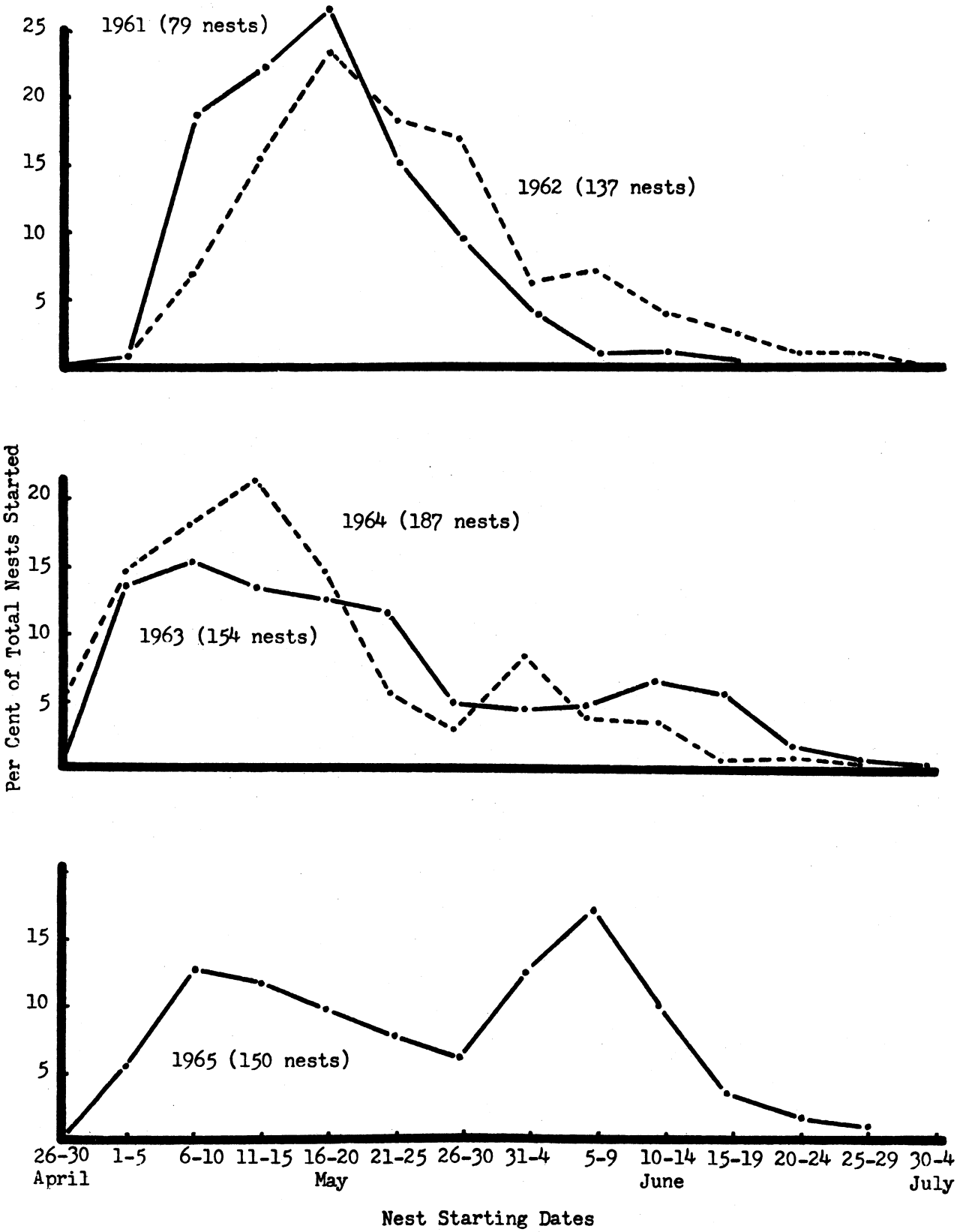
Nesting Chronology and Renesting

Figure 1 (Slide 5) illustrates nesting chronology for the canvasback over the five-year study period. The nests in the latter half of each of those nest-initiation curves consisted mainly of renests as evidenced by (i) clutch size, (ii) the fact that no late influx of birds was noted in the area, and (iii) the fact that lone drake-pair ratios indicated that most of the females started to nest prior to May 23.

Slide 5:

The canvasback usually is considered an infrequent renester, but evidence collected in 1965 shows that under certain conditions the species can exhibit a strong propensity to renest. The graphs in Figure 1 show little or no renesting effort in 1961 and 1962, a small amount of renesting in 1963 and 1964, and a very strong effort in 1965. Nesting success from uncorrected nest data was 32 percent in 1961, 51 percent in 1962, 45 per-

Figure 1. - CHRONOLOGY OF ACTIVE CANVASBACK NESTS



cent in 1963, 57 percent in 1964 and 33 percent in 1965. The data were adjusted for renesting in 1963, 1964, and 1965 raising the total nesting success to 60 percent, 70 percent and 37 percent respectively.

Some explanation of these graphs is in order. In 1961, predation on the first nesting effort was very high. This was partially due to rapidly receding water levels which dropped at the rate of one-third of an inch per day. As a result, predation by skunks on stranded nests was much higher than during any other year of study. Because of the dry weather and receding water levels very little renesting occurred and nesting success for the season was poor (32%).

In 1962, the peak of the first nesting effort was quite late. This fact coupled with a fairly high nesting success (51%) apparently precluded any strong renesting effort that year, even though water levels were quite stable and cool weather prevailed.

In both 1963 and 1964, nesting success of the first nesting effort was fairly high but the peak of nest initiation was early. This fact, together with favorable weather conditions, stimulated some renesting effort but this was limited by the good initial success.

In 1965, canvasback hens got off to a good start with a strong early nesting effort but disaster occurred between May 23 and May 26 when rain, snow, and cold temperatures with drifting snow caused wholesale desertion of nests. These desertions plus the normal loss to the raccoon almost wiped out production from the first nesting effort. Although we had 78 nests under observation as of May 26 only 7 hatched, for a low success rate of 9 percent. This heavy loss at an early date, followed by cool weather and fairly stable water levels apparently stimulated a very strong renesting effort. This renesting effort, calculated from beat-out census data to involve close to 70 percent of the pairs was an unprecedented high for the study. Incubation had just started for about 50 percent of the nests of the first nesting effort at the time of desertion or destruction and about 20 percent had been incubated one week or more. So apparently some of the renesting effort was by hens which had lost their first nest during the incubation period.

Causes of Nest Loss

The raccoon was the chief predator every year of the study and accounted for 44 to 53 percent of the total number of nests destroyed annually. Other important causes of nest destruction were the common skunk which accounted for 31% of the losses in 1961, and flooding which accounted for 22% of the losses in 1963, and 20% in 1965.

Without question, the raccoon has become the most serious predator in the Minnedosa area in recent years. Ten or fifteen years ago the raccoon was almost unknown in the Minnedosa area when studies by Dzubin (1955), Kiel (1949), Hawkins (1950) and others indicated 70 to 90 percent nesting success for the canvasback. The raccoon is still somewhat limited to areas adjacent to the main drainages in southern Manitoba but is spreading rapidly to other areas. For example, canvasback nesting success was 84 and 80 percent during the past two seasons on the Redvers study area in southeastern Saskatchewan where the raccoon is just beginning to invade. The Newdale-Shoal Lake area of Manitoba is only 20 to 40 miles from Minnedosa yet canvasback nesting success in 1965 was 87 percent there compared to 37 percent at Minnedosa. There was less nest desertion in the Shoal Lake area in 1965, but the main reason for higher success was the apparently lower population of raccoon. No canvasback nest is immune to predation by the raccoon no matter how deep the water at the nest site. Raccoon predation on over-water nests might not be compensable by any other predator, so control of this predator in canvasback nesting habitat might increase production appreciably, especially during years when water levels are low.

Habitat and Nesting Success

In order to assess its relation to nesting success, the habitat of each nesting pond and nest site was studied.

Slide 6:

According to our data, canvasback hens preferred ponds less than one acre in size for nesting. Each year nesting success was somewhat above average in these ponds.

This preference for small ponds may be a defensive mechanism against redhead parasitism. As the season progressed, use of the larger ponds

increased. Water depth at the nest site seemed to have little effect on nesting success except during years of below-normal precipitation when some nests were left stranded on dry ground before hatching. When this happened, the bulky, ill-concealed canvasback nests became extremely vulnerable to land-roving predators. All of the nests found during this study were built over the water in emergent vegetation at the time the nest was started.

Slide 7:

There was no evidence that nesting success was related to the distance of the nest from shore. The successful nests were, on the average, only one foot farther from land than the nests which failed.

At nesting time most of the cropland in the Minnedosa area has either been plowed or is in the process of being plowed or disced. Pasture-land is about equally divided between open grassland and woodland pasture. Many nests were located in ponds between roads and fields and, because the land on three sides of these ponds is unused, they were considered to be in the ungrazed grassland land-use type.

Slide 8:

In general, canvasback nesting success was well above average on ponds located in grain crops, grassland pasture and ungrazed grass-land. Nests in ponds located in stubble, plowed fields, and wooded pasture were consistently less successful. Proximity of the nest to cover which is usually inhabited by raccoons, was probably more important as a factor affecting nesting success than the type of land use surrounding the pond.

Canvasback preferred cattail and hard-stemmed bulrush over all other cover types with the exception of flooded willows. It is believed that willows are used mainly in areas where other emergent vegeta-tion is absent or scarce.

Slide 9:

There did not appear to be any great difference in nesting success in the various cover types, with the exception of willows where success was lower than average. Nests in ponds with more than two-thirds of

their shoreline covered by woody vegetation were somewhat more vulnerable to predation. These areas are, of course, commonly frequented by raccoons.

Clutch Size

Clutch data was based on full clutches from about 100 nests each year. The average number of canvasback eggs per clutch was 7.42 in 1961, 7.71 in 1962, 7.18 in 1963, 7.69 in 1964, and 7.93 in 1965. In 1965 there was an excellent opportunity to compare clutch size from the first nesting effort (9.16 eggs per nest) with that from the second effort (7.41). The difference in average clutch size of 1.75 eggs per nest illustrates one reason why production from a second or renesting effort can never equal that of a highly successful first nesting effort. It is also interesting to note that the number of redhead eggs found in canvasback nests in 1965 averaged 1.30 for the first nesting effort and 2.74 for the renesting effort.

Parasitism by the Redhead Duck

Parasitism by the redhead has been described in detail by Erickson (1948), Weller (1959), and Olson (1964).

Slide 10:

During this study at Minnedosa we found that both the redhead population and the number of parasitized canvasback nests have increased in recent years as follows:

	1962	1963	1964	1965
Redhead pairs per square mile	1.5	2.5	4.1	5.1
Percent of canvasback nests parasitized	53.0	64.0	61.0	72.0
Redhead eggs hatched per canvasback nest	.44	.62	.83	1.10

On the same 80 miles of roadside transects the canvasback breeding pair population averaged 7.0 per square mile in 1962, 9.8 in 1963, 10.1 in 1964, and 10.5 in 1965. It is an interesting conjecture as to whether the canvasback in that area have reached a saturation point or whether increased redhead parasitism has hindered canvasback production.

Summary

During 1961-1965 the main factors limiting canvasback nesting success in the Minnedosa area were: predation by the raccoon, seasonal flooding of nests; seasonal drouth which resulted in increased predation by land predators, and parasitism by the redhead duck. The raccoon was by far the most serious factor and probably could be eliminated by some type of practical control such as the use of reproductive inhibitors. In one way the time is right for such a program because local opinion has become aroused against the raccoon for its raids on grain bins and poultry flocks. Parasitism by the redhead duck might also be alleviated by relaxing hunting restrictions on this species in areas where the two species compete for breeding habitat, though the advisability of resorting to this expedient might be questioned.

A major drouth, such as occurred during 1959-1961 is an even more serious threat to nesting success. During this period over-the-water nesting habitat was completely eliminated from vast areas of the canvasback range, but luckily such a drouth has not occurred but once in the last 30 years.

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