MORTALITY OF DIVING DUCKS ON LAKE WINNIPEGOSIS THROUGH COMMERCIAL FISHING

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Introduction

Redhead (*Aythya americana*) and Canvasback (*A. valisineria*) populations in North America have been so precariously low that both the Canadian and United States governments afforded these species complete protection during the 1962 and 1963 waterfowl hunting seasons. These two species, along with several other species of diving ducks, have received varying degrees of special protection during the past 30 years. All of such regulations were designed to reduce losses from hunting. Although much is known regarding waterfowl losses through hunting, little is known regarding the types and magnitudes of nonhunting mortalities. This paper appraises the mortality of diving ducks and other birds in nets used for commercial fishing in summer on Lake Winnipegosis, and it makes recommendations for waterfowl management based upon this study and long-term information of waterfowl concentrations in the area.

Accidental and intentional netting of waterfowl has long been known to exist in North America. One of the earliest accounts of netting waterfowl is found in the Relation of the mission of St. Francois Xavier (Anonymous, 1899, p. 121). In the Relation of 1671-72, on Green Bay, Wisconsin, the following observation was made: "Of this practice [netting ducks] the Savages are the inventor; for perceiving that Ducks, Teal, and other Birds of that kind dive into the water in quest of the grains of wild rice [which are] to be found there toward the Autumn season, they stretch nets for them with such skill that, without counting the fish, they sometimes catch in one night as many as a hundred wild fowl." During later years market hunters would set gill-nets for Canvasback (Grinnell, *et al.*, 1918; Phillips, 1925). Ellarson (1956) reviewed much of the literature on diving duck mortality through commercial fishing and reported his findings on 9,215 ducks caught in nets on Lake Michigan. William F. Nichols (*in. litt.*) reported 1,904 and 2,320 ducks (mostly divers) being caught in trammel-nets on the Mississippi flyway during the winter and spring of 1960-61 and 1961-62, respectively. My review of the literature has not revealed any reports of diving duck losses through netting during the summer months.

Observations

I first became aware of the net mortality among diving ducks on Lake Winnipegosis on August 6, 1961, when George W. Cornwell and I were crossing Long Island (Waterhen) Bay (Figure 1). We found a dead Redhead drifting and entangled in a fragment of gill-net. Because several floats were still attached, I assumed that the net had been torn loose during a storm. In 1962, for the purpose of a waterfowl food-habits study, I obtained 14 diving

ducks that were caught in a single haul of a net sometime late in August by Mike Magnusson, Bev S. Johnson, and Orville Belinducke, all of Winnipegosis. This group of flightless birds consisted of 13 Redheads and one Common Goldeneye (*Bucephala clangula*).

During the summer of 1963, I asked the managers of the only three fish-processing stations operating on the southern half of Lake Winnipegosis to have their fishermen cut off and save one wing from each bird caught in their nets. Only 128 wings were collected in this manner; but through casual observations during two visits to the processing stations, 11 additional birds were observed either aboard the boats or being carried home by fishermen. The last collection of wings was made during the end of the sixth week of the nine-week fishing season which opened on July 23.

From 1961 to 1963, observations were made on 154 birds, representing eight species, that were caught in gill-nets on Lake Winnipegosis (Table 1).

TABLE 1.—Observations on 154 birds caught in gill-nets by commercial fishermen on Lake Winnipegosis

Species	Number of Birds		
	Adult	Juvenile	Total
Redhead	63	2	65
Western Grebe	28	17	45
Horned Grebe	11	3	14
Common Loon	10	—	10
Red-necked Grebe	9	—	9
Canvasback	3	3	6
Common Goldeneye	3	1	4
American Widgeon	—	1	1

The species netted included: Redhead, Canvasback, Common Goldeneye, American Widgeon (*Anas americana*), Western Grebe (*Aechmophorus occidentalis*), Red-necked Grebe (*Podiceps grisegena*), Horned Grebe (*P. auritus*), and Common Loon (*Gavia immer*). Anseriformes accounted for 49 per cent of these netted birds; the Podicipediformes and Gaviiformes, 44 and 6 per cent, respectively. The Redhead (42 per cent) and the Western Grebe (29 per cent) occurred most frequently.

Seventeen of the netted Western Grebes and three of the Horned Grebes were juveniles. There appeared to be no juvenile mortality in the Red-necked Grebe and Common Loon.

Only seven out of 76 waterfowl netted were juvenile birds; and only two of these were Redheads. Sex ratios among the adult waterfowl were as follows: Redhead, 51 ♂♂ : 12 ♀♀; Canvasback, 2 ♂♂ : 1 ♀♀; Common Goldeneye, 0 ♂♂ : 3 ♀♀. All of the adult waterfowl netted, except for a female Canvasback with a brood of three ducklings, were in the flightless stage of their molt.

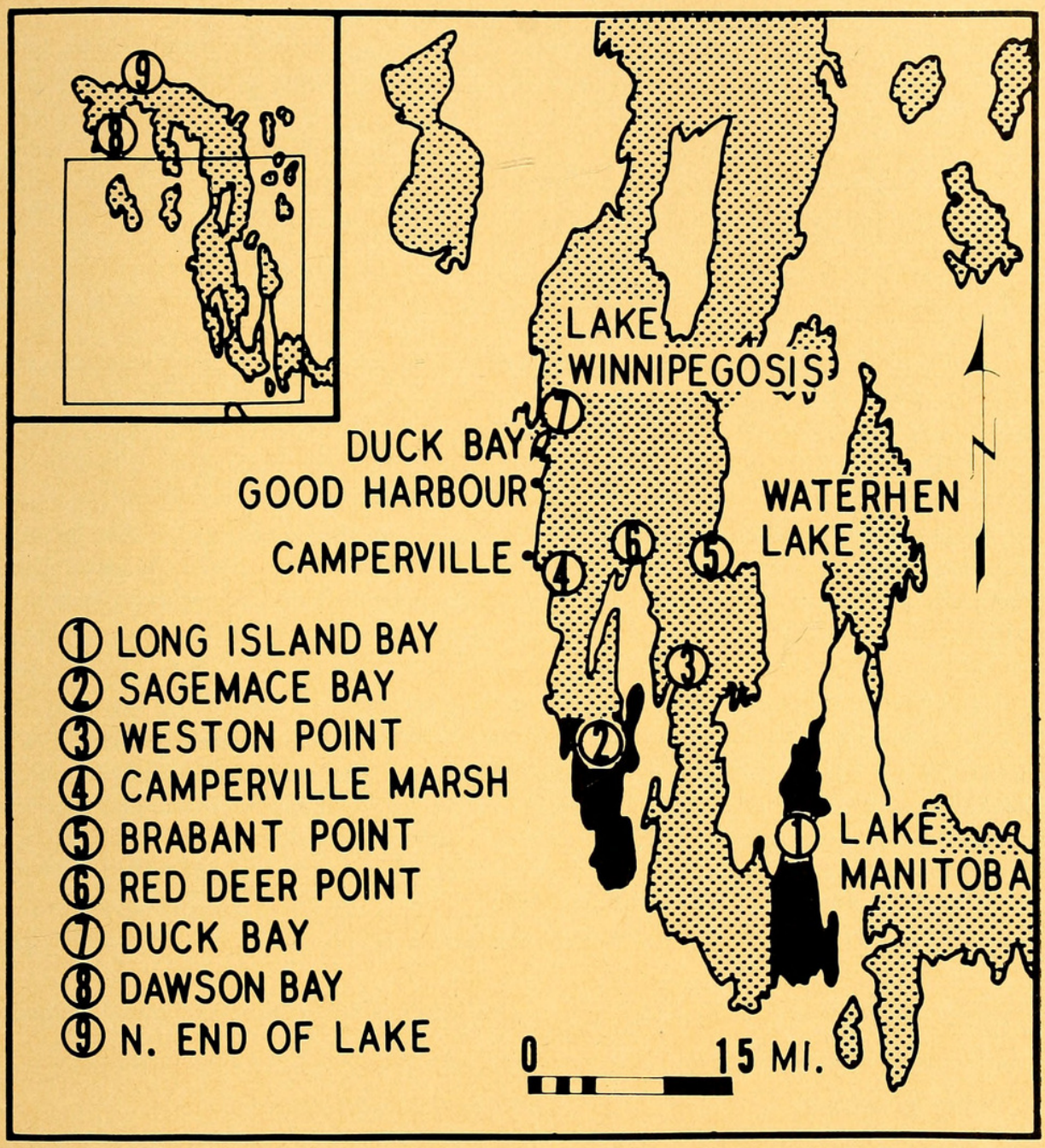

FIGURE 1. A map of southern Lake Winnipegosis showing locations of fish-processing stations, areas included in Ducks Unlimited aerial surveys (numbered circles), and locations of high summertime diving duck concentrations (in solid black).

The magnitude of diving bird losses in the southern half of Lake Winnipegosis attributable to commercial fishing can be estimated by an extrapolation of information obtained by questioning the local fishermen. In personal interviews, most fishermen said that from 15 to 30 ducks and 100 "divers" (grebes) and loons were caught per boat during a season. Of the five fish-processing stations on Lake Winnipegosis, two are located at Dawson Bay in the northern half, and the other three are in the southern half. During the 1963 season, 30 boats were operating out of the southern processing stations

located at Good Harbour, Duck Bay, and Camperville (Figure 1). If the fishermen's estimates were correct then approximately 450 to 900 ducks and 3,000 grebes and loons are netted annually by the southern group of fishermen. These estimates may be low, because one fisherman cited an example when three boats caught approximately 120 Redheads in a single haul of their nets. Another fisherman reported catching up to 50 Redheads a day for nearly two weeks; this period apparently coincided with the peak period of molting for Redheads.

DISCUSSION

The 1963 commercial fishing season on Lake Winnipegosis opened on July 23, and ran for nine consecutive weeks. Each license holder was permitted 20,000 pounds of yellow pike-perch (*Stizostedion vitreum*) plus an unlimited poundage of any other species of fish. All fishermen used gill-nets in the relatively shallow (20 foot mean depth) waters of Lake Winnipegosis.

Adult male Redheads were more frequently netted than any other group of waterfowl. Except possibly for botulism outbreaks on molting lakes, this relatively large loss to the adult male diving-duck population represents a unique situation. Generally, the only summertime mortality reported for waterfowl is that of nesting females or juvenile birds.

The large netting of Redheads (87 per cent) reflects their high concentration in areas used for fishing. On August 5, 1961 and August 24, 1962, respectively, I counted 7,530 and 2,002 diving ducks on aerial surveys over southern Lake Winnipegosis. On both occasions the Redheads were estimated to comprise 99 per cent of those counted. At approximately three-week intervals from May 23, 1963 to September 3, 1963, I made aerial counts of diving ducks over the same portions of the lake covered in the two previous years (Table 2). These counts were supplemented by a flight made by E. F. Bossenmaier, H. A. Hochbaum, and Peter Ward on September 19, 1963, during which only Canvasback were recorded (*in litt.*). These observations on southern Lake Winnipegosis indicated a build-up in Redhead numbers during the molting season in July and August and a subsequent decline during September.

TABLE 2.—Diving ducks on southern Lake Winnipegosis as observed during aerial surveys conducted in 1963

Observations on Waterfowl	Date of Aerial Survey						
	22 May	13 Jun	6 Jul	29 Jul	13 Aug	3 Sep	19 Sep*
No. diving ducks	1,972	1,027	14,111	26,453	15,260	1,076	10,005*
Percent Redhead	19	12	99	99	99	48	
Percent Canvasback	23	58	1	1	1	52	
Percent other divers	58	30	—	—	—	—	

*Aerial survey made by E. F. Bossenmaier, H. A. Hochbaum, and Peter Ward; this number represents only Canvasback and no other species of waterfowl.

The numbers of Canvasbacks remained relatively low throughout the summer, but they increased noticeably during September. The nine-week fishing season spanned both periods when peak numbers of Redhead and Canvasback were found. If wing collections had been made after the first week in September it is probable that more Canvasback would have been found among the birds netted later in the season.

In spite of relatively large numbers of dabbling ducks and coots found in the same waters with the diving ducks, only one dabbling duck, a juvenile widgeon, was found in the nets. This can undoubtedly be explained by differences in feeding habits of the two groups of birds. Eleven of the adult Redheads were found to be feeding almost exclusively upon the winter buds of a pondweed (*Potamogeton* sp.); some pondweed and bulrush (*Scirpus* sp.) seeds, along with a few snails (Gastropoda), were found in smaller quantities. An adult female Canvasback, with what appeared to be her brood of three ducklings, had been feeding mainly upon mayfly (Ephemeroptera) nymphs and midge (Chironomidae) larvae. Apparently the diets of Redhead and Canvasback found on the lake changes from summer to fall. Of 17 diving ducks collected on the lake in mid-October, nine Redheads had fed exclusively upon muskgrass (*Chara* sp.); while eight Canvasbacks had fed primarily upon pondweed tubers and seeds.

Ducks Unlimited gave me data from mid-August to early-September aerial surveys of waterfowl concentrations during 1938-58. These data present subjective appraisals of the combined numbers of Redhead and Canvasback for each of eight locations designated on the lake as shown in Figure 1 (Table 3).

TABLE 3.—Number of years in which various sizes of Redhead and Canvasback concentrations have been observed on parts of Lake Winnipegosis during Ducks Unlimited's aerial surveys conducted in late August and early September, 1938-58

Location	Number of Years			
	Observations Taken	Concentrations Observed		
		Large	Medium	Small
Long Island Bay	13	2	3	3
Sagemace Bay	13	3	2	—
Weston Point	1	—	1	—
Camperville Marsh	2	—	1	—
Brabant Point	1	1	—	—
Red Deer Point	3	—	1	—
Duck Bay	12	1	1	—
North end of Lake Winnipegosis	11	—	1	1

They suggest that Long Island Bay and the southern half of Sagemace Bay are frequent sites of diving duck concentrations; my three years' experience confirm this. Long Island Bay appears to have large concentrations earlier in the summer than Sagemace Bay.

Of those birds caught in nets, probably only the loon goes unutilized. From interviews with fishermen and personal observations, I am of the opinion

that all ducks, both adult and juvenile, and most grebes are used for food either by the fishermen or other residents of the fishing villages.

Commercial fishing is apparently the main source of income in the vicinity of Duck Bay, Good Harbour, and Camperville; and it is, therefore, vital to the livelihood of these people. Considering the economic importance of fishing and that, by and large, only the adult male segment of the waterfowl population is affected, I would suggest that normally no prohibitive regulation should be imposed upon the fishermen. However, should circumstances of reduced continental populations coupled with the increased local concentrations of diving birds warrant additional protection the lower half of Sagemace Bay and all of Long Island Bay might be closed to fishing. These areas are delineated in black on Figure 1. The long-term aerial surveys of the lake indicate that large concentrations of diving ducks are infrequently found other than in these two locations; therefore, lake-wide fishing restrictions are not warranted.

ACKNOWLEDGMENTS

I wish to acknowledge the financial support received from the North American Wildlife Foundation, operating through the Delta Waterfowl Research Station, and the University of Wisconsin during this investigation. I also wish to thank the following people: H. Albert Hochbaum, for his suggestions and encouragement of the study; Peter Ward and Nan Mulder, for their assistance in sexing and aging wings taken from netted birds; William G. Leitch, for making available aerial survey data of Ducks Unlimited; the Manitoba Wildlife Branch and Royal Canadian Mounted Police, for providing several flights over Lake Winnipegosis.

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Received for publication 19 March 1964