

Disponible également en français

No. 136, May 1983

### Distribution of postbreeding diving ducks (*Aythya* and *Mergina*) on southern boreal lakes in Manitoba

by Robert O. Bailey<sup>1</sup>

#### Introduction

Effective management of migratory bird resources requires knowledge of factors affecting species abundance and distribution in key areas throughout the entire range. Although thousands of diving ducks are known to gather at sites in the southern boreal forests of the Prairie Provinces, little information has been documented on species composition, numbers of birds, or factors influencing habitat distribution. Bailey (1982) described the macro-habitat distribution of moulting and staging diving ducks on the Manitoba and Saskatchewan Plains of the Interior Plains Region. He hypothesized that species were distributed according to physiographic, edaphic, and hydrologic factors that differed between these regions. Lesser Scaups (*Aythya affinis*) and Common Goldeneyes (*Bucephala clangula*) were more numerous in Saskatchewan. Moulting Canvasbacks (*A. valisineria*) occurred mainly in Saskatchewan, although a shift to Manitoba was apparent in the fall. Moulting Redheads (*A. americana*) were equally divided between the two areas but fall-staging birds were concentrated in Manitoba. Bartonek (1965) and Bergman (1973) also reported large numbers of postbreeding Redheads in Manitoba.

The purpose of this note is to examine the distribution of all diving duck species on the Lake Winnipegosis drainage. Based on the macroscale distribution reported in aerial surveys by Ducks Unlimited biologists from 1938 to 1968, described by Bailey (1982), I predicted that Redheads and Canvasbacks would be most abundant in the southern boreal lakes of Manitoba. The influence of water level fluctuations on habitat and bird distribution is also considered.

#### Study area

Lakes in the Lake Winnipegosis drainage comprise almost all of the available postbreeding habitat in the boreal forest portion of the Manitoba Plain (Fig. 1). The Precambrian Canadian Shield extends as a barrier along the east shore of Lake Winnipeg and north shore of Lake Winnipegosis. These large lakes are the remnants of glacial Lake Agassiz (Anon. 1977). Lake Winnipegosis provides a continuous habitat of expansive, shallow bays. Soft calcareous marl covers the substrate in large portions of the drainage, and is conducive to the growth of aquatic vegetation, particularly the alga *Chara* sp. (Bailey 1981). Additional description of the Manitoba Plain is available (Anon. 1977).

#### Methods

Two sources of data were used to examine the distribution and abundance of diving ducks and the effects of water levels on postbreeding habitats.

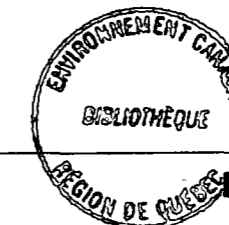
**Aerial surveys of the Lake Winnipegosis drainage in 1976 and 1977**  
Aerial surveys of the Lake Winnipegosis drainage were conducted in conjunction with a study of the postbreeding ecology of Redheads (Bailey 1981). These flights were intended by Environment Canada to assess the effects of prairie-wide drought in 1977 on the habitat and distribution of postbreeding divers in the Lake Winnipegosis watershed. Notes on water levels and aquatic vegetation were made in surveyed areas each year. Aerial surveys were timed by ground observations to coincide with the premoult, peak of remigial moult, beginning of premigratory staging, and peak population prior to fall departure. The survey was conducted monthly from July to October in 1976 and in July, August, and October in 1977.

**Aerial surveys of Redheads in Long Island Bay, Lake Winnipegosis**  
Long Island Bay is a well known moulting and staging ground for diving ducks (Hochbaum 1944). The Delta Waterfowl Research Station and the Province of Manitoba conducted summer and fall surveys of waterfowl populations from 1962 to 1974 and provide estimates of Redhead numbers over a wide range of Lake Winnipegosis water levels. Water level data were used to predict Redhead abundance on Long Island Bay. The data were divided into summer (1 July to 7 September) and fall (8 September onward) periods. Redhead numbers for each period were regressed on Lake Winnipegosis water levels (Manitoba Hydro, unpublished data). Lake level units were measured in millimetres above an arbitrarily established baseline on a graph of mean monthly levels.

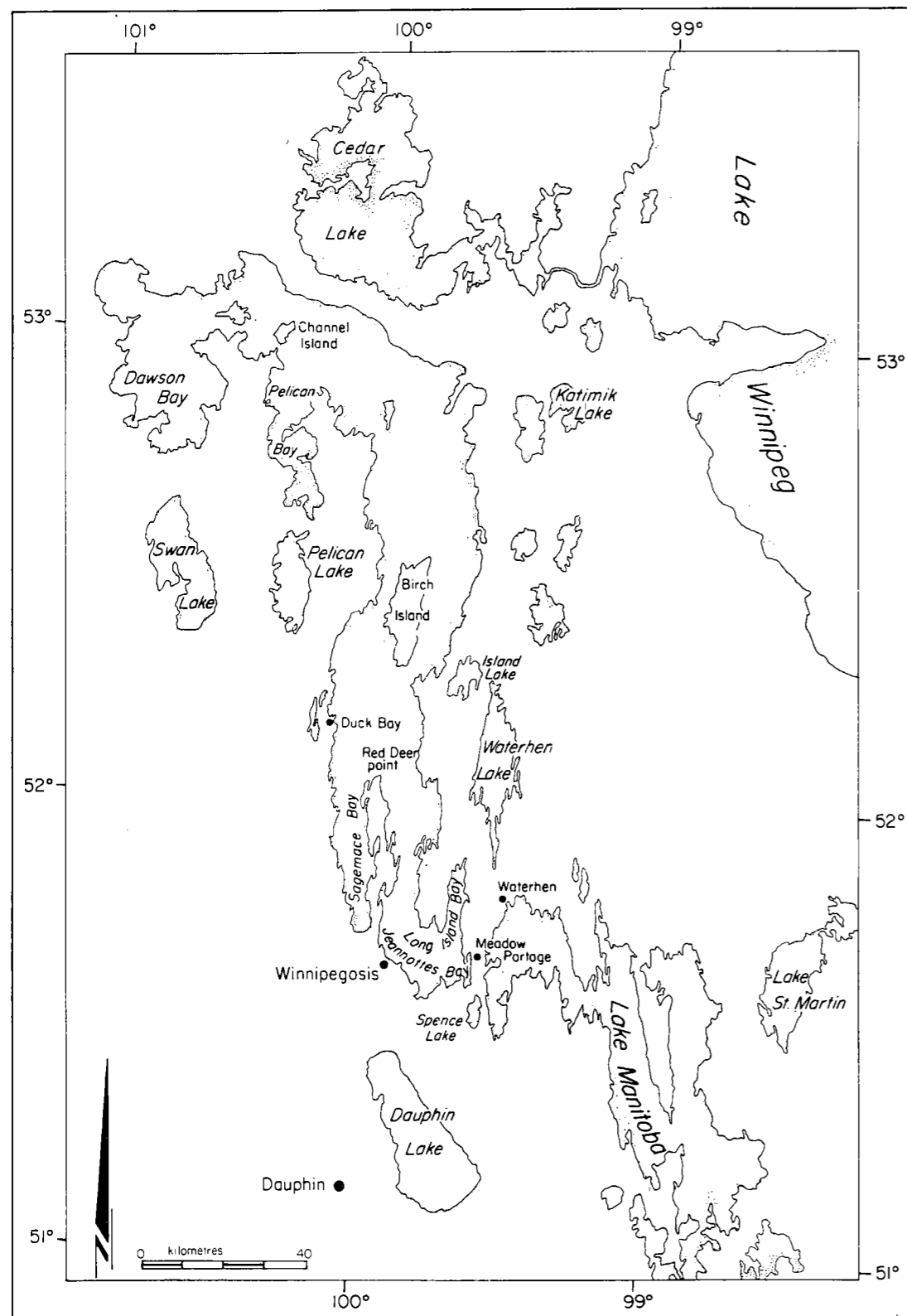
#### Results

**Aerial surveys of Lake Winnipegosis in 1976 and 1977**  
Canvasbacks were not very numerous on boreal lakes in Manitoba (Table 1). Swan Lake (Fig. 1) supported the only concentration of moulters in 1976, (11 500) and these birds departed by fall. A small group of Canvasbacks used Long Island Bay in late August and early September following the moult (Table 1). These birds gathered on the west side of the bay on a large patch of sago pondweed (*Potamogeton pectinatus*). A dense bed of sago formed in the south end of Spence Lake over summer 1977, and was used by 3000 Canvasbacks in the fall.

Large numbers of Redheads were consistently found throughout the Lake Winnipegosis drainage in summer and fall (Table 2). Several thousand birds were found on Red Deer Point and at the south end of Pelican Bay (Fig. 1)

<sup>1</sup> CWS, Saskatoon, Saskatchewan S7N 0X4.

**Figure 1**  
Map of the southern boreal lakes in Manitoba



**Table 1**  
Numbers of Canvasbacks observed during aerial surveys of moulting and staging lakes in Manitoba, 1976 and 1977

Location	1976				1977		
	July	August	September	October	July	August	October
Long Island Bay	16	6	712	0	35	1428	7
Jeannotes Bay	0	0	0	frozen	0	0	0
Spence Lake	25	36	77	frozen	28	510	2974
Sagemace Bay	1	0	0	0	0	0	0
Red Deer Point	0	12	0	frozen	0	25	175
Duck Bay	0	nc†	136	nc	0	20	0
Pelican Lake	0	15	0	nc	6	110	0
Pelican Bay	0	0	0	nc	0	25	0
Dawson Bay	0	0	0	nc	0	27	0
Swan Lake	11 513*	689	397	nc	386	689	51
Inland Lake	0	5	0	nc	2	0	0
Waterhen Lake	0	5	135	nc	0	0	0
<b>Total</b>	<b>11 555</b>	<b>768</b>	<b>1457</b>	<b>0</b>	<b>467</b>	<b>2834</b>	<b>3207</b>

\* Almost all flightless.  
† nc = not counted.

**Table 2**  
Numbers of Redheads observed during aerial surveys of moulting and staging lakes in Manitoba, 1976 and 1977

Location	1976				1977		
	July	August	September	October	July	August	October
Long Island Bay	1504	1889	7370	19 766	5541	4289	60 182
Jeannotes Bay	1258	470	151	frozen	2370	2155	1 572
Spence Lake	2780	3850	952	frozen	618	1394	80
Sagemace Bay	1100	100	nc*	8245	10	100	0
Red Deer Point	8141	3837	572	frozen	350	395	5 528
Duck Bay	10	nc	801	nc	0	50	0
Pelican Lake	50	412	1309	nc	113	1266	0
Pelican Bay	7088	3745	622	nc	3385	1177	0
Dawson Bay	245	310	320	nc	0	269	0
Swan Lake	1005	489	1350	nc	447	68	0
Inland Lake	99	13	17	nc	94	nc	0
Waterhen Lake	585	390	1530	nc	33	435	0
<b>Total</b>	<b>23 865</b>	<b>15 514</b>	<b>14 967</b>	<b>28 011</b>	<b>12 961</b>	<b>11 598</b>	<b>67 362</b>

\* nc = not counted.

in July 1976. Most other areas contained moderate numbers of birds. Key moulting areas in August 1976 were Spence Lake, Red Deer Point, Pelican Bay, and Long Island Bay (Table 2). Most moulting sites were vacated in September when Redheads began to accumulate in Long Island Bay.

Fewer Redheads were recorded in the survey zone in summer 1977 (Table 2). Long Island Bay appeared least affected by the drought and usually contained the largest number of birds. The amount and distribution of the alga *Chara* sp., a favourite food of postbreeding Redheads, was unchanged by lower 1977 water levels (Bailey 1981). Aquatic vegetation in Spence Lake was greatly reduced from 1976 to 1977 and utilization by Redheads decreased accordingly. Jeanottes Bay and Pelican Bay supported moderate numbers of birds prior to and during the wing moult in 1977 (Table 2). Vegetation in Jeanottes Bay did not appear to have been altered by lower 1977 water levels. A bulrush marsh extended over half of the bay and extensive beds of *Chara* were visible each year. Lower water levels were noticeable in Sagemace Bay, where aquatic vegetation was sparse except for beds of sago pondweed in shallow inlets around the shore. A broad area of alkali flats on Red Deer Point was heavily utilized in 1976, but was almost dry in 1977. Several postbreeding Redheads were encountered in a marsh at the south end of Pelican Bay in 1976, and aquatic vegetation was abundant. Expanses of nearly dry ground prevailed throughout the marsh in 1977. Redheads gathered along the west side of Pelican Bay during the drought. Low water in Waterhen Lake exposed the bottom far out in marshes along the west side. No evaluation of vegetation changes could be made in the remaining lakes because of excessive depth or turbidity. Redhead numbers were reduced in 9 of 12 areas surveyed in 1977 (Table 2).

Very few Lesser Scaups used the Lake Winnipegosis drainage as moulting or staging grounds (Table 3). Scaups were more numerous in the survey region in 1977 because of concentrations in Spence and Swan lakes. Swan Lake supported about 8000 moulters and 2000 staging birds. Spence Lake contained nearly 6000 staging scaups in 1977.

Ring-necked Ducks (*A. collaris*) moulted and staged in small flocks on Long Island Bay, Spence, Pelican, and Swan lakes (Table 3). Ground observations showed that Ringnecks consistently used certain portions of Spence Lake and peripheral small lakes around Long Island Bay from 1974 to 1977 (Bailey, unpublished data). These small flocks may be easily overlooked on extensive aerial surveys.

Negligible numbers of Common Goldeneyes and Common Mergansers (*Mergus merganser*) moulted in the region (Table 4). Moulting adult male goldeneyes were observed as single scattered birds and some small flocks were found migrating through Long Island Bay in fall. A few small groups of moulting mergansers were recorded in 1977, but no staging birds were documented.

**Aerial surveys of Redheads in Long Island Bay, Lake Winnipegosis**  
Lake Winnipegosis water levels significantly affected the numbers of Redheads using Long Island Bay in summer ( $r = -0.70, P < 0.01$ , Fig. 2). Redheads were more numerous at lower lake levels, although much variability was apparent, probably because of the timing of surveys. Conversely, higher lake levels consistently resulted in fewer birds using the bay. This inverse correlation persisted in the fall ( $r = -0.41, P < 0.05$ , Fig. 3); however, much less variability in numbers was explained by fall water levels (17 vs 49%).

#### Discussion

Redheads were the prevalent moulting and staging diving duck species in the vast shallow bays of Lake Winnipegosis, and in many of the surrounding lakes. Canvasbacks and Lesser Scaups were much less abundant than Redheads. Very small numbers of ringnecks, Common Goldeneyes, and Common Mergansers were recorded. This pattern of species distribution is consistent with the findings of Bailey (1982), although the overwhelming relative abundance of Redheads during the moult was less pronounced in the macroscale overview. The importance of Lake Winnipegosis to Redheads may be linked to the prevalence of *Chara*, which covers more than 90% of the substrate at the principal moulting and staging site in Long Island Bay (Bergman 1973, Bailey 1981), and is used extensively by postbreeding birds.

Drought influenced the distribution of postbreeding Redheads through its effect on submerged vegetation. Low water levels in 1977 eliminated or sharply reduced aquatic vegetation in several portions of the Lake Winnipegosis drainage, causing birds to concentrate in fewer, more stable habitats. Redheads gathered in Long Island Bay in 1977 because of superior plant food resources. The vegetation in the bay was unaffected by drought (Bailey 1981), and the area was a focal point for Redheads in the region. The strong inverse relationship between numbers of Redheads on Long Island Bay and Lake Winnipegosis levels is a reflection of the greater stability of plant food resources in this bay. Great mobility of Redheads prior to the flightless period (Bailey 1981) may permit them to find suitable moulting and staging habitat over a wide range of water levels and habitat conditions. Habitat conditions in several gathering places, even within these large lake systems, are unstable, and good sites appear patchily distributed.

Swan Lake was the only boreal location in Manitoba containing substantial numbers of moulting and staging Canvasbacks and Lesser Scaups. The water in Swan Lake is turbid compared to Lake Winnipegosis (Bergman 1973), indicating a lack of the extensive bottom cover usually provided by *Chara* in the region. Swan Lake seems unique in the Manitoba southern boreal zone in vegetation features, and comparable to the habitat of moulting scoup and Canvasback in Saskatchewan (Bailey 1982).

**Table 3**

Numbers of Lesser Scaups and Ringnecks ( ) observed during aerial surveys of moulting and staging lakes in Manitoba, 1976 and 1977

Location	1976				1977		
	July	August	September	October	July	August	October
Long Island Bay	0(50)	1(30)	2(80)	211	0(2)	6(47)	21(23)
Jeannotes Bay	0	0	0	frozen	0	0	0
Spence Lake	25(203)	0(10)	6(12)	frozen	36(50)	0(150)	5932(15)
Sagemace Bay	0	0	nc*	146	0	0	0
Red Deer Point	0	0	0	frozen	0	0	600
Duck Bay	0	nc	0	nc	0	0(25)	0
Pelican Lake	0	0	41	nc	0(10)	0(202)	182
Pelican Bay	0	1	0	nc	0	0(15)	0
Dawson Bay	6	0	0	nc	0	0	5
Swan Lake	30(50)	25(65)	283	nc	2101	8069(10)	1949
Inland Lake	0	200	5	nc	0	nc	105
Waterhen Lake	0	0	10	nc	0	0	138
Total	61(303)	427(105)	347(92)	357(0)	2137(62)	8074(449)	8932(38)

\*nc = not counted.

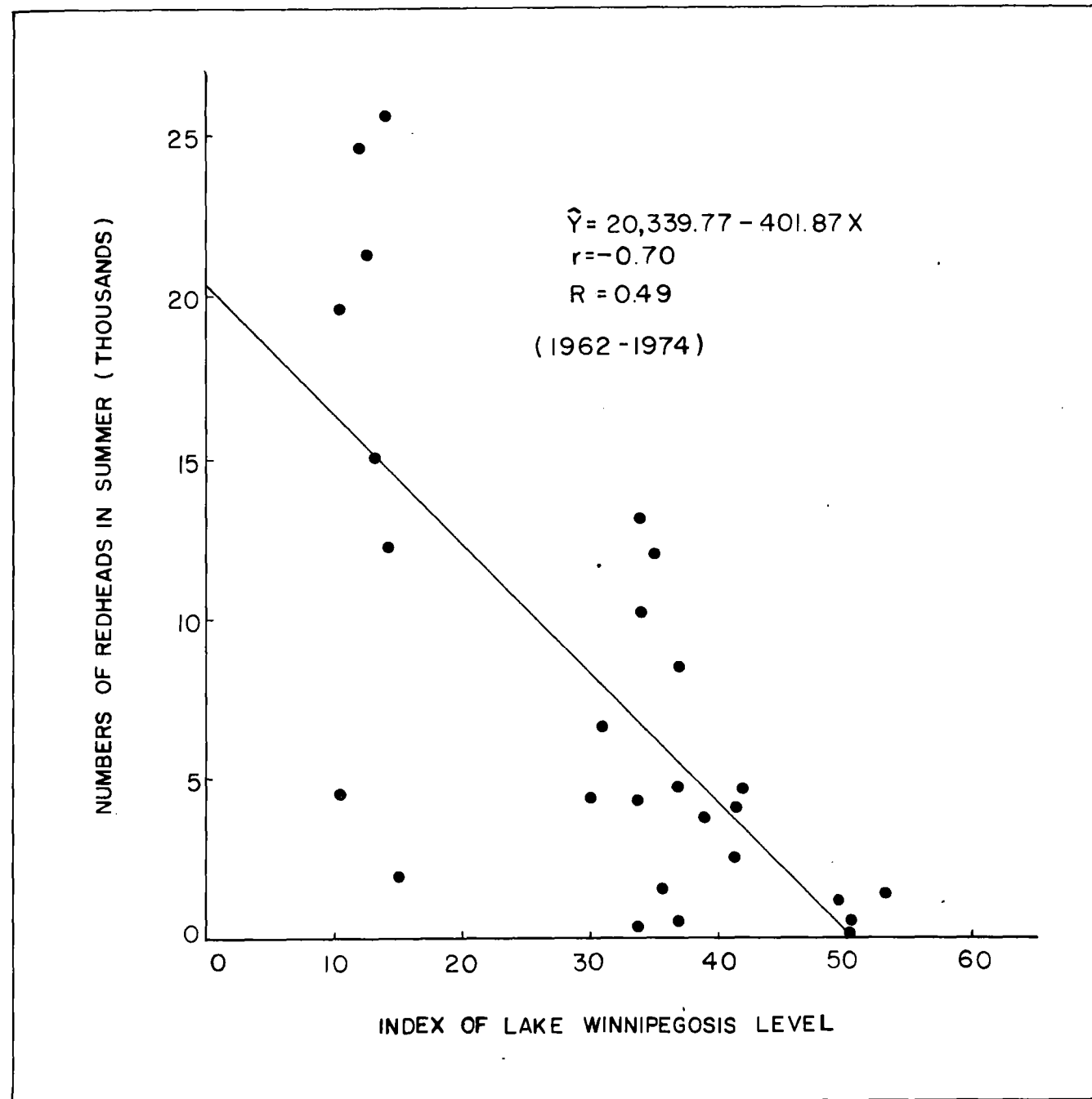
**Table 4**

Numbers of Goldeneyes and Common Mergansers ( ) observed during aerial surveys of moulting and staging lakes in Manitoba, 1976 and 1977

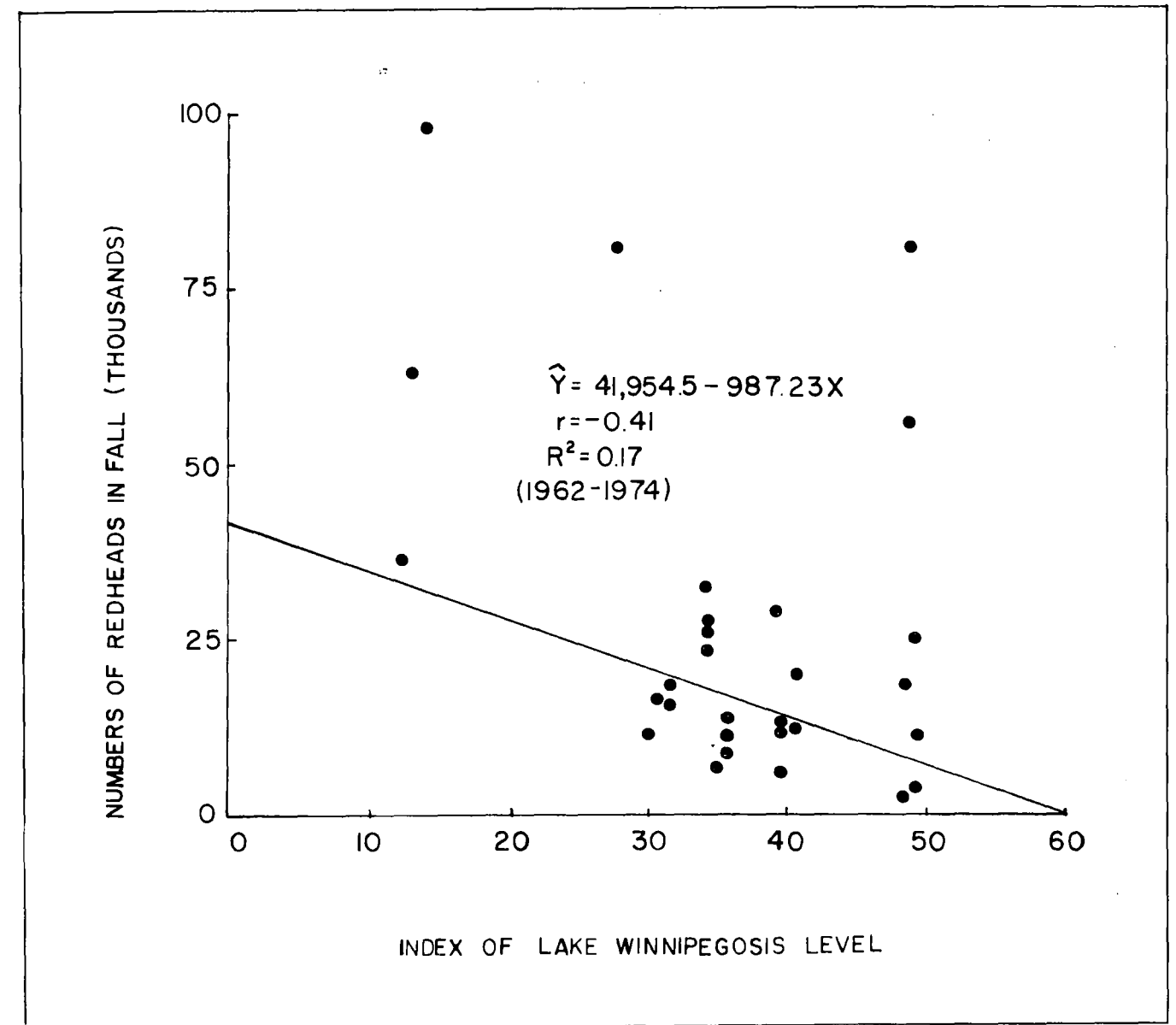
Location	1976				1977		
	July	August	September	October	July	August	October
Long Island Bay	40	0	0	1922	16	50	483
Jeannotes Bay	40	0	0	75	0	0	0
Spence Lake	0	0	0	frozen	0	5	0
Sagemace Bay	0	0	nc*	416	0	0	3
Red Deer Point	0	0	0	frozen	60(25)	(81)	282
Duck Bay	0	nc	0	nc	0	0	0
Pelican Lake	0	0	0	nc	26	18	147
Pelican Bay	42	0	0	nc	(4)	(35)	20
Dawson Bay	219(20)	0	5	nc	0	111(210)	88
Swan Lake	4	0	1	nc	0	15	25
Inland Lake	4	0	4	nc	0	nc	115
Waterhen Lake	7	0	25	nc	0	0	61
Total	365(20)	0(0)	35(0)	2413(0)	102(29)	189(326)	1224(0)

\*nc = not counted.

**Figure 2**  
 Linear regression of Redhead numbers in summer on Long Island Bay on Lake Winnipegosis water levels from 1962 to 1974



**Figure 3**  
 Linear regression of Redhead numbers in fall on Long Island Bay on Lake Winnipegosis water levels from 1962 to 1974



### Conclusions

Management of diving ducks in the southern boreal forest of Manitoba should be directed at maintaining suitable postbreeding habitat for the Redhead. Lower Lake Winnipegosis water levels restrict the distribution of Redheads to larger, perhaps more stable areas such as Long Island Bay. Higher water levels tend to make more habitat available and distribute Redheads over a broader area, although the effect of prolonged flooding or abnormally high levels was not assessed. Habitat changes causing major alteration in the aquatic plant community are likely to affect the abundance and distribution of postbreeding diving ducks in the region.

### Acknowledgements

I thank the Delta Waterfowl Research Station and R.K. Brace of the Canadian Wildlife Service for funding the aerial surveys. This note was reviewed by R.K. Brace, H.J. Boyd, and W.C. Pleszczynska.

### References

- Anon. 1977. Soils of Canada. Vol. 1: Soil Rep. Agric. Canada. Ottawa. 243 pp.
- Bailey, R.O. 1981. The postbreeding ecology of the red-head duck (*Aythya americana*) on Long Island Bay, Lake Winnipegosis, Manitoba. Ph.D. Thesis, McGill Univ., Montreal. 301 pp.
- Bailey, R.O. 1982. Use of southern boreal lakes by moulting and staging diving ducks. 28th Int. Waterfowl Res. Bur. Symp., Edmonton.
- Bartonek, J.C. 1965. Mortality of diving ducks on Lake Winnipegosis through commercial fishing. Can. Field-Nat. 79:15-20.
- Bergman, R.D. 1973. Use of southern boreal lakes by postbreeding canvasbacks and redheads. J. Wildl. Manage. 37:160-170.
- Hochbaum, H.A. 1944. The canvasback on a prairie marsh. Am. Wildl. Inst., Washington. 201 pp.