REPORT ON JOINT INSPECTIONS OF BIRD SANCTUARIES IN SASKATCHEWAN DURING THE SEASON OF 1947 TOGETHER WITH RECOMMENDATIONS

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Winnipeg, Manitoba.
February, 1948.

C O N T E N T S

INTRODUCTION

Much time and attention has been devoted in the past to the study of Saskatchewan bird sanctuaries. These investigations have embraced not only a detailed examination of the fauna, but also a close scrutiny of the prevailing physical conditions. Such conditions became markedly altered from time to time. These were very important as they bore acutely, for better or worse, upon the summer resident birdlife of the respective areas. From time to time reports were produced dealing with the nature of the avian populations and the state of the environment.

After 1930, physical conditions began to deteriorate with more or less rapidity as the climate on the Great Plains became increasingly dryer. Many lakes once renowned for the variety and abundance of their waterfowl finally dried up completely. At the peak of the great drought of the thirties (1937) not a single bird sanctuary or public shooting ground lake, or any other body of water, existed on the Great Plains of extreme southern Saskatchewan. Many personal reports were made during this period describing general conditions, including specific accounts of the state of various bird sanctuaries.

As a matter of course, considerable solicitude was felt for the present and future condition and usefulness of the bird reservations so drastically effected. Since the sanctuaries were transferred to the province (under the Natural Resources Transfer Act) in the year 1930, the Saskatchewan Government was naturally much concerned as was also the Dominion Government. Extensive discussion ensued during and following the drought period as to the advisability of cancelling the sanctuary lakes most succeptible to the effects of drought. Further field investigations were conducted (including joint inspections of all sanctuaries), more reports were written, and finally it was concluded that abolishment of certain sanctuaries was the best course to adopt. The Act of 1930 stipulated that were a transferred sanctuary abolished for any reason on the basis of joint inspection and agreement, another sanctuary had to be set aside in lieu thereof.

The cancellation of certain sanctuaries was then agreed upon in communications between the Dominion and Saskatchewan Governments. Much detail was involved in arriving at conclusions and plans acceptable to both governments. It is unnecessary in this place to deal with the matter at great length. This has been thoroughly clarified in earlier reports and numerous memoranda over a period of time in the thirties, as well as more recent years.

Briefly it may be stated that mutual agreement has been reached (in advance of necessary joint legislation) with respect to the abolishment of the five following bird sanctuaries in Saskatchewan which are now worthless, have been for about 15 years, and will continue likewise into the indefinite future. They were originally established by the Dominion Government (coincident with excellent circumstances about 23 years ago) under the Migratory Birds Convention Act.

Saskatchewan bird sanctuaries for which unconditional and permanent cancellation is jointly recommended at this time:

Chaplin Lake Bird Sanctuary	; Tp's. 16-17, R's, 5-6,	W. 3rd Mer.
Crane " " "	; Tp. 13, R's. 22-23-24,	" "
Bigstick" " "	; Tp. 15, R's. 24-25,	" " "
Cabri " " "	; Tp's. 24-25 R. 27,	" " "
Whitebear " "	; Tp's. 23-24-25, R's. 15-16	" "

Having selected the five foregoing sanctuaries for abolishment it then became necessary through joint investigations to select five areas for new bird sanctuaries. Such action was undertaken during the summer of 1947. The basic requirement was to find lakes of acceptable character with permanent waters and a suitable environment for wildfowl, in particular. The joint inspections were conducted by Mr. W. A. Hartwell, Supervisor of Game, Saskatchewan Government, and the writer, representing the Dominion Government.

Prior to making a start for the field, the Game Branch, Department of Natural Resources, Regina, compiled a tentative list of available lakes, or projects, chosen with a view to their apparent suitability as bird sanctuaries. From these a choice was made during, or following, the field investigations.

The five areas finally selected, and herewith jointly recommended for new bird sanctuaries to replace the five proposed for cancellation, are listed below:

Val Marie Reservoir	; Tp. 4, R. 14	W. 3rd Mer.
Duncairn "	; Tp's.12-13, R's.15-16-17	" " "
Murray Lake "	; Tp's. 46-47, R. 16,	" " "
Scentgrass Lake	; Tp. 46, R. 15,	" " "
Upper Roussay "	; Tp. 25, R. 5,	" " "

In the present paper the writer has not considered it necessary, nor has he been under any responsibility to deal with the finer details regarding the exact boundaries of the five new sanctuaries involved. The approach has been one solely concerned with the general biological properties of the areas, their desirability as bird habitats (especially with reference to waterfowl), and an otherwise broad appraisal and description of the overall physiographical character. The work of determining the exact boundaries and fabricating the legal descriptions has properly and of necessity been left to the Saskatchewan Government in dealing with its own natural resources.

It may be remarked, in passing, that the writer had earlier conducted solitary investigations at the two P.F.R.A. projects embraced--Val Marie and Duncairn Reservoirs. In order to economize on time, verbatim copies of his reports on those occasions have been utilized for the present purpose, as freshly produced ones would serve no better. For the other three areas (Murray, Scentgrass and Upper Roussay Lakes) newly written reports are being submitted.

VAL MARIE RESERVOIR, SASKATCHEWAN

(P.F.R.A. Project No. 87)

Construction work conducted by P.F.R.A. at this project consisted of building a long earth and rock-fill dam across Frenchman River and much of the adjacent valley. A central section is composed of reinforced concrete with control gates, sidewalls and apron (Figs. 1 & 3). Work was commenced in 1936 and completed that year at a total cost of $214,142.00. Water area is 2,140 acres and the storage capacity 6,000 acre-feet. Primary purpose of this undertaking is to irrigate an area of 6,049 acres of river-bottom flats below the dam; the project finally went into operation in 1938.

Physiographical Description:

This reservoir (Fig. 2) is located on Frenchman River approximately 5.5 airline miles northwest of the town of Val Marie, Saskatchewan; it is 30 miles south of Cadillac and 21 miles north of the International Boundary. The dam is situated in Sections 15 and 22, Township 4, Range 14, west of the Third Meridian. Approximate latitude is 49° 18'30"N., and longitude 107°48'30"W. When at average capacity the reservoir waters will reach an elevation of about 2,634 feet above sea-level; the top of the dam is 2,639 feet. The drainage basin area tributary to the point of diversion at the dam is 1,660 square miles.

At maximum capacity, it would appear that the reservoir will have a length of between two and three miles narrowing rapidly upstream to the northwest. The main body of water above the dam is over a mile in length. In my report of November 5, 1937, I said in part: "At the time of inspections a very respectable body of water had been impounded. It was several feet deep in the vicinity of the dam and shallower toward the sides and up the river. Considering the comparatively light runoff during the past spring and the successive years of recent drought (with the most marked deficiencies during the summer of 1937), the amount of water present appealed to me as quite extraordinary." Of course, since the above was written, conditions have vastly altered for the better. It is assumed that the reservoir is now filled to capacity.

The Frenchman Valley at this point is about a mile in width, with nearly flat bottomlands rising gently to the westward. Its depth is apparently from about 150 to 175 feet, thus being only about one-third as deep as at Eastend. Eastward the valley deepens again to introduce acutely trenched badlands and rugged coulees; these comprise some of the wildest sections to be found anywhere on the Coteau de Missouri. Especially during the drought years, a very pronounced degree of aridity prevailed throughout the region. There is comparatively little of the spectacular in the walls of the valley at the Val Marie Reservoir as compared with some sections to the northwest and southeast. However, marked erosion and the presence of minor buttes and arid benches on the acclivities lend a certain amount of ruggedness to the landscape.

The upper plains are entirely treeless, but some depressions support small areas of dwarf willows. They are further characterized by the shortgrass type of cover typical of the southern plains. Shrubbery in Frenchman Valley is similar to that at Eastend. Various willows thrive in a narrow zonation along the river, while sagebrush (Artemisia frigida) is the predominating growth over the uncultivated adjoining flats, on valley walls, lower buttes, and along the narrow floors and neighbouring slopes of tributary coulees. Further denoting a marked degree of aridity is the presence of buffalothorn (Lepargyrea?), greasewood (Sarcobatus) and the two species of cacti Opuntia polyacantha and Mamillaria vivipaurs. Other characteristic plants are grama grass (Boutelous); buffalo pea (Astragalus), bearberry (Arctostaphylos), creeping juniper (Juniperus), prairie rose (Rosa), wild sunflower (Helianthus), low evening primrose (Oenothera) and Indian paintbrush (Castillega).

In my report of November 5, 1937, I made the following comments: "Aquatic growth is naturally absent for the most part, due to the recency of flooding, though some native species have quickly developed. This unquestionably derived from original flora which existed in the shallow margins of Frenchman River. Extensive developments may in time be anticipated; doubtless additions will accrue in the natural spread of seeds, etc., brought down by the river current from the well-established growths upstream." When the reservoir was examined in 1941 there appeared to be some improvement in this respect.

Notes on Climate and Faunal Life Zone:

The district under discussion lies on the third prairie steppe with a mean elevation of about 2,800 feet above sea-level. All drainage is southeard to the Missouri River. The entire region comes within the Grassland Formation. Normal total precipitation per annum is 16 inches, but during drought preriods this is reduced to about half that amount, or less, and the region is then properly classified as semiarid. Normal mean daily temperatures are: January maximum 15°, minimum - 2°; July maximum 78°, minimum 50°. Average length of the growing season is approximately 130 days. In 1937, I commented, as follows on the state of Frenchman River and general conditions: "During the spring of 1937 the regional subsoil was so dry from the cumulative effects of many years of drought that through absorption the small runoff was probably the lowest known. This was followed by the climaxing and continuing drought of the past summer, the intensity of which eclipsed that of any other season of the dry cycle since 1929. In 1936, Frenchman River ceased to flow and this was repeated during the past season."

Regarded zoögeographically, this whole southern country on the tupper plains is to be referred to the semi-arid subdivision of the Transition Zone. Aridity is much more pronounced than farther north in the Grassland Formation. Throughout the Frenchman Valley there is an unquestionable blending of semiarid Transition and Upper Sonoran Zones, the latter being of dilute character. That the latter exists, however, is indicated by the presence of various species of plants, mammals and birds characteristic of this zone. The prairie dog is a marked example; it is of special interest in this connection, as it was on the site of Val Marie Reservoir that I found a small colony of these animals in 1927 and took the first authentic Canadian specimens for the National Museum of Canada. None now exist northwest of Val Marie, but a large colony is located in Frenchman Valley about six miles southeast of the town. Other typical species of the two zones referred to will be mentioned in a succeeding section of the report.

Waterfowl Population:

Reporting on the waterfowl situation observed in this area on July 6, 1937, I made the following comments:

"Of the three recently completed reservoirs inspected in extreme southern Saskatchewan during July, 1937, the present one was markedly the richest in waterfowl. As the project had been completed only the autumn before, and we were then in the midst of the most disastrous drought year in western history, it may be frankly stated that the reservoir was approached with a low degree of anticipation. The quantity of water present, however, was the first surprise; and the second, a waterfowl population in total estimated at between 1,000 and 1,500 birds. This was considerably more under the circumstances than was expected.

"Species present were: Eared Grebe, Mallard, Baldpate, Pintail, Shoveller, Blue-winged Teal, Canvas-back, Lesser Scaup, Ruddy Duck and American Merganser. Mallard and Shoveller were common; Pintail, Baldpate, Eared Grebe and Lesser Scaup tolerably common; Canvas-back moderately followed in numerical abundance by Blue-winged Teal, with finally a count of ten Ruddy Ducks. The presence of the latter in even this relatively small number was a gratifying feature, as the species has become very scarce, or totally wanting in the great majority of waterfowl resorts still existing on the Great Plains. Only a single Merganser was seen.

"Many of these water birds were breeding here as evidenced by young observed on several occasions. In view of the date, of course, all were summer residents and there can be doubt that a high percentage of the individuals inhabiting the reservoir nested in the vicinity. For this purpose the area offers splendid opportunities, as ample cover is provided in the thickets of willow, buffalothorn and wild rose which grow along the margin of the reservoir and the river beyond. Excellent cover is also provided for such land-nesting species as Mallard, Pintail and Blue-winged Teal in the abundant clumps of sagebrush that sprinkle the neighbouring flats and benchlands."

A somewhat similar aggregate was observed when the reservoir was revisited on June 18, 1941. A very strong wind was blowing at this time so that conditions were not

as favourable for observation as on a calm day. Ducks were more in seclusion in bays and coves, or resting on the banks, often protected by willows, etc., under which circumstances they were not so easily seen. By walking the banks, however, hundreds of birds were flushed. I gained the impression that the total population may have been greater than in 1937. With much superior conditions prevailing in 1941, this may well have been the case. In order of abundance, the species recorded on this occasion were: Pintail, Mallard, Shoveller, Lesser Scaup, Blue-winged Teal and Ruddy Duck. No Canvas-backs were detected as in 1937. Other waterfowl observed were a few White Pelicans, and a fair showing of Ring-billed Gulls, and Common and Black Terns. I concluded my short report in 1941 by remarking that "This is a splendid bird area as reported upon originally when it was inspected in 1937 as a proposed bird sanctuary."

I discussed the present area with Mr. Stuart Shields (P.F.R.A. engineer, Val Marie) last June, and he informed me that he considered the upper portion of the Val Marie Reservoir much superior to the West Val Marie Reservoir as a duck-producing area. He also stated that a pair of Canada Geese was found nesting on an island in the former body of water and that there is also a small colony of nesting Great Blue Herons.

Additional Characteristic Fauna:

Habitat conditions provide not only for waterfowl but numerous other species of birds. In addition to those already mentioned, the following bird species have been recorded in this locality:

Great Blue Heron; American Bittern; Red-tailed, Swainson's, Ferruginous Rough-legged, Marsh and Sparrow Hawks; Sage Grouse; Sora Rail; Mountain Plover (at Bracken); Killdeer Plover; Northern Curlew; Western Willet; Lesser Yellow-legs; Mourning Dove; Burrowing and Short-eared Owls; Sennett's Nighthawk; Arkansas Kingbird; Say's Phoebe; Alder Flycatcher; Desert Horned Lark; Bank, Barn and Cliff Swallows; Magpie, Crow; Rock Wren; Catbird; Brown Thrasher; Sprague's Pitpit; White-rumped Shrike; Yellow Warbler; Yellow-throat; Long-tailed Chat; Western Meadowlark; Red-winged and Brewer's Blackbirds; Cowbird; Goldfinch; Spotted Towhee; Lark Bunting; Savannah, Baird's, Vesper, Lark,

Clay-colored, and Song Sparrows and McCown's and Chestnut-collared Longspurs.

Characteristic mammals of the district include: Least and Long-tailed Prairie Weasels; Badger; formerly Kit Fox; Great Plains Coyote; Richardson Ground Squirrel; Black-tailed Prairie-dog; Sagebrush Pocket Gopher; Wyoming Kangaroo Rat (rare); Missouri River Beaver; Audubon Grasshopper Mouse; Osgood White-footed Mouse; Badland Meadow Vole; Pallid or Sagebursh Vole; Great Plains Muskrat; Varying Hare; White-tailed Jack Rabbit; and Rocky Mountain Mule Deer.

Concluding Remarks:

In 1937 I wrote: "I have no hestitation in stating that the Val Marie Reservoir possesses all the required qualifications for an excellent, semiarid region bird sanctuary (It was jointly inspected--Province and Dominion-- as a proposed bird sanctuary and subsequently it was recommended that action be taken along these lines). We were very favourably impressed with the initial, prevailing conditions as observed in July of this year. Owing to the recent completion of the dam these conditions, however, are still much below the potential possibilities of the area. It follows, therefore, that with future betterment of the local environment, the value and attractiveness of the area, from an ornithological viewpoint, will be progressively enhanced....

"One of the great merits of the reservoirs created under the Prairie Farm Rehabilitation Act rests in the fact that these bodies of water, as potential waterfowl breeding resorts and sanctuaries, are of a permanent character. This cannot be said of a single sanctuary in extreme southern Saskatchewan originally set aside under the M. B. C. Act; today they are all dry, the last meeting this fate being Johnston Lake, where all water finally disappeared during the past summer."

DUNCAIRN RESERVOIR, SASKATCHEWAN

(P.F.R.A. Project No. 144 (12-2))

A limited amount of study was given to this area in mid-May of 1944, in company with Mr. E. S. Forsyth, who was then Game Commissioner of Saskatchewan. The notes then secured were never written up, but they are still available in connection with producing the present report. The principal investigation, however, was conducted during the past summer. Work was commenced on July 21 and continued without interruption until the forenoon of July 25, 1946.

Preliminary observations were carried out at the north end of the reservoir and about the southwest arm. After this, camp was established on the point at the forks five miles southwest of the dam. This provided a strategic location from which the main body of the reservoir and both branches could be reached by canoe with equal facility and with a saving of time, motion and effort.

Duncairn Reservoir is the most important of the various projects collectively referred to as the Swift Current Irrigation Project. It was completed in 1943, almost simultaneously with the work undertaken at the companion project of Highfield Reservoir. Duncairn dam is among the largest completed in the Prairie Provinces; it is an earthfill structure about one-half mile long, with a maximum height of 66 feet (Fig. 6). The storage capacity at full supply level is about 85,000 acre-feet. The total cost was $186,859.00.

Physiographical Description:

Duncairn Reservoir is a capacious and very important project. So far as personally known, it is the largest so far completed by P.F.R.A. in the three Prairie Provinces, exceeding in size even Cypress Lake by the amount of 5,000 acre-feet of water. It is located in Townships 12 and 13, Ranges 15, 16 and 17, West of the Third Meridian, approximately 20 miles southwest of Swift Current and 18 miles east-southeast of Gull Lake. Elevation of the reservoir is not known to the writer, but it is apparently in the vicinity of 2,525 feet a.s.l., or about 100 feet higher than Swift Current.

The reservoir roughly assumes the shape of the letter Y, with the principal arm inclined to the northeast, at the upper extremity of which the dam is located. The lake junction lies five miles to the southwest. From here radiates the two branches, the eastern one--approximately 5½ miles long--extending nearly due south, while the other arm runs with several curves to the westward. The length of the lake from the dam to the extremity of the latter arm is about 13 lineal miles; adding the southern arm, the total amount of waterway is approximately 18½ miles. The area is apparently about 4,500 acres. Various views of the lakes are provided in Figures 4, 5 and 7.

On the whole the lake is winding with innumerable indentations along the shoreline. Some of these attain to the size of small bays, occasionally from 50 to 100 yards, or more, in length, originating in flooded-out lateral ravines. The opening to one of these bays appears in the foreground of Figure 4. In windy weather they are favourite retreats for several species of ducks, their sequestered waters offering calm places for feeding, rest and seclusion. Hundreds of coves occur along the numerous miles of shoreline; many of these show clearly in Figures 5 and 7. Subaquatic vegetation is often more common in such indentations than in the open sweep of the lake.

In many parts the water is markedly shallow, particularly in places along the sides of the two arms and at their extremities. Occasionally this is to be noticed over bottom that was formerly beachland in the Swift Current Creek Valley, before the lake was created. Elsewhere, over most of the area, the water is deep. In fact, much of it is remarkably so, 20 feet being common, while some central areas in the main axis of the lake are said to lie under 40 feet of water. As at Highfield Reservoir, the water in the present area, by mid-summer, is thickly congested with fine algae in suspension. Large quantities are washed up along shore to form a slimy, vividly green, decomposing scum with an offensive odour.

The greater part of the shore is composed of dry clay, or mud, or a mixture of this material with gravel and small boulders. Some points are littered with glacial stones and larger boulders washed out of the slopes by wave action. In some sections of the lake the greater part of the shore for miles is more stony than muddy. Along the main trunk of the lake, several exposures of sedimentary rock were observed at, and occasionally a few feet above, the level of the water.

As may be seen in the accompanying photographs, flat land near the lake is rare. Nearly everywhere the terrain rises more or less acutely from a point at, or near, the water and sweeps up to the high plains above. These slopes vary in height from about 120 to 150 feet. The surrounding country is everywhere treeless on slope and high plain alike, except for some growth in occasional lateral ravines. Here a little cottonwood occurs, together with thickets of chokecherry, saskatoon, silverberry and snowberry. Elsewhere, at wide intervals, are low, thick copses of the latter plant, as well as wild rose and stands of sagebrush. In some areas the cacti, Opuntia and Mamillaria, are moderately common components of the native flora.

Some ranching is carried on in the immediate vicinity of the lake, particularly that part of the terrain embracing the wild, tributary draws and coulees and the whole length of the lake's grass-grown slopes. The greater part of the adjacent high plains is devoted to agriculture.

Notes on Climate and Faunal Life Zone:

In general character this country is very similar and, in fact, superficially indistinguishable from the short-grass plains of the Missouri watershed. In this immediate area, however, drainage is northward to the South Saskatchewan River. The entire region comes within the Grassland Formation, the major part of it being characterized by xerophytic vegetation. Normal total precipitation is about 17 inches per annum, but during droughts this is reduced to about half that amount or less and the region is then properly classified as markedly semiarid rather than slightly subhumid. Normal mean daily temperatures are: January maximum 15°, minimum -2°; July maximum 78°, minimum 50°F. Average length of the growing season is about 130 days.

Regarding zoögeographically, this whole southern country on the upper plains (as distinct from irrigated bottomlands) is to be referred to the semiarid subdivision of the Transition Life Zone. Aridity is much more pronounced here, and to the south, than in the Grassland formation somewhat farther north. For the most part, the animal life is distinctly characteristic of the niche represented by the zonal subdivision mentioned above. This is particularly the case in connection with the native mammals. Further and more detailed remarks will be made in a latter section regarding the typical birds and mammals of the district.

The Waterfowl Aggregate:

Before proceeding to comment on the waterfowl observations of 1946, it may be desirable to briefly present the bulk of the information on the waterbirds that were secured here on May 13, 1944, when accompanied by Mr. E. S. Forsyth of Regina. On that occasion all observations were carried out along the northern, or main body of the lake; only a few hours were devoted to the investigations and without any refinements as to specific ratios, etc. Nevertheless, the following list of game ducks seen at that time, with comments, will be of some interest in relation to occurrences and relative abundance at the above period.

Dunoairn Reservoir, May 13, 1944

Common Mallard - Abundant; the predominant species.
Gadwall - Several; of only casual occurrence.
Baldpate - Fairly common.
Pintail - Second in relative abundance to Mallard.
Blue-winged Teal - Status about similar to Baldpate.
Cinnamon Teal - One male, Very rare.
Lesser Scaup - Moderately common.
Buffle-head - Several.
White-winged Scoter - Several.
Ruddy Duck - Two.

Regarding other species of the larger waterfowl seen at this time, Eared and Western Grebes were scarce. Ring-billed and Franklin's Gulls frequented the lake in moderate numbers, while the Common Tern was only about one-quarter as numerous. The following shorebirds were recorded, none of

which were noticeably common: Killdeer Plover; Black-bellied Plover; Wilson's Snipe; Northern Curlew; Western Willet; Marbled Godwit; Lesser Yellow-legs; and Wilson's Phalarope. Of these, at least the Black-bellied Plover, Wilson's Snipe and Lesser Yellow-legs were migrants enroute to more northern breeding grounds.

One of the first apparent differences noted in July, 1946, as compared with 1944, was the smaller population of ducks on Duncairn Reservoir. Such was my original impression after beginning work. This impression was later supported by local ranchers and farmers who asserted that the ducks were noticeably less abundant on this lake during the past summer than in the season of 1944. Particularly positive on this score was Mr. George Ecker, who is established at the fork of the lake in the valley about five miles north of Simmie. Mr. Ecker is in a notably advantageous position at that point to observe general waterfowl conditions.

Another distinct feature was the apparent modification in the status of Mallard and Pintail, respectively, as compared with early May, 1944. At the latter time, Mallards were clearly in the majority by a generous margin, at least in the more northern part of the lake. Such was not true for most sections of the area in 1946, when Pintails were more numerous than Mallards by nearly two to one. This predominance was especially noticeable in the two arms of the lake above the forks. In part, the above disparity may have been a seasonal one, actuated by a certain instability of the spring population producing the results noticed in early May, 1944.

During July, 1946, nearly 70 per cent of the entire duck population was composed of Pintails and Mallards. Of the next most common species, the Lesser Scaup, Baldpate and Canvas-back occurred in that order of relative abundance. The percentage of Canvas-backs and Ruddy Ducks, comparatively low as it was, nevertheless provided a surprise in relation to these waters, taking into account that typical marsh habitat for nesting purposes was all but totally lacking. The only evident explanation seems to be that the birds were non-breeders, leading a summer season of carefree existence.

A comparable condition exists at many other waters of the shortgrass plains where emergent, nesting cover, or any type of terraqueous vegetation, that would serve for concealment, is entirely wanting. Obviously, in a treeless region of this kind, the American Golden-eyes were also loafers and non-reproductive.

As at all important projects, much care and effort was devoted to securing what was hoped would develop into relative accurate data with respect to specific ratios and the waterfowl aggregate. Daily tallies were made on canoe runs over various parts of the lake. As birds were identified, their numbers were recorded in the appropriate column. Estimates in relation to total population figures were secured in several ways, all pooled to arrive at a theoretical average result.

One of these methods was to climb to the rim of the valley at various places for sample counts; from a height of 150 feet on a calm day, waterfowl appeared startlingly clear on the water and counts could be made in relation to the full width of the lake, for example (when narrow, as in Duncairn type), and extending through one-half lineal mile. Averages were thus secured to be made applicable to the whole water area. With this method most of the ducks cannot be thus distantly identified for specific ratio figures, but a fairly shrewd knowledge of the overall waterfowl population can be obtained.

Relative abundance data on the various species are best secured by slow canoe cruising with continuous identifications and recordings. A large body of water, such as Duncairn Reservoir, presents self-evident census and ratio difficulties as contrasted with smaller areas. The smaller the lakes, the progressively easier do they become for securing this type of wildlife information. In large areas, observations by air offer some distinct advantages.

Presented in the table below are the percentages obtained respecting the numerical abundance of all species of ducks observed at Duncairn Reservoir (July 21-24, 1946) in relation to each other:

American Pintail	44.8	per cent
Common Mallard	25.0	" "
Lesser Scaup	9.1	" "
Baldpate	6.9	" "
Canvas-back	4.4	" "
Ruddy Duck	2.7	" "
White-winged Scoter	2.4	" "
Gadwall	1.7	" "
American Golden-eye	1.3	" "
Blue-winged Teal	.9	" "
Shoveller	.8	" "
Total	100.0	" "

In this connection, the general pattern of resident game ducks and their relative abundance differs widely as between the present lake and the companion project--Highfield Reservoir, though the dominant status of Pintail and Mallard is much the same. This is an item of absorbing interest, under analysis, since physical conditions are very similar in the two areas--at least, as respects the notable scarcity of emergent cover and subaqueous duck foods, and the superabundance of an identical algae.

A point of divergence, on the other hand, is the relatively great depth of Duncairn, as compared with the Highfield waters. The latter may have something to do with the presence at Duncairn of Lesser Scaups (in fairly large numbers), together with White-winged Scoters and American Golden-eyes, while these birds were completely lacking at the Highfield project. Many other points of dissimilarity obtain in the waterfowl composition of the two areas. It is not always possible to determine what the deciding factors are in instances of this kind; puzzling disparities are often exhibited in a study of local distribution on the Great Plains and elsewhere.

As a result of frequent checks on waterfowl population numbers, it was found that the birds varied from about 160 to 600 individuals to the lineal mile of lake. Experience in the field indicated that a fair average was 400 ducks to each of these unit areas. This works out to about 7,200 ducks for the whole lake, or approximately 1.5 ducks to the acre.

It will be seen that this density of game ducks is very similar to that computed for Highfield Reservoir. However, the similarity ends there, for the sum total of all kinds of waterfowl was much higher per acre at the latter body of water. At the same time it is true that the greater part of this difference arises from the fact that the Highfield waters attracted an unusual gathering of about 9,000 non-breeding Franklin's Gulls; such may be regarded as a somewhat fortuitous circumstance, which, in any event, had no direct bearing upon the game duck totality -- the chief concern of the investigations.

In order to cast light upon the integral character of the wildfowl aggregate at Duncairn Reservoir, the following table is appended, listing the summer resident species (exclusive of the ducks), together with their approximate ratios of abundance expressed in percentages:

Franklin's Gull	62.5	per cent
Eared Grebe	23.1	" "
Black Tern	5.7	" "
Ring-billed Gull	3.8	" "
American Coot	1.5	" "
Horned Grebe	1.4	" "
White Pelican	1.4	" "
Black-crowned Night Heron	.6	" "
Total	100.0	" "

The entire waterfowl population found residing at Duncairn Reservoir may be represented in character and quality as follows:

Ducks of all species	(approx. 81.8%	= 7,200	individuals.
Other waterfowl	(" 18.2"	= 1,600	"
Total		8,800	"

These figures give a result of about 1.76 birds to the acre.

Before closing this section it may be mentioned that the duck population is vastly increased in these waters during the spring and fall migrations. Local residents particularly refer to the tens of thousands of ducks which drift in to feed and rest at the latter season. In addition, geese are said to the plentiful during a certain interval of time in the autumn; these consist of Canada and Lesser Snow Geese, the former species in the majority. Whistling Swans also occasionally visit these waters.

Nesting Environment and Duck Foods:

With respect to this subject, it may be stated, immediately, that no substantial difference obtains as between Highfield and Duncairn Reservoirs. In order to save time and effort in what essentially would otherwise be repetition, the reader is referred to this same subsection in the preceding report.

In passing, however, attention is to be especially drawn to the fact that the same species of fine, green algae that occurs at Highfield Reservoir is equally abundant at Duncairn, In looking at the water, one's first impression is that of a bright green, opaque, supersaturated solution. It is doubtful if this plant has any genuine usefulness, or qualities as a wildfowl food, though some of it may be casually consumed with other plants of high food value. It probably does a great deal more harm than good in obstructing sunlight and preventing the proper and normal growth of valuable subaquatic vegetation.

The major part of the reservoir was examined by canoe and comparatively little plantlife of the latter class was discovered. In this respect it is as impoverished as Highfield Reservoir. Only at relatively wide intervals were small beds of pondweeds noted, these consisting of the claspingleaf pondweed (Potamogeton perfoliatus) and the sageo pondweed (P. pectinatus). Alone, or associated to some extent with the foregoing plants, the watermilfoil (Myriophyllum spicatum) was rarely encountered in some parts of the lake.

The water smartweed (Polygonum smphibian?) was found comparatively common at the extremity of the western arm (Antelope Coulee) growing in a very shallow water; small beds of it were blooming at this time. It is obvious from the above statements that the amount of waterfowl food of this character at Duncairn Reservoir is of comparatively insignificant quantity; further, that the ducks by compulsion, if not by choice, subsist on other materials in this area.

Comments on Reproduction:

Relatively little was learned with respect to this subject. On several occasions much walking was done along shore and on the beachlands with a view to securing data on nesting, but only three nests were discovered. Two of these belonged to the Lesser Scaup, containing 9 and 10 eggs, respectively; one of them was located 10 yards from the lake in an area totally devoid of cover beyond the typical grama and other short grasses of the plain; the other was in a similar situation, 25 yards from the water, except for the addition of a small spray of sagebrush on one side of the nest. The third nest, with 7 eggs, was that of a Gadwall, situated in a low thicket of snowberry near the shore.

Broods of young were far from common in relation to size of the area. Mr. George Boker informed me that ducklings were noticeably more numerous in the summer of 1944--the year following completion of the dam. He offers the explanation that pike have substantially increased in numbers and that their recent predation on ducklings has, likewise, been progressively upward and in serious amount. I cannot substantiate this statement, but loss from this cause unquestionably occurs. Further, some damage to eggs and young is doubtless suffered through the activities of coyotes, skunks and long-tailed weasels, but the same cannot be said of crows and magpies, none of which were detected in this locality.

The broods of young seen and positively identified at Duncairn Reservoir are listed below; many other family groups were observed in the distance whose identity was not ascertained.

Common Mallard:- 7 : 2 : 9 : 6 : 5.
American Pintail:- 8 : 5 : 4 : 4 : 6 : 4 : 5.
Baldpate:- 3 : 6 : 4.
Gadwall:- 4 : 6.
Lesser Scaup:- 6 : 10 : 7 : 7.

Apparently reproductive successes were far short of potentialities, in view of the fact that broods were uncommon and their average size was only 5.6 individuals. This figure is exceedingly close to that obtained at Highfield Reservoir (5.7), where I saw, or heard, nothing suggesting the presence of any pike whatever. It may be mentioned here that the young of Mallard and Pintail at this time were about three-quarters adult size; and Baldpate observed were about one-half; Gadwall ranged in size from small downies to those about 10 days old; while the Lesser Scaup juveniles varied from those just recently hatched, to hatching and others that were estimated to be three or four day's old.

Additional Characteristic Wildlife:

Aside from waterfowl already mentioned, the following birds were recorded in the locality:

Swainson and Marsh Hawks; Prairie Falcon; European Partridge, Killdeer Plover; Northern Curlew (nearby colony of about two dozen); Spotted Sandpiper, Western Willet (over 40 seen near lake) Lesser Yellow-legs; Baird's Sandpiper (early returned migrant); Marbled Godwit; Avocet; Common Kingbird; Say's Phoebe; Horned Lark; Bank Swallow; Western Meadowlark; Red-winged Blackbird; Cowbird; Lark Bunting; Savannah, Vesper, Clay-colored and Song Sparrows; and Chestnut-collared Longspur.

Native mammals known to occur in the vicinity of the reservoir include the following:

Long-tailed Weasel; Hudson Bay Mink; Northern Plains Skunk; Common Badger; Great Plains Coyote; Richardson Ground Squirrel; Saskatchewan Pocket Gopher (few reported

in valley of Swift Current Creek to the northward of the dam); Maximilian Pocket Mouse (reported by Mr. George Ecker); Canada Beaver; Audubon Grasshopper Mouse; Osgood White-footed Mouse; Drummond Meadow Vole; Sagebrush, or Pallid Vole; White-tailed Jack Rabbit; Plains White-tailed Deer; and Rocky Mountain Mule Deer.

Concluding Remarks:

The Duncairn water-level is subnormal by several feet. Or perhaps a more accurate statement is to say that the water supply is considerably below the maximum height received in the reservoir a year or two ago. I understand that when ample runoff waters are again available, the P.F.R.A. intends to raise the level about eight feet beyond the highest at any time attained in the past.

Marked fluctuations in water-level are the bane of any area in relation to the successful propagation of bulrush and cattail marsh cover and valuable subaquatics for duck food. Land-nesting waterfowl do not so much suffer, but failure to establish plenty of emergent plant growth, also promotes failure to establish the marsh-nesting species. A great drop in the water-level leaves the emergent aquatics high and dry to die of drought and exposure. The same happens with shallow-water beds of valuable pondweeds and other floating and totally submerged vegetation.

With the opposite condition, when the water-level is greatly augmented through improved weather conditions, stands of off-shore vegetation are drowned out beyond their normal depth for survival and consequently perish. Fluctuation of level can be a prominent factor, therefore, in retarding, or preventing the successful culmination of marsh growth that would normally attract diving ducks and generally enrich the waterfowl population.

It would appear from the recent investigations that only a very moderate amount of marsh vegetation could be propagated in Duncairn Reservoir. The bulk of this would be confined to the extremities of the two lower arms of the lake. Paltry areas might also be adaptable in various coves and small bays throughout the length of the reservoir. For the most part, the gradient of the shoreline is toosteep to accomodate aquatic vegetation in any large quantity.

In regard to the question of livestock, versus waterfowl, in this area, the situation is essentially similar to that of the Highfield project and the same arguments and recommendations apply.

Predation does not appear to be a problem in this area, with the possible exception of pike, which are reported abundant in the lake. Any great numbers of these fish, anywhere, within waterfowl resorts, unquestionably jeopardize the juvenile population and may be responsible for a decidedly ruinous degree of mortality. This is especially true of the very young ducklings. Coyotes do not appear to be overly common in the locality and no crows nor magpies were observed.

The area's capacity for improvement, with respect to waterfowl propagation, appears to be decidedly limited. It seems to me that not much can be done of a truly valuable and practical nature. A fundamental requirement is an effective and stabilized water-level, which would achieve several beneficial results as casually touched upon above. However, this can scarcely be expected in connection with a body of water primarily developed for irrigation purposes. In this instance, as in many others, waterfowl reproduction and conservation is secondary and purely incidental to the main agricultural interests involved.

Notwithstanding certain drawbacks, the reservoir supports quite an attractive waterfowl population and undoubtedly contributes many hundreds of additional game ducks each season to the continental supply. This is a decidedly worthwhile gain, even though the area, with its present characteristics, is far from being one of top-ranking production.

In addition to its moderate attractions for chiefly indolent and nesting river and pond ducks, the reservoir also functions as a valuable stop-over, resting place for many additional thousands of northern ducks and geese during the seasons of migration. In view of the inherent character of the lake, it is indeed doubtful if the gross, wildfowl summer population of the lake can be substantially increased. It must be remembered, however, that the present population is subnormal not owing directly to environment, but to a reduced continental population. In 1946 ducks were everywhere scarcer than in 1944. When the total duck supply is greater, the various projects discussed should automatically harbour a larger number of these birds.

February, 1948: Since the above was written a further marked decline has taken place in the continental waterfowl population. This has doubtless had its effect upon the summer resident aggregate of ducks at Duncairn Reservoir. However, this has not altered the potentialities of the area as a good waterfowl resort. On the basis of the continental population of 1944, the reservoir would doubtless support a duck and other wildfowl summer population of 10,000 or more individuals. As a resting place for ducks and geese, during the autumn, it possesses great additional value. The area would constitute an excellent bird sanctuary and we unreservedly recommend that it be officially established for that purpose through necessary legislation.

MURRAY LAKE, SASKATCHEWAN

This body of water, together with Jackfish Lake as a single unit, was reserved by the Dominion Government as a public shooting ground nearly 23 years ago. It was established by Order in Council of March 9, 1925 (P.C. No. 347) under the provisions of Section 76 (e) of the Dominion Lands Act, 1908. The area was first inspected by the writer on July 3, 1936, in company with Mr. J. R. Hill (then Game Commissioner of Saskatchewan), Wardens Mosses and Symmons, and Judge A. E. Bence of Battleford. A few years later some causual observations were made in the vicinity, but little of real biological importance was learned owing to lack of time.

In the winter of 1946-47 the Saskatchewan Government tentatively placed Murray Lake on a list of various areas selected with a veiw to establishing them as new bird sanctuaries to replace those in the province proposed for cancellation. During the latter part of June, 1947, a joint inspection of the lake was conducted in company with Mr. W. A. Hartwell, Supervisor of Game, and the local game warden who resides at Cochin. Providing that Murray Lake was found acceptable as a proposed bird sanctuary, the Government of Saskatchewan was agreeable to withdrawing the area as a public shooting ground in favour of a sanctuary at this place. Such action would represent an advance in the cause of bird-life protection and conservation--a move of distinct benefit in this era of our history when human occupation is ceaselessly increasing and numerous forms of our wildlife are declining. Even with the withdrawal of Murray Lake as a part of the public shooting grounds, a much larger and more effective portion would still remain in the nearby Jackfish Lake. In consequence, sportsmen would not be deprived of a public area for wildfowl hunting in this district.

Physiographical Description:

Murray Lakes lies approximately 16 miles due north of North Battleford in Townships 46 and 47, Range 16, West of the 3rd Meridian; the mean geographical position is approximately Latitude 53°04' N, Longitude 108° 17' W. The village of Cochin is situated near the northern extremity of the lake,

which is flanked by the Moosomin and Saulteux Indian Reserves. At the narrowest part it is separated from Jackfish Lake by less than a half-mile (which lies to the west), while the maximum distance between them is about one and a half miles.

The contour of the lake is very irregular with numerous coves and bays. Of the latter there are two major examples, one occurring in the southwest quarter and the other in the southeast; perhaps the latter is to be regarded as part of the main body of the lake. At the extreme east end of this arm an island is located, nearly a mile in length. The principal axis of the lake extends in a northwest-southeast direction with a length of approximately six miles. The greatest width is about 1.4 miles; in several places it narrows to a few hundred yards. The total area to high water mark is about 3,300 acres. Elevation above sea-level is 1,737 feet. Several streams drain to Murray Lake from the northeast to southeast quarters, among them, Horse and Crystal Creeks. The lake drains by way of a very short stream from its north end into Jackfish Lake, which in turn empties through Jackfish River that flows to North Saskatchewan River.

While the greater part of the shoreline examined is of a muddy character, it is understood that some sections are firmer and in part composed of sand and gravel. Particularly would this condition presumably apply to the points. Much of the shore is margined by a belt of roundstem bulrush (Scirpus) of varying width, but the best waterfowl marshes occur in the extremities of the larger bays. In some areas there is a wealth of subaquatic vegetation, represented by numerous species, including those excellent wildfowl food plants, the pondweeds of the genus Potamogeton.

The topography of the district is generally characterized by the rolling nature of the terrain. Some of the hills and ridges are quite pronounced with the higher ground, in places, reaching the lake shore and thus modfying the character of the latter zone and imparting numerous irregularities to the shape of the lake. Locally, the land is relatively low with restricted bottomlands of little elevation extending to the lake shore. Some of the ground is open grassland, or under cultivation, while other areas, again, are clothed with shrubbery and scattered stands, or more extensive tracts, of thick poplar woodlands. The wilder and less modified portion of the environment lies to the North of Murray Lake. Particuarly is this true in relation

to the two Indian reserve areas previously mentioned. Unfortunately, through an oversight no photographs were obtained to illustrate the character of Murray Lake and surroundings.

From time to time the water-level is somewhat effected by prevailing climatic conditions. That is, prolonged dry periods can have an adverse influence on the quantity of water stored in the lake, although the subsidence is not of serious extent. The fact, however, that a degree of depreciation can occur is shown by comments in my report on Jackfish and Murray Lakes, of February 17, 1937, during the major drought of that decade:

"Surprisingly enough, drought has had definite ill effects upon this district despite the relatively high latitude. There is, however, a most substantial body of water in all lakes, and while marked subsidence has occurred, there is no danger of very acute depreciation as compared with the devastated lakes farther south. Moisture conditions are as good as they are here, no doubt, by virtue of the rolling terrain which, on the whole is so well supplied with broad tracts of poplar woodlands". It may be mentioned that in addition to moisture conservation on the part of the vegetational cover, latitude and greater rainfall with flowing creeks also played their part. Since the above was written the water-level has improved.

Climate and Faunal Life Zone:

Owing to climatic and other factors, the whole of the present district lies well within that part of the Northwest known as the "Mixed Woodland and Prairie" area, or the "Aspen Grove Belt". The lower limit of this belt is about 36 miles south of Murray Lake (edge of Grasslands Formation), and the upper limit about 20 miles to the north where it gradually merges into the "Northern Coniferous-Deciduous Forest." In this area the mean annual precipitation is normally 15 inches, and the average length of the growing season, 130 days. Mean daily temperatures are approximately as follows: January maximum 7°, minimum 9°, July maximum 75°, minimum 50°.

Faunal characteristics are those of the western humid subdivision of the Transition Life Zone. Owing to the locally mixed character of the vegetative cover, the bird and mammal life, in aggregate, reflect qualities of both the grasslands and deciduous woods biomes. Representtative species will be mentioned in succeeding pages.

Comments on Waterfowl:

It naturally follows that in an inspection of the present type, information on waterfowl could not be secured to the same extent as during a prolonged biological investigation. In fact, the data obtained was very limited. Sufficient knowledge of the area was secured, however, to suffice as an accurate indication of its good qualities as a prospective bird sanctuary. This substantiated earlier information as to its ornithological characteristics, both on the basis of personal inquiry and statements made by reliable local residents. Such was especially the case with respect to information obtained from ex-warden R. D. Symmons who was well known for his ornithological abilities.

Of some value with respect to a knowledge of the area it will not come amiss to record some of the data obtained on the birdlife during the investigations of 1936. During that season the continental population of ducks had reached an all-time low; the latter condition also obtained the following year. Nevertheless, ducks were present in attractive numbers. (Doubtless this was partly the result of thousands of lakes and sloughs drying up in territory to the south and west). They were sufficiently numerous to at once classify Murray Lake as an excellent wildfowl environment. The attractive marsh areas was an affiliated feature readily noted.

The duck species observed on that occasion were Mallard, Pintail, Lesser Scaup, Blue-winged Teal, Shoveller, Gadwall and Canvas-back. There was insufficient opportunity to secure accurate specific ratios for the aggregate population. However, little doubt existed as to the first three species named above being in the majority, with Mallards the most abundant. The other species are believed to be listed in their order of relative abundance; in any event the Blue-winged Teal was the most plentiful of these and the Canvas-back the scarcest.

Mr. Symmons stated that during the summer of 1936 (and for many years previously) about 5,000 Franklin's Gulls bred in a large marsh at the extreme east end of Murray Lake. The same area supported a large number of various duck species, some of which bred in the marsh, while other species nested on the land and later led their young to the marsh and other parts of the lake.

While they were not personally observed, Mr. Symmons reported that a fair-sized colony of Forester's Terns reproduced in the same general area; this was of special interest since nesting habitats of this species are comparatively few in the Prairie Provinces and very widely scattered. Shorebirds noted at the lake were Killdeer Plover, Lesser Yellow-legs, Solitary and Spotted Sandpipers, Marbled Godwit and Western Willet.

A rough calculation of the duck population at that time (1936) indicated an aggregate of about 4,000 individuals. In this connection it is to be remembered that the continental total was greatly reduced that year (as earlier mentioned) and this was undoubtedly reflected in the total number of ducks present at Murray Lake, though part of the total may have been the effect of drought concentration. Previous to the drought of the thirties, for example there might well have been a total twice as great. Waterfowl numbers in 1947 were at least superficially similar to those of 1936. The numerical status improved after 1938, but again declined from 1945 to 1947. Consequently the sporting duck population at Murray Lake was again depressed far below normal, not as a fault of the envornment, but as the result of a reduction in wildfowl numbers throughout the continent as a whole. With another up-swing in the regional population, Murray Lake will again improve with respect to its waterfowl aggregate.

Another feature of interest is attached to this area. Mr. Symmons assured me that Murray and Jackfish Lakes are situated in a major flyway of large numbers of ducks, Canada and Lesser Snow Geese, Whistling Swans and various species of northern waders. The locality therefore appears to be the recipient of a rich flow of migrating birds, spring and fall, as well as a large breeding population, especially under normal biological conditions.

From the viewpoint of protection Murray Lake with the status of a sanctuary would be of great value in providing rest and security especially during the hunting season. It would tend to offset the slaughter of birds that would legitimately take place in the nearby Jackfish Lake Public Shooting Ground. Any tendency in such a direction is directly in harmony with the needs of an era in civilization when many species of birdlife are facing diminution in numbers and require all reasonable measures of protection. If such measures do not prove adequate, the only solution is a closed season to prevent actual extirpation.

Additional Characteristic Wildlife:

Aside from the species of birds already mentioned as summer residents, or migrants, at Murray Lake, the following birds are known to occur in the district; this is only a partial list which would be greatly expanded by prolonged local observations:

Red-tailed, Sparrow and Marsh Hawks, Mourning Dove, Great Horned Owl, Nighthawk, Flicker, Hairy and Downy Woodpeckers, Kingbird, Phoebe, Least and Alder Flycatchers, Horned Lark, Tree and Barn Swallows, Purple Martin (rare), Crow, Black-capped Chickadee, House, Short- and Long-billed Marsh Wrens, Brown Thrasher, Willow Thrush, Cedar Waxwing, Red-eyed and Warbling Vireos, Yellow and Black and White Warblers, Western Meadowlark, Yellow-headed, Red-winged and Brewer's Blackbirds, Cowbird, Rose-breasted Grosbeak, Slate-colored Junco, Goldfinch, and Savannah, Baird's, Leconte's, Vesper, Song, and Clay-colored Sparrows.

The enumeration of these species will at once provide a ready comprehension of the ornithological character of the life zone which typifies the Murray Lake locality. Some of the characteristic mammals are: Cinereus Shrew, Skunk, Red Fox, Coyote, Woodchuck, Richardson Ground Squirrel, Little Northern Chipmunk, Red Squirrel, Pocket Gopher, White-footed Mouse, Red-backed Jumping, and Meadow Mice, Muskrat, Varying Hare, and Mule Deer.

Concluding Remarks:

As will have been noted from the foregoing remarks, Murray Lake is an attractive area and well-suited to the purposes and requirements of a bird sanctuary. It is not too severely effected by severe drought periods such as the one that occurred in the past decade. Even some of this undesirable effect could be offset and controlled by a small dam on the stream that drains from it to Jackfish Lake. The water supply is permanent; under normal conditions of moisture it is fed by several active streams. The lake provides an excellent waterfowl habitat with its several marshes and its combination of good water, abundant subaquatic duck foods, and the extensive shrub and woodland areas adjacent to the lake.

The proposed conversion from its present status as a public shooting ground to that of a bird sanctuary is an action deserving approval in the light of present-day decline of many species of our fauna. We unreservedly recommend that Murray Lake be adopted for the purpose proposed and thus established as an inviolate sanctuary at all times and in perpetuity. Such a reservation would constitute an improvement beyond any comparison in relation to one of the old, dried-up sanctuaries which it is proposed to replace.

SCENTGRASS LAKE, SASKATCHEWAN

Scentgrass Lake was tentatively selected by the Saskatchewan Government, prior to field inspections, as an apparently suitable area for a new bird sanctuary to replace one of the dry sanctuaries listed for cancellation. Immediately following the inspection of Murray Lake, the present area was jointly investigated in the latter half of June, 1947. The party consisted of Mr. W. A. Hartwell, Supervisor of Game, the provincial district game warden and the writer.

In order to obviate any confusion it should be stated here that two lakes of the same name are situated in this locality. At least, this is local usage and apparently lacks the sanction of the Geographic Board of Canada. In any event, the larger body of water with which we are now concerned is locally known as "East Scentgrass Lake" and the smaller one, a half-mile west, as "West Scentgrass Lake". They are joined by a creek, that flows through a grassy marsh area between, and drains from the latter lake to Murray Lake, five miles to the northwest.

The original intention was to propose the inclusion of both lakes in the new sanctuary (as an unbroken strip also embracing the interconnecting marsh), but complications arose in connection with the Moosomin Indian Reserve (No. 112A); it flanks "West Scentgrass Lake" on the north and extends south into the grassy bottomlands or marsh as far as the creek (See Dominion Sectional Sheet No. 267). Under the circumstances the marsh and the west lake were withdrawn from the original plans. Consequently, the water area proposed for the sanctuary embraces only Scentgrass Lake, proper. The following description and general remarks apply to it exclusively.

Physiographical Description:

The west end of Scentgrass Lake (Fig. 9) is separated from the southern extremity of Murray Lake (dealt with in the preceding section) by a distance of six miles. North Battleford lies about 13 miles to the south-southwest. All but a trivial fraction of the lake (at the west end) is located in Township 46, Range 15, West of the 3rd Meridian and contained in Sections 7, 8, 9, 16, 17 and 18. The small portion west of this lies in Sections 12 and 13, Township 46, Range 16.

Mean latitude and longitude are 52° 57' 30"N. and 108° 09' W., respectively. Elevation is approximately 1,747 feet a.s.l. It may be mentioned at this point that a municipal road skirts the western extremity of the lake.

The main axis of Scentgrass Lake trends exactly east and west. The length is slightly over two and a half miles and the greatest width about 1.8 miles. A prominent point about mid-way of the south shore juts to the north (extreme left, Fig. 9), thus in a sense dividing the lake into two distinct areas, the larger of the two lying to the east. The "narrows", however, is not of a restricted character since this narrowest part is fully three-quarters of a mile wide. The shoreline is relatively simple, although the contour expresses itself in a number of coves and inextensive bays. Roughly calculated to the high water mark, the total area of the lake is about 1,500 acres.

Two minor creeks, or brooks, enter the lake from the east. A larger stream, Crystal Creek, flows from the northeast to "West Scentgrass Lake" and thence to Murray Lake; it joins the stream that drains Scentgrass Lake, within a few hundred yards of the latter, and thus during time of spring freshets, or very heavy rains, ostensibly replenishes the water supply in the area under discussion. In any event, Scentgrass Lake is an excellent body of water of positively, permanent character. It appears to be little effected by periods of subnormal precipitation. It was stated that this stability is the outcome of active springs in the creeks which feed it.

Much of the area is shallow, or relatively shallow, but central parts are said to be of good depth. Most of the shoreline is of an earthy, muddy character; some sections, however, are firmer with an admixture of stones and boulders. Scattered marsh areas occur in the west and northwest sectors (Figs. 8 & 9) and at the east end, as well as elsewhere along the shores. These constitute excellent reproductive habitats for marsh-nesting waterfowl. The cover consists of bulrush (Scirpus), cattail (Typha) and various aquatic grasses and other vegetation.

The nature and relative abundance of the sub-aquatic plantlife was not well ascertained, owing to lack of a boat, or canoe. However, it was clearly observed in some sections around the shores that this type of growth was either abundant, or fairly well represented. Included among these plants are species of pondweeds (Potamogeton), watermilfoil (Myriophyllum), duckpotato (Sagittaria) and duckweed (Lemna). These are all duck foods, the Potamogetons having notably high value in this respect.

The topographical nature of the locality is fairly well illustrated in the two photographs provided. Most of the terrain is seen to be of a very gently rolling type, well adapted to agriculture, with but moderate elevation above lake-level; the average seems to be about 30 to 40 feet. Higher ground occurs in restricted areas as hills and ridges, an example of which appears in the left distance of Figure 8. Numerous areas are wooded with aspen poplar (Populus) and shrubbery. Of the latter, leading examples are snowberry (Symphoricarpos), silverberry (Elaeagnus) and wildrose (Rosa). Thickets of alders (Alnus) and willows (Salix) generously border the lake shore at many points, as well as associated creeks and marshes. A high percentage of the district is under cultivation, but considerable primitive land also occurs.

Climate and Faunal Life Zone:

The remarks made under this sub-section, in connection with Murray Lake, apply with equal force to the Scentgrass Lake locality. Repetition is unnecessary in this place and the reader, if interested, can refer to the details in the place mentioned.

Comments on Waterfowl:

Information gained on the wildfowl in this instance was incomplete and totally inadequate for a full knowledge of this resource. The nature of the investigations, however, did not lend itself to detailed and extensive research along these lines, as will be appreciated, but aimed merely in ascertaining the general character of the area to determine its appropriateness as a potentially good

bird sanctuary, or the reverse. The very fact that this report is being written on the area indicates that a decision was made in the affirmative.

It may be briefly stated that an attractive representation of ducks was observed at this lake. Many were more or less concentrated in the marsh tracts, such as depicted in Figures 8 and 9, together with a number of American Coots. With the aid of X8 binoculars wildfowl could be seen generally distributed over the entire expanse of the lake. Relative abundance varied greatly from one area to another. In some sections the birds were thinly scattered--in others, concentrated in conspicuous numbers, In several places a few hundred examples were noted within a comparatively small area.

The species identified were Common Mallard, Pintail, Baldpate, Shoveller, Gadwall, Ruddy Duck and Blue and Green-winged Teal. There was little question as to the Mallard being the most abundant species and the Green-winged Teal the scarcest. Specific ratios were not obtained for these or the other ducks, but it may be said with some degree of certainty that the Pintail, Baldpate and Shoveller were in some unknown order of abundance next to that of the Mallard, with Blue-winged Teal in fair numbers. Very few Gadwall, Ruddy Duck, or Green-winged Teal were noted.

On the whole, a very good representation of sporting ducks was in evidence in this area. In view of the late June date of the observations, the migration was long since over and the entire population was to be regarded as the stabilized summer breeding aggregate. A tentative estimate of the total, adult population of ducks was placed at not less than 1,500 individuals. In relation to the size of the area, this is not a large number.

The lake is undoubtedly capable of supporting a denser population. This assumption is based on the size and quality of the territory concerned, with due consideration to the available food supply and nesting accomodation in both marsh areas and woodland-shrub-grassland habitats.

Like most lakes within a huge territory of the West last year, Scentgrass Lake was undoubtedly under-populated owing to a serious decline in the total wildfowl population of the continent as a while. With an increase in the supply of these birds, one would naturally anticipate a more generous summer aggregate at this lake in the future. Many of the comments appearing in the Murray Lake report, page 29, paragraph three, have equal application to the present area.

Lake Murray Lake, it is stated that Scentgrass has a much larger population during the autumn when migrations of wildfowl sweep in from the north, or northwest. At that time ducks become much more plentiful (including additions of Lesser Scaup) and the lake also attracts numbers of Canada and Lesser Snow Geese and Whistling Swans. The area, were it declared a sanctuary, would do excellent service at this period, alone, in providing rest and safety, and protecting the birds from an increasing number of gunners.

Other waterbirds noted in the locality were Franklin's Gull, Black Tern, Western Willet, Marbled Godwit, and Spotted Sandpiper. A Sora Rail was heard calling in the west-end marsh (Fig. 8). Other marsh inhabitants undoubtedly occur which were not detected. The number of shorebirds is markedly augmented during the time of the spring and autumn migrations.

Additional Characteristic Wildlife:

With respect to this subject, the reader is referred to the sub-section of the same name in the Murray Lake report. Since the two localities are located in rather close proximity, within the same district, the fauna may be considered as practically identical. The list of species would be virtually the same, though relative abundance might well vary from one locality to another.

Concluding Remarks:

We would venture to say that within the bounds of long-settled country in the West, few lakes exist today with better qualifications than the lake under review.

Its several good features have been sufficiently described to provide a reasonably ample knowledge of its worth for the purpose in view. Without hesitation we believe that Scentgrass Lake possesses the elements necessary for an excellent bird sanctuary, in keeping with its size, and we therefore advocate its establishment as such a preserve. One could wish for a larger area, but suitable lakes for this purpose in southern Saskatchewan, not already reserved, are increasingly difficult to find. The present lake is available and we think should be put to the use proposed.

Before terminating this report another fact should be noted. In view of the decline of waterfowl the local fish and game association of North Battleford formally requested the Saskatchewan Government to establish Scentgrass Lake as a bird sanctuary, or game preserve, as it also did with respect to Murray Lake. Some local residents in these localities expressed a similar desire. It will be noted, therefore, that wide-spread support exists for sanctuaries at these points. Such an attitude demonstrates an increasing public consciousness in connection with the need for more wildlife protection and intensified conservation.

One of the factors behind the public desire for the establishment of a sanctuary at Scentgrass had to do with the excessive slaughter of wildfowl in the natural flyway between "East" and "West Scentgrass Lakes". Most of the killing took place on or near the road which skirts the west end of the former lake. Not only was the kill high at this vulnerable spot, but a large percentage of the birds were lost in the thick vegetation of the surrounding marsh and bottomlands. There was also a high degree of crippling losses.

It was reasoned that were the whole area created a preserve, among other desirable features it would permanently end the excessive killing of wildfowl at this point. If the area here described is set aside as a sanctuary it is highly desirable that some provision be made to outlaw any shooting along the road to which earlier reference was made; preferably, the sanctuary area should be extended,

if possible, well west of the road to include at least the N.E.¼ of Sec. 12 and the S.E.¼ of Sec. 13, Township 46, Range 16. Apparently such a step would not interfere in any manner with the adjacent Moosomin Indian Reserve, No. 112A.

UPPER ROUSSAY LAKE, SASKATCHEWAN

On June 26 and 27, 1947, Mr. W. A. Hartwell and the writer jointly inspected the Roussay Lakes. During part of the investigations were were accompanied by district Game Warden Deiton, and Dr. H. S. Swallow of Yorkton, an officer of the Yorkton Fish and Game Association, and an ardent lover of wildlife and conservationist.

Original plans embraced both Upper and Lower Roussay Lakes in connection with a proposal for the establishment of a new bird sanctuary in this locality; creation of such a preserve would automatically replace one of the old, dry sanctuaries for which abolishment is being jointly recommended. Coincident with local investigations it was discovered that certain handicaps unfortunately, made it inadvisable to include Lower Roussay Lake (much the larger of the two areas), thus making it necessary to confine attention to Upper Roussay Lake. Therefore, it is only the latter body of water that is herewith proposed as a bird sanctuary and to which the following remarks apply.

Physiographical Description:

Upper Roussay Lake lies in a west-southwest direction from Yorkton at a distance of about 4.5 miles. It is closely flanked by Lower Roussay Lake on the east (with York Lake 2.5 miles distant to the southeast) with its location in Sections 25 and 26, Township 25, Range 5, West of the 2nd Meridian. Approximate latitude and longitude are 51° 11' 30" N., and 102° 35' W., respectively. (See Dominion Sectional Sheet No. 170). Elevation above sealevel is 1,675 feet.

As shown on the 1916 topographical map of the district, Upper Roussay Lake assumes nearly a circular shape with only a few minor irregularities along the north shore. Such would appear to indicate, conclusively, that the water-level at that time was appreciably higher than that prevailing now. With reference to Figure 11, it may be seen that a long point thrusts into the lake from the west which is virtually absent on the map referred to above. Aside from this, however, the contour of the lake is notably simple with few indentations or points of land of any significance.

A view embracing a portion of the east side of the lake is provided in Figure 10. Practically all of the lake is contained in Section 25, but at high water-level, at least, a small portion extends west into Section 26. The total water area covers about three-quarters of a section, or approximately 480 acres. At the moment of writing the total, proposed area for the sanctuary is uncertain; the Saskatchewan Government has plans for including much surrounding land which would materially increase the size and value of such a preserve.

The lake is relatively shallow, but at the same time it is several feet deep (parts six feet) in the central and deeper sections of the area. During the drought of the thirties this and Lower Roussay Lake went totally dry, the latter being the more susceptible of the two lakes to deficient precipitation. Since then, however, Ducks Unlimited developed a ditch from Willow Brook which led to the near-filling of both Roussay Lakes. Local residents are convinced that these areas will not go dry again and that the waters are therefore permanent. Such, no doubt, would be especially safe-guarded if the ditch is constructed from Cussed Creek to Upper Roussay Lake which is now under serious consid-eration (Such a development would not only supply a greater volume of water to the Roussay Lakes, but also to York Lake, all three of which have been already rehabilitated by the Willow Brook project).

The shoreline is everywhere low and without prom-inent topographical features of any description. Conse-quently the greater part is of a swampy or muddy nature. Little is fully exposed, since the margin is mostly fringed by a screen of round-stemmed bulrush (Scirpus) and less commonly, cattail (Typha), while much of the littoral zone is clothed with various grasses, sedges, shrubbery and trees. Little was ascertained with regard to the kind and relative abundance of the subaquatic vegetation. Nevertheless, it was noted that in some tracts, at least, such plantlife was plentiful. Local residents interested in waterfowl, and the character of the lake, stated that such duck-food vegetation thrived in considerable abundance. Rather extensive cover exists for marsh-nesting waterfowl.

As will be noted in the accompanying photographs, generous stands of woodland and shrubbery characterize the lake environs. The predominant tree is the aspen poplar (Populus tremuloides), followed by scattered examples of the balsam poplar (P. balsamifers). The shrubbery of the district consists chiefly of willow, alder, silverberry, snowberry wildrose. The environment provides plenty of protective cover for land-nesting wildfowl. As a further comment upon the essential, physical aspects of the locality, it is to be mentioned that the greater part of it is occupied by farms and under active cultivation and production. The smaller percentage is still in a relatively wild state, or devoted to grazing. An example of some pastureland appears in the foreground of Figure 10.

Climate and Faunal Life Zone:

In common with the Prairie Provinces, as a whole, the winter is long and relatively cold and summers of about three months duration, moderately warm, but with some periods that are notably hot. Spring usually commences in the latter part of March, or early April, and autumn about mid-September. Winter normally arrives in late October, or early November. Normal total precipitation per annum averages about 17 or 18 inches. Average length of the growing season (average date of seeding to average date of first heavy frost) is approximately 130 days. Examples of mean daily temperatures are about as follows: January minimum -8°, maximum 8°; July minimum 50°, maximum 76°.

The district lies on the Second Prairie Steppe deeply within the Aspen Grove Belt. In this longitude the latter is about 125 miles wide, Upper Roussay Lake lying 65 miles from its northern margin at the beginning of the Northern Coniferous Forest. The pure Grassland Formation, as distinct from scattered prairies in the Aspen Grove Belt, is approximately 60 miles to the south. Zoögeographically, the district lies in the western humid sub-division of the Transition Life Zone. The Canadian Life Zone begins about 65 miles to the north.

Comments on Waterfowl:

Upper Roussay Lake is inhabited by most species of sporting ducks common to the Prairie Provinces. At the time of the investigations it was said by local students of natural history that it supported a sub-normal population of these birds. This was evident from a general appraisal of the situation, since waterfowl could not be considered plentiful.

It is to be kept in mind that such a condition was consistent with the general regional and continental decline in the duck population during the past several years. Consequently, the reduction from normal in the wildfowl aggregate at this lake is not necessarily chargeable to the inadequacy of the environment but to the widespread condition mentioned as prevailing at this period. As a matter of fact, the Roussay Lakes have the reputation of being normally good duck areas both during the breeding season and periods of migrations.

Insufficient investigations could be conducted under the circumstances to determine the relative abundance of the various ducks by way of tallies for specific ratios. As in most areas, Mallards were undoubtedly the most numerous. With regard to several other species their status is uncertain. However, it may be said that Pintail, Baldpate, Shoveller, Lesser Scaup, and Blue-winged Teal were fairly well represented, while Gadwall, Ruddy Duck, Redhead and Canvas-back were notably scarce, or occurred in only very moderate numbers. The two latter species, in particular, were apparently in the former category. We were reliably informed that a few Canada Geese breed at this lake; they were not personally observed. Apparently the total duck population did not exceed 400 to 500 individuals.

Other species of waterfowl and shorebirds occurring in varying numbers at this lake included Eared, Pied-billed, and Western Grebes, Black-crowned Night Heron, Sora Rail, American Coot, Killdeer and Upland Plovers, Western Willet, Lesser Yellow-legs, Marbled Godwit, Franklin's Gull, and Black Tern. A much richer assembly of ducks and geese appear at the lake during the seasonal migrations than is found there as a static, breeding population during the summer months.

Other characteristic forms of wildlife are essentially the same in this district as at Murray Lake, under which heading a partial list of typical species was provided. Both lakes are situated in the same life zone and, although far apart, the majority of species range over a wide territory in the same zone with little change in the overall character of the local fauna.

Concluding Remarks:

We mutually recommend the adoption of this lake to be established as a bird sanctuary. Its acceptance, followed by joint legislation, would set it aside for the above purpose in lieu of one of the dry Saskatchewan bird sanctuaries long ago established under the Migratory Birds Convention Act.

Upper Roussay Lake is smaller than the ideal area conceived in our search for acceptable area to be recommended for new bird sanctuaries. However, the lake has quality. A bird sanctuary is desirable in this part of Saskatchewan; during the course of the official inspections several areas were examined in the district with this end in view, but owing to their lack of suitability, or other cause, the initial plans were necessarily abandoned.

Although Upper Roussay Lake is of restricted area, as compared with many other provincial sanctuaries, we believe it to be suitable for the purpose intended; we also think it to be an advisable action to create a bird sanctuary in the Yorkton district. Many local residents approached the Saskatchewan Government with an appeal to have either one or both of the Roussay Lakes established as a sanctuary. Such people included numerous residents of Yorkton, among them many members of the Yorkton Natural History Society and the Yorkton Fish and Game League. Consequently, it will be appreciated that there is much support and demand for a bird sanctuary at Upper Roussay Lake.

FOREWORD TO THE SUCCEEDING SECTION ON SANCTUARIES

In the foregoing section of this report attention has been directed to proposals and recommendations with respect to the cancellation of five Saskatchewan bird sanctuaries and the establishment of five new ones to replace them. The succeeding section is of different character. The various individual reports deal with long-established bird sanctuaries that are to be retained, but which embrace certain parcels of land that are discussed in connection with proposed changes. Only those pieces of sanctuary land are brought into the picture for which there appears to be any justification for proposing alterations in their present status.

These portions of various sanctuaries were jointly inspected during the autumn of 1947 by Mr. W. A. Hartwell, Supervisor of Game, Saskatchewan Government, and the writer, representing the Dominion Government. The present review is the result. The conclusions presented are those jointly reached and agreed upon at the time of the joint inspections on the ground. Areas slated for inspection, but which upon examination were mutually agreed upon as being unquestionably of present high and future value to the sanctuary, were promptly dismissed at the time and do not appear in this place.

The desirability of the inspections and request for the same was originally introduced by the Department of Agriculture, Government of Saskatchewan. It was contended by that department that various pieces of sanctuary property lacked any intrinsic value for the ends originally intended and therefore were unessential to the respective reservations. In some instances it would appear that such was the fundamental character of certain areas from the beginning; necessarily they would continue likewise into the future.

Under such circumstances, the Department of Agriculture logically concluded that where sanctuary areas existed which possessed little or no value in this connection, nor were basically contributory to the cause of bird conservation, such areas would serve a higher and better enconomic purpose by being cancelled and converted to the

aims of agriculture. In some cases this reasoning was found to be incontestably sound and true with actual application to certain lands. In some other instances, however, (with reference to the list of items proposed for inspection), we jointly concluded that the proposition did not unconditionally apply. Therefore, cancellation could not be recommended.

The maximum number of items on the list for which alteration in status was deemed as warranted in any manner are dealt with on following pages. They are shown in yellow on accompanying sketch maps drawn on base township plans. Separate parcels of land are 14 in number associated with five sanctuaries--Quill, Lenore, Middle, Basin and Last Mountain Lakes.

In making the recommendations which appear, our best judgment was exercised. Complete vindication for these are not always readily app rent either from a study of the maps, nor from the descriptive text. Reasons for the final conclusions are most in evidence upon examination actually in the field. In that place, matters are clear which are not so transparent in writing. Many factors enter the picture such as the general physiological aspects of the situation; location of the discussed areas in relation to the lakes concerned; actual or potential wildlife habitat values; relationship to adjacent property, privately owned and otherwise; the consequences of past and present drought effects with respect to lake levels, etc., together with future prospects; and various other aspects of the case which one senses from considerations of the whole with consequent reactions affiliated with absorptions derived from studying values and conditions in a state of nature.

In a number of cases cancellation of certain sanctuary lands was unconditionally recommended. In others we could not go so far, but felt justified in advocating an alternative plan, that of granting a provisional grazing lease. We deemed this proper and expedient so as to utilize the land for stock raising where such land is presently worthless as sanctuary (and has been for the past 10 to 15 years), but may become valuable as a wildfowl habitat again some time in the future.

This is intimately related to water-levels in the various lakes; in most instances, they have deteriorated almost beyond belief. It is problematical with such widespread cultivation in the implicated districts if the lakes will ever again become restored to their one time height and quality. If they do not, grazing could continue on the areas concerned without detriment to sanctuary principles or waterfowl propagation and protection. However, if the lakes do return to normal (thus favourably effecting the land habitats which are now of only vague, potential value), the grazing leases of the land units involved here should be nullified immediately. This is the reasoning behind our recommendation adverse to outright cancellation, but in favour of a distinctly provisional lease.

Unwarranted encroachment upon the bird sanctuaries in any part of the Dominion cannot be tolerated, since such reserved areas, in aggregate, are of relatively small extent in relation to the whole and in the face of ever expanding civilization; wildlife must be ceaselessly protected and cared for or it will inevitably disappear. Such must be constantly accepted and adhered to as a cardinal principle with respect to the perpetuation of bird sanctuaries and all other wildlife reserves for the preservation in this day and age of many species of our fauna. In some respects it is already too late and in others our wildlife resources have slowly but surely suffered a regrettable decline.

For convenient reference to the land units treated, hereafter, they are listed below in their order of occurrence. The recommended change in status is indicated after each item.

Sanctuary	Land Unit	Recommendation
Quill Lakes	S.E.¼ 29-34-16, W 2	Canacellation
" "	N.W.¼ 36-34-17, " "	"
" "	E½ N.E.¼ 11-35-17W 2	"
" "	N.W.¼ 20-35-17 W 2	"
" "	S.W.¼ 19-35-17 " "	"
Lenore Lake	F.E.½ 29-40-21 " "	"
" "	S.W.¼ 20-40-21 " "	Provisional lease
" "	N.E.¼ 19-40-21 " "	" "
Middle Lake	N.E.¼ 18-41-22 " "	" "
" "	S.W.¼ 18-41-22 " "	" "
Basin Lake	S.W.¼ 25-42-23 " "	Cancellation
" "	N.E.¼ 13-42-23 " "	"
" "	F.E.½ 1-42 -23 " "	Provisional lease
Last Mountain Lake	W.½ 13-28-24 " "	Canacellation

QUILL LAKES BIRD SANCTUARY, SASKATCHEWAN

(Dominion Sectional Sheet No. 219)

Southeast ¼ Sec. 29, T. 34, R. 16, W. 2nd Mer.:

This fractional quarter section is located on nearly level to slightly undulating land devoid of any outstanding topographical features. The southern two-thirds of the area comprises open grassland with excellent qualifications for grazing; the greater part of it is composed of good arable soil suitable for agriculture. Approximately the northern third of the area is clothed with moderately continuous, to well-scattered "bluffs" of the familiar aspen poplar.

It is bounded on east, west and north by privately owned land. On the south it is flanked by the narrow channel connecting "Big" and "Little" Quill Lakes. This channel is a part of the sanctuary and to the extent of its area in this tract substracts that much upland from the quarter section under review; that is, the apparent land area is something like 120 to 130 acres (see attached sketch map). Much of the time, and for relatively long, continuous periods, the channel has been totally dry, with consequent disconnection of the two lakes.

Because of the severe drought of the thirties, the Quill Lakes suffered a marked decline in the water-level, a process that has gradually continued up to the present time. For this reason the channel has been totally, or periodically dry for a long term of years. To a major extent the value of the quarter section under discussion depends upon water in the channel so as to properly function as an available habitat for wildfowl. It has not so functioned to any practical extent for about 15 years. It is quite liable to remain in this category for a long time to come and will, in addition, be susceptible to the severe effects of major drought recurrences which are certain to strike again periodically.

At no time in the foreseeable future will this quarter section be of moderate, or perhaps any practical, value as a sanctuary area (notably with respect to wildfowl), and it is on this account that the Provincial Department of Agriculture contends that it should be cancelled and put to real economic use. In this we agree after careful consider-

ation of the associated conditions and prospects bearing upon the case. As may be seen in the accompanying sketch map, numerous, additional sanctuary lands are available in the vicinity, as well as the whole lake area. We consider that these will adequately meet the local resting and nesting needs of waterfowl. Therefore we recommend the cancellation of the present quarter section.

QUILL LAKES BIRD SANCTUARY, SASKATCHEWAN

(Dominion Sectional Sheet No. 219)

Northwest ¼ Sec. 36, T. 34, R. 17, W 2nd Mer.:

The whole of this quarter section is flat to gently rolling without topographical features of any distinction. It is chiefly characterized by its open nature, as it is completely composed of grassland and devoid of trees. In addition, shrubbery is practically non-existent in which game ducks normally secrete their nests in the parklands areas of the West. While much of the territory surrounding the Quill Lakes is either natural, grassy uplands, meadows, or arable lands under cultivation, some tracts are of the true aspen grove type with numerous stands of aspen poplar (Populus tremuloides).

On both the west and south, respectively, the area under discussion is flanked by somewhat more than a quarter section of sanctuary land which extends to the former lake shore. (Note attached sketch map). But the old shoreline is now some distance from the water owing to the subsidence of the water-level. The intervening terrain is composed of barren mudflats, in part, strewn with stones and boulders. For this reason the sanctuary has materially deteriorated both in appearance and for practical purposes.

Even under normal conditions, and in view of the nature of the terrain and lack of cover, it is very doubtful if this quarter has any practical value as a part of the sanctuary. At the present time it is considered as having no material worth in relation to migratory birds. Certainly in connection with the more important species, such as waterfowl, it is useless, since the grass is short and lack of other cover is nearly absolute, while at the same time it is far removed from water. This is even more notable since the lake subsided during the drought of the thirties and has remained in this condition ever since.

The soil is suitable for farming and could readily be placed under cultivation. In view of the lack of merit of this quarter section for bird sanctuary purposes and its value for wheat-growing the provincial Department of Agriculture is therefore concerned with acquiring the area

for conversion to better enconomic uses. Because of its worthless character as sanctuary (for at least the past 15 years) it was leased some time ago for grazing purposes to the municipality. A windmill was erected on the area to supply water to cattle. Because of the circumstances and conditions just described, we unconditionally recommend that this quarter section be cancelled as a part of the sanctuary so that it may be utilized for agricultural purposes.

QUILL LAKES BIRD SANCTUARY, SASKATCHEWAN

(Dominion Sectional Sheet No. 219)

East ½ of N.E.¼, Sec. 11, T. 35, R. 17, West 2nd Mer:

Nearly the whole of the land portion of the fractional east half of Section 11 is gently rolling with an elevation of only a few feet above the high water mark of Quill Lake. A substantial portion is treeless and covered with grasses and other vascular plants; there are a few scattered shrubs. Other areas are clothed with a mixture of various shrubs and patches of aspen poplar. The whole or the greater part of the area, is suitable for agriculture.

The Saskatchewan Department of Agriculture requested the release of the whole fractional east half of Section 11 for purposes of cultivation. Careful field inspection, however, indicated that it would be inadvisable to cancel any parts of legal subdivisions, 1, 8, 10 and 15 (2 and 7 are in the lake area)--the only portions in the east half of Section 11 which are flanked by, or normally have an intimate association with, the lake in relation to wildfowl welfare and general conservation.

With the lake about 12 feet subnormal in level at the present time (bounded by wide mud-flats) this viewpoint is temporarily somewhat irrelevant; however, if and when the lake again attains to a high water-level it is unquestionably desirable to have retained the legal subdivisions mentioned (1, 8, 10, 15). Much cover obtains on these areas for purposes of waterfowl nesting. Despite the low water-level, they doubtless function now as an acceptable nesting habitat, but they would become even more desirable at high water stages when the existing, extensive mud-flats are eliminated. Under such conditions, the water and tree-shrub tracts are immediately adjacent.

However, legal subdivisions 9 and 16 are composed of open grassland fit for tillage and could, with propriety, be released on the basis of the request from the Department of Agriculture. Both subdivisions present a

rather barren aspect and have but very minor, if any, value as a wildfowl nesting environment. In the immediate vicinity there would still remain an extensive strip of sanctuary land adjacent to the lake shore (See accompanying map). Under existing circumstances we recommend that subdivisions 9 and 16 be cancelled as a part of Quill Lake Bird Sanctuary and thereby legally released for agricultural purposes.

QUILL LAKES BIRD SANCTUARY, SASKATCHEWAN

(Dominion Sectional Sheet No. 219)

Northwest ¼ Sec. 20, T. 35, R. 17, W. 2nd Mer.:

Because of the general character of, and circumstances surrounding this quarter section, a specific request was lodged by the Saskatchewan Department of Agriculture for its release by the Dominion Government for cultivation. It is substantially similar to the N.W.¼ of Sec. 36, T. 34, R. 17, previously described in connection with this sanctuary. The entire tract is simple grassland without shrub or tree cover of any kind. The soil is arable and thus suited to the raising of cereal crops.

Under normal conditions the quarter section's southern boundary is approximately one-half mile distant from Quill Lake. At the present time, and for a long term in the past, it is about twice that distance from the water as the latter has greatly receded leaving behind a wide and desolate mud flat. The quarter section under discussion is thus not only far removed from water, but is also completely isolated in relation to other terrestrial sanctuary areas (see accompanying map). It would clearly be of more practical value, more logically disposed and easier to mark and administrate if it were located at the lake shore and continuous with the lake area of the sanctuary.

In addition to these shortcomings the quarter section is too barren of cover and far removed from the lake to serve in a practical manner as an integral part of the sanctuary. It is virtually worthless as a wildfowl nesting habitat; this has been particularly true during the past 15 years. With the lake level down about 12 feet, this maximum depreciation is liable to bear upon the case for a long time in the future. Because of its patent uselessness from a sanctuary viewpoint, this quarter section was leased several years ago to the municipality as a community pasture. In order to supply water to the cattle a windmill was installed on the area.

In view of the inherent characteristics of this quarter section and its location, we unconditionally recommend that it be cancelled outright as a part of this sanctuary and thus make it available for some practical utilization.

QUILL LAKES BIRD SANCTUARY, SASKATCHEWAN

(Dominion Sectional Sheet No. 219)

Southwest ¼ Sec. 19, T. 35, R. 17, W. 2nd Mer.:

Little can be said with regard to the present tract that has not been expressed already in connection with the preceding quarter section. The two areas are virtually identical, physiographically, as well as having similar characteristics with respect to location and mutual relationship to each other and other sanctuary areas, including the lake itself. In short, the present quarter is completely isolated and far removed from the old lake shore and much farther from the lake, proper, under present conditions of notable water subsidence and recession. The situation may be readily grasped by consulting the map. The area under review is characterized solely by grass cover and therefore entirely devoid of any sheltering shrubs and trees.

The reason for the discussion of this part of the bird sanctuary is the same as that involving the preceding areas. The land is arable and in view of the negligible value of this quarter section the Saskatchewan Department of Agriculture requested its examination under the joint inspections and asked for its cancellation in due course. Owing to the transparent lack of value of the tract as waterfowl nesting terrain, or other practical sanctuary purposes, it was leased by the Saskatchewan Government some time ago to the municipality as a community pasture. It was functioning in that capacity when jointly investigated last season.

For the same reasons as advanced in connection with the N.E.¼ of Sec. 20, T. 35, R. 17 (of this same sanctuary), we are of the conviction that the present quarter section is of negligible worth as a part of Quill Lakes Bird Sanctuary. Consequently, it is our opinion that it may be properly cancelled and thus made available for agriculture.

LENORE LAKE BIRD SANCTUARY, SASKATCHEWAN

(Dominion Sectional Sheet No. 219)

Fractional East ½, Sec. 29, T. 40, R. 21, W. 2nd Mer.:

This parcel of land was requested for release from the sanctuary by the Saskatchewan Government for the purpose of veteran settlement. It is suitable for agriculture, except, possibly, for a narrow fringe along the lake shore. As will be seen on the attached sketch map, this fractional half-section is bounded nearly throughout its full length on the east side by Lake Lenore. The area is gently undulating in character, mostly open grassland, and virtually devoid of trees and shrubs. There is, however, a small tract of aspen poplar in the extreme northeastern part.

Whether intentional, or owing to an unwitting error in area identification, some of this half-section was found under cultivation at the time of the joint inspections. Thus, a small tract of a few acres was in crop at the north end and also a strip approximately one-fifth of a mile wide practically throughout the length of the west side; this is part of an adjoining field that was obviously carried too far east and into the sanctuary.

Owing to its location adjacent to the lake, it would appear illogical to relinquish this fractional half-section as part of the sanctuary. However, upon actual examination and study of the physiographical properties of the area, a different opinion is formed. The relatively barren aspect of the topography and lack of cover for waterfowl nesting clearly indicates this area as having relatively little, if any value, as sanctuary property. These features are inherent in this area. It would appear to have been of this character even during the best of times, but, if anything, it is worse today owing to the notable drop in the lake-level and the wide recession of its waters. Owing to this development, with the consequent introduction of wide mudflats, this part of the sanctuary has suffered a very marked deterioration in character as compared with the time in which the lake was a t a high level. It has been in this inferior condition for 12 to 15 years and may continue in the same condition for a long time into the future with most of the neighbouring land under cultivation.

We can see no good reason for retaining this fractional half-section as a part of the sanctuary. It apparently does not function with any appreciable merit in relation to the original purposes for which it was set aside; chief among these was ostensibly waterfowl protection and reproduction. Character of the area indicates that very few if any game ducks would use the area for bringing forth young, or utilize it to advantage in any other way. So far as small passerine, migratory birds are concerned, only a few individuals are represented and there is ample waste land in the vicinity for their accomodation. It is our belief that because of the nature of this half-section from a sanctuary viewpoint, together with its arable character, it would be more profitably employed for crop production. In part this is necessarily taking the long view in relation to national economy. In consequence of these conditions and our conviction in the matter, we feel impelled to recommend cancellation.

While dealing with this sector of the sanctuary a certain other matter should be broached. In the original legal description of this sanctuary the following statement may be found in relation to the reserved area: "fractional northwest quarter and fractional southeast quarter of Section 32." This is obviously an error, or a redundancy, since both quarter sections mentioned are located in the lake; they were already included in the sanctuary, automatically, with the preceding words, "Comprising the lands covered by the waters of Lenore Lake..."

LENORE LAKE BIRD SANCTUARY, SASKATCHEWAN

(Dominion Sectional Sheet No. 219)

Fractional S.W.¼, Sec. 20, T. 40, R. 21, W. 2nd Mer.:
" N.E.¼, Sec. 19, " " " " " " "

The Department of Agriculture in its request for certain lands in Saskatchewan bird sanctuaries included the first fractional quarter section listed above, together with the N.W.¼ of Sec. 21, T. 40, R. 21, at Lenore Lake. It may be noted at once that some confusion must have existed in this respect, since the land fraction of this quarter never was a part of the sanctuary as may be seen by consulting the accompanying map. Therefore, it is available already for any other purposes desired and does not enter into any problems in relation to the sanctuary.

As to the fractional S.W.¼ of Section 20 as noted above: Like other parcels of land, this was wanted for agriculture following its desired withdrawal from the sanctuary. It comprises treeless grassland of low elevation. We carefully inspected the area and do not regard it as suitable for agriculture and therefore not in the same category with the fractional east half of Section 29 which lies one-half mile to the north-northeast.

The subsidence in the lake-level is so great that practically all of the adjoining bay to the south and west was dry at the time of inspections--a condition that has existed for many years. (For this reason the physical conditions have been so markedly altered that it is frequently difficult to reconcile certain areas with the map of 1914, which has been followed in the accompanying sketch maps). Some of the former water area of the bay is now represented by desolate, boulder-strewn mudflats, but some considerable portions are now grown to grass and weeds. Some tracts are now remarkably similar in superficial aspect to the low-gradient land that adjoins it. Such is substantially the case with respect to the parcel of sanctuary land under discussion.

MIDDLE LAKE BIRD SANCTUARY, SASKATCHEWAN

(Dominion Sectional Sheet No. 269)

Fractional N.E. ¼ Sec. 18, T. 41, R. 22, W. 2nd Mer.:
" S.W. ¼ " " " " " " " " "

As with other sanctuary areas dealt with in this report, the above fractional quarter sections were requested by the provincial Department of Agriculture for cancellation that the land might be devoted to farming. Upon adequate joint inspection it was concluded that the terrain involved is not primarily of the type suited to agriculture, but would lend itself well to grazing. Both parcels of land listed above will be dealt with together as they are essentially similar.

All of the land is comparatively flat and quite featureless and elevated but slightly above the high water-level of Middle Lake. It represents natural grassland, although in some parts, foxtail and various weeds have become established. Trees are completely lacking as in numerous areas about western lakes. However, some tracts in the locality are clothed with aspen poplar.

Large neighbouring parts of the lake are totally dry, presenting wide mudflats, or broad reaches of land covered with grasses and various species of weeds. In superficial aspect many parts of the dry lake floor resemble the adjoining uplands. For this reason it is sometimes difficult to distinguish between the two and to identify certain areas in relation to the map. Subsidence of the lake is apparently not less than 10 feet. Alteration in the local topographical features is so profound that it may be mentioned, for example, that the whole of the long bay in Sections 17 and 20 is completely dry, as well as many other localized tracts of the lake basin to the south and west.

All such waterless and adjacent parts of the sanctuary are quite worthless at the present time. It has been in this condition for many years and will doubtless continue in this state for a considerable period into the future. The sanctuary cannot possibly attain to its original high value as a waterfowl resort until such time as the lake fully recovers.

Under these circumstances it would be justified to temporarily release the two fractional quarter sections under review under a provisional grazing lease to be nullified if and when the lake returns to normal condition. Because of the intimate adjacency of the areas concerned to the lake area, we do not subscribe to the idea of cancelling them outright. They may be advantageous to birdlife at a later date. Many of the remarks forwarded under Lenore Lake apply with equal force here.

BASIN LAKE BIRD SANCTUARY, SASKATCHEWAN

(Dominion Sectional Sheet No. 269)

Southwest ¼ Sec. 25, T. 42, R. 23, W. 2nd Mer.:

This quarter section is composed of gently rolling land of arable quality. The greater part of it is heavily wooded with aspen poplar and associated shrubbery. A minor portion near the lake is open and grown to grass. Only the extreme southwest corner abuts upon the old shoreline, while to east, north, and west it is flanked by privately owned land. Directly to the south is sanctuary territory in the northwest quarter of Section 24 (See map).

Owing to a great drop in the water-level (comparable to Lenore and Middle Lakes) marked changes have occurred in the physical properties and aspect of the adjoining lake area. Wide, marginal tracts of the lake floor now lay exposed as bare mudflats, or lowland areas covered with grasses and weeds. The entire bay in the western portion of Section 24 is dry in addition to wide neighbouring parts of the lake. It is safe to say that the nearest water in the lake to the quarter section under discussion is at least a half to three-quarters of a mile away.

The provincial Department of Agriculture has requested the release of this quarter section to be developed as a farm for a veteran of the last war. We recommend that this action be taken with consequent cancellation of the area as bird sanctuary. Under present conditions, in particular, this quarter section has no recognizable value for the latter purpose and even at high water its utilization by land-nesting ducks would be very limited (in relation to disposition, i.e. lake frontage) and out of all proportion to its value for agriculture. Owing to so much cultivated land in the general neighbourhood of the lake, it is very doubtful if the latter will ever again achieve its former level and quality. In any event, it will doubtless be a long time in the future. The lake has been more or less in its present condition, with slow but consistent subsidence, for the past 12 to 15 years.

The Department of Agriculture had also tentatively listed for cancellation the northwest quarter of Section 24. This area is rolling and wooded and evidently the most of it is arable and adapted to agriculture. However, in taking a long view of the matter it would seem inadvisable to cancel this area. The whole west side is broadly flanked by the lake basin and adjoins sanctuary property to the south. If the lake returns to normal the area would be utilized by certain species of ducks for nesting. On general principles the sanctuary should not be too far reduced by cancellations, and especially lands immediately adjacent to the lake.

except the west. On that side is a quarter section of sanctuary land, directly north of which is another half-section of the same (flanking the lake) exclusive of the S.W. ¼ of Section 25, dealt with in the preceding part of the report.

As will be noted on the accompanying sketch map, the present quarter section is one-half mile distant from the old shoreline. But at the present time, owing to drastic decline in the water-level it is about a mile from the water of Basin Lake. The quarter juts out irregularly to the east, bounded by private property, and lacks compactness in relation to other sanctuary lands adhering to the lake shore. Owing partly to this feature, but more notably to the fact that it is so far from water, we are of the opinion that this quarter section could be removed from the sanctuary with every justification: we therefore recommend that legislation should be adopted to this end. Following such cancellation the land will be utilized for veteran settlement and the raising of farm produce.

It is our belief, in view of the location and general nature of this quarter, that its original adoption for the sanctuary was more or less arbitrary because it was crown land still available at that time. So far as waterfowl are concerned it would seem certain that it never possessed any measureable attraction or value for nesting: it is too far from water, in addition to which is interposed a wooded sanctuary tract a full half-mile in width. It is extremely doubtful if wildfowl of any kind ever reproduced

on the area in question. So far as other migratory birds are concerned (chiefly small passerines), considerable sanctuary areas would remain, together with much waste land of wooded character which would offer accomodation.

BASIN LAKE BIRD SANCTUARY, SASKATCHEWAN

(Dominion Sectional Sheet No. 269)

Fractional east ½ Sec. 1, T. 42, R. 24, W. 2nd Mer.:

This fractional half-section differs widely in its topographical features as compared with the rolling and largely wooded terrain on the east side of Basin Lake. The present location is flatter and much more widely composed of land covered with grasses and weeds, or areas with a thinner or interrupted growth of shrubbery and aspen poplar. The soil is ostensibly of arable quality, as this fractional half-section was one of the sanctuary areas listed by the provincial Department of Agriculture as desired for farming purposes. However, superficially, at least, it possesses more the aspects of typical grazing land in its present natural condition.

As compared with its one-time appearance when the lake was high (see accompanying map), this sector has undergone notable alterations. It is somewhat difficult to reconcile it with the Dominion Sectional Sheet of 1916, since the actual waterline of the present day has changed to a great extent. The water-level has declined 10 or 12 feet with consequent marked recession of the water along the shores, producing wide areas of exposed lake floor. In many instances these areas are so covered with vascular plants, and merge with the adjacent low-gradient terrain, that it is not always readily clear where the land ends and the true lake basin begins. Consequently, the real upland grass areas superficially appear to be of much wider extent than is actually the case. Such is the condition in the sector under discussion.

While it was the expressed desire of the Department of Agriculture to obtain this parcel of land for conversion to farming, we do not conform to the suggested practicality of subjecting the area to cancellation. We think it should be retained in the sanctuary. Waterfowl and other wildlife require some protective and undisturbed habitat for their use in a sanctuary as well as out of it. But availability of such areas should be especially characteristic of avowed bird sanctuaries. In the present instance the fractional east half of Section 1 is the only sanctuary land existing along the whole extent of the lake's west shore and this is little enough.

It is agreed that owing to the unfortunate and wide withdrawl of the lake waters the area is virtually useless in relation to its main purpose at the present time. However, if the lake recovers this assertion would no longer be true. Under prevailing conditions, however, we do recognize the fact that this area could be temporarily and provisionally leased for grazing purposes without detriment to the sanctuary and the negligible wildlife which may be associated with the area in question. If good conditions return the lease should be cancelled.

LAST MOUNTAIN LAKE BIRD SANCTUARY, SASKATCHEWAN

(Dominion Sectional Sheet No. 169)

West ½ Sec. 13, T. 28, R. 24, W. 2nd Mer.:

The accompanying sketch map shows the location of this half-section in the vicinity of a channel of Last Mountain Lake. The sector lies on the west side and approximately two miles from the lake's northern extremity. This is the only area in this sanctuary requested by the Department of Agriculture which is considered by it as fit for tillage and at the same time logically available for removal from the sanctuary without detriment thereto.

Close inspection revealed the fact that the whole half section is practically flat to gently undulating terrain without trees or shrubs of any kind. It is as open as true, shortgrass plains farther south. Parts are stony and one depressed strip is liable to flooding. In relation to the lake, the land is of low elevation throughout. The area under discussion, as well as the whole of the sanctuary as originally established by the Dominion Government and additional areas along the lake, is now embraced by a Provincial Game Preserve. The situation in this case is therefore that of a bird sanctuary contained within a game preserve.

We believe that the west side of Section 13 could be cancelled and used for agriculture with complete justification without detriment to the sanctuary or the cause of wildlife conservation. Between it and the lake is a sanctuary zone of similar but somewhat more rugged character which would be more fully utilized by land-nesting ducks because of its proximity to the water. At the distance which the west half of Section 13 lies from the lake it is a foregone conclusion that utilization of this nature would be nil, or of very meagre extent. Practically all of such reproduction as occurred would take place in the adjacent east half of the section nearer the lake. In addition, the general vegetational cover in the west half is extremely scanty and poorly adapted to the ground nesting of wildfowl. Obviously its use in this respect is scanty or non-existent.

At the present time (and for many years in the past), as a matter of fact, the described conditions are all the more applicable because of the subsidence and recession of waters in Last Mountain Lake. Two miles or more of the latter's northern extremity are now entirely dry and very little water remains in the channel bisecting the east half of Section 13. In consequence, waterfowl conditions and numbers have greatly deteriorated. In view of all the circumstances depicted, we believe that the east half of Section 13 may be cancelled with justification and allocated to the interests of agriculture.