Aerial Waterfowl Surveys of the Lower La Grande Basin, Late September, 1972

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Waterfowl survey of the La Grande Basin

I. Introduction

From 27 Sept. to 30 Sept. 1972 André Bourget & Steven Curtis of the Canadian Wildlife Service conducted aerial waterfowl surveys of the lower portion of the La Grande River system. The surveys of the La Grande ~~was~~ were conducted as part of a larger effort by the Canadian Wildlife Service to study the fall migration of waterfowl through the James Bay area. Some 1800 miles of transects were flown by helicopter over the territory to be inundated by the proposed L.G. 1, L.G. 2, L.G. 3, & the Sakami Lake hydro reservoirs. A Hughes 500 helicopter was chartered from Viking Helicopter & piloted by Bruce Dennison of Viking.

The objectives of the survey were:

1. to determine the densities of waterfowl, especially geese, in the La Grande basin & to assess the degree of utilization by waterfowl of the various major ecological zones within the basin;
2. to observe the development to date by the James Bay Development Corporation;
3. to obtain a first hand "baseline" impression of the region; & to evaluate the existing habitat for potential waterfowl & game production;

4. to make some predictions as to the possible impact of the proposed project on waterfowl.

II. Physiographic & Floristic Features of the western half of the La Grande Basin.

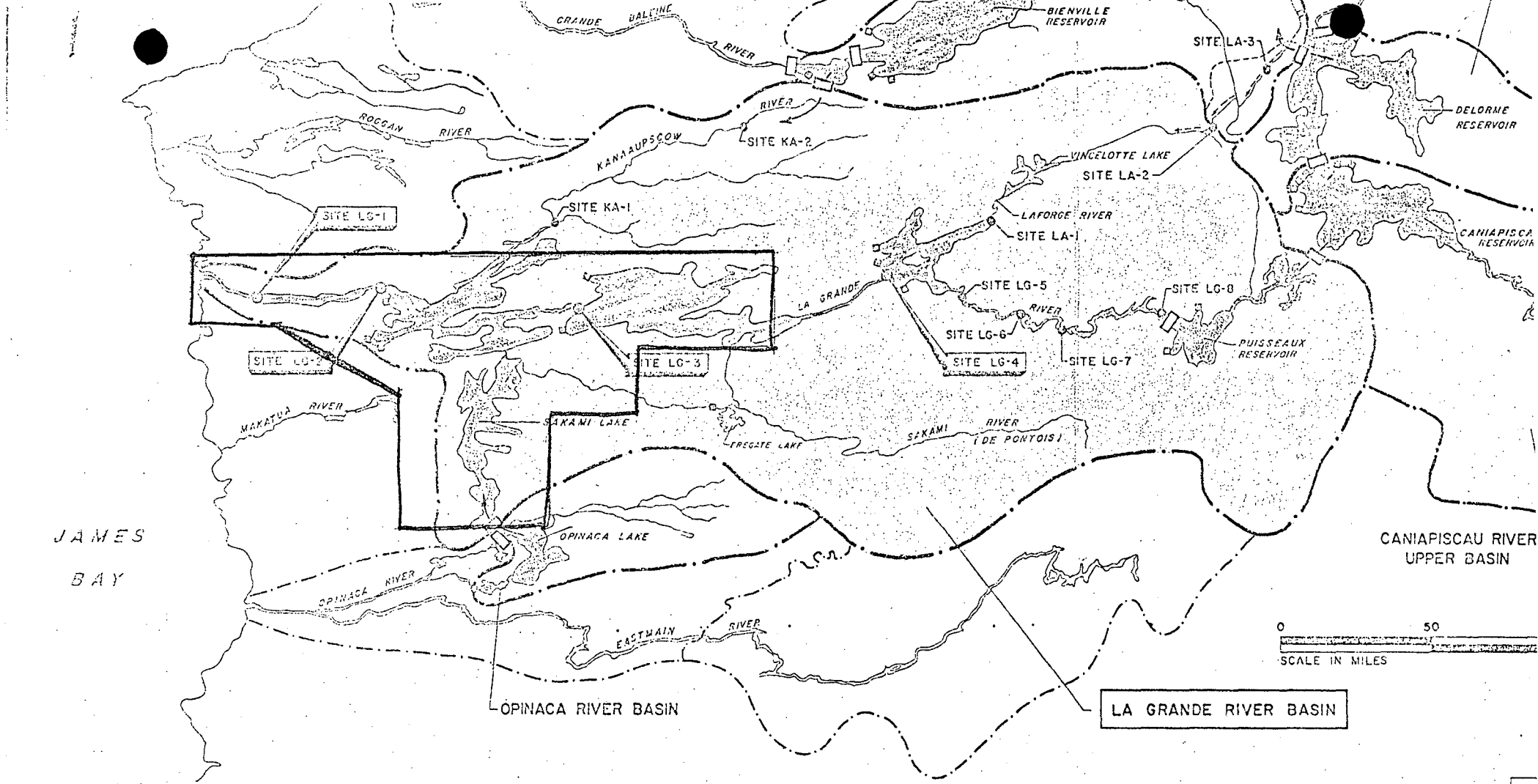
The region covered on the September, 1972 waterfowl survey included the Sakami & Boyd Lake areas, & the portion of the La Grande River basin to be affected by L.G. 1 (L.G.- abbreviation of La Grande), L.G. 2 & L.G. 3 (see fig. 1). In the La Grande basin the surveyed area lies between $53^{o}15'N$ & $54^{o}00'N$, & between $74^{o}25'W$ & $79^{o}00'$ W. The Sakami & Boyd Lake areas extend south to about $52^{o}40'N$ creating a T-shaped survey area encompassing some 12100 square miles in total.

In general the area consists of a relatively flat peneplane of Precambrian origin. The land rises gradually from the James Bay Coast to the east & reaches an average elevation of about 800' in L.G. 3 with hills 1400 to 1600'. The whole area was heavily glaciated during the Pleistocene leaving such features as drumlins, eskers, ground moraine, scour lines, & beaches from post-glacial submergence of the western part of the region.

West of $77^{o}00'W$ there are low rolling rock outcrops which trend E-W or NE-SW. Drift & muskeg occupy the lower ground. Fairly extensive sand deposits occur along the lower 50 miles of the La Grande River. Muskeg is

Figure 1.

Map of the lower La Grande river basin. Red lines denote the area surveyed & proposed impoundments are indicated in purple.


GRANDE BALEINE RIVER
BIENVILLE RESERVOIR
SITE LA-3
DELORME RESERVOIR
ROGGAN RIVER
KANAAUPSCOW RIVER
SITE KA-2
SITE KA-1
VINCELOTTE LAKE
SITE LA-2
LAFORGE RIVER
SITE LA-1
CANIAPISCA RESERVOIR
SITE LG-1
SITE LG-2
SITE LG-3
SITE LG-4
SITE LG-5
SITE LG-6
SITE LG-7
SITE LG-8
LA GRANDE RIVER
PUISSEAUX RESERVOIR
MAKATUA RIVER
SAKAMI LAKE
FREGATE LAKE
SAKAMI RIVER (DE PONTOIS)
JAMES BAY
OPINACA LAKE
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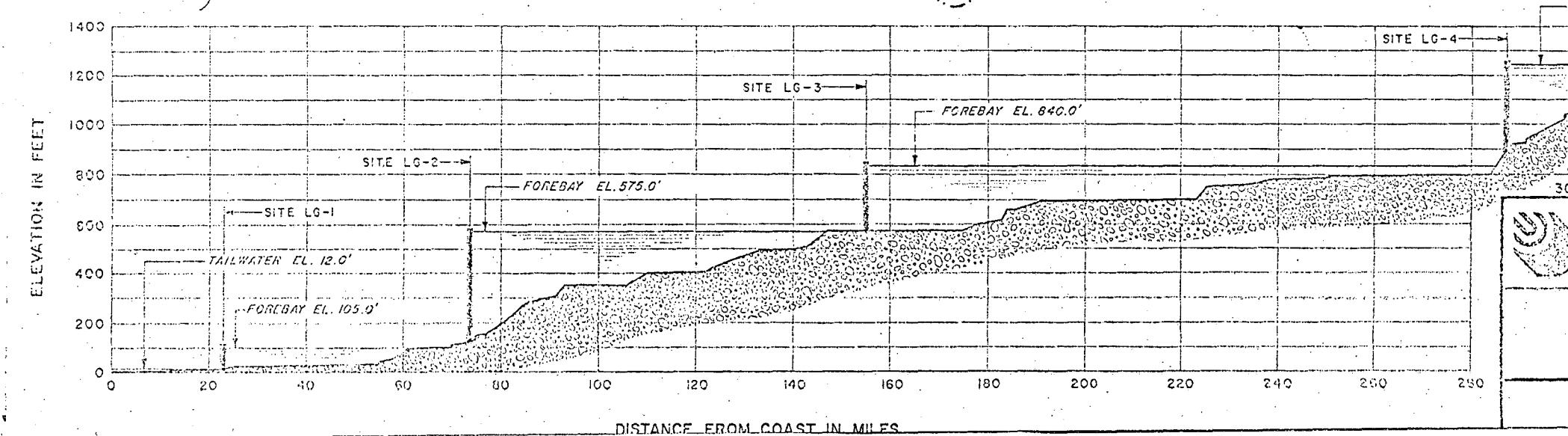
ELEVATION IN FEET
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FOREBAY EL. 575.0'
SITE LG-1
TAILWATER EL. 12.0'
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140
160
180
200
220
240
260
DISTANCE FROM COAST IN MILES

most extensive near the James Bay coast & south of the lower La Grande where it occurs on flat plateaus. Proceeding east, muskeg & boglands are of small size & are scattered between the low hills. The notable exception is west & northeast of Sakami Lake where there are extensive areas of muskeg & meandering sedge lined watersources.

The eastern & northern part of the area is dominated by bedrock (of the western Plateau Belt - Hare, 1959), much of which is exposed & the remainder of which is covered by drumlinized drift plains cut by streams & dotted with lakes. Lichen woodlands with spruce, jackpine & a thick lichen mat occur in this zone (fig. 2).

The north & east areas are interspersed with high rugged hills which are elongated E-W, due both to structural foliation & subsequent glaciation (Douglas & Drummond, 1953). These hills are especially noticeable west & southwest of Pine Mountain Lake (NW of L.G. 3); & in the south central region of L.G. 3; & in the area south of the La Grande, west of L.G. 3, & extending into L.G. 2 north of Sakami Lake. Some rugged hills also occur east of Sakami Lake. The high hill country is dotted with small lakes which occur at many elevations. Aspen & Balsam poplar are quite prevalent & were very conspicuous at the time of our fall survey (fig. 3).

Dense closed canopy stands of white spruce (with some larch, black spruce, & occasional jackpine & aspen) occupy the unburned portions of the valleys of the La Grande & Kanaaupscow Rivers, especially in L.G. 2.

Much of the survey area has been extensively burned at various times in the past. Some of the burns cover hundreds of square miles, particularly in the Lac Grande-Point area, south of L.G. 3, & on the higher ground between Bereziuk Lake & the La Grande River.

East and southeast of McNab & Old Factory lakes an area of at least 80 sq. miles has been severely burned within the past year. This burn follows the brushed out portion of the Mattagami to Ft. George road, & no doubt was caused by man.

There is a limited amount of what appears to be good waterfowl nesting habitat. While there are some exceptions, most of the muskeg is not of the type known to be good for Canada Goose production (figures 4 & 5). The best habitat lies just west & northeast of Sakami Lake & along slower flowing portions of the La Grande & Sakami Rivers. Scattered throughout the region are sedge lined ponds, small lakes & water courses (which have been created, in large measure, by beaver) which appear suitable for waterfowl production.

III. Survey Results & their Interpretation

In all 1,805 miles were flown over the proposed impoundments & adjacent lands at an average ground speed of about 108 miles per hour. Only 648 individuals were seen of which 211 were Canada geese, 260 common goldeneye, 93 mergansers, 31 black ducks & 25 lesser scaup, as well as 19 which could not be identified. An average of .30 waterfowl per linear transect mile was found, or about 1.20 per square mile if one assumes an effective transect strip width of $\frac{1}{4}$ mile (1/8 mile on either side of the helicopter).

Table 1 shows the breakdown of waterfowl sightings by major physiographic zone. The classifications are somewhat arbitrary.

Section I summarizes by habitat the results of all the surveying. Included are straight line transects established with no prior knowledge of the terrain to be encountered as well as surveys in which certain habitats such as lakes or rivers were arbitrarily selected. "Lake" (type 1) refers to large lakes encountered on transects, or lakes arbitrarily selected. Included are such lakes as Duncan, Alder, Sakami, Debeney, Boyd, Carbillet, Bereziuk, Pine Mountain & Lac Grande-Pointe.

Much of the La Grande, Sakami & Kanaaupscow Rivers were arbitrarily flown in search of waterfowl & only a few miles of river or stream were encountered on the transects. The value in parenthesis represents the average per mile of survey as rivers are usually not measured in sq. miles.

All observations in upland habitats were of birds on lakes or streams but the general classification of the

La Grande Survey, September 27-30, 1972

Waterfowl by Habitat

	Type of habitat	Miles Covered	Time (min.)	No. Waterfowl	Density per Sq. mile	No. per 10 min.
I.	1. Lake	159.8	87.7	152	3.80	17.3
	2. Rivers, streams	367.8	194.7	264	2.88 (.72)	13.6
	3. Small sedge lined streams, beaver ponds (non muskeg wet areas)	177.9	101.5	63	1.40	6.2
	4. Muskeg	99.8	53.5	9	.36	1.7
	5. Low relief	715.8	391.8	113	.64	2.9
	6. High hills	195.7	115.4	26	.52	2.3
	7. Valleys	111.8	59.7	21	.76	3.5
	8. James Bay Coast	23.0	18	1402*	121.8*	778.9
II.	1. Water courses	527.6	282.4	416	3.15	14.7
	2. Poorly drained	277.7	155.0	72	1.04	4.6
	3. Well drained	1023.3	566.9	160	.64	2.8
III.	1. Burned	277.2	154.3	50	.72	3.2
	2. Unburned	746.1	412.6	110	.60	2.7

*Values for coast not included in determination of average densities for the La Grande survey.

area being flown was low rolling hills (Type 5), or high hills dotted with lakes at many elevations (Type 6).

The "valley" category refers to major river valleys crossed on the transects. (All river valleys which were actually followed are included in the "River" category.)

On the La Grande Survey only 23 miles of the James Bay coast were flown. The densities encountered for hundreds of miles of coastal flying on other surveys will be discussed in forthcoming reports. It can be said with certainty that the coastal densities are many times those of the interior (probably on the order of 100 times densities found in the interior). Because visibility along the coast is greater & no visual obstructions occur a transect width of $\frac{1}{2}$ mile ($\frac{1}{4}$ on either side of aircraft path) is assumed (hence the asterisk).

Section II lumps the various categories of section I into 3 classes.

Section III contrasts burned over areas with unburned areas. Only the upland or well drained sites are included. It was felt that burned over areas might be less desirable for waterfowl. The densities found do not indicate this (Table 1), however the compounding problems include: differential ages & severity of burns; variations in productivity of habitat before burn; & the possibility for higher detectability in burned over areas.

Table 2 gives the average densities found in each of the basins to be affected by the proposed hydro project. The lower La Grande being close to the James Bay coast, the higher densities encountered there may well represent a spill over from the coast itself.

Detectability is a function of habitat type & density of vegetation, waterfowl behaviour, aircraft speed & height, wind direction relative to the direction of travel of the aircraft, viewing conditions such as rain, haze,

La Grande Survey

Waterfowl densities in proposed hydro basins

Areas to be affected	Transect miles	Time (min.)	No. Waterfowl	No. per sq. mile	No. per 10 min.
La Grande River (above and below L.G.1)	150.5	81.5	148	3.92 (.98)	18.2
L.G. 2	246.6	139.0	52	.84	3.7
L.G. 3	259.3	145.25	88	1.36	6.1
Sakami Lake	203.4	110.7	118	2.32	10.7

snow or sun glare, & observer ability. Quantification of the effects of each of these & other possible influencing variables is elusive, & for the La Grande survey perhaps meaningless because of low densities & high variability.

Attempts were made to reduce some of the variability by flying at a height of about 200 ft. above the surface & maintenance of constant ground speed. This was not always possible due to weather & uneven terrain. Observations were recorded on tape to avoid missing birds while writing down data. At least two forms of bias occurred, one resulting in underestimation & the other in overestimation. It would be desirable if the biases cancelled one another, but quite unlikely.

Underestimation occurred due to inability to detect birds within the strip (especially small ducks such as teal - it is felt however, that any possible teal in the area probably would have departed before September 27 & hence their absence in the survey was real & not an artifact).

Overestimation resulted from incomplete randomization of the transects. Most survey lines were flown without a prior knowledge of the habitat to be covered but about 510 miles were deliberately flown along watercourses assumed to be attractive to waterfowl. This type of coverage does have its benefits as it enabled us first,

to identify the more critical high density areas, second to get an overall impression of density, and thirdly to examine the effects of nonrandomization in sample design (see Table 3). The average density of 1.20 per square mile is probably the least biased estimate of the mean number per square mile. For an area of 12,100 square miles this works out to 14,520, but the reliability of this estimate is not good. From a sampling standpoint, the type of waterfowl distribution encountered during our fall surveys is perhaps the worst possible kind. Low overall densities were encountered but with considerable local contagion (clustering) thus resulting in high variability. Increasing the sampling effort would decrease the variability but would probably be too costly in view of the low densities. Some optimization balancing cost and variance can perhaps be achieved. A further discussion of sampling problems will occur in another report.

Large birds identified on the survey were: bald eagle - 3, golden eagle - one immature (no positive verification), rough-legged hawk - 5, red-tailed hawk - 2, osprey - 1, pigeon hawk - 2, great gray owl - 1, raven - 3, and gray jay - 7.

Birds recorded around the gas caches included: common loon - 1, spruce grouse - 1, crow - 2, gray jay - 3, boreal chickadee - 23, black-capped chickadee - 5, robin - 1, ruby crowned kinglet - 1, water pipit - 2, northern shrike - 1, unidentified warblers - 3, pine grosbeak - 1, goldfinch - 3, slate coloured junco - 2, and snow bunting - 5.

La Grande Survey

Effect of randomization

Category	Distance (Miles)	Time (Min.)	No. Waterfowl	No. per Sq. Mi.	No. per 10 min.
1. No a priori knowledge	1146.6	649.6	345	1.20	5.31
2. Arbitrarily selected	658.0	354.7	303	1.84	8.54
A. Road	146.5	84.0	2	.06	.24
B. Water-courses, Marsh	511.5	270.7	301	2.36	11.12

IV. Hydro Project development to date

As of the date of the survey in late fall of 1972 little major visible alteration of the landscape had occurred except near Ft. George. Hydro camps exist at the L.G. 2 & L.G. 3 dam sites as well as several other locations on the La Grande river. Also encountered were camps on Sakami Lake, Lac Carbillet, the Opinaca River, the Eastmain River, and an abandoned camp on the Eastmain River (Fig. 6).

The most evident changes and signs of activity are in the Ft. George area and along the Ft. George to Mattagami Road.

V. Potential Impact of the Proposed Development on Wildlife

Will the proposed hydro development enhance the region's ability to produce and sustain wildlife, and to accommodate transients during their migrations?

Based on the information we have at hand, albeit scant, the only logical conclusion is that the region will be less productive than it is currently.

The rational for this conclusion is as follows:

1. The hydro impoundments are unlikely to create any new waterfowl habitat, especially if the trees are not cleared out before inundation, and if the shoreline fluctuates markedly due to drawdown (as predicted will occur).

Plans for raising the water level of Sakami Lake are rather vague at present. There appears to be substantial amounts of desirable waterfowl habitat northeast and west of Sakami Lake which could be lost to flooding.

In some cases hydro dams have created impoundments which serve as important stopover locations for migrating waterfowl. The reserviors proposed for the La Grande are unlikely to attract and accommodate migrating waterfowl. In spring the ice on the large impoundments will presumably break-up even later

than at present, and hence the impoundments will have little attraction. In fall waterfowl could conceivably stopover, but there would be little for them to eat.

2. The beaver is an integral part of the existing ecosystem. Their densities for an area that can be fairly classified as having a harsh environment are quite high (see Table 4). The amount of suitable habitat is limited, and as a first impression one would suggest that the region is near a saturation level with respect to beaver colonies. Damming the La Grande will inundate many square miles of currently utilized beaver habitat (which also supports some waterfowl and other wildlife) forcing migration to suitable areas on higher ground (most of which are already occupied by colonies). Competitive stress for the reduced food supplies and available watershed will doubtless cause significant mortality for the local populations. As impoundments created by beaver provide habitat for waterfowl and other wildlife more than loss of beaver will occur.

3. Due to reduced rate of flow during the water accumulation phase, and a later up-stream break-up of the large impoundment areas, spring break-up of

the James Bay coast at the mouth of the La Grande will be retarded and will not coincide with the northward migration of geese. Planned diversion projects affecting the Great Whale and Opinaca rivers will permanently reduce the flow on each of these rivers and retard coastal break-up at their mouths.

Traditional spring hunting by Indians will be adversely affected at the mouths of all three.

4. The proposed increased accessibility of the Fort George area (seaport, airstrip, road) is a matter of some concern. Greater hunting pressure on waterfowl, especially geese is anticipated, and the proposed seaport will destroy some coastal habitat directly and have a severe effect on the nearby coast.

5. Miscellaneous

a. To date increased air traffic may disturb the geese somewhat, and certainly has a disturbing effect on the hunters. Further air traffic will increase disturbance to geese and to hunters, and may increase the likelihood of bird strikes by aircraft.

b. Undocumented reports were received of camp workers occasionally killing many forms of wildlife near the camps, presumably due to bush boredom. This practice should not go unchecked.

c. While there are no major waterfalls in areas to be flooded, there are a number of rapids and

low falls which will be lost (fig. 7). From a purely esthetic standpoint the hydro project will detract from the area's scenic beauty. This is more true for L.G. 2 than L.G. 3. In addition substantial closed canopy stands of spruce along the La Grande & Kanaaupscow rivers will be flooded by L.G. 2.

Figure 8 shows falls on the Opinaca River which will be nearly dry if the Opinaca diversion occurs.

Plans for the Eastmain are not known at present. The falls at Clouston gorge on the Eastmain are noteworthy (fig. 9).

VI. Recommendations for Future Impact Studies

Monies were not available early enough in 1972 for carrying out waterfowl production surveys of the La Grande watershed. Such surveys are planned for the summer of 1973. Although it is expected that the breeding distribution of waterfowl in the area will be somewhat different from that encountered during our fall survey, a sampling procedure can be designed based in part on our fall findings. Waterfowl brood surveys will provide us with baseline information on the productivity of the region, and will in addition, fill some of the gaps in our knowledge of waterfowl production in Eastern Canada.

Although no large concentrations of snow geese or Canada geese were seen in the fall of 1972 near the mouth of the La Grande, waterfowl densities along the adjacent James Bay Coastal areas were found to be about 100 times the average found for the interior. (The presence of several large barges and other vessels, as well as frequent aircraft, probably accounts for the low numbers at the river mouth.) It is apparent that the various ecological zones which are characteristic of the coast are: 1. currently heavily utilized by waterfowl (primarily during spring and fall migration); 2. quite sensitive to disturbance. We should make every effort to insure minimal disturbance to

the coast. Botanical investigations of the sort carried out in late summer 1972 in Ruperts Bay (under the direction of J.P. Lamoureux of the Canadian Wildlife Service) are needed near Fort George. Such investigations, including a detailed analysis of the major ecological factors affecting the coastal vegetation, are planned by the CWS for this summer. Information is needed on potential siltation, salinity and current changes near the mouth of the La Grande. This will hopefully be provided by other branches of the Department of Environment.

In order for us even to begin to assess impact effectively it is necessary that we are informed of all planned development for the area. At present we do not have enough information on the ecology of the area, or on all the changes in the plans for development, to make anything more than a educated guess.

References

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Hare, F. Kenneth 1959 A Photo-reconnaissance Survey of Labrador-Ungava. Memoir 6 - Geographical Branch, Mines & Technical Surveys, Ottawa. 83 pp.

Hustich, I. 1949 On the Forest Geography of the Labrador Peninsula; Acta Geographica, Vol. 10, No. 2.

Note : Originals of these figures were in poor quality reading.

Figure 2.

Lichen woodland near Bereziuk Lake

Figure 3.

Example of high rock hill typical of the region. Aspen & white birch are quite prevalent.

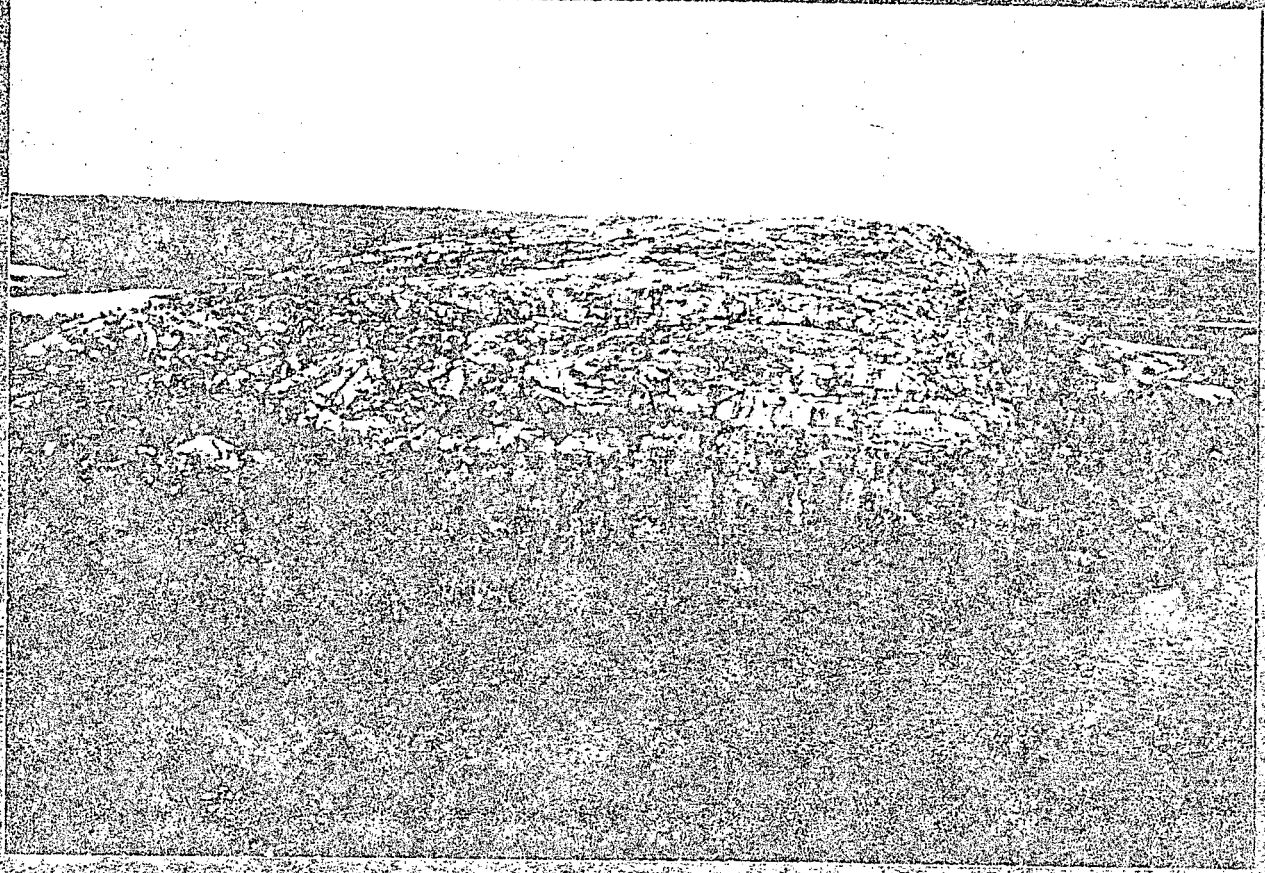

Figure 4.

Small elongated patches of muskeg lie between the low rolling hills. This is a typical example. Such muskeg is not particularly desirable for waterfowl production.

Figure 5.

Muskeg in the vicinity of Kinoji Lakes northwest of Moosonee Ontario. Numerous small islands are ideal for Canada Goose nesting.

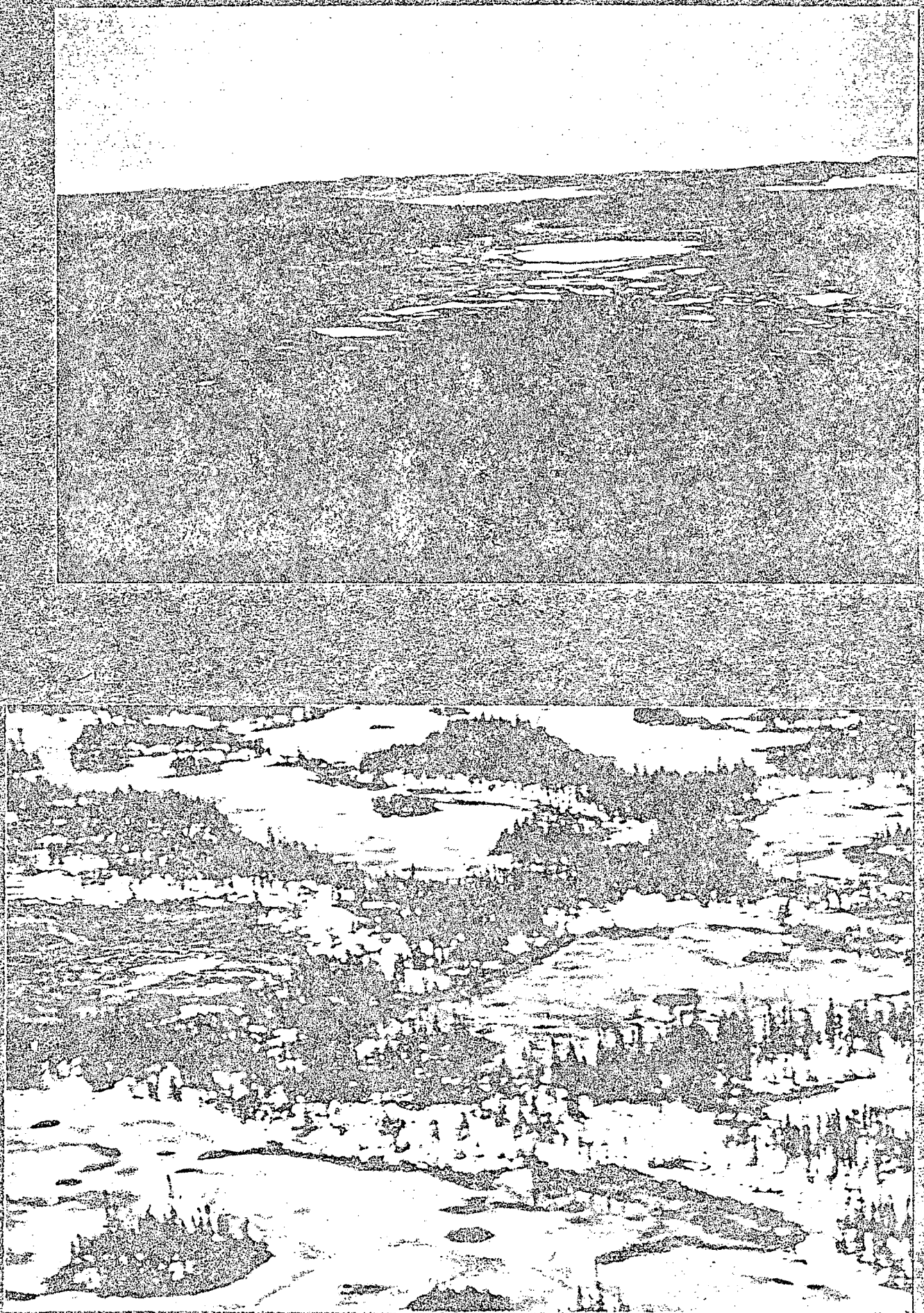

Figure 6.

Abandoned hydro camp just above Clouston Gorge on the Eastmain River.

Figure 7.

Typical set of rapids on the La Grande River. There are many such rapids which will be lost when the hydro impoundments are created.

Figure 8.

Unnamed falls on the Opinaca River

Figure 9.

Clouston Gorge on the Eastmain River