

Preliminary Biological
Reconnaissance of the
Lower Nisutlin River Floodplain

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1976

PRELIMINARY BIOLOGICAL RECONNAISSANCE
OF THE LOWER NISUTLIN RIVER FLOODPLAIN

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Aerial view of the Nisutlin River floodplain looking north from "30 Mile Slough" in the foreground. Notice the numerous cut-off channels, oxbows, and marshes and the predominance of riparian vegetation which contribute to the great biological diversity and productivity of this unique valley.

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Introduction:

During the summer of 1975 the Yukon Game Branch decided to begin a series of river surveys as part of its Territory-wide wildlife inventory programme.

This decision was made because the demand for use of river valleys is increasing at an alarming rate for a variety of purposes, for instance - proposed hydrodevelopments, right-of-ways for roads, railroads and pipelines, and leases for agriculture and grazing purposes. Many river valleys are of great importance for wildlife, in particular for wintering areas of moose, breeding and staging areas of waterfowl and other birds and as year-round ranges of many fur bearers. It is reasonable to say that the carrying capacity of many river valleys and their biological productivity exceeds that of neighbouring uplands by 5 to 10 times.

It is the purpose of these river surveys to reveal a brief preliminary biological reconnaissance. It is the intention to cover as many rivers as possible in the next few years, rather than going into great detail of a single one. These preliminary reconnaissance surveys will allow the Game Branch to make comparisons between different river valleys; they will point out the more significant biological features of the area, and they will provide some baseline information on which more detailed studies could be based should those become necessary, for instance if a given river valley is chosen for a new hydro-electric development.

To show seasonal trends these surveys are done three times during the year for the following reasons: 1) a late June one was meant primarily to catalogue the various bird species that utilize the area for breeding purposes, as well as to establish some indices on moose productivity based on calf to cow ratios; 2) a late September survey was meant to investigate the importance of the valley for migratory purposes of birds, primarily waterfowl, survival

of moose calves and sex ratio of moose during the rutting season, and lastly, to describe plant communities which were submerged during the "high water" surveys during June; 3) a late winter survey to estimate the numbers of moose using the valley as winter range and to document fur bearer activity based on frequency of tracks and other signs.

The terms of reference set up for these projects are attached to this report in the appendix. During the 1975/76 fiscal year the following rivers were investigated: Pelly-MacMillan, Nisutlin, Old Crow-Porcupine.

PHYSIOGRAPHY AND GEOLOGY

The area is geologically heterogeneous with rocks of various ages from the Paleozoic to the Cretaceous protruding through Pleistocene till and alluvium. There is evidence to suggest that much of the area is a former plateau with intrusions and erosion cuts of rivers and glaciers; both continental and alpine glaciations have contributed to the undulation and general ruggedness of the land (Mulligan, 1963; Geist et al, 1974).

Nisutlin River rises in Pelly Mountains and enters its southward-trending broad valley from the east. It enters Nisutlin Bay by several shallow distributaries in an extensive delta. Its average width is about 300 feet. Some riffles and gravel bars occur in the fast-flowing stretch (up to 6 miles per hour) below the confluence with Wolf River, and the few bedrock exposures are the only ones on the river. From there up to the mouth of Sidney Creek the river meanders slowly between sandy terraces and low clayey silt banks. From the mouth of Sidney Creek to Carey portage, southeast of Quiet Lake, it is rapid (up to 5 miles per hour) and shallow, with numerous gravel bars and shoals extend across practically the whole width in places and are barely passable at low water. Above the portage, rapids are reported to be numerous (Mulligan, 1963).

Nisutlin Bay lies at an elevation of 2,239 feet above sea level (Mulligan, 1963). The relief in the vicinity of the lake is

relatively low, containing rolling hills, rounded mountains, and broad rolling upland instream areas. The relief is divided into northwest trending ranges by the main river valleys (Mulligan, 1963).

Soil development in the region is generally not far advanced due to the recent glaciations. Most of the soils are of glacial origin with various degrees of water modification (Hirvonen, 1968). The alluvial flats are made up of fine silty sand with little organic matter to a depth of a few inches, underlain by firm sand or gravel. In elevated areas, humus layers have developed. Gleyed Regosols are found in poorly drained channels and depressions. Cumulic Regosols are found on alluvial terrain subject to annual flooding, and Orthic Regosols are found at higher elevations. Mini Humo Ferric Podzol is found on high terraces and uplands (Geist et al, 1974). In some areas, a layer of volcanic ash, a few inches to a few feet below the surface, limits root penetration (Hirvonen, 1968). Most alluvial soils in the Yukon are neutral or alkali (Gubbels, 1963), but no ph measurements were undertaken during this survey. Soil temperatures are likely to be cool over most of the area.

Permafrost is discontinuous in this area and probably confined to *Sphagnum*-spruce bogs in fine-textured soils. It is uncommon in coarse soils or under an open canopy (Hirvonen, 1968).

The terraces of the Nisutlin and adjoining Wolf rivers are largely formed from sand and clay; in a few areas there are well-

developed gravel terraces and, occasionally, a box canyon similar to the one confining the lower Wolf River. Here numerous rapids and cataracts are found.

Above Wolf River, the Nisutlin River slowly winds its way in many isolated oxbows and ponds along the river, as well as sloughs and bogs. The high-water level usually occurs in mid June, coincident with the spring run-off. A second flooding may come in August, coinciding with the high precipitation during that month. Teslin Lake becomes ice-free in early June, reaching its highest level in mid June. Thereafter, the water continues to drop throughout the summer, which exposes the mud flats of Nisutlin Bay. The extremes in water level of Teslin Lake differ by about 15 feet. Upstream from the delta, the river bottom contains progressively more sand and gravel. In the fast-flowing sections, one finds gravel-cobble washed clean of detritus, while in the quiet waters near the shoreline, silt and detritus cover the bottom material. Although, during melt-off, the river water is turbid, it is clear after the flood (Geist et al, 1974).

Of utmost importance in this ecological system is the meandering nature of the river which constantly cuts into geological "old" banks, covered by climax stands of white spruce, which are relatively unproductive biologically, and at the same time deposits silt on the opposite side (the inside "slow-water" curve), which create substrates for pioneer and early successional plant communities, which are very productive biologically. We are therefore dealing

here with a dynamic self-perpetuating system, which for instance, will always produce winter range vegetation for moose (poplars and willows), in contrast to the moose habitat produced by fires, which is of a temporary nature.

The Nisutlin River delta is formed of large and small low-profile islands, divided by many shallow channels. During low-water levels in late summer and fall, many channels carry no water. During high water, many islands are partially or totally flooded with concomitant effects on the vegetation found thereon. The delta area encompasses about $2\frac{1}{2}$ square miles (Geist et al, 1974).

It appears to be formed by a variety of forces (Geist et al, 1974). The basic building material, silt, is carried down the Nisutlin River mostly during melt-off originating primarily as colluvium from the mountain ranges, terraces, and uplands drained by the Nisutlin River. The silt depositions in the delta - as well as the log jams and vegetation - obstruct the river, slow the water, and enhance silt precipitation. It is possible that the prevailing southwesterly winds, which blow against the outflow of the river, slow the currents still more and aid in the deposition of silt. The logs that annually flow down into Nisutlin Bay are blown against the northerly shores where they are stranded as driftwood and are slowly covered by silt and sand, minor obstructions that slow the silt-laden waters. The wave action, besides moving silt and sand against the northern

bay shores, may be responsible for stirring the sediments and contributing to the cycling of nutrients, which is ultimately reflected in the rich vegetation of the bay and its remarkable ecological diversity.

Vegetation

A. Plant communities encountered along the lower Nisutlin River itself.

The lower Nisutlin River occupies a very wide flood plain with a very low gradient. For these reasons the river is over long stretches characterized by a meandering course. The meandering nature results in a dynamic, self-perpetuating nature of the flood plain vegetation along the shores. Mature, climax vegetation is consistently being destroyed on the "fast-water" cutting side of the river, while pioneer and successional vegetation colonizes and becomes established on the "low water" side of the river, where sediments are being deposited. The meandering nature of the river has over the thousands of years since the last ice age brought into being many cut-off channels and oxbows, many of which have through the process of "eutrophication" already become "dry land". These bodies of water (cut-off channels, oxbows, marshes) in various stages of eutrophication add much to the biological diversity of this flood plain, since many of them are more productive than the river itself. Their water levels do not undergo the drastic change in water levels characteristic for the river, and their shores are therefore stabilized with a continuous vegetation cover.

As mentioned previously the water level of the Nisutlin River fluctuates greatly in a seasonal rhythm, and the difference between "highs" and "lows" along the lower course may be 6 to 10 feet. These water level changes greatly affect the vegetation along its shores; they also affect indirectly many of the other plant communities in the flood plain by "fertilizing" them annually through this "spilling over" during times of high water.

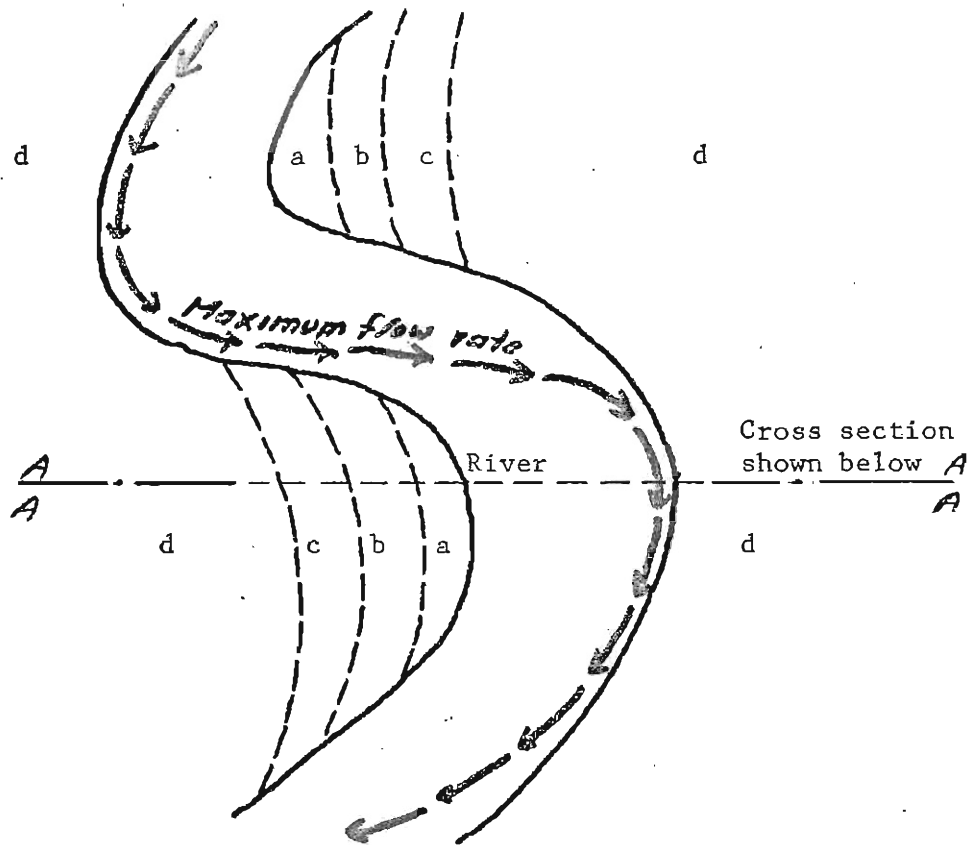
A representative diagram of a meandering river and the associated plant communities are shown on the following diagram. As is indicated the river cuts into the shore occupied by mature spruce forest (d), while its shallow shore, where sediments are being deposited, are colonized by various herbaceous plants (a); these are being displaced by shrub communities (b) at a later successional phase as the shore builds up and the water table is lowered. At a later phase yet, these shrub communities are invaded by broad-leaved forests (c), under whose canopy seedlings of the original coniferous climax forest (d) may again gain a footing. No research has been done in this area to document how long such a "cycle" from the destruction of climax forest to its re-establishment will take, but considering the ages of the trees inspected and assuming that neither fires nor other disturbances would interfere with the normal evolution of this system, it is reasonable to estimate that it will take at least 500 years.

The following is a brief summary of the plant species that may be encountered at the various successional stages of the ecosystem:

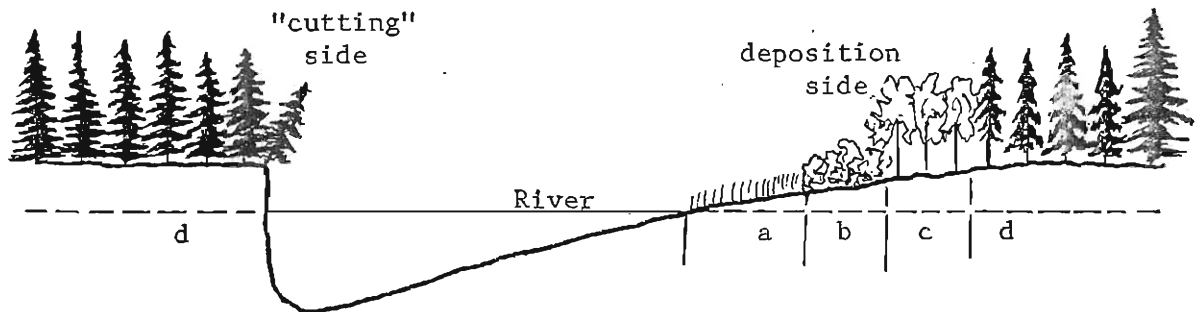
a) A number of factors influence what kinds of plants are able to colonize the mud flats recently deposited by the river. These include: the depth to which they are inundated during high water as well as the duration; the types of sediments deposited in the area (silt, sand, gravel); the strength of the current flowing over these deposits when they are inundated; the nature of the surrounding vegetation which may function as a seed source and the characteristics of the site with respect to microclimate (amount of sunshine vs. shade, exposure to wind, etc.). There will be other factors, but those listed above are the more obvious ones.

The following species have been observed to colonize such recently deposited mudbanks alone or in combination: Aster sibiricus, Epilobium latifolium, Petasites sp., Artemisia tilesii

Vertical View of Meandering River



Cross Section A - A



see explanation in text

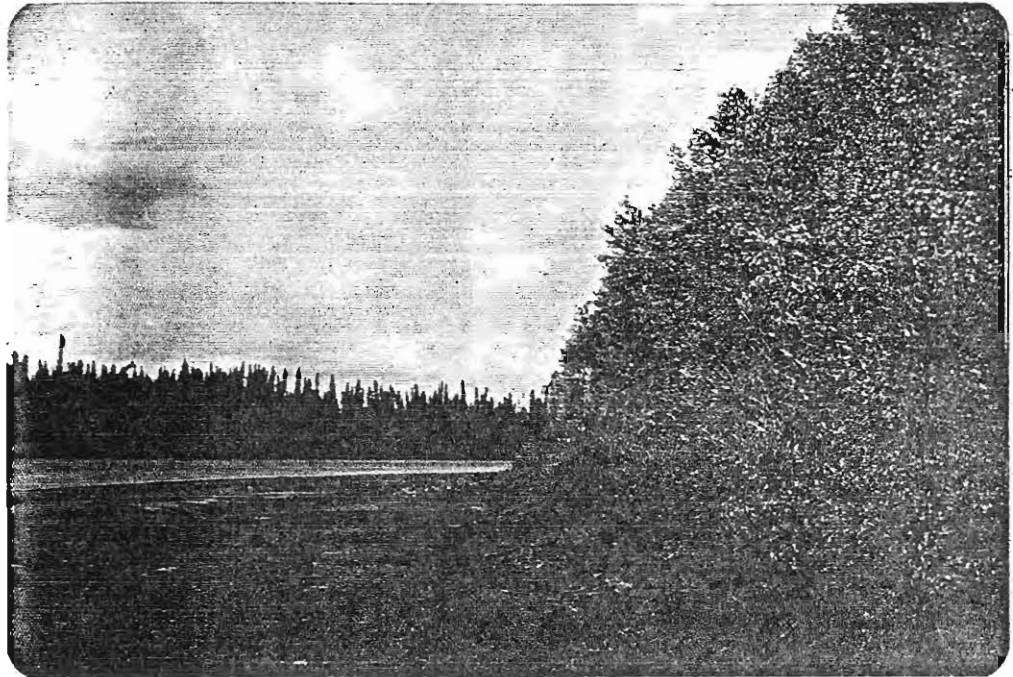
and Equisetum pratense. The latter species is a very important goose food plant, and river banks or bars occupied by this horse-tail are of great importance to the Nisutlin Canada Goose population (see photograph).

b) The original pioneer communities described above are later displaced by shrubby vegetation. Various Salix spp. (willows) are the only important shrub type in the area. Occasionally they may be mixed by alder (Alnus crispa). The ground vegetation under the willow stands contains many of the species also found in the pioneer community listed above. In addition the following herbs may be encountered if the substrate is fairly dry: Hedysarum Mackenzii, Lupinus arcticus and Achillea borealis.

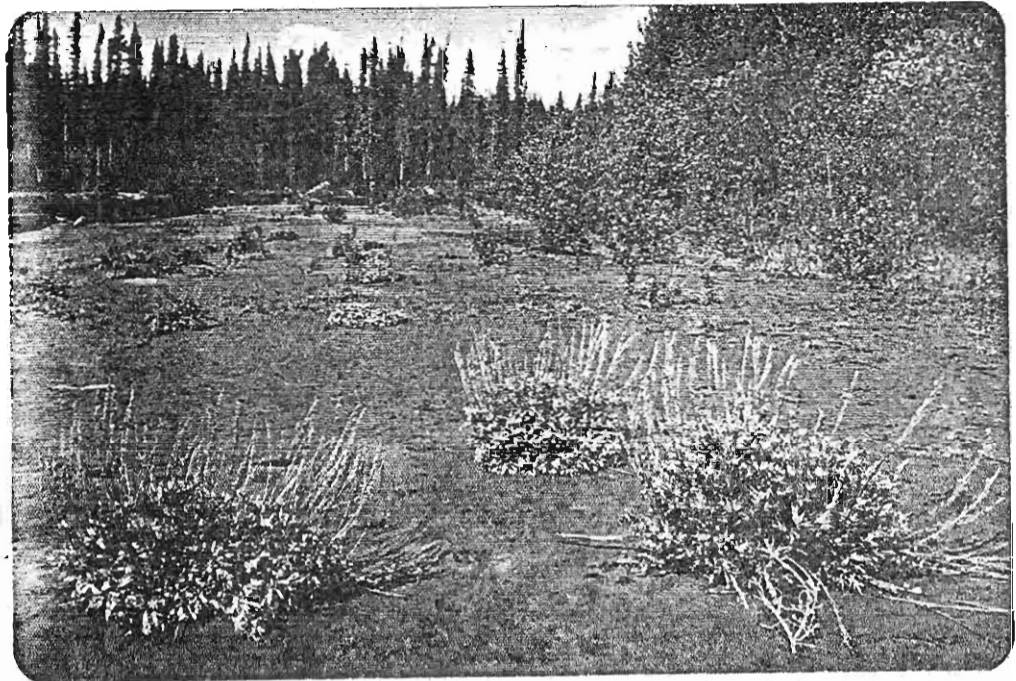
c) The dominant deciduous tree, which becomes established in the next successional phase is black poplar (Populus balsamifera). Paper birch (Betula papyrifera) and Aspen (Populus tremuloides) have not been observed in these habitats, even though they do occur in the general area. Poplar stands may have a shrubby understory of willows, highbush cranberry (Viburnum edule), Rose (Rosa acicularis) and Soapberry (Shepherdia canadensis). The herbaceous ground cover may include the following species: Hedysarum alpinum, Hedysarum Mackenzii, Astragalus alpinum, Aster sibiricus, Equisetum pratense, Potentilla hookeriana, Achillea borealis, Zygadenus elegans, Anemone multifida, Fragaria virginiana, Linnaea borealis, and Mertensia paniculata. The exact species composition varies greatly and is influenced by the moisture conditions of the substrate and the "openness" of the stand (available light). Poplar stands that are subject to regular and prolonged flooding, as those in the Nisutlin delta area, may have an understory consisting only of pure stands of Equisetum pratense.

d) The climax boreal forest of the area consists almost entirely of pure stands of White spruce (Picea glauca). Lodgepole pine (Pinus contorta) as well as Black spruce (Picea mariana) do occur in the area, but have not been observed along the river shores.

Vegetation along the "slow-water" deposition side of the river

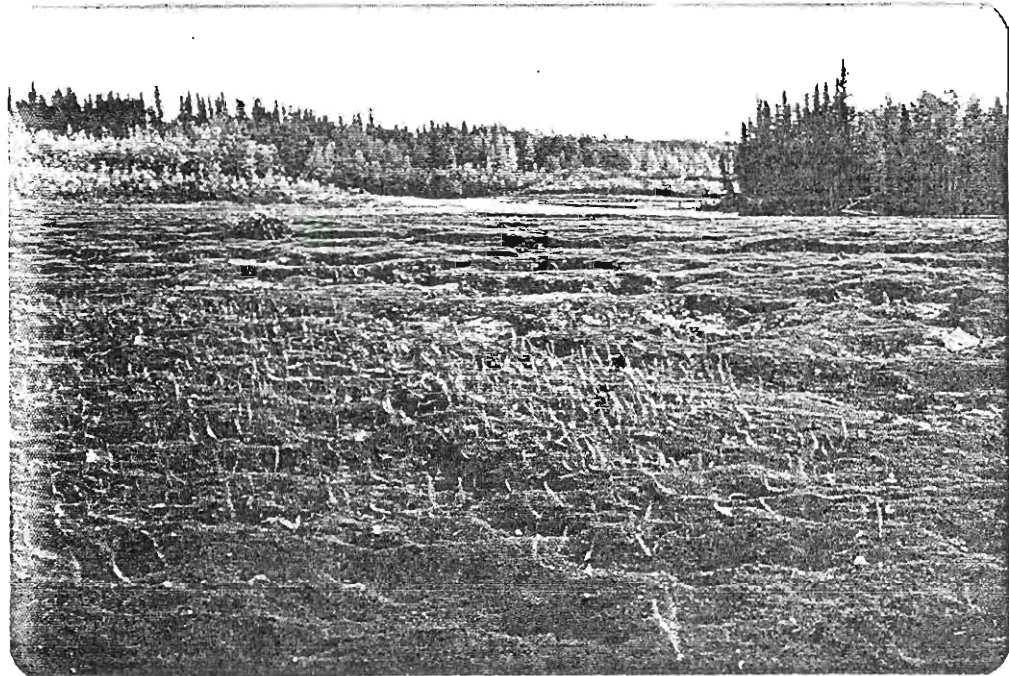


Notice zonation of sedges - willows - poplars on deposition side of river, and spruce on opposite side.



Artemisia tilesii colonizing recently-deposited mud flats.

"Goose pastures" on deposition side of river



Recent alluvial deposits - if periodically inundated are often supporting almost pure stands of Equisetum sp. Such sites are very important feeding grounds for geese. Notice the amount of goose droppings in the lower photograph.



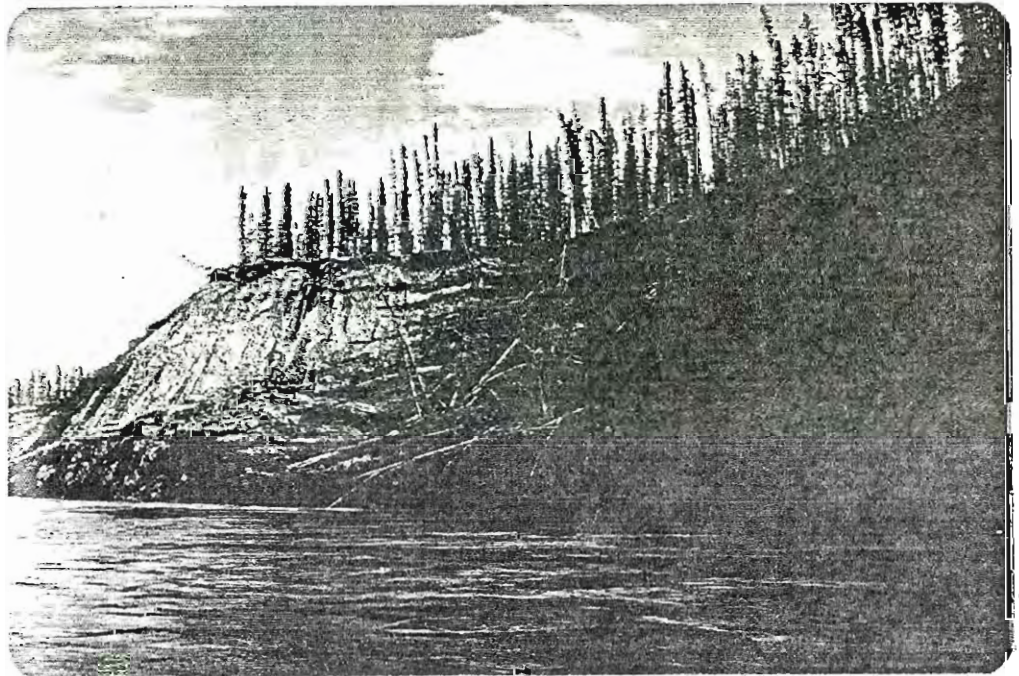
Dense stand of Populus balsamifera.

Notice the dense understorey of Viburnum edule
(high bush cranberry), an important moose
browse species.

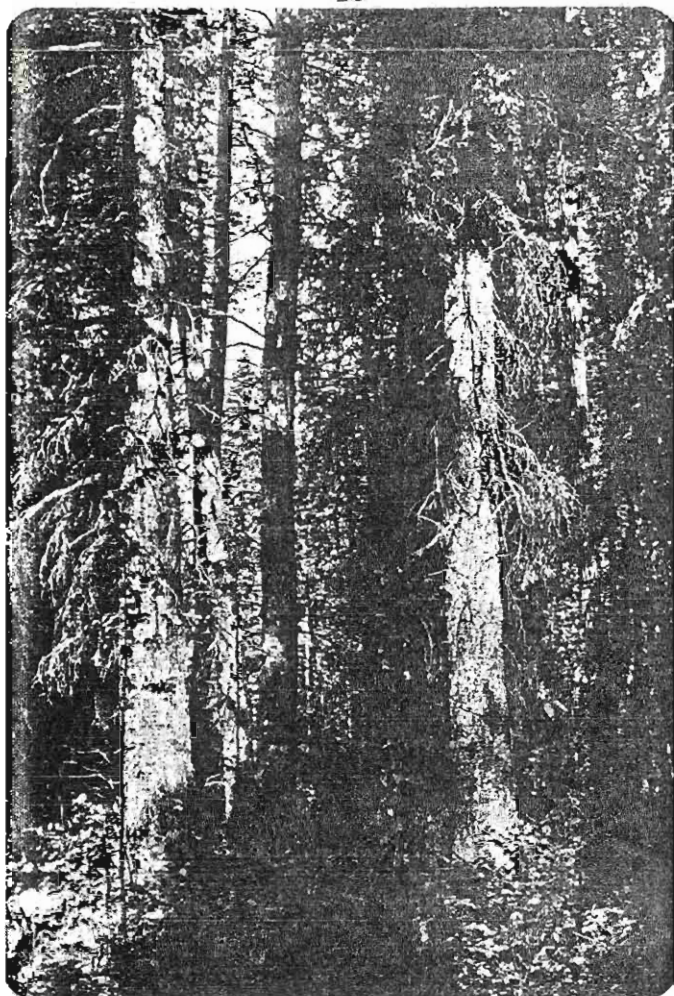
Spruce stands along the "fast-water" cutting shore of the River.



Notice that the climax vegetation is destroyed through "undercutting." Large chunks of peat break off and trees tumble over.



In areas with high banks this undercutting may result in landslides.



Climax spruce stand in Nisutlin floodplain.

Notice the dense understory of high bush
cranberry (Viburnum edule).

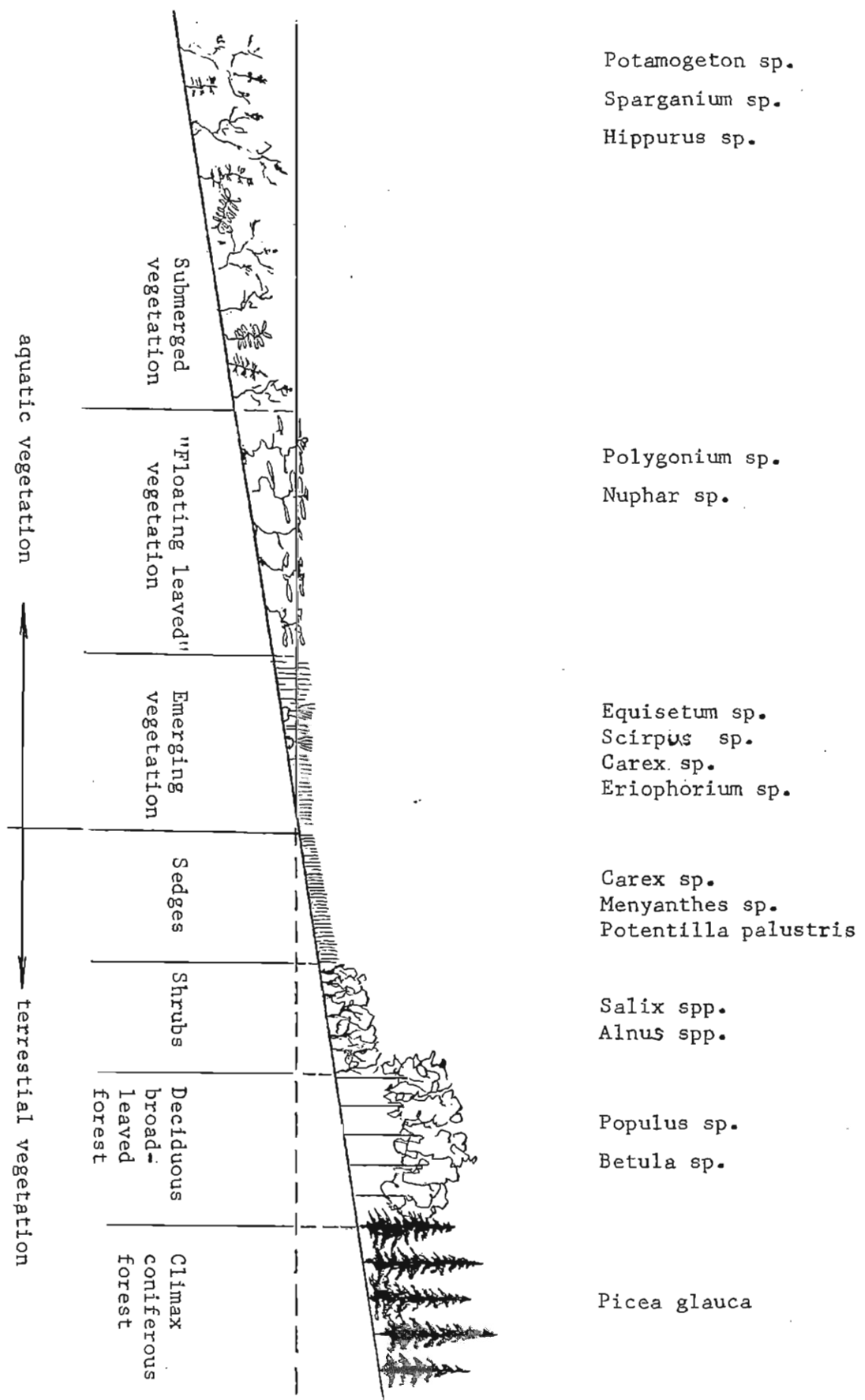
Occasionally some Paper birch (Betula papyrifera) may be mixed in spruce stands. The understory vegetation varies greatly in a similar manner as has been mentioned for poplar stands. Forest close to the river which are subject to periodic flooding have a herbaceous ground cover consisting often only of Equisetum pratense. (Photo) In more mesic sites the following other herbs can be observed: Mertensia paniculata, Epilobium latifolium, Linnaea borealis, Hedysarum Mackenzii, Arctostaphylos rubra and several lichens and moss species. At the edge of the river or in openings with better light conditions Lupinus arcticus and Calamagrostis sp. may grow. Shrubby understory vegetation may include the following species: Shepherdia canadensis, Rosa acicularis, Ribes triste, Cornus stolonifera, and Viburnum edule. Highbush cranberry (Viburnum edule) is a very important shrub in both poplar and spruce stands (Photo) and it is heavily used as browse by moose.

B. Vegetation of flood plain communities other than those along the shores of the Nisutlin River.

The following diagram gives a representative picture of the zonation observed around many of the ponds and marshes in the Nisutlin River flood plains. Not all of these vegetation types may be encountered around each marsh, but this general classification based on water depths and depth of water table in the soil is useful for discussion purposes.

The terrestrial communities, coniferous forest (white spruce), deciduous forest (poplar) and shrub stands (willows and alder) are the same as those described in the section on river shore vegetation and their description need not be repeated here. Further discussion is therefore limited to such types whose substrate is water saturated throughout the growing season, or which are temporarily or permanently

Representative Zonation around eutrophic marsh habitat



inundated. The depth of a body of water and the slope gradient of its shores determine largely how many of the community types in the zonation of the diagram will be found. Additional factors will be the type of substrate encountered as well as the nature of water level fluctuations.

Areas with saturated soils surrounding many water bodies in the area as well as occupying sites where the process of eutrophication has advanced to a degree that no more open water is encountered are occupied by almost pure stands of Carex sp. (Sedges). Few other species are found in these sedge meadows, among them Potentilla palustris and Menyanthes trifoliata (Photo). At least two different Carex spp. are involved as dominants, but their identity could not be determined at the time when our surveys were made.

Emerging aquatic vegetation were plant communities growing in water up to 2 feet in depth, but the upper portions of the plant protrude out of the water. In the study area the most important species in these habitats is the horsetail Equisetum fluviatile. (Photo). This species is an important moose forage plant. Also found mixed with horsetails are Scirpus sp. and occasionally Eriophorum sp.. A bunch forming Carex sp. (Photo) may also be observed in such sites, however this is a different species than those that make up the extensive sedge meadows referred to above. In some ponds, particularly near the delta of the river, Water lilies (Nuphar polysepalum) and Polygonum sp. may form distinct communities, where the water depth is between 2 and 5 feet. (Photo). These communities have not been observed farther up in the Nisutlin flood plain. In these plants the leaves as well as the flowers are floating on the surface of the water, but the roots are anchored. Most ponds, except those that are very deep, have extensive communities of submerged vegetation.

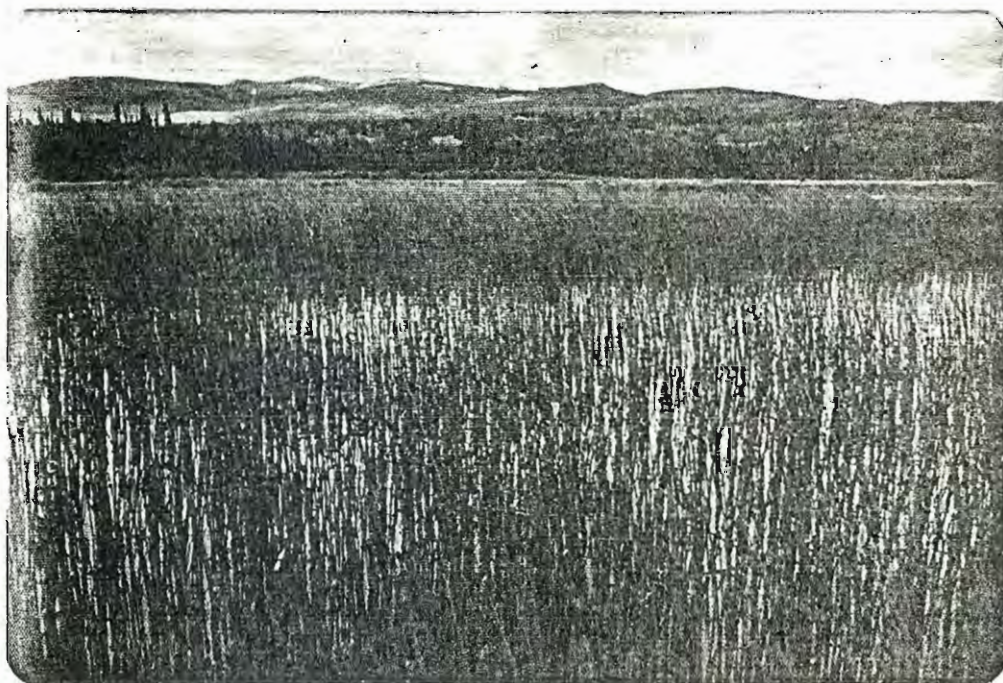


Aerial view of Nisutlin River floodplain marsh habitat.

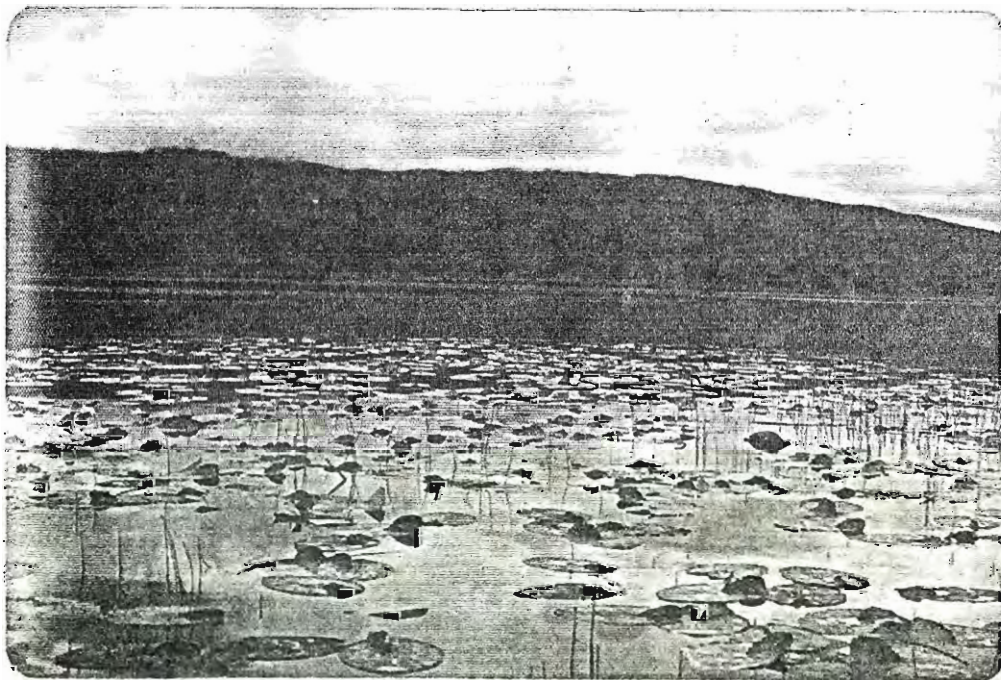
Notice the 'zonation' of vegetation around cut-off channels and ponds.

Dark green areas at water edge are stands of Equisetum fluviatile. Yellow areas are sedge (Carex spp.) meadows. Low dark green shrubs are willows, greyish-green taller vegetation are poplar stands. Dark green tall trees are white spruce.

Vegetation of marshes in Nisutlin River basin continued.

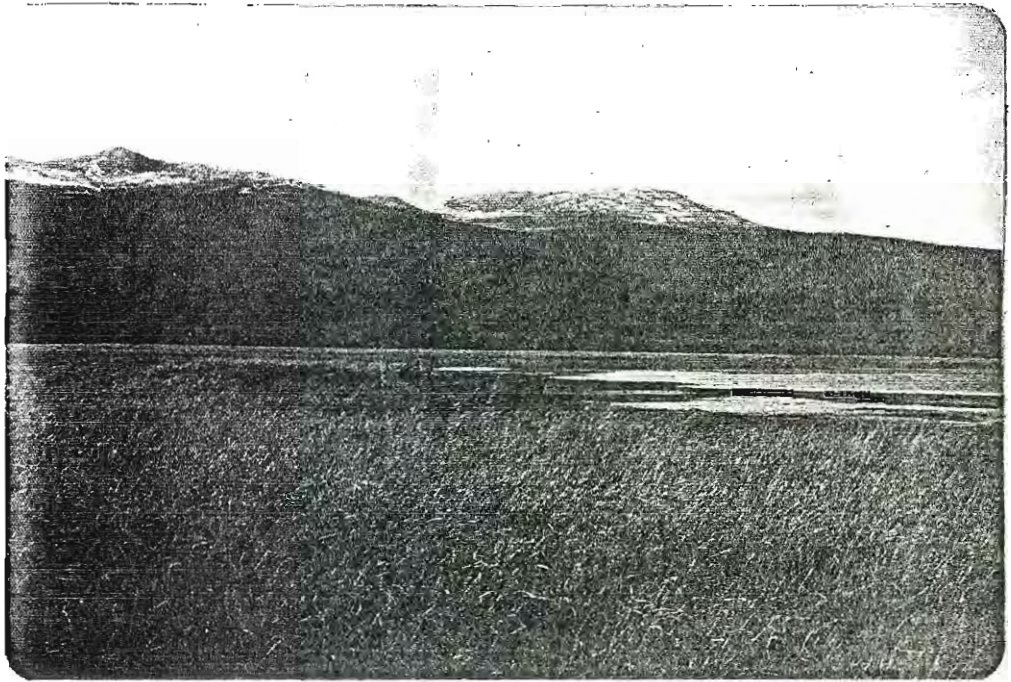


Pure stand of Equisetum fluviatile in water up to $1\frac{1}{2}$ foot depth. This is an important forage plant for moose and muskrat.

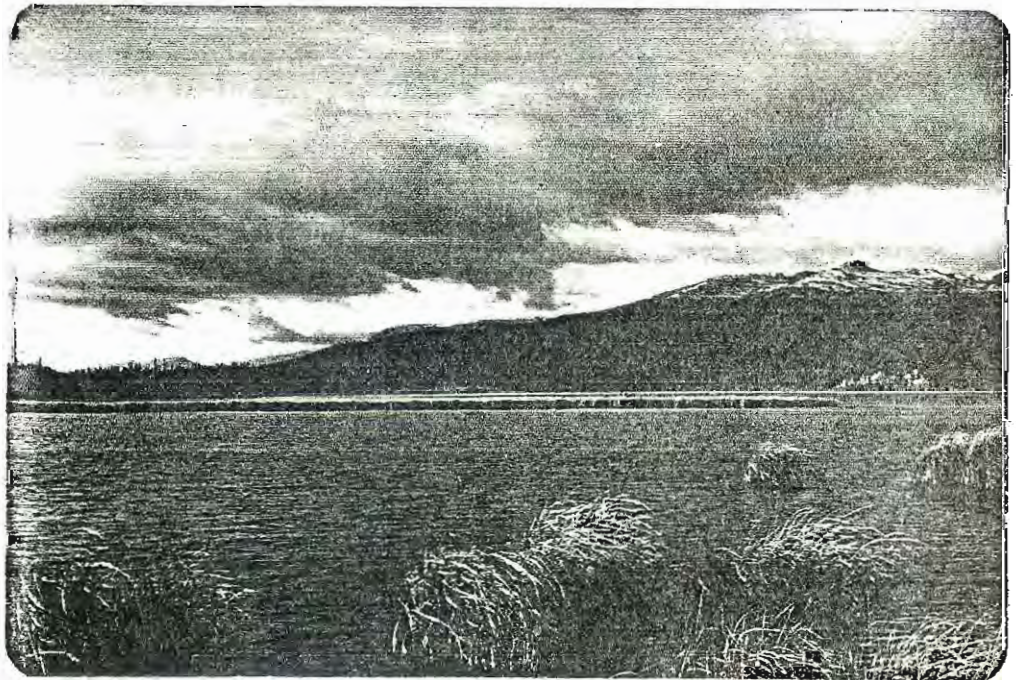


In deeper water (up to 5 feet) Equisetum is replaced by Water Lily (Nuphar polysepalum).

Vegetation of marshes in Nisutlin River floodplain



Dense stand of *Carex* sp. (Sedge) on water-saturated soil, often inundated during high water in early summer.



Isolated clump of *Carex* sp. (different species than that in the above picture) growing in up to 1 foot of water.

No equipment was available to properly sample these sites, but the following genera are involved: several Potamogeton spp., Sparganium sp. and Hippuris sp.. These species are of great importance as food plants for moose, geese, ducks and muskrats, and their extensive distribution in the area will in part explain the great biological diversity and productivity encountered in the Nisutlin flood plains.

POTENTIAL FOR COMMERCIAL FOREST MANAGEMENT

The Nisutlin valley is one of the few areas in the Yukon where commercial logging has taken place to supply the local market. Sawmills were in operation in the area with interruptions till 1972.

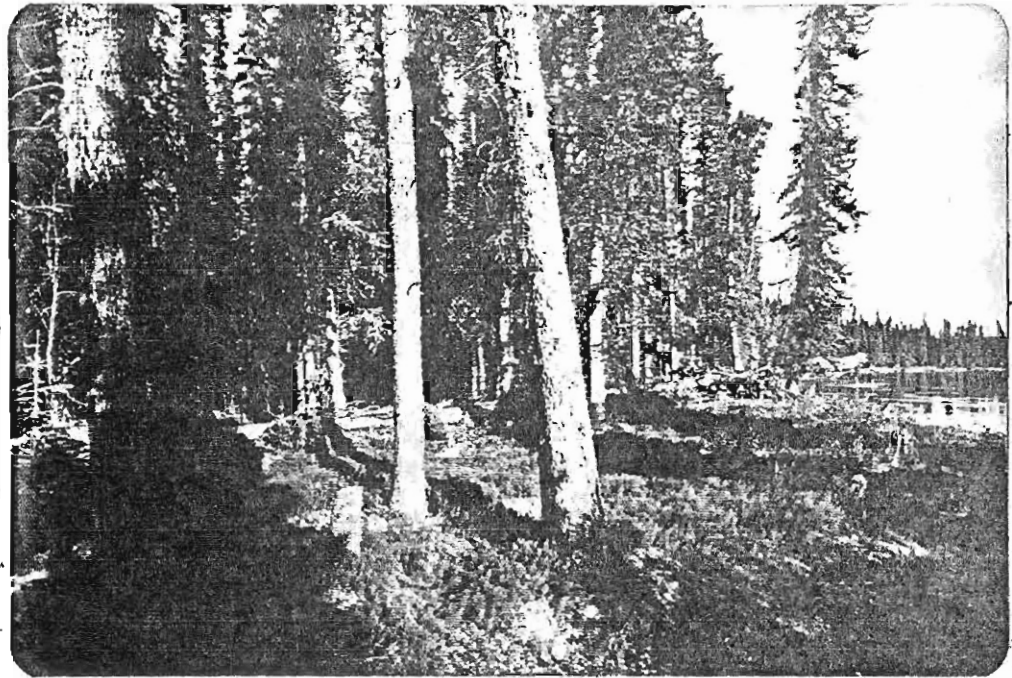
A preliminary inventory of the Nisutlin River watershed was done by the Forest Management Institute in 1953 and has been published by Hirvonen in 1968. The following brief description is abstracted from his report. The inventory tables have not been reproduced since they cover an area much larger than the actual floodplains, with which we are concerned here.

The Nisutlin River valley falls within the most southeastern portion of the B. 26b - central Yukon section of the Boreal Forest (Rowe, 1959). The tree species common to this section are white spruce (Picea glauca (Moench) Voss), black spruce (P. mariana (Mill) BSP.), alpine fir (Abies lasiocarpa (Hook.) Nutt.), lodgepole pine (Pinus contorta Dougl. var. latifolia Engelm.), balsam poplar (Populus balsamifera L.), trembling aspen (P. tremuloides Michx.), and white birch (Betula papyrifera Marsh.). On the river flats and lower slopes, white spruce grows to sawtimber size in pure stands and in mixtures with alpine fir. The incidence of alpine fir generally increases with altitude. Lodgepole pine usually dominates the well-drained, sandy soiled benchlands and river

bluffs but, as a rule, does not reach sawtimber size. The hardwoods tend to occur in scattered stands and do not attain large size.

Along the Nisutlin River itself, white spruce stands are pre dominant. In sawtimber stands, the ages vary from 130 to 215 years with the best growth being on the well-drained river flats. Most of the stands above the 70-foot height class are located within the meander system of the river. Heights up to 95 feet were recorded by the field party. The undergrowth in the white spruce stands is generally sparse with wild rose being the most common shrub. Black spruce stands are small and few in number; they are generally confined to the poorly-drained flats and depressions away from the main river. Lodgepole pine stands are also few and occur only on the higher sandy bluffs above the river. The average dbh of the pine is generally not over 6 inches and ages range between 60 to 70 years. There are scattered occurrences of alpine fir, white birch, aspen, and balsam poplar. Further away from the river, the black spruce and lodgepole pine stands become more frequent but they seldom exceed 50 feet in height. At elevations above 3,500 feet a.s.l. these stands give way to stunted black spruce and alpine fir, and dwarf birch.

At Nisutlin Bay and along the adjacent portions of Teslin Lake, white spruce and lodgepole pine form the greater part of the forest cover. The pine is also very common along the Alaska Highway on sand and gravel hills; the spruce occurs



The two most common forest types along the Nisutlin River.



a) White spruce stands
(climax vegetation)
which in this area often
reached saw timber size

b) Balsam poplar stands
(successional vegetation)
occupying more recent
alluvial deposits.

mainly along the lake or on rocky slopes leading back from the lake. There are only a few stands containing large white spruce and the lodgepole pine seldom grow beyond polewood size. Small numbers of black spruce and both poplars are present but the trees are generally small. Individual white birch are found scattered within the softwood stands; alpine fir is almost non-existent.

Hirvonen summed up his report as follows:

"The survey on which the estimates are based, was of a reconnaissance nature and therefore not very intensive. However, it provides useful information on the location, extent, and distribution of the timber resources in the Nisutlin basin. More detailed information can be obtained locally as prospects of timber sales make such necessary.

Although all the large timber appears to be located along driveable streams the stands are few and generally small. In addition, the markets are spread out and limited: the town of Whitehorse, which is some 100 miles from Teslin, provides the best market. The quantity and the quality of the timber does not warrant the cost of transportation to larger markets further away, but rather, is better suited to a small operation based primarily on local use."

AVIFAUNA

During the two surveys of five day duration in late June and mid September a total of 72 species were observed by the writer, and a total of 110 species were observed in the general area by various investigators, as shown on the following Table. This table also includes an additional 28 species which are known to be found in the general area particularly during migration, even though this fact has not officially been published.

If it is considered that all biological surveys in the area have been short-term exercises and that the area under investigation is relatively small and located in sub-arctic latitude, than the total number of species (138) reveals a fairly rich avifauna.

Our observations during June and September 1975 have been quantified "as number of positive sightings per species" in the summary table. However, this may not necessarily be an indication of relative abundance of various species, because the emphasis in sampling was on wetland communities, with little time spent in forest and none at all at sub-alpine and alpine altitudes. An additional complicating factor is the secretive nature of a number of bird species during incubation time in June. During the September survey a number of insectivorous birds, (for instance, swallows, warblers and a number of shore birds) had already migrated out of the area.

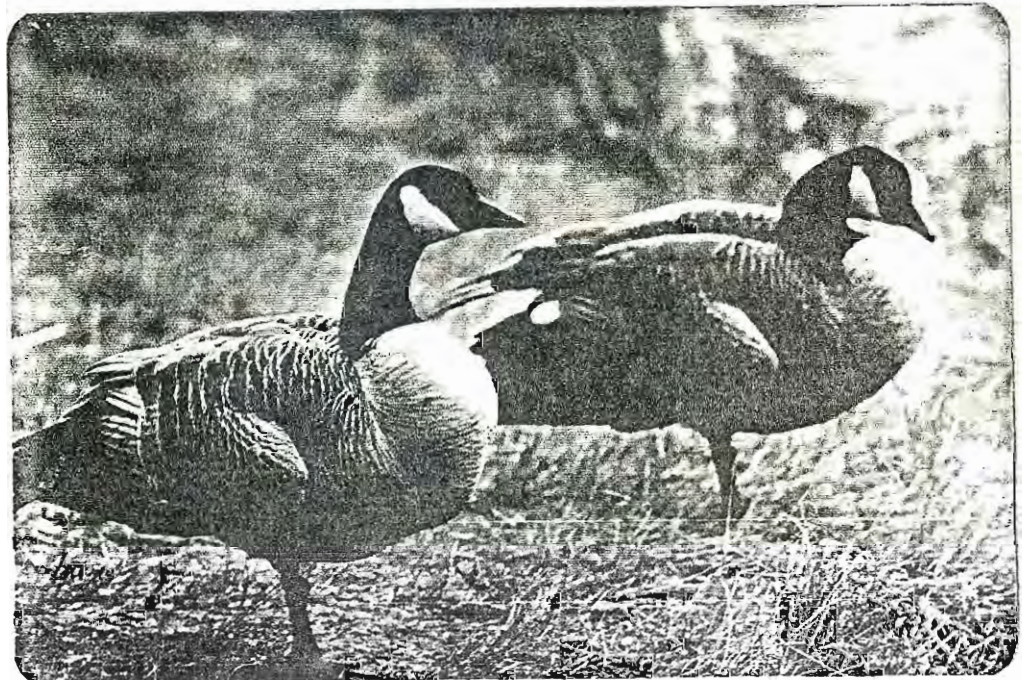
It is therefore reasonable to assume that additional bird species may be reported for the area once intensive year-round surveys are conducted.

This rich avifauna of the Nisutlin valley can be explained by the great habitat diversity of the area and the pre-dominance of wetland-type vegetation.

From the point of view of game management, perhaps the waterfowl of the area is of utmost importance. The valley exceeds any other in the Yukon as a breeding ground for geese and the delta area is the best geese staging area during fall migration. For this reason the Game Branch has on several occasions proposed to have it set aside as a waterfowl refuge. It is estimated that up to 2,000 geese (Canada) use the delta during fall, many of which are birds that are raised in the Nisutlin valley (Geist et al, 1974). It is estimated that about 200 pairs nest in the vicinity of the Nisutlin Bay and the lower Nisutlin River. According to Dr. Hanson, the river boasts its own subspecies of Canada goose. Our observations during fall migration indicate that the geese use the mud flats and the open water of Nisutlin and Colwell Bays for roosting at night and return to the various marshes along the lower Nisutlin River in day time to feed. We found also that geese at this time do not only feed on the submerged vegetation of the various sloughs, potholes and marshes consisting of Potamogeton spp., Sparganium spp., Myriophyllum sp., and Hippuris sp., but also feed extensively on the gravel beds of the river which were submerged earlier in the season during high water, but are now exposed and often covered by pure stands of Equisetum sp. The area is also used by Snow geese during spring migration and by White-fronted



Non-breeding Canada Geese using gravel bars for resting (Photo taken during June survey).



Geese using large open flats of Nisutlin and Colwell Bays for feeding and resting during fall.

geese in the autumn.

Dabbling ducks are common but do not represent the majority of ducks in this area, according to surveys conducted by the U.S. Bureau of Sport Fisheries and Wildlife (Geist et al, 1974).

J. G. King, who conducted these surveys in 1961, 62 and 63 showed a breakdown of 49% scaup; 27% scoters; 4% buffleheads; and 4% common goldeneyes, but only 6% pintail and 10% mallards. King reported a three-year average density of 12 ducks per square mile for the Nisutlin River area, however this density includes many square miles of forested lands which are interspersed with wetlands throughout the Nisutlin valley.

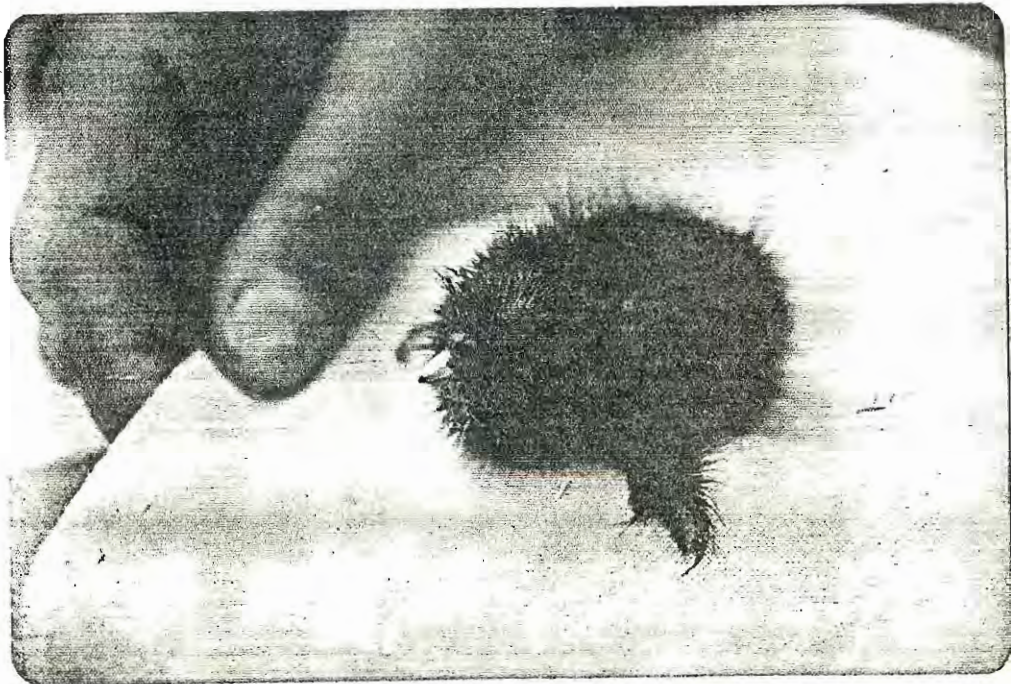
While the entire area is of great importance to birds, in particular waterfowl and shore birds, two observations on passerines were of significance and should be pointed out. Red-winged blackbirds are not very common in the Yukon in general, but in the Nisutlin valley they are far more common than Rusty blackbirds, and in one large marshy area - commonly known as 30-mile Slough - we counted at least 50 territorial males.

We also made several observations on Sora rails, a bird which according to Godfrey, 1966, does not breed in the Yukon. There were at least 3 breeding pairs in the '30-mile Slough' referred to above, and photographs were taken of one adult and a downy chick. This location is 200 to 300 miles from the nearest known (published) breeding area.

Additional observations on bird occurrence and abundance can be obtained by consulting the following summary table.



An important discovery was the breeding of Soras in the Nisutlin basin. This bird has not been reported to breed in the Yukon before.



Evidence of breeding of Soras: A downy chick a few days old.

List of birds observed in the Nisutlin River area
or reported for the area by other investigators.

| | Number of Observations during June trip | Number of Observations during September trip | Observations by other investigators |
|--------------------------|--|---|--|
| Common Loon | 2 | 1 | G. R. |
| Arctic Loon | 1 | | R. H. |
| Red-throated Loon | | | R. |
| Horned Grebe | 2 | | H. |
| Red-necked Grebe | 9 | | R. |
| Western Grebe | | | R. |
| Double-crested Cormorant | | | R. |
| Whistling Swan | | | H.R. |
| Osprey | | | H. |
| Bald Eagle | 2 | 6 | G. H. R. |
| Marsh Hawk | | 7* | H. R. |
| Goshawk | 1 | | G. H. R. |
| Sharpshinned Hawk | | 1 | G. |
| Peregrine Falcon | | | R. |
| Merlin | | 1 | R. |
| American Kestrel | 3 | | R. |
| Red-tailed Hawk | | 1 | R. |
| White-winged Scoter | 12 | | H. R. |
| Red-breasted Merganser | 3 |) 145 | H. R. |
| Common Merganser | 2 |) | G. R. |
| Blue-winged Teal | 2 |) 15 | H. |
| Green-winged Teal | 5 | 23 | R. |
| Mallard | 85 | 73 | H. R. |
| Pintail | 5 | | R. |
| Wigeon | 21 | 122* | R. |
| Lesser Scaup | 231 | 60 | R. |
| Barrow's Goldeneye | 24 | 13 | R. |
| Common Goldeneye | 2 | 2 | |
| Northern Shoveller | 3 | | |
| Bufflehead | 6 | 15 | R. |
| Canada Goose | 46 | 800+ | H. R. |

| | Number of Observations during June trip | Number of Observations during September trip | Observations by other investigators |
|-------------------------|--|---|--|
| Spruce Grouse | 1 | 1 | G. H. R. |
| Blue Grouse | | | R. |
| Ruffed Grouse | | 5 | R. |
| Willow Ptarmigan | | | G. R. |
| Rock Ptarmigan | | | R. |
| White-tailed Ptarmigan | | | G. R. |
| Black-bellied Plover | | | H. |
| Semi-palmated Plover | 4 | | H. |
| Upland Plover | | | R. |
| Solitary Sandpiper | 5 | | H. R. |
| Spotted Sandpiper | 28 | 4 | G. H. R. |
| Pectoral Sandpiper | | | H. |
| Least Sandpiper | 1 | | H. |
| Semi-palmated Sandpiper | | | R. |
| Greater Yellowlegs | 2 | | H. |
| Lesser Yellowlegs | 82 | | H. R. |
| Hudsonian Godwit | | | R. |
| Whimbrel | | 4 | |
| Common Snipe | 48 | 3 | H. R. |
| Long-billed Dowitcher | 8 | | H. |
| Northern Phalarope | 67 | | H. R. |
| Sora Rail | 8 | | |
| Herring Gull | 10 | 12 | H. R. |
| Mew Gull | 12 | 8 | H. R. |
| Bonaparte's Gull | 132 | | H. R. |
| Arctic Tern | 9 | 2 | H. R. |
| Pomarine Jaeger | | | R. |
| Mourning Dove | | | R. |
| Great Horned Owl | | | R. |
| Hawk Owl | | | R. |
| Great Gray Owl | | | R. |
| Short-eared Owl | | | R. |
| Common Nighthawk | 7 | | H. R. |
| Belted Kingfisher | 2 | 2 | H. R. |
| Common Flicker | 2 | | H. R. |
| Hairy Woodpecker | | | H. R. |

| | Number of Observations during June trip | Number of Observations during September trip | Observations by other investigators |
|-----------------------------------|--|---|--|
| Downy Woodpecker | 1 | | |
| Northern Three-toed Woodpecker | | | R. |
| Traill's Flycatcher | | | H. R. |
| Western Wood Peewee | 1 | | G. H. R. |
| Olive-sided Flycatcher | | | H. R. |
| Say's Phoebe | 4 | | R. |
| Cliff Swallow | 2 | | H. |
| Tree Swallow | 8 | | H. R. |
| Bank Swallow | 4 colonies | | H. R. |
| Gray Jay | 6 | 8 | H. R. |
| Black-billed Magpie | | | H. R. |
| Raven | 9 | 12 | H. R. |
| Black-capped Chickadee | | | H. |
| Boreal Chickadee | 6 | 7 | H. R. |
| Red-breasted Nuthatch | | | H. |
| Robin | 4 | | G. H. R. |
| Townsend's Solitaire | | | G. |
| Varied Thrush | | | R. |
| Hermit Thrush | 3 | | R. |
| Swainson's Thrush | 8 | | R. |
| Water Pipit | | 6* | |
| Ruby-crowned Kinglet | 2 | | H. R. |
| Bohemian Waxwing | 7 | 14 | R. |
| Yellow-rumped Warbler | 6 | | G. H. R. |
| Yellow Warbler | 25 | | G. H. R. |
| Northern Waterthrush | | | H. |
| Wilson's Warbler | | | G. H. R. |
| Blackpoll Warbler | | | R. |
| Yellowthroat | 23 | | R. |
| Rusty Blackbird | 60 | 6 | H. R. |
| Red-winged Blackbird | 65+ | | H. |
| Pine Siskin | | | H. |

| | Number of Observations during June trip | Number of Observations during September trip | Observations by other investigators |
|------------------------|--|---|--|
| Red Crossbill | | | R. |
| White-winged Crossbill | | | H. R. |
| Golden-crowned Sparrow | | | G. |
| Savannah Sparrow | | 2 | H. R. |
| Dark-eyed Junco | 2 | 16* | H. R. |
| Tree Sparrow | 2 | | R. |
| Chipping Sparrow | 2 | 12* | R. |
| White-crowned Sparrow | 2 | | R. |
| Fox Sparrow | 3 | 1 | R. |
| Lincoln Sparrow | | | R. |
| Song Sparrow | 1 | | |

Abbreviations used:

R = Rand (1946)

G = Geist (Geist et. al. 1974)H = Hubbard (in Geist, et. al. 1974)

* mainly migrants

In addition, the following species can be expected to be summer residents in the area, and they should be observed if all habitat types, in particular the forests, grasslands, and the sub-alpine and alpine areas are investigated: Golden Eagle, Horned Lark, Harlequin Duck, Gray-crowned Rosy Finch, Mountain Bluebird, American Golden Plover, Western Sandpiper, Sharp-tailed Grouse, Western Sandpiper, Hammond's Flycatcher, Northern Shrike, Tennessee Warbler, American Redstart, Orange-crowned Warbler, Townsend's Warbler, Pine Grosbeak, Canvasback, Greater Scaup, Killdeer and Dipper.

The following species are known to use the area at times of migration, even though this may not have been officially reported: White-fronted Geese, Snow Geese, Whistling Swan, Lapland Longspur, Smith's Longspur, Snow Bunting, Snowy Owl and Rough-legged Hawk.

MAMMALS OTHER THAN MOOSE

A. Big Game

Moose are the most abundant big game animals in the Nisutlin River valley and they are dealt with in a separate section of this report.

Other big game species that are known to occur and whose tracks and signs have been observed during our reconnaissance include wolves and both black and grizzly bears. Because of the high moose density in the area and the known tendency of wolf populations to adjust to the abundance of their prey animals, it can be expected that the numbers of wolves in the area will be fairly high particularly in winter. Bear densities will not be very high because of the preponderance of aquatic plant communities in the area, which are not utilized by either bear species. Mountain caribou are known to be found on surrounding mountain ranges (Geist et al, 1974; Banfield, 1974; Youngman, 1975) and it can be expected that some may occasionally utilize the Nisutlin valley during winter. Both Mule deer and White-tailed deer have been observed near Teslin and it is therefore possible that some of these deer may occasionally be found in the delta area. Such observations would be of transient animals, however, since the Nisutlin valley, and particularly the delta area, do not constitute "typical" deer habitat.

The nearest Stone sheep population in the Salmon and Cassiar Ranges, and the nearest Goat population apparently utilizes portions of the Englishman's Range (Geist et al, 1974). We have no evidence

of either of these species traversing the Nisutlin valley on their annual migration from winter to summer ranges.

B. Furbearers

The lower Nisutlin River valley, which is reported on here, traverses two traplines: #322 presently held by Graffie JULES and #334 held by Jack SMARCH. The following Table lists the furbearers taken on these two lines, as far as can be ascertained from Game Branch records. For JULES' trapline harvest reports cover the time interval of 1950/51 to 1972/73; during these years trapping activity was conducted during 17 winters. Jack SMARCH'S trapline was utilized much less often. Records from 1950/51 to 1973/74 show that the line was only worked during 6 winters.

While the harvest statistics compiled in the following Table are not necessarily an indication of the abundance of various furbearers, since the take is also influenced by ease of trapping various species, accessibility, market values and personal preference of the trappers, that do give an indication of the distribution of furbearers in the area and their importance to trappers. Interpretation of harvest statistics also has to take into consideration the fact that some furbearing animals undergo cyclic fluctuations. This includes the lynx, and to a lesser degree foxes, coyotes and muskrats.

During our river survey the most obvious furbearer was the beaver. Bank beaver activity was noticed on 35 different locations along the shores of the Nisutlin River. No other furbearer was

observed except for a few red squirrels.

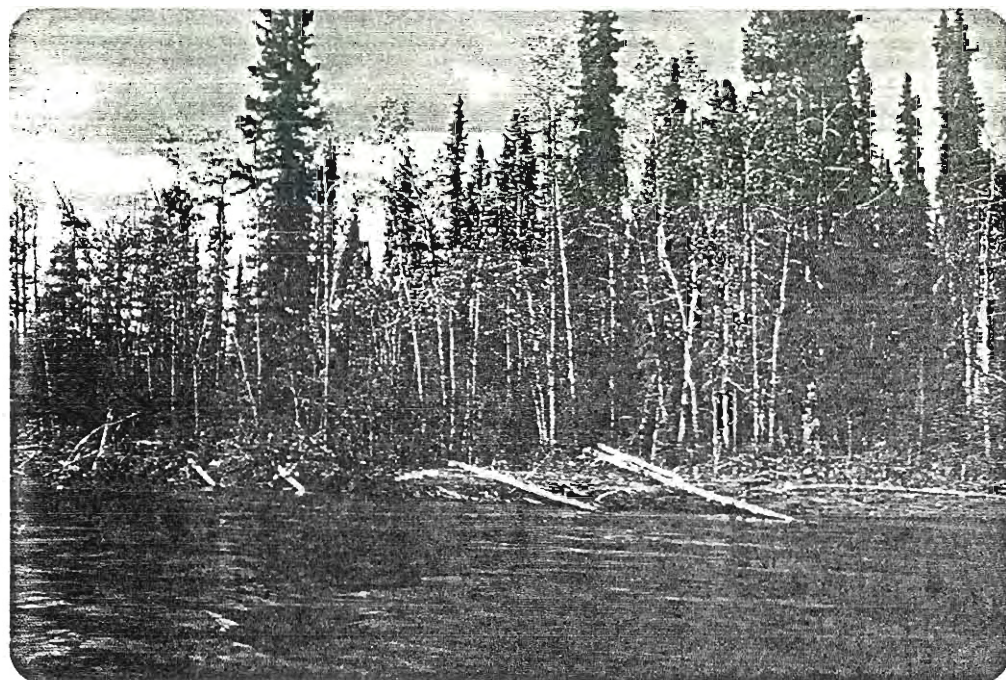
Muskrats appear to be at the "low" of their cycles. Even though we searched many marshes, we did not see any signs of rats. As is obvious from the following Table, these animals are over the years second only to red squirrels in importance to trappers. The list of "small mammals" at the end of this section lists all the potential furbearers that can be expected in the Nisutlin River valley.

C. "Small mammals"

Small mammals include all those that are not dealt with under big game or furbearers. During the June river trip 5 small mammal traps were set for 3 nights (15 trap nights), but only 1 deer mouse and 2 meadow voles were taken. In addition two porcupines, 1 chipmunk and two meadow voles were observed. The list of "small mammals" at the end of this section is a summary of published information and it mentions the various species that can be expected in the area in suitable habitats.

Fur-bearing animals taken in traplines #322 & 334

| | Beaver | Otter | X-Fox | Red Fox | Lynx | Mink. | Muskrat | Marten | Weasel | Red Squirrel | Coyote | Wolverine |
|--|--------|-------|-------|---------|------|-------|---------|--------|--------|--------------|--------|-----------|
| Trapline #322 Graffie Jules 50/51 to 72/73 (17 years trapped) | 105 | 6 | 4 | 12 | 42 | 47 | 247 | 95 | 63 | 1245 | 1 | 11 |
| Trapline #334 Jack Smarch 50/51 to 73/74 (6 years trapped) | 55 | | 1 | 2 | 7 | 8 | 188 | 1 | 13 | 516 | | |
| Summary | 160 | 6 | 5 | 14 | 49 | 55 | 435 | 96 | 76 | 1761 | 1 | 11 |



The most obvious furbearing animal along the lower Nisutlin River was the beaver. During the June reconnaissance a total of 35 localities with recent beaver cuttings were recorded.

"Small" Mammals reported for the Nisutlin River watershed.

| | |
|-----------------------|-------------|
| Cinereus Shrew | R. B. Y. |
| Dusky Shrew | R. B. Y. |
| Water Shrew | R. B. Y. |
| Pygmy Shrew | R. B. Y. |
| Little Brown Bat | R. B. Y. |
| Marten | R. B. Y. |
| Fisher | R. Y. |
| Least Weasel | R. B. Y. |
| Ermine | R. B. Y. |
| Mink | R. B. Y. |
| Wolverine | G. R. B. Y. |
| Otter | G. R. B. Y. |
| Red Fox | R. B. Y. |
| Lynx | R. B. Y. |
| Woodchuck | R. B. Y. |
| Hoary Marmot | G. R. B. Y. |
| Ground Squirrel | G. R. B. Y. |
| Least Chipmunk | R. B. Y. |
| Red Squirrel | H. R. B. Y. |
| Flying Squirrel | R. B. Y. |
| Beaver | G. R. B. Y. |
| Deer Mouse | H. R. B. Y. |
| Bushy-tailed Wood Rat | R. B. Y. |
| Northern Bog Lemming | R. B. Y. |
| Brown Lemming | R. Y. |
| Red-backed Vole | R. B. Y. |
| Tundra Vole | R. B. Y. |
| Meadow Vole | R. B. Y. |
| Long-tailed Vole | R. B. Y. |
| Heather Vole | Y. |
| Western Jumping Mouse | B. Y. |

Meadow Jumping Mouse

B. Y.

Muskrat

R. B. Y.

Porcupine

R. H. B. Y.

Collared Pika

R. B. Y.

Snowshoe Hare

R. B. Y.

Abbreviations:

G: Geist (1974)
H: Hubbard (in Geist 1974)
R: Rand (1945)
B: Banfield (1974)
Y: Youngman (1975)

Moose:

The Nisutlin River is known to be one of the best moose areas in the Yukon and between 40 and 60 are shot here every fall by people coming down river with a boat from Mile 41 at the South Canal road. Some additional moose are taken during winter by Teslin Indians who take them in the delta area where they are very concentrated in February and March. Their annual harvest is not known but may be between 10 and 20 moose.

Periodic surveys by the Yukon Game Branch to monitor the performance of this moose population began in February 1974 and continued at regular intervals to February 1976. Recent survey notes are attached as an appendix to this report.

Considerable variation in numbers of moose using the Nisutlin floodplain have been observed between surveys, depending on what time of the year such surveys are carried out. During this 3-year period we have flown the area during the following months to detect reasons for population fluctuations: June, December, January and February.

The February counts were always the highest and those of June and December were the lowest. Based on these surveys the annual migrations into and out of the floodplain appeared to be as follows.

Many moose leave the floodplain in spring and early summer and move up into the sub-alpine shrub zone and into the large burned area between the Nisutlin and Wolf Rivers. However, some moose remain in the floodplain during summer, perhaps 30% of them, where they feed extensively on the aquatic vegetation of the many marshes and ponds.

Preferred forages appeared to be Equisetum fluviatile and Nuphar sp. and Potamogeton spp. It appears that many of these remaining moose also leave the floodplain in late fall after all the water is frozen over. Some moose are in the floodplain during the rutting season, but many have moved to higher altitudes. Most moose are concentrated at sub-alpine elevations during December (above the 4000 foot level). At this time hardly any are left in the floodplains.

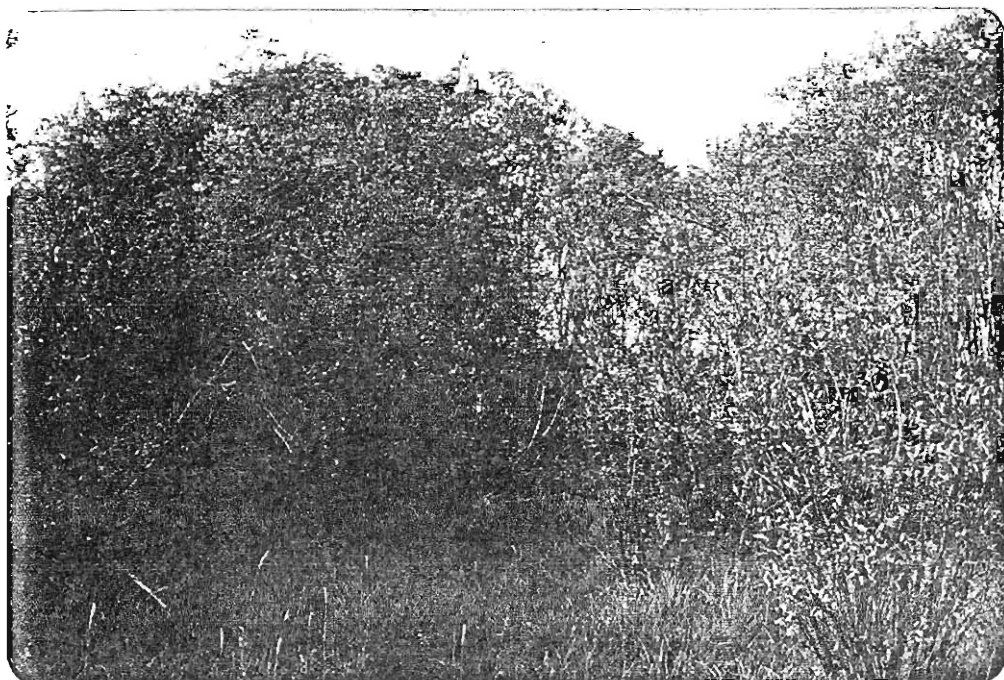
It is at present not known why moose concentrate at higher elevations at this time of the year when the rutting season is long over. These concentrations at this time of the year may have some social significance, since in many groups the sexes are separated, the bulls still have their antlers and sparring matches are frequent. Geist et. al. (1974) speculates that moose are comfortable in soft snow up to 20 inches in depth - which is prevalent at that altitude at that time - but wolves can not maneuver under such conditions, leaving the moose relatively undisturbed. Moose begin to move downhill in the latter part of winter (late January, early February) when snow conditions become hard and crusted and when snow depths approach 36 to 40 inches. Our observations indicate that they first move downhill into the floodplain and subsequently move downstream such valleys and concentrate in late winter (late February, March) in the delta areas. Here they form very dense concentrations, which could be referred to as "yards" using eastern Canadian terminology. In such deltas the moose densities may approach 10 to 15 moose per square mile. The Nisutlin delta is the best of such concentrated areas known to us at present, others are

Eagle Bay and Morley Bay, both also on Teslin Lake.

Based on February counts the numbers of moose using the Nisutlin floodplain from its delta upstream to Mile 41 Canol road will be between 300 and 350 moose. The density "per mile of floodplain" is around 7 moose at that time. Between 70 and 80 moose use the delta area in late February.

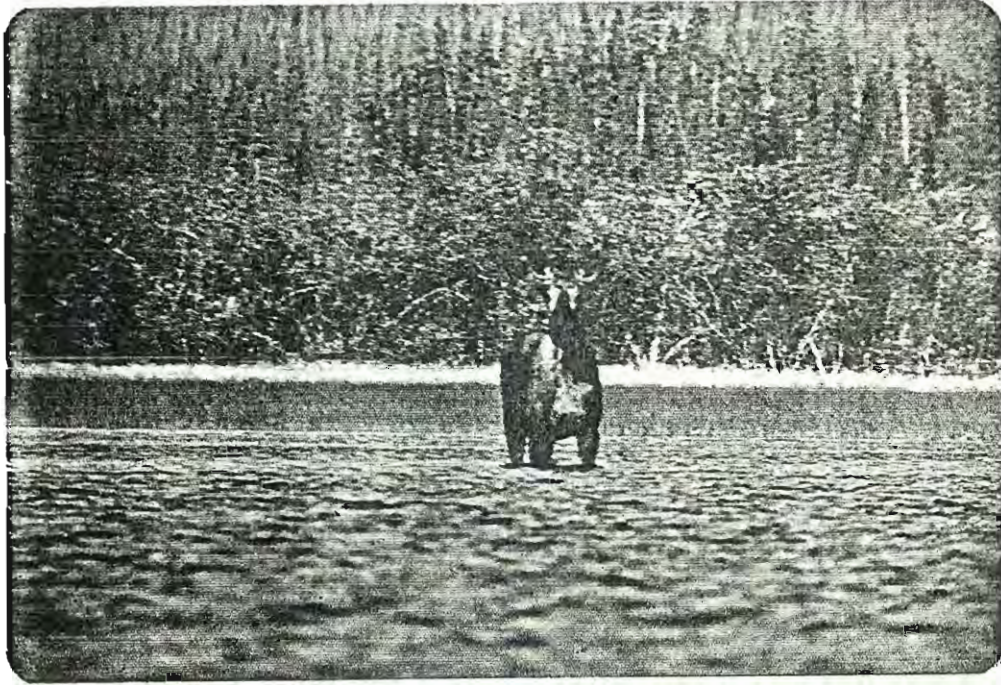
The moose population of the Nisutlin floodplain appears to be fairly stable with an annual recruitment rate of 15 to 20%.

For more details on moose surveys the reader is referred to the appendix as well as to a special report by the Game Branch dealing with moose surveys in this area, as well as the Teslin Lake - Tarfu Lake district.



An important feature of the vegetation cover of the Nisutlin River floodplain are extensive willow stands. Willows are the most important browse plant of moose and their abundance in this area is an important factor in explaining the high density of moose observed.

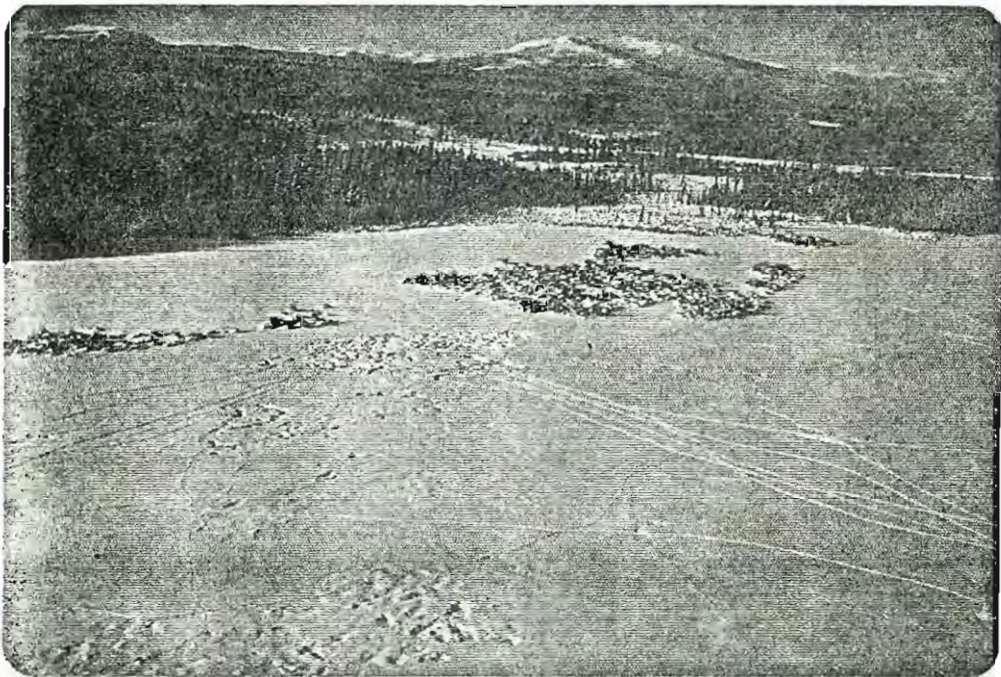
On the above photograph notice the signs of excessive browsing on the two willows in the left and right foreground; also notice the moose trail in the centre of the photo, worn deep into the soil by frequent use.



Many shallow ponds, oxbows and marshes with aquatic vegetation are important in supplying summer forage for moose.



Willow stands in the backwaters of the Nisutlin River are important moose winter ranges as is obvious from the tracks.



Moose are not entirely browsers during winter. They also graze on sedges as is obvious from the "feeding waters" in this sedge meadow in the Nisutlin floodplain.



Aerial photograph of the Nisutlin delta; probably the best moose winter range in the Yukon



Close-up of tall willow stand in the Nisutlin delta. The moose and numerous tracks reveal its importance as winter range.

Conclusion and Recommendations:

While our biological reconnaissance of the Nisutlin floodplain is based on only 2 one-week expeditions in June and September and several winter survey flights, sufficient knowledge was gained to compare this valley to other areas in the Yukon which have been surveyed too and to make some recommendations for management.

There is no doubt that this valley is the most important moose wintering area in the southern Yukon (60° to 62° latitude). There are other rivers which are just as good or even better over short distances, for example, Liard, Rancheria, Teslin Rivers, but none can rival the Nisutlin if the moose population over its entire length is considered. Of utmost importance is the delta of the Nisutlin River, which supports moose densities of 10 to 15 animals per square mile during late winter. The entire moose population wintering in the lower Nisutlin floodplain from 41 mile (Canol Road) to Teslin Lake is estimated to be 300 to 350.

Of equal importance are the various waterfowl species, particularly Canada geese, that use the Nisutlin valley as breeding areas and the Nisutlin Bay as staging areas during fall migration. 2000 to 3000 geese have been counted here, many of which are supposed to have been raised along the Nisutlin River. The geese in the Nisutlin valley are somewhat different from other Canada goose types, which led to the proposal of assigning sub-specific status to them.

This valley is also of importance with respect to furbearing animals, in particular muskrats, mink, beaver and otter, and it has a large number of different species of birds, some of which for instance, soras and red-winged blackbirds, are very rare in the Yukon.

This great faunistic diversity and productivity can be explained largely by the physiography of this floodplain and its vegetation cover. A slow, meandering river perpetuates an ecosystem consisting largely of pioneer and early successional communities, which are much more important for moose, waterfowl and furbearers than the climax spruce forest.

In addition, no other river valley in the Yukon has such an abundance of oxbows, marshes, sloughs and ponds, sedge meadows and willow flats in its floodplain. It is primarily these water bodies that provide the bulk of the habitat for birds and furbearers.

It is reasonable to say that no other river of equal size in the southern Yukon is so important in so many respects.

This uniqueness has been recognized long ago. Several proposals have been made to at least protect the delta area as a waterfowl refuge. The International Biological Program has also recommended the lower Nisutlin River as part of an ecological reserve.

It is recommended that some special status must be given to the Nisutlin floodplain in the near future because of its importance to wildlife. It is realized that designations like "Park" or "reserve" may imply prohibition of hunting and the imposing of other

restrictions, and thereby stir up opposition from the very beginning. But it may be considered to declare the area as "special wildlife management area" or "critical wildlife habitat area" with the condition that wildlife management has priority in this valley over other types of land use. This does not mean that other types of land use must not be allowed. Some types are compatible with wildlife management, while others are not.

Forest management can be made compatible, well-regulated recreational use is also compatible. On the other hand, agricultural use and grazing use must not be allowed, nor should the area be opened for recreational cabin building.

It is unfortunate that grazing leases for horses are already issued for the delta area - the most critical area of the entire river. These leases should not be extended once they expire and other areas should be located for substitution.

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Appendices:

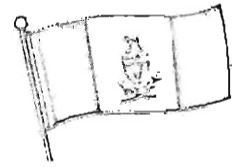
- (1) Terms of reference for river surveys.
- (2) Summary of Nisutlin River Patrols and costs involved by Ron Butler.
- (3) Letter of Dr. H. Hanson to Dr. V. Geist regarding the taxonomic status of the Nisutlin goose.
- (4) Letter of Dr. G. King to Dr. V. Geist regarding waterfowl surveys in the Nisutlin area.
- (5) Moose survey of February 18, 1976 by M. Hoefs.
- (6) Moose survey of January 22, 1976 by M. Hoefs.
- (7) Report on "critical" moose wintering areas by M. Hoefs.

Government of the Yukon Territory

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OUR FILE
YOUR FILE

TO: Joe, Grant, Ron, Manfred, David, Bill M.

DATE: 15 May, 1975

FROM: J.B. Fitzgerald

RE: River surveys

The recent N.C.P.C. proposals have caught the Game Branch completely unprepared with respect to biological knowledge of even our most important rivers.

To remedy this situation and to be prepared in the future to make competent comparisons between various proposed hydro power developments our Game Branch will begin this summer to do biological reconnaissance work of major Yukon Rivers.

Since this unexpected work is not accommodated for in our budget we have to fit this year's surveys into our regular working schedule, and we will work on rivers that are accessible, since there is no money to fly into the headwaters of inaccessible ones.

For this summer the following schedule is anticipated:

(1) Mossop and assistant -

Portions of the Porcupine and Old Crow Rivers, that can be fitted into other planned investigations.

(2) Lortie and Joe -

Pelly River from Faro downstream to the junction with the Macmillan, hence upstream the Macmillan for about 10 miles to cover the proposed N.C.P.C. reservoir.

(3) Hoefs and Ron -

Nisutlin from Quiet Lake to Nisutlin Bay.

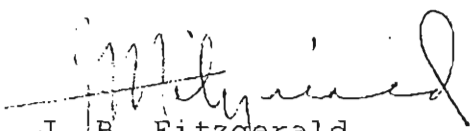
7 June 16 to 21/75

These surveys (by boat) should be done at the same time, tentatively during the 3rd week of June (7 to 10 days), so that comparisons between rivers can be made.

During these surveys the biological resources of the valleys should be documented qualitatively as well as quantitatively. This means that simple species list of birds, for instance, are not enough; we have to know, for instance, how many broods of mallards etc. per mile of river or per "pot hole" of a given size in the flood plain. The emphasis of this reconnaissance should be on waterfowl, beaver, muskrats, but other species must not be neglected. Observations can also be made on moose, for instance, calf to cow ratios.

The reconnaissance should be documented in a well illustrated report with detailed maps, accounts of waterfowl, furbearers as well as other birds and mammals, and an appraisal of the habitat (for instance percentage of coverage by spruce and pine vs willows and poplars). This survey must not be limited to the river itself, but must also cover oxbows, cut-off channels and potholes in the back-country, since these are often more productive than the river itself.

As our staff expands this river reconnaissance work will be accelerated and perhaps 4 rivers will be done next year. At this rate we will have covered all potential hydro sites in the next three years.


J. B. Fitzgerald,
Director of Game.

cc: Joe
Grant
Ron
Manfred
David
Bill M.

SUMMARY OF NISUTLIN RIVER PATROLS

June and September 1974

Two river patrols were conducted on the Nisutlin River during the summer of 1974. The first patrol followed the river downstream from Mile 41 on the Canol Road (approximately 85 miles upstream from the mouth of the Nisutlin River).

During the latter part of June and early July, down river is the most practical direction to travel as the water is high and quite swift. Estimated current speed would average about 5 or 6 MPH.

The second patrol, during early September, followed the river in the reverse direction. Current is much slower and as the river is very shallow in many stretches, it is easier to "read" than when travelling downstream. This second patrol was to the vicinity of 30 mile slough and return.

Navigation during high water is relatively easy for anyone at all familiar with running river and with a rudimentary knowledge of reading currents.

Using the attached map and mileages marked in as a reference, the only stretch of water that may prove troublesome during high water is located immediately downstream from the mouth of the Wolf River, at the point marked Mile 46. For approximately 1/2 mile the river narrows to about 10 MPH with standing waves (not cresting) about 2 - 3 feet high. This does not pose any problem for a well constructed river boat but might be dangerous for a car-top type boat. Also during this time of year it is necessary to keep a constant lookout for drifting timbers, sweepers and sawyers throughout.

During low water in the early fall the only problems likely to be encountered are with low water. The worst stretch of river is from the outlet at Nisutlin Bay to the mouth of Wolf River, Mile 49 to Mile 45. A number of gravel and rock riffles are encountered and at least 2 stretches of water are too shallow for an outboard motor. The first is a gravel bar at Mile 47.5 which stretches completely across the river. The second is the same narrowing of the river at Mile 46. It is possible to work upstream following the extreme left bank (west side) through a stretch of rock strewn river for about 1/4 mile. Above this is another gravel bar stretching completely across the channel.

Upstream of the Wolf River the bottom is mostly sand and silt and even though it is very difficult to locate the channel in some spots no danger exists to the motor or boat due to the nature of the river bottom. Rock ledges are located at Mile 41.5 and Mile 41. Both are difficult to see and caution is necessary when navigating these stretches. Other rocks and rock ledges exist above this but with careful reading of the river, should not prove a danger.

Summary of expenses, equipment and other pertinent information:

| | | | | | |
|-------------------------------|---|---|----------|---------------|----------|
| Food & camp supplies | - | June | \$175.00 | September | \$175.00 |
| Fuel & oil for outboard motor | - | June (20 HP) | \$35.00 | Sept. (35 HP) | \$45.00 |
| Equipment used | - | 22 ft. wooden river boat | | | |
| | | 20 HP motor used in June | | | |
| | | 35 HP motor used in September | | | |
| | | 16 ft. canoe carried as an auxiliary and used to investigate sloughs and lakes located back from the rivers edge. | | | |

- 9 x 12 tent
- Fly sheet for tent
- SSB potable radio
- Coleman cook stove
- 10 HP outboard as emergency
- Miscellaneous cooking utensils
- Sleeping bags, rifle, paddles,
- Life jackets, etc.

- Serviceables cabins
- Mile 36 - log trapper's cabin
 - Mile 47.5 - a frame cabin in excellent condition which is privately owned and was once used in the logging industry. A number of other cabins are located throughout but all are tumbled down and unserviceable.

Due to the depth of the Nisutlin River, especially in low water, the most desirable type of craft to run this river with would be an inboard jet boat of about 22 - 25 feet in length. Properly handled, this type of craft could easily navigate all stretches of the Nisutlin, even well above Mile 85 which is the point where navigation with a conventional river boat becomes impossible. Also this type of craft could travel at speeds of 20 - 30 MPH whereas a prop driven boat averages about 3 - 4 MPH upstream. A great deal of time would be saved with the use of a jet boat.

Other than the above, a conventional river boat, over 20 ft. in length would be recommended and lastly, a 20 - 22 ft. freight (square stern) canoe. This last would be the least desirable of the three due to its greater draft when loaded and the time necessary to effect repairs to the canoe's bottom.

The 20 HP motor proved too small, even for downstream travel. There was not enough power to properly maneuver the craft where the 35 HP motor used in the fall was much more satisfactory. If heavy loads are anticipated I would recommend a 50 HP motor.



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March 2, 1972

GEORGE SPRUGEL, JR, Chief

Dr. V. Geist
University of Calgary
Calgary, Alberta
CANADA

Dear Dr. Geist:

Sorry about the endless delay in reply to your letter--pure procrastination. I was glad to get back the photos as a great deal of time had been spent on them--much "dodging" etc. Many poor prints made before achieving the final result. Uneven negative developing and bringing out the clouds make for problems.

My answer to all 4 points is Yes:

1. The Yukon race is distinctive and will be described as new to science.
2. I would judge that the lower Nisutlin River is a relatively high density area for breeding Canada geese.
3. The muskeg ponds along the river--arranged in alternate fashion--apparently characterize most of the breeding range of the Canada goose in the Yukon Territory--The range of this race extends into northern Alberta--Jennings Plateau.
4. The Nisutlin geese do have a very exceptionally high load of minerals in their primary feathers. Ash weight of the minerals of the primary feather vane is 8-10 per cent (!) the highest of any population across the continent (Hanson and Jones, Robert L.--unpublished).

I was happy to be of service as I have received so much aid in Canada.

Sincerely yours,

HCH:ew

Harold C. Hanson
Wildlife Specialist



UNITED STATES
DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE
BUREAU OF SPORT FISHERIES AND WILDLIFE
P. O. Box 1287
Juneau, Alaska 99801

September 20, 1971

V. Geist, Associate Professor
University of Calgary
Calgary 44
Alberta, Canada

Dear Professor Geist:

Henry Hansen of our Bureau did aerial waterfowl surveys in Northern B.C. and southern Yukon Territory in 1961, 62 and 63, as part of the Cooperative Continental Waterfowl Management Program. These were done on an experimental basis and have since been dropped for lack of time. Three of the 27, 16-mile survey segments used by Hansen fell within the Nisutlin River drainage. (see enclosed map)

I've just reviewed that data and I'm afraid it won't be of much value to you. As you know this is rather rough country characterized by wooded hills interspersed with narrow but rather rich river valleys and lake systems. The productivity of the small marshes here are much higher than our type of cross country surveys, designed to sample whole regions, would indicate.

The 3 segments shown in the Nisutlin valley had a 3 year average of 12 ducks per square mile. By the same method our survey in the Old Crow indicates an average of 57 ducks per square mile. These figures however are not directly comparable because the Old Crow survey includes only the lowland habitat and none of the wooded upland habitat.

Air survey figures are rather rough at best and need to be interpreted in conjunction with ground studies which we do not have for the Nisutlin area. The 3 year average species composition for the 3 segments was pintail 6%, mallard 10%, scaup 49%, goldeneye 4%, bufflehead 4% and scoter 27%. Teal, widgeon and other ducks I assume are there were not picked up by our survey. A good survey of this area would require some refinements.

I certainly agree the Nisutlin and other small river systems in that area are highly productive and important and regret that our experimental surveys do not do the area justice.

Yours truly,

James G. King
Waterfowl Supervisor

(Map appended)

Moose survey in the Nisutlin River floodplains on January 22/1976.

A moose survey was conducted in the Nisutlin River basin to continue the annual monitoring of this population.

A Jet Range helicopter (T.N.T.) was used for about 3 hours survey time. The pilot was George Howell, and Mr. Hoefs and G. Lortie served as navigator and observer respectively. The weather was cloudy, calm and mild.

The Nisutlin floodplain was surveyed from Nisutlin Bay north to the mouth of Sidney Creek. An attempt was made to classify a good sample size by approaching closely to the moose to check for white patches of female moose. All moose had lost their antlers by this time.

A total of 138 moose were located in the area, consisting of 31 bulls, 44 cows and yearlings, 5 calves and 58 unidentified moose.

The bull:cow ratio was therefore 70:100,
the calf:cow ratio was therefore 11:100,
and the productivity (percentage of calves of total number) was only 3.6%.

This count was very disappointing in two respects, firstly a productivity as low as 3.6% is too low to replace adult mortality and is indicative of a declining population; secondly, the total number of 138 moose is much lower than expected, since 163 were observed on February 21, 1974 in only half the distance of floodplains (from Nisutlin Bay to 30-Mile Creek).

The following summary shows a comparison of the three surveys done in the area during the past 3 years.

| <u>Date</u> | <u>Bull/Cow Ratio</u> | <u>Calf/Cow Ratio</u> | <u>Productivity</u> |
|---------------------------|-----------------------|-----------------------|---------------------|
| February 1974 (n= 163) | 62:100 | 50:100 | 21% |
| December 1974 (n = 51) | 78:100 | 30:100 | 16% |
| January 1976 (n = 138) | 70:100 | 11:100 | 4% |

It may, however, be premature to draw any conclusion from this survey, regarding the performance of this moose herd, since this count was conducted at a different time. It is recommended that another flight be made in the latter part of February 1976 so that a more valid comparison can be made to the 1974 survey.

MOOSE SURVEY IN NISUTLIN RIVER FLOODPLAIN ON

FEBRUARY 18/76

A survey was made of the Nisutlin River floodplain with a Jet Ranger helicopter (T.N.T. - pilot Kim Carswell) for about 4.9 hours on February 18/76. About 3.5 hours were spent in the Nisutlin valley, the remainder was ferry time from Whitehorse. The weather was clear, calm and cold (-30 C); M. Hoefs served as navigator and recorder and Ron Butler assisted as observer and recorder.

The length of the floodplain covered ~~was~~ from the delta at Nisutlin Bay upstream to Mile 41 of the Canol Road, is the same distance that was covered during our June biological reconnaissance of the area.

On the way to Teslin we did a brief reconnaissance of the Mitchie Lake, Squanga Lake and Squanga Creek valleys. Some caribou signs were observed on the chain of lakes between Mitchie Lake and Squanga Lake. A high concentration of moose was observed along Squanga Creek starting from the Alaska Highway at Squanga Lake upstream to a Seaforth Lake (the lake Callison has a hunting camp). On this stretch of creek, not more than 16 miles long, we observed 36 moose and probably missed a few more. This area is fairly open, recently burnt and has many stands of low willows intermingled with sedge meadows. It is reasonable to estimate that the density of moose in this valley will be around 3 moose per square mile.

The Nisutlin River was surveyed by flying upstream along its east side and returning along its west shore. Wherever the floodplain was very wide circles were made to cover all willows and poplar stands

and sedge meadows. We flew at an altitude of about 200 ft. No attempt was made to separate male from female moose, but records were made of the number of calves observed unless the moose were under dense cover. Notes were also made on the number of fresh tracks in locations where the moose themselves could not be seen.

The highest moose density was observed in the willow stands in the Nisutlin delta area. This delta habitat is not larger than perhaps 6 square miles in size and we observed 64 moose in it. Because of the dense cover of some willow stands we will have missed a few additional moose, so that the total moose population utilizing the delta can be expected to be between 70 and 80 animals. This late winter density of 12 to 15 moose per square mile appears to be the highest ever observed anywhere in the Yukon.

Moose densities along the remainder of the river surveyed were considerable lower, even though they are still among the best in the Yukon. Beyond the delta upstream to Mile 41 camp site we observed 103 moose and recorded an additional 135 fresh tracks in areas where the moose could not be located because of heavy timber or dense cover. It can therefore be estimated that a minimum of about 250 moose use the floodplain upstream from the delta and a minimum of about 300 to 350 moose use the entire lower Nisutlin floodplain at this time.

Considering the "air distance" of the floodplain surveyed, which is around 45 miles, and the estimated number of moose of 300 to 350, then the density per air mile of floodplain works out to be 7 moose per mile of floodplain, which is higher than that of

the Liard and is comparable to that of the lower Rancheria River.

It was not possible to accurately determine the number of calves in the total number of moose observed, since many of them were running under tall timber or in heavy willows. We estimate that about 120 moose were evaluated and of these 16 were cows accompanied by 17 calves. One cow was leading twins. The ratio of calves to adults in this sample size was therefore 17/103 or about 17%.

One young bull in the delta area still had his antlers.

Near the northern boundary of our survey area, east of Quiet Lake, we flew to 3 larger lakes located to the east at about 3500 foot elevation to check whether all moose are down in the river valley at this time. We found occasional moose tracks all the way to timber line indicating that the total number of moose using the Nisutlin River watershed will be considerable higher than the estimates given above.

No wolves were observed during this survey, but two fairly old kills were located, one just north of the "Oxbow" and one 4 miles upstream of "30-mile Slough".

Manfred Hoefs,
Asst. Director.

Feb 1976

SOME "CRITICAL" MOOSE WINTERING AREAS IN SOUTH-CENTRAL YUKON

During recent winter game surveys in the south-central Yukon on February 18 to February 20/76 a few concentration areas of moose were observed which must be considered "critical", because of the limited extent of these habitats and the high density of moose observed in them.

Our observation during this survey and earlier ones carried out in the southeastern Yukon indicate that moose in this part of the Yukon not only move downhill into the valleys as winter progresses but in addition move downstream, such river valleys and concentrate in delta areas during February.

It is at present not known why moose prefer the willow stands in river deltas to those found along the rivers farther upstream. Various factors may be responsible, for instance snow conditions may be less severe, the browse may be more nutritious (different species of willows may be involved), this "yarding" of moose may also be advantageous to respect to predators and less energy will be spent in moving about in these tramped down concentration areas.

Four such areas were located in the south-central Yukon around Teslin Lake. These are the Nisutlin River delta, Eagle Bay, the delta of the Morley River at Morley Bay, and the delta of the Morley River further upstream where it empties into Morley Lake. All these areas consist of tall willow stands which are flooded in early summer. The relevant characteristics of these four areas are summarized in the following table:

| Location | Approximate size square miles | Number of Moose observed | Total Number of Moose estimated | Density |
|----------------|-------------------------------|--------------------------|---------------------------------|--------------|
| Nisutlin delta | 6 | 64 | 80 | 13 moose/mil |
| Eagle Bay | 5 | 40 | 50 | 10 " |
| Morley Bay | 3 | 14 | 20 | 7 " |
| Morley Lake | 2 | 9 | 15 | 8 " |

The areas are shown on the attached map.

These areas must receive special considerations in land use questions since the moose in them are drawn in from a much larger "hinter land". There is no doubt that many of the moose in the Nisutlin delta and in Eagle Bay, for instance are Wolf River moose. This river has a fairly large population in summer and fall, but is practically deserted of moose at this time.

It is unfortunate that three of these areas (all but Morley Lake) are already subject to grazing by horses. It should be considered to terminate these grazing leases once they expire, or at least assure that no additional ones are granted for these areas and that the number of horses on existing leases is not increased.

Manfred Hoefs,
Asst. Director.

