Canadian Wildlife Service

Research Contract no. 20.

ECOLOGICAL SURVEY OF THE CHIGNECTO COASTAL LOWLANDS

by

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Progress Report
for the Fiscal year 1968/69.

Introduction.

The object of the present study is an ecological survey of the Chignecto Coastal Lowlands with emphasis on their wildlife component. Information obtained in this survey will provide a basis for the consideration of wildlife values in land planning and management in the Chignecto Coastal Lowlands, and will be helpful also in the management of other wetland areas with similar conditions.

A preliminary report on the ecology of the Chignecto Coastal Lowlands was submitted previously to the C.W.S. as progress report for the year 1967/68. This year's report will report only on work done in 1968/69 and on its more important results.

Data obtained under this contract will be combined with results of research on upland forests in the area, supported by an N.R.C. grant, in a paper on "The ecology of the New Brunswick - Nova Scotia border area" to be ready for publication in September 1970. The lowlands within this area have in the past been used largely for agriculture, since 1948 with substantial financial support of the Federal government under the framework of the Maritime Marshlands Rehabilitation Act. From the turn of the century onward, there has been, however, a drastic decline in the intensity of agricultural use. Large areas are used at the present only intermittendly. There is therefore the possibility of an alternative use of these lowlands, with management for wildlife being a main consideration. The value of the proposed paper will therfore be a twofold one.

1. It will provide information necessary for the planning of such alternative landuse.

2. It will record the state of these lowlands in the late 1960's, a time which in the future may be looked back upon as a turning point in land use, and will serve as a point of comparison for assessment of the ecological consequences of future use.

From this year onward, for the duration of the contractual relationship, there will be an annual report to the C.W.S., giving (1) ecological information and management recommendations relevant to the planning of management projects during the coming year, and (2) an assessment of the ecological consequences of past management.

Work done in 1968/69.

In 1968/69 the investigator spent a total of 160 hours on the contract, divided about equally between field work and desk work. Mr. J. Van Zoost, employed through the C.W.S. was field assistant.

Work in 1967/68 was confined largely to the peatland zone in the Jolicure Lakes section. In 1968/69, investigations were extended to Memramcook Lake, Midgic West, La Planche and Amherst Point sections, and dealt about equally with both reclaimed marsh zone and peatland zone.

In 1967/68 surface conditions in the area were classified into 15 groups with 31 landscape units. On the basis of additional data, especially for the reclaimed marsh zone, this classification was re-considered in 1968/69. All 15 groups and 23 of the landscape units were left unchanged. Some rearrangements were made in the remaining units, resulting in a new total of 30 landscape units. The grouping of surface conditions resulting from these changes, appears to be as satisfactory a solution as can be achieved in such relatively cursory survey. No

further changes are thus anticipated as result of future work.

In addition tolandscape units and landscape zones, as defined in 1967/68, work in 1968/69 showed the need for an additional unit which was termed "land section". This term is applied to an area which is hydrologically relatively independent from adjacent areas and which represents therefore a potential management unit. The borders of such units are formed partially on natural, topographic features and partially on man-made structures.

On the basis of data obtained in 1967/68 and 1968/69, tentative maps are being prepared in time for the 1969 field season: one small scale for the whole area, one medium scale for each the Midgic West, Midgic South, Jolicure Lakes, Missaquash, La Planche, and Amherst Point sections, and one large scale for each of the eutrophic to rich mesotrophic lakes and adjacent marsh areas with high carrying capacity for ducks, including Memramcook Lake, Tower's Goose Lake, southwest extension of Large Lake with adjacent marsh and smaller lakes, Front Lake, Patten Lake, Missequash Impoundment, small lake west of Blair Lake and the lakes in the Amherst Point Sanctuary. These maps will be reconsidered in 1969/70 and will be prepared in a definitive version in 1970.

The description of the drainage pattern as presented in the 1967/68 report (Pages 17-20) was found to be remain unaffected by additional data obtained in 1968. It became obvious, however, that for manipulation of water levels more precise information is needed on the interdependence of water levels and water flow in different parts of each land section. Field work in 1969 will study such relationships for the Jolicure Lakes section and any other area for which water level manipulation is being considered. Some problems demanding special consideration are outlined later in this report under separate heading.

Field and herbarium studies on the vascular plant flora of the area were largely concluded with work in 1968/69. Some work has also been done on bryophytes and lichen. An ecological flora for these plant groups is planned as part of the 1970 paper. Cursory work has indicated the importance of algae as indicators of the over-all character of water bodies. More work will be done on this in 1969/70.

Further detail has been added to the knowledge of bird distribution patterns. The planned work on bottom-living invertebrates has not yet been undertaken. The need for such knowledge has become in the meantime even more obvious, and considerable time will be spent on this work during the coming field season.

Some Hydrological Problems.

It is obvious that an understanding of the landscape pattern and for manupulation of water levels more precise information is needed on interdependence of water levels and water flow.

An important question concerns the degree of interdependence between water levels of lakes within one land section. E.g. in the Jolicure section, Large Lake has as its main outlet a canal extending southwards through Fillmore's Hole and further towards the Tantramar. In 1968 this outlet has been provided by the C.W.S. with a control structure. There are, however, two other routes through which water may leave Large Lake: to the wouthwest through the cattail marsh of gravelly Beach Lake into Robinson Brook and towards the southeast along a belt of floating-mat fen towards the soutern end of Long Lake which in turn drains into Front Lake. It appears thus that water levels in the lakes, marshes, and fens of Jolicure Lakes are interdependent and can only to a limited extent be manipulated independently from one another.

Bogs present another problem. Their surface is raised above that of adjacent marsh and fen areas. Are they therefore barriers to water movement and can they be used as such in the planning of impoundments? Or does water movement take place trhough them as to preclude such use?

What are the features of water flow through areas of floating-mat fen or marsh? Does water flow through them as if through an open water body? And to what extent does movement through such an area affect the solute content of the water?

Essential to land management in the reclaimed marsh zone is a knowledge of the slope angle of this seemingly flat country, especially along the finger-like landward extensions of the lowlands. Such knowledge will allow a better understanding of the spring flooding, affecting extensive areas of this zone, and of the subsequent, often very rapid drainage of the flooded land. If these conditions are understood, it may be possible to convert areas subject to such flooding into permanent or semi-permanent impoundments for wildlife production.

Peatland Zone as Ecological Reserve.

All efforts should be made to give the peatland zone as a whole the status of an ecological reserve or wilderness area. Management should be concerned mainly with the protection of this area against disturbance by man. Use of the area for recreation, instruction, or research should be permitted only as far as compatible with such an objective. The reasons for such an recommendation are the following:

(1) In its striking development and variety of peatland and aquatic ecosystems, including successional sequences, in a relatively small area, the peatland zone of the Chignecto Coastal Lowlands appears to be unique for the Maritime Provinces, and possibly even for eastern Canada. These features, together with the ease of access qualify it as an area with outstanding potential for observational research and instruction on properties and dynamics of a wetland landscape, developed under the influence of a cool-humid climate.

(2) Between different sections, the peatland zone differs strikingly with regard to landscape pattern and occurrence of landscape units and plant species, and with regard to historical developments leading to the present-day condition. The Jolicure Lakes section is, e.g., distinguished by the greatest diversity with regard to both, landscape units and plant species; expecially noteworthy are its bogs and mesotrophic lakes. The Missaquash section is largely covered by fen, while carr is most prominent and represented by the greatest diversity in the La Planche section. Because of these sharp contrasts between different sections, it seems important that a reserve status be extended to all of them.

(3) The properties of the peatland zone are such as to make it highly doubtful whether any drastic and large-scale manipulations for increased wildlife production would yield results high enough to justify the invested effort. Such gains would have also to be weighed against the loss represented by the damage to landscape patterns and disturbance of successional changes.

Impoundments in the Reclaimed Marsh Zone.

It is obvious that the conversion of abandoned or marginal agricultural land into waterfowl habitat will involve the making of impoundments. One such impoundment has been established in the Missaquash section in the fall of 1965 in a cooperative venture between the Nova Scotia Department of Lands and Forests and Ducks Unlimited. A dam with water control structure has been built by them in late winter 1969 in the Jolicure Lakes section. The area which concervably could be impounded by the latter dam consists however largely of floating-mat wet fen and mesotrophic cattail marsh, and is thus part of the peatland zone. Other impoundments are presently under consideration by the C.W.S.

In order to develop waterfowl habitat of high carrying capacity by means of such impoundments, there has to be an adequate knowledge with regard to two aspects of such ventures: (1) the hydrology of the area under consideration, (2) the ecological successions, initiated by the impounding, and of ways in which such successions can be manipulated as e.g. by drawdowns, liming, or fertilizing, as to reach a stable condition (plagio-climax) with high carrying capacity.

I do not think that at the present we do have a satisfactory understanding, especially with regard to the second problem. It is therefore recommended that decisions on any further impoundment be postponed until 1970. In the meantime, I, under the terms of the contract will do the following:

1. Make an assessment of the Missaquash Impoundment, of the construction done so far in the Jolicure Lakes section, and of other impoundments in the area, brought about accidentally, especially by the building of railroad embankments.

2. Study the hydrology and ecology of the areas for which future impounments are planned.

3. Obtain information on impoundments elsewhere which are either managed for waterfowl production, or have otherwise developed desirable qualities for such production.

On the basis of these various kinds of information, I will be able to make a better based recommendation on the subject than is possible at the present time.