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A Report on

THE SALT MARSH OF MUD BAY near Crescent Beach, B. C.

W. Arthur Benson

February 1962

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B46
1962

COSTS

A. DREDGING

534,675 cu. yds. @ .35¢/cu. yds. = $187,136.25

B. RIP RAP

9200 Tons ROCK @ $4.00/TON = $36,800.00

C. FLOOD GATES

4 GATES @ $3000.00 EA = $12,000.00

TOTAL $235,936.25

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A report on the salt marsh of Mud Bay: near Crescent Beach, B.C.

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DATE	ISSUED TO

BRO DART CAT. No. 23-115 PRINTED IN U.S.A.

DATE	ISSUED TO

Salicornia (glass wort)

Triglochin (arrow-leaf)

Scirpus palhedosus (three-square bulrush)
Scirpus (roundstem bulrush)

Typha (cattail)

Juncus (spikerush)

Carex (sedges)

Distichlis (salt grass)

Spergularia sand spurrey

Potentilla anserina (silver weed or silver cinquefoil)

Atriplex (orach)

Suaeda (sea blite)

Glyceria (mannagrass)

Cuscuta (dodder or love vine)

~~13.6 x 1500 = 20,400 ft at 14' height.~~
~~9.5 x 1500 = ft @ 8' "~~

~~Outer ... ft~~
~~Ce... @ 14' =~~

Cross Dyke @ 14' ht. =	5 x 1500	=	7500 ft.
Outer Dyke @ 14' ht =	8.6 x 1500	=	12900 ft
Total @ 14' ht. =			20400 ft.

Norther Dyke @ 8' ht =	2.7 x 1500	=	4050 ft.
Central " " " " =	3.3 x 1500	=	4950 ft
Southern " " " " =	3.5 x 1500	=	5250 ft.
Total @ 8' ht. =			14250 ft

Cubic Yardage with 12 ft top width

Cross Dyke =	7500 x 20 =	150,000	cu. yd.
Outer " =	12900 x 20 =	258,000	" "
Northern Dyke =	4050 x 8.3 =	38,015	" "
Central " =	4950 x 8.3 =	45,085	" "
Southern " =	5250 x 8.3 =	43,575	" "
Total		534,675	cu. yds

Rock Rip Rap 2' thick for 4000 ft.
1.34 cu. yds / lineal foot @ 1.7 Tons/cu. yd.
= 2.3 Tons / lineal foot
4000 x 2.3 = 9200 Tons

ENCLOSES 685 Acres.

Total length at 14' height = 7650 ft. 7,700 f+

If top width at:

12'	= 20 cu. yds/lineal foot	= 153,000 cu. yds	= 53550.00
8'	= 20 − 1 = 19 cu. yds / " "	= 145350 "	= 50872.00
6'	=	= 137700 "	= 48194.00
4'	=	= 130050 "	= 45516.00

i.e. each 2' reduction in width reduces yardage by 1 for every lineal foot or 7650 cu. yds for entire length. Cost reduced by 7650 × .35 = 2678.00

Total length at 8' height = 14250 ft.

If top width at:

12'	= 8.3 cu. yds/lineal foot	= 118275 cu. yds	= 41396.00
8'	=	= 109725	= 38404.00
6'	=	= 101175	= 35412.00
4'	=	= 92625	= 32420.00

i.e. each 2' reduction in width reduces yardage by $(\frac{16}{27})$.6 cu. yd for every lineal foot or 5550 cu. yds for entire length. Cost reduced by 8550 × .35 = 2992.50

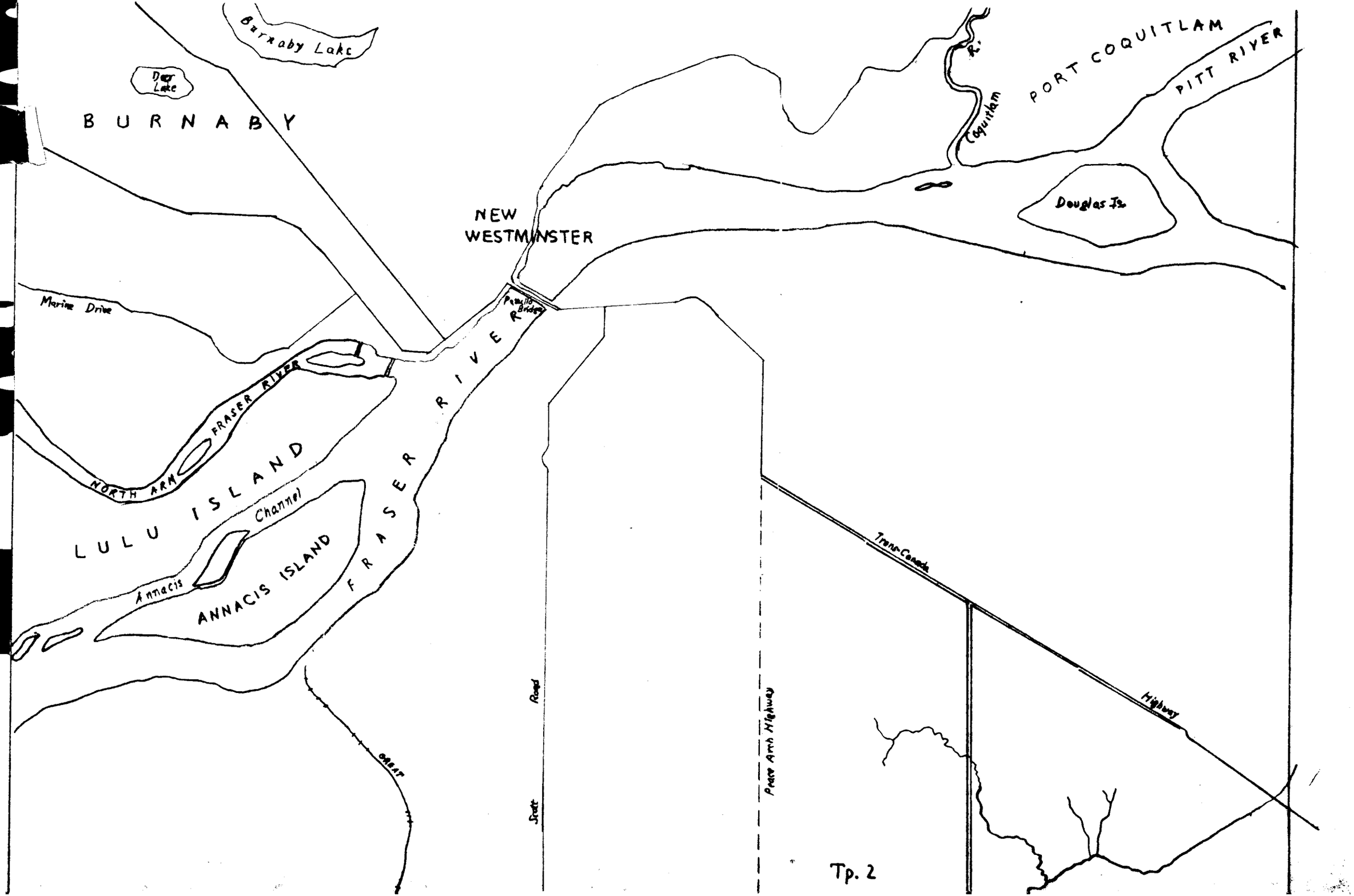
12 foot width costs.

9200 Tons rock @ 4.00		36,800
7650 ft of dyke 14' high	153000 yds @ 35¢	53 550
14250 " " " 8' "	118275 yds @ 35¢	41 396
4 flood gates @ 3000.00		12 000
		143746

8 foot width is $5670.00 cheaper than above 138 076

6 foot width is 5670.00 cheaper than above 132 406

4 foot width is 5670.00 cheaper than above 126 736


Burnaby Lake
Deer Lake
BURNABY
NEW WESTMINSTER
PORT COQUITLAM
PITT RIVER
Coquitlam R.
Douglas Is.
Pattullo Bridge
Marine Drive
FRASER RIVER
NORTH ARM
LULU ISLAND
Channel
Annacis
ANNACIS ISLAND
FRASER RIVER
Trans-Canada
Highway
Scott Road
Pitt Arm Highway
GREAT
Tp. 2

Marina and Nicomekl River,
CRESCENT BEACH, B. C., Canada
by W. W. Hastings

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Canadian Post Card Co., Ltd., Toronto 3

Post Card

49427 B

Gt. Northern Railway Trestle,
CRESCENT BEACH, B. C., Canada.
by W. W. Hastings

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CRESCENT BEACH, B. C., Canada
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by W. W. Hastings

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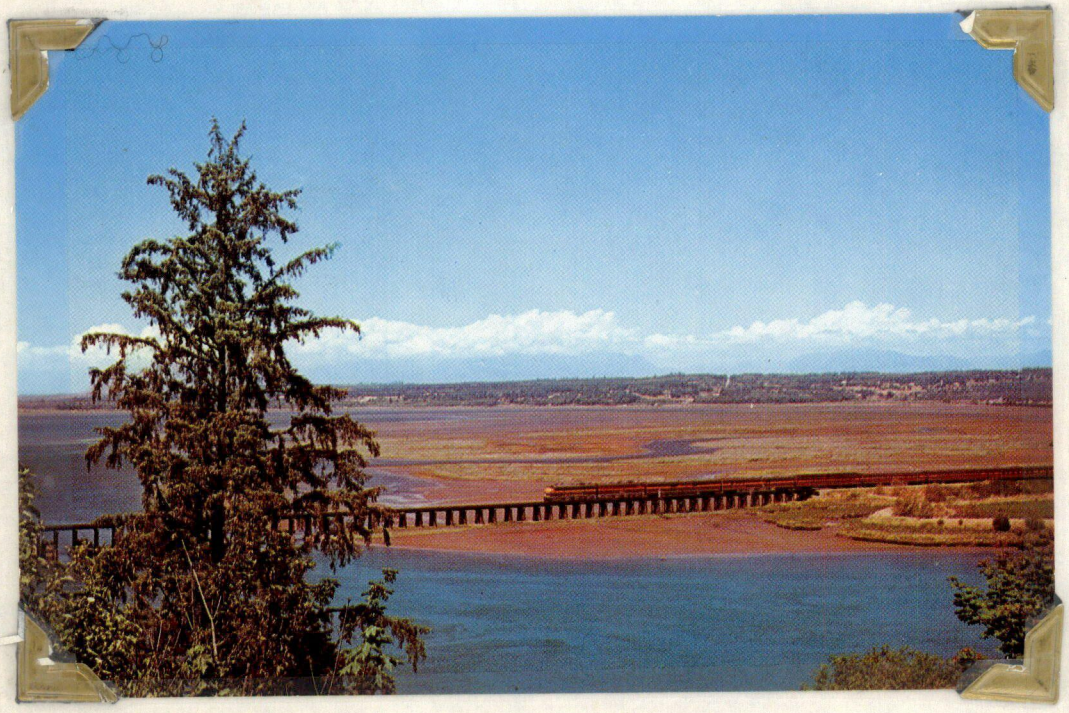
A REPORT ON

THE SALT MARSH OF MUD BAY

Near Crescent Beach, B. C.

W. Arthur Benson

February 1962



14078

A REPORT ON THE SALT MARSH OF MUD BAY NEAR CRESCENT BEACH, B. C.

Introduction

The Vancouver office of the Canadian Wildlife Service was approached in April 1960 by Mr. Miller Lougheed, then President of the Crescent Beach Property Owners Association. He wished us to assist in two projects, one of which involved a playground area not concerned with the responsibility of the Service. The other project was the acquisition of the Mud Bay marsh for waterfowl management purposes. Head Office was notified of the request and some of the ramifications were mentioned. Further study was proposed.

In February of 1961 a letter was sent to The Honourable Walter Dinsdale by the Crescent Beach Property Owners Association requesting that the Department of Northern Affairs and National Resources gain title to the marsh area of Mud Bay and maintain the area for waterfowl (Appendix A).

A letter in reply to the Association (Appendix B) in part, instructed the Service to "investigate the situation thoroughly". A subsequent letter from Head Office officially designated the writer to conduct the investigation.

This report is the result of investigations to date together with an outline of some operational techniques which may serve to increase the usefulness of the area. More work of a detailed

nature will be done on the marsh as part of an overall study of salt marsh ecology in the southwest portion of the mainland. The larger study is a comprehensive research problem which is not expected to be completed for four or five years. Consideration of the Mud Bay area need not wait for more ecological information.

Location

Mud Bay lies some ten miles south of New Westminster and approximately seventeen miles southeast of Vancouver. It is the most eastern portion of Boundary Bay. The marsh itself is bounded on the north by the channel of the Serpentine River; on the south by the channel of the Nicomeki River; on the east by the Great Northern Railway and on the west by the confluence of the Serpentine and Nicomeki channels and the sea. Map 1 shows the relation of Mud Bay to the features mentioned. The entire Mud Bay area is tidal. Figure 1 shows the southern part of the marsh with Crescent Beach in the foreground. Map 2 shows the general outlines of the marsh itself together with other details which will be discussed later.

Ownership

"Certificate of Title" numbers are all shown on Map 2. A list is given here of land ownership details taken from the Certificates of Title which will be on file at Head Office:

1. DESCRIPTION: Part (plan 10769) of the west half of Section 29 and southwest quarter of Section 32, Township 1.

CERTIFICATE OF TITLE: 345513E

OWNER (Fee Simple) Great Northern Railway Company.

ENDORSEMENTS: None

JUDGEMENTS: None

PENDING APPLICATIONS: None

2. DESCRIPTION: Northeast quarter of Section 32, Township 1, south of the Serpentine River.

CERTIFICATE OF TITLE: 402322E

OWNER: (Fee Simple) C. A. Hoggard; C. J. Hoggard; Guido Bianchin.

ENDORSEMENTS: Mud Bay Dyke Improvement - Filing 29424.

JUDGEMENTS: None

PENDING APPLICATIONS: None

3. DESCRIPTION: Fractional west half of Section 29, Township 1, except portions on reference plans Nos. 10106F and 28594F.

CERTIFICATE OF TITLE: 402323E

OWNER: C. A. Hoggard; C. J. Hoggard; Guido Bianchin.

ENDORSEMENTS:
1. Mud Bay Dyking District Improvement - Filing 29424.
2. October 1897 Drainage Agreement.
3. June 1898 Drainage Agreement.

JUDGEMENTS: None

APPLICATIONS PENDING: None

NOTE: Reference plan designations 10106F and 28594F are railway right-of-ways originally belong to Vancouver, Victoria and Eastern Railway and Navigation Company which have

apparently been reconstituted under Plan 10769. Part of the land is now included under certificate 345318E.

4. DESCRIPTION: Three parts (11.84) (6.53) and (1.37) acres of the fractional west half of Section 29, Township 1, except parts on Plan 10769.

CERTIFICATE OF TITLE: 14310F

OWNER (Fee Simple) Vancouver, Victoria and Eastern Railway and Navigation Company.

ENDORSEMENTS: None

JUDGEMENTS: None

APPLICATIONS PENDING: None

NOTE: This company apparently no longer exists.

5. DESCRIPTION: Parcel "C" of the east half of Section 29, Township 1.

OWNER (Fee Simple) Montreal Trust Company and John Lloyd leasers "In Trust".

ENDORSEMENTS:

1. Improvement District Filing 29424.
2. October 5, 1897 Agreement as to Dyke Inter Alia (with several others).
3. June 9, 1898 Agreement as to Dyke Alia (with several others).
4. August 19, 1949 Agreement for sale and purchase to N. Cryer and L. H. Cryer, "Joint Tenants".
5. May 3, 1950 Agreement for sale and purchase to R. G. Campbell and Marjorie E. Campbell "Joint Tenants". Assignment of agreement for sale and purchase No. 124698C.

6. February 5, 1960 Agreement for sale and purchase to Maroem Farms Limited. Assignment of agreement for sale and purchase No. [illegible].

JUDGMENT: None

APPLICATIONS PENDING: None

6. DESCRIPTION: Fractional south half of Section 32, Township 1, except part shown on Plan No. 20769.

CERTIFICATE OF TITLE: 431043E

OWNER: E. O. McDonald

ENCUMBRANCES: 1. Mud Bay Dyking Improvement District - Filing 204284.

2. June 5, 1928 Agreement to Dyke Inter Alia.

3. October 14, 1950. Her Majesty the Queen in Right of the Province of British Columbia. A first charge by virtue of the Farmers' Land Clearing Assistance Act.

JUDGMENT: None

APPLICATIONS PENDING: None

7. DESCRIPTION: Water Lot 4980 shown on Township Plan (see Map 5 in this report) 135 acres.

CERTIFICATE OF TITLE: Number unknown. Appears on Surrey Municipal files as D.L. 4v5 and has the IBM code of 28130.

OWNER: Samuel Weaver (original and still owner).

Most of the ownership information given is not now of direct bearing on the marsh in question. Search of titles was necessary to establish definitely the ownership of pieces of marsh to the

west of the railway right-of-way. If these small pieces of marsh belonged to any of the upland owners, portions of the remainder of the marsh would be liable to claim (by those owners) under the Quieting Titles Act. As it now turns out development of the marsh would not involve more than two outright purchases, probably at very reasonable prices.

The water lot (405) owned by Samuel Weaver makes up approximately one-fifth of the possible marsh area if development were undertaken. Much of the existing marsh could probably be claimed by Weaver on the basis of accretion under the Quieting Titles Act if he chose to do so. Lot 405 is listed on the Surrey tax register as having an assessed value of $350.000 (three hundred and fifty dollars). The tax does not exceed $14.00 (fourteen dollars) annually and is probably less than this amount.

The land under certificate of title 14310I would be required since under the Quieting Titles Act it would control accreted marsh. This title involves three parts to the seaward side of the Great Northern Railway Company right-of-way totalling 19.74 acres. The title shows the Vancouver, Victoria and Eastern Railway and Navigation Company as the registered owner. This company now appears to be defunct hence the Province of British Columbia is probably in control though some other company may unknowingly own this land. It is certain that Great Northern did not buy this land when it took over its present right-of-way

from the Vancouver, Victoria and Eastern Railway and Navigation Company.

Access to the marsh is limited to waterways as ownership now stands. It would be necessary to obtain access by road for full use of the marsh. The best route appears to be along Mud Bay Road which runs between Sections 29 and 32 as far as the centre line of each section. Purchase or easement would be required from the owners of the fractional west half of Section 29, Certificate of Title No. 40323I. Easement for passage over the Great Northern Railway right-of-way would also be required.

None of the owners has been approached to ascertain selling price, nor have they been acquainted with any phase of the investigation. It is the writer's opinion that prices would be reasonable

Historical

Early Indians used the area at the mouth of the Nicomekl River years before the white man came to Canada. Primitive artifacts and human remains have been discovered in plentiful supply on Blackie Spit and where the town of Crescent Beach now stands. Waterfowl bones are abundant in the middens. In the fall of 1824 Governor Simpson sent Chief Factor MacMillan to find a suitable fort on the Fraser River. MacMillan went around Blackie Spit and up the Nicomekl then overland to the Salmon River and at the confluence of the Salmon River and the Fraser River he began the

building of Fort Langley (now a National Historic Site). In his journal Macmillan mentions great flocks of plover at the mouth of the Nicomekl on December 13, 1824 (probably shorebirds).

Since Macmillan's day the marsh has been used consistently as a hunting area. Figures 2 and 3 show a permanent blind which was built in the marsh in the early part of this century with what must have been a great deal of hard work. More recently as settlement became more dense, property lines have reduced access to the marsh so that now it is only lightly hunted by a few hardy individuals who are willing to carry a boat to the water and row to the marsh or who are willing to walk three-quarters of a mile of railway trestle and track and wade to the marsh with the certain knowledge that they will be isolated by the tide and come back completely soaked after virtually swimming a tide channel. Reference to Figures 1 and 4 will show the multitudinous tide channels which create the difficulty.

Soils and Climate

The soils of the marsh are all of recent origin. They are azonal as is typical of recent alluvials. This is the oldest marsh in southwestern British Columbia since it was formed in the immediate post-glacial period when it was the delta of the Fraser River. There is the slightest indication of profile development but this is not definite enough to separate it taxonomically from

Fig. 1. Aerial view of Mud Bay Marsh from south Crescent Beach in foreground.

Fig. 2. Old cement blind still in use.

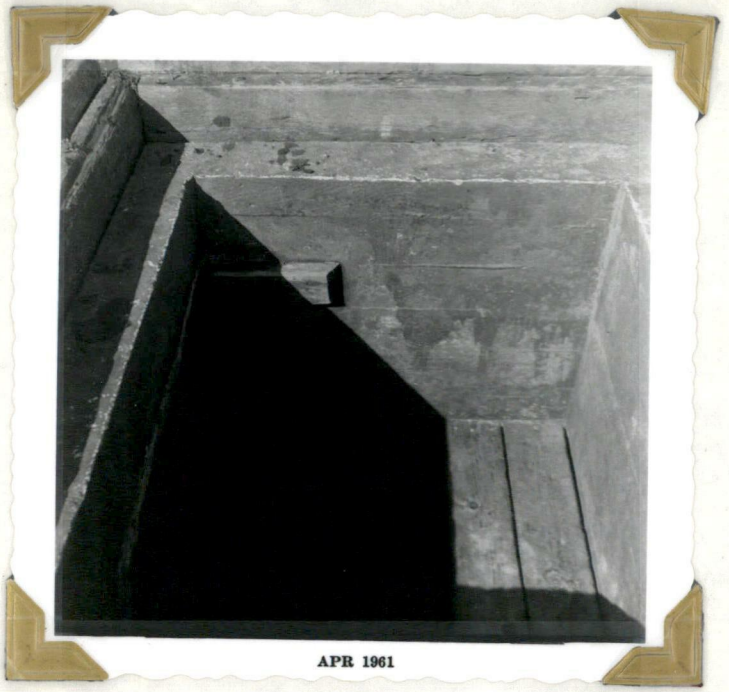


Fig. 3. Inside of old duck blind at Mud Bay.

A R E

Fig. 4. Looking across the Nicomekl River to Mud Bay marsh from height of land east of Crescent Beach.

the Ladner Clay classification of the present Fraser Delta. (1). The soil is grey brown to black clay intermingled with micaceous sand or sandy clay. Iron stains are found in quantity and are particularly apparent in the burrows of nereid worms and to a lesser extent in the burrows of shore crab, ghost shrimps and mud clams (mostly Mya arenaria). For the most part Ladner Clay is fertile soil on the upland areas which have been weathered and oxidized over the years. Reclaiming of tidal land for agriculture in the Mud Bay area however would be extremely expensive and at best would allow only marginal grazing at anything approaching reasonable cost. Recent work in this general area by J. M. Clark et al (2) shows that sulphates and iron polysulphides occur in quantity in this soil and that drying increases the acidity of the soil as sulphides are formed. In this marsh p.H. ranges from six or seven near the tidal verge to four near the railway in some areas of the grass marsh. This indicates a similar soil chemistry to that found by Clark et al. Several tons of lime per acre would be required to reduce the acidity. Without reducing the acidity plant food elements such as phosphates and potash would have low availability resulting in low nutritional values of forage plants in particular. Vast quantities of commercial fertilizers would be required to adequately supply the nutritional value to plants used by grazing animals. With proper drainage and freshwater flooding the agricultural potential of the land could be greatly increased

over a period of years. At the moment, and for several years, finite agricultural potential is sub-marginal.

Drainage in the marsh is generally poor. There are several well-defined drainage channels but the porosity of the soil is such that a saturated situation can exist a few feet away from a drainage channel. In the summer when lower tides are normal, slightly indented areas or "pans" with poor lateral drainage occur where evaporation plays an important part in concentrating soil salts. These "pans" vegetate slowly. Where geese have been grubbing for roots an artificial "pan" often occurs which may be distinguished from the rest of the marsh for two years or more until it is re-colonized by the surrounding plant species.

The climate of the area is similar to that of Vancouver but is slightly drier. Rainfall closely approximates that of Ladner where the annual average precipitation is 36.33 inches. Mud Bay itself is subject to heavy fogs in the winter months.

The annual mean temperature at Vancouver is 51 degrees. Mud Bay probably has a slightly higher annual mean temperature because of local conditions. In summer vast expanses of sand and mud are laid bare by low tides - the sand and mud reflect the heat but as summer progresses they hold more and more heat energy. The water in Boundary Bay also continues to increase temperature until middle

or late August. Water temperatures on an incoming tide are often as high as 68 degrees at depths to three feet.

Vegetation

There are only two communities represented on the Mud Bay marsh and these have been named by their dominants. The Salicornia community occupies the seaward and lower part of the marsh. The grass meadow community occupies the higher and landward part of the marsh. Figure 5 shows the two communities. The shrubbery in the immediate foreground is on the railway embankment and is not connected to the marsh.

Salicornia Community

The seaward portion of the Mud Bay area consists of tidal mud flats. The mud is populated by mud clams (Mya arenaria), nereid worms, shore crabs and ghost shrimps. Sea lettuce is often washed onto the mud flats and the only other plant form on the flats is green algae. At a point approximating half tide level the Salicornia community begins, first sparsely populated, then within a few feet of the edge attains uniform high density. The outer edge is shown in Figures 6 and 7. The species involved is Salicornia pacifica or Pacific glasswort. In the established Salicornia community Triglochin maritima (arrowgrass) occurs in widely scattered patches but it never becomes a dominant.

Fig. 6. Looking northwest from P.G.&E. embankment. Grass meadow community in foreground beyond mud and Salicornia community beyond.

Fig. 6. Mud flats and channels in Salicornia community.

Fig. 7. Tide channel with Salicornia and Triglochin.

Two other species occur in this community; Cuscuta salina is abundant and is parasitic on the glasswort; isolated single plants of Spergularia marilina occur on the mud flat at never more than twelve inches distant from the Salicornia edge. Figures 7, 8 and 9 show general views of the Salicornia community which include Triglochin maritima. Figure 10 shows details of a pure Salicornia pacifica stand with some parasitic Cuscuta salina. Salicornia is instrumental in strong turf development which gradually raises the level of the marsh and prepares the way for invading grasses. Evidence of this turf development may be seen in Figure 11 and again in Figure 12 where grass invasion is well advanced.

Grass Meadow Community

At higher tide levels grass invades the Salicornia community. The grass meadow community is free of Salicornia above the mean high water mark. The intergrading of the two communities occurs over a very narrow zone approximately 10 feet wide. Some details of this zone may be seen in Figure 12 and Figure 13. The shrubby plant in the centre of Figure 12 is tarweed (Grindelia stricta) a common feature of the transition zone and the grass meadow community.

The most abundant plant in the community is Distichlis spicata. D. spicata is found in all quadrats and comprises some 70% of individual plants per quadrat. Other species are variable in density and occurrence and the sample size to date is not large

Fig. 8. Salicornia and Triglochin. Dark vegetation is Triglochin or tide-strewn sea lettuce.

Fig. 9. Looking east to ~~P.G.R.~~ GNR from near centre of Salicornia community. Darker plants are Triglochin.

Fig. 10. *Salicornia* community.

Fig. 11. Salicornia community showing turf development above mud.

Fig. 12. Grass meadow marsh with some Salicornia at lower left. Note turf development.

Fig. 13. Salicornia and grass mixed.

enough to give frequency - abundance ratings. The following plants are found in the grass meadow community:

Distichlis spicata	*Grindelia stricta*
Juncus sp.	*Potentilla pacifica*
Spergularia marina	*Potentilla anserina*
Glaux maritima	*Suaeda fruticosa*
Plantago juncoides	*Glycaria occidentalis*
Atriplex patula var. *hastata*	

The species listed are those which are apparently important using a subjective visual approach. Other species are present but only detailed work will indicate their real importance.

Use by Wildlife

Mud Bay is used by a great number of bird species. Waterfowl are particularly abundant. Appendix C shows the approximate number of birds representing the major species by seasons. Some of the numbers noted imply a greater accuracy of count than actually exists. The purpose is merely to indicate constancy of appearance. Thus one may see more or less than two marsh hawks in a particular visit but one is most likely to see two birds. Waterfowl numbers in Mud Bay may be greatly influenced by waterfowl numbers in Boundary Bay and the weather affecting them. The numbers shown in Appendix B are the writer's estimate of the actual normal contribution of Mud Bay. A particularly blustery

southerly, southeasterly or southeasterly wind will increase but may subside considerably. It is not unusual for example to have 100,000 birds in boundary Bay any time from November until early May. A large portion of this number may be shifted to Mud Bay by strong winds. Mistakenly in March and April boundary Bay may contain up to 40,000 black brant but many of this will be shifted to Mud Bay. The reverse is seldom true and birds are very seldom shifted out of Mud Bay by any wind. An extremely strong westerly wind may occasionally shift birds from Mud Bay. A westerly of this magnitude has occurred only twice to the writer's knowledge since June 1952.

Mud Bay is essentially migration or wintering habitat for waterfowl at present. One brood of blue-winged teal hatched out and appeared on a pond beside the railroad tracks on the Mainland side. The brood either did not reach maturity or moved into the Nicomekl River for it was not seen again. Under static water conditions the area could provide nesting.

From late February until late November ducks use the Mud Bay flats beside the tide channels of the Nicomekl and Serpentine rivers. Young are born here as well as on the bare in the rivers themselves.

Under present conditions the main natural use of Mud Bay is as a loafing area. High and bare and those portions of the vegetated area which are on the edge of tide channels are most used. Eelgrass and Triglochin are grazed slightly (and seeds of Triglochin are used), but are certainly not significant food items in the diet of several

thousand ducks.

Management of the area as a slightly brackish to fresh-water marsh would allow growth of several plant species used by waterfowl. High ground such as islands and spoil banks could be made to grow snowberry (*Symphoricarpos* sp), rose (*Rosa* sp) and serviceberry (*Amelanchier* sp). These shrub types together with grasses such as *Distichlis spicata* would provide adequate nesting cover. Food and cover species which could be expected with non-tidal conditions are *Polygonum* sp, *Juncus* sp, *Carex* sp, *Plantago* sp, *Typha latifolia* (must be watched carefully because of tendency to form dense homogeneous stands), *Scirpus pallidosus*, *Sparganium* sp, and others in lesser quantity.

Marsh Management

Examination of Map 2 shows that a large mud flat occurs from the Serpentine River to the Bicomal River. The map also shows that the vegetated area is along the southern portion of this flat. The vegetated portion of this area is higher than the unvegetated northern portion. Any attempt at marsh management must recognize this fact and develop two levels of marsh separately. A third level could be developed at the site of the grass meadow community which on Map 2 is mainly the area of water lot 4000 and the fringe north of the water lot adjacent to the tracks. However it may be desirable to leave this more upland community in its present form (or drier) to facilitate approach to the rest of the marsh.

Other marshes along the coast with different salinities and different heights indicate that the mud area of Mud Bay can be vegetated and that the vegetation already there can be modified. To improve Mud Bay as a waterfowl area dyking will be required, salinities must be changed and water levels must be controlled. A dyke (see Dyke A proposed, Map D) along the south side of the channel of the Serpentine to its confluence with the channel of the Nicomekl and then continuing along the north bank of the Nicomekl will control tidal movements and will decrease salinity by holding out sea water. Dyke A on Map B will separate the two march levels. A flood gate in and a flood gate out will allow fresh water to be taken into the marsh at any desired level. Fresh water will further reduce the salinity and the water depth will in large part control plant growth. The combination of water depth and salinity will determine the plant species which will grow or can be made to grow. The foregoing is basically the method of marsh management but is extremely oversimple. It may be necessary to start some species with seeds or shoots. Cross-dykes may be necessary in some places. Detailed study of existing marshes will give more information on which to base a marsh management plan. On the other hand results from managing this area would go far toward an understanding of the other marshes.

Cover dispersion may be accomplished by cross-dyking, blasting or hole-digging or by dumping dredged material to form islands. Work of this sort will be necessary for maximum waterfowl use. Failing artificially varied depths the resulting marsh would be simply a dense homogeneously vegetated mass with waterfowl use limited to the periphery.

General Considerations

The farm lands to the east of Mud Bay are all privately owned and virtually all of these are posted to exclude all hunters except those belonging to one or another gun club. Some of the gun clubs in the area are the Colebrook, Mud Bay, Hale and Quail, Langley and Cloverdale Gun Clubs. These clubs are not registered in any way so that membership and extent of shooting area are difficult to determine. Some farmers are paid an annual fee while others are paid nothing and are content to know that a limited number of known hunters use their land. To avoid complaints from the licenced hunters who are not members of clubs (the majority by far) it would be necessary to allow shooting on a portion of Mud Bay or obtain easements or agreements from upland owners or both. The latter action is preferable since it would seem unfair to arrange for a public refuge which gave most benefit to gun clubs catering to the privileged few. Possibly this is a field of endeavour where the Agricultural Rehabilitation and Development Act would be helpful.

Probably the provincial Fish and Game Branch would be interested in handling the public shooting aspects.

A new marina is being constructed on the south side of the Nicomekl River and on the east side of the Great Northern Railway. Movement of pleasure boats will cause some disturbance of waterfowl but should not be too difficult to control by signs and occasional patrols. Patrols will not be entirely feasible until land access to the marsh is achieved or unless a man in the area can be prevailed upon to conduct necessary patrols.

Sanctuary laws as presently applied in other sanctuaries to date will not be useful in the Mud Bay area. Proper use of the marsh requires land and water manipulation not possible without ownership or definite agreement with the province. Public shooting should be a consideration also both on the marsh and the upland areas surrounding it.

It is the writer's opinion that acquisition and management of Mud Bay as a waterfowl management area is feasible and an extremely worthwhile endeavour for the Department of Northern Affairs and National Resources. Personally, the writer, would like to see the whole of Boundary Bay and Mud Bay developed as a "National (multi-purpose) Recreational Area" with swimming, camping and beach facilities in the Boundary Bay and and marsh in the Mud Bay end. The entire area would then be assured for recreation in general and as the largest waterfowl wintering area in Canada.

APPENDIX A

Copy of letter from Crescent Beach Property Owners' Association to The Honourable Walter Sinsdale, February 8 1961.

We, the Crescent Beach Property Owners' Association, seek your assistance in maintaining for perpetuity a waterfowl marsh in the Boundary Bay region of British Columbia. This marsh is on the east side of Boundary Bay between the Nicomekl and Serpentine Rivers and lies west of the Great Northern Railway track. There are roughly three hundred acres involved and slightly less than half (137) acres is privately owned. The marsh is an ideal wintering area for waterfowl (including whistling and trumpeter swans) and would make an ideal waterfowl management area.

We, at Crescent Beach, are much concerned with the area since it is the only marsh area left in Boundary Bay and since it is so close to our hearts. Some of us have shot in the area for a number of years while others have watched birds and marsh plants at all seasons. Several species of migratory birds nest in the area and the Canada goose rest in the area on their spring flight to the north and on their return trip to the south, a sight quite wonderful to anyone who has watched their formations in the sky, this is well known to officers of your Canadian Wildlife Service.

We understand also that P.F.R.A. in conjunction with Surrey Municipality will be doing some channel improvement work on the Nicomekl and Serpentine Rivers - perhaps it will be possible for your department to gain title to the presently owned private land from Department of Agriculture or perhaps you may purchase outright. Certainly this is a marsh deserving of preservation as to waterfowl management area.

We thank you for your consideration and hope that action will save this marsh before reclamation renders it unfit for any use save speculative light industrial real estate promoted for dubious means.

(Sgd) Jos. A. Smith
President.

APPENDIX [illegible]

Species	Winter Dec-Feb	Spring Mar-May	Summer June-Aug	Wal Sep-[illegible]
Common loon	5	30		8
Red-throated loon	2	20		0
Horned grebe	10	15		15
Western grebe	30	100		50
Double-crested cormorant	10	10		10
Brandt's cormorant	2	2		2
Pelagic cormorant	20	20		20
Great blue heron	15	10	15	30
Whistling swan	-	-		20
Canada goose	50			to 10,000
Snow goose	200	1,000		
Black brant	20	6,000		
Mallard	1,200	6,000		8,000
Pintail	500	6,000		6,000
Green-winged teal	500	200		6,000
Baldpate	1,000	1,000		500
Canvasback	15	15		15
Bodhead	5	5		5
Greater scaup	100	200		100
Golden-eye	20	40		20
Bufflehead	20	40		20
Old squaw	10	10		10
White-winged scoter	10	10		10
Common scoter	10	10		10
Surf scoter	30	30		30
Red-breasted merganser	5	5		5
Marsh hawk	2	2	2	2
Peregrine falcon	1	1		1
Killdeer	5	5	5	10
Black-bellied plover	20	-	200	20
Snipe	2	2	2	20
Greater yellowlegs	10	-	200	200
Baird's sandpiper	-	20	400	-
Least sandpiper	5	200	400	-
Dunlin	6,000	4,000		1,000
Glaucous winged gull	10	10		10
Herring gull	10	10		10
Pigeon guillemot	2	-		2
Short-eared owl	2	-		2
Northwestern crow	10	10	10	10
Marsh wren	5	5	5	10
Western meadowlark	2	2	10	10
Fox sparrow	6	5	20	20
Pheasant	2	4	10	20

References

1. Kelley, G. C. and R. E. Spilsbury; Soil Survey of the Lower Fraser Valley; Publication 600, Tech. Bull. 80, Division of Canada Department of Agriculture; October 1949.

2. Clark, J. F., G. A. Cobin and V. L. Sprout; Yellow Mottles in some Poorly Drained Soils of the Lower Fraser Valley, British Columbia; Canadian Journal of Soil Science 41(2): 131-138, August 1961.

Appendix D

Copy of letter from the Honourable Walter Dinsdale to the Crescent Beach Property Owners' Association, February 28, 1961.

Thank you for your letter of February 6, 1961, in which you draw attention to the marsh lying to the east of the Great Northern Railway between the mouths of the Serpentine and Nicomekl Rivers. I note your statement that the area is a particularly valuable piece of waterfowl habitat and your implication that some change in land management may result in it becoming less useful to waterfowl.

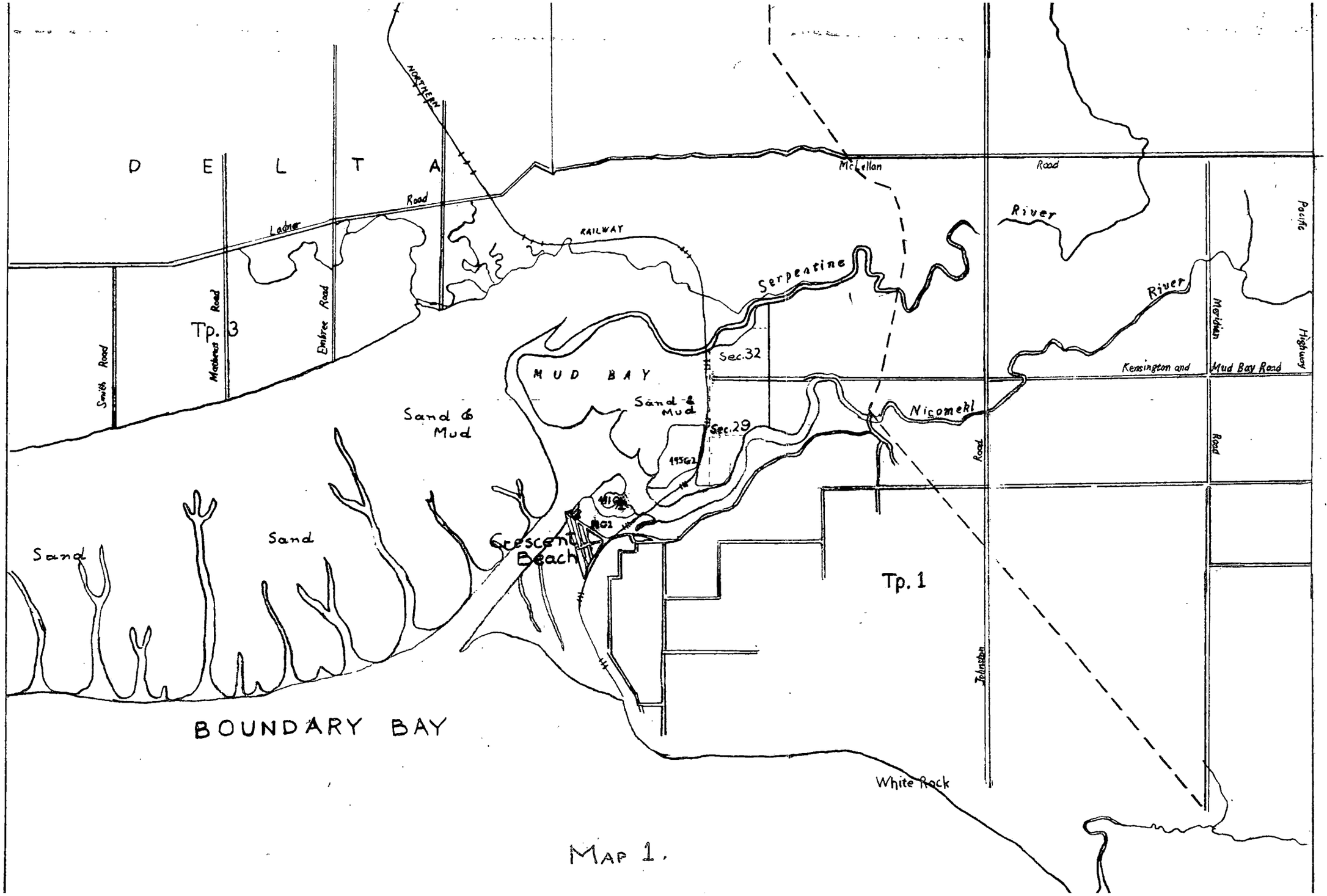
I understand that there has been a slow but steady decline in the amount of good waterfowl habitat in the Lower Mainland region of British Columbia. As the long run this trend will undoubtedly have some effect on the numbers of waterfowl which migrate through or winter in the region. Certainly we must view the situation with some concern.

As you recognize, land management is the key to this situation. A certain problem is involved here because a number of authorities have an interest. I have indicated the interest of my Department, through the Canadian Wildlife Service, ranging from the responsibility for preservation of migratory birds. The Government of British Columbia, through the Departments of Lands and Recreation and Conservation, also has a direct interest. In fact, management of public lands in a province is the sole prerogative of the responsible provincial department. The municipality of Surrey is concerned because of the need to improve upstream drainage. D.F.R.A. is involved in the technical sense, as you mention, but I understand that there has not been any application that the Government of Canada should acquire title to any lands through D.F.R.A. or the Department of Agriculture. Finally, some of the marsh is privately owned.

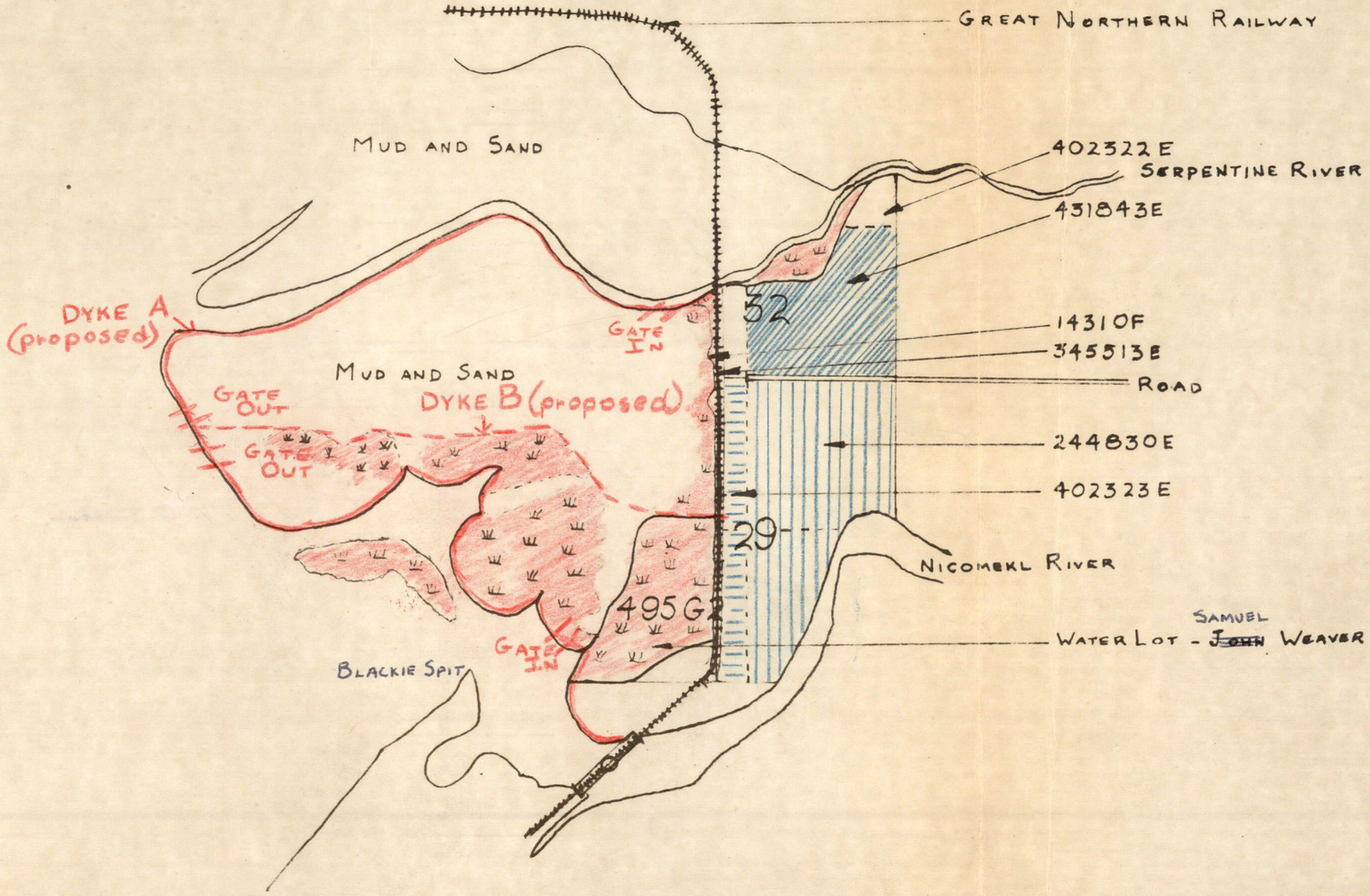
The situation is so complex that I can say now only that I recognize the problem that you have drawn to my attention and appreciate your concern. I am instructing officers of the Canadian Wildlife Service in Vancouver to investigate the situation thoroughly I would like to think that through co-operative action some means can be found to maintain a reasonable extent of good waterfowl habitat in your region.

Yours sincerely,

Walter Dinsdale


DELTA
Ladner Road
NORTHERN
RAILWAY
McLellan Road
River
Serpentine
River
Pacific
Highway
Meridian
Road
Kensington and Mud Bay Road
Nicomekl
Tp. 3
Smith Road
Mathews Road
Embree Road
MUD BAY
Sec. 32
Sec. 29
Sand & Mud
Sand & Mud
Sand
Sand
Crescent Beach
Tp. 1
Johnston Road
BOUNDARY BAY
White Rock

MAP 1.



185 ACRES

MAP 2.