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INTRODUCTORY FLORISTIC ANALYSIS OF COASTAL SALT
MARSH COMMUNITIES OF THE QUEEN CHARLOTTE ISLANDS

Part I: Windy Bay
Kootenay Inlet
Port Chanal

Alex Inselberg
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INTRODUCTION: This report provides an introduction to the plant community structure of three Queen Charlotte Island coastal salt marsh systems. An additional three salt marsh areas on the Queen Charlottes have been studied, however, this information has not yet been typed. It becomes clear that the composition of plant communities is significantly different at each marsh, although a general pattern of regularity does exist.

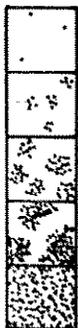
At this stage no attempt is made to review or integrate relevant literature. The information in this report is based only on my own field work. Errors, especially with regard to cover value/sociability, likely exist as many grasses and sedges were not in flower, or browsed.

METHODS: The European or Braun-Blanquet method of vegetation analysis was used. Cover value and sociability were recorded for each species in the relevé, unless the individual was rare, in which case only cover value was taken.

i) Cover value:

- r = rare or solitary with small cover
- + = few with small cover
- 1 = up to 5% of the plot
- 2 = 5 to 25%
- 3 = 25 to 50%
- 4 = 50 to 75%
- 5 = greater than 75%

ii) Sociability:



- 1 = growing solitary, singly
- 2 = growing in small groups of a few individuals, or in small tussocks
- 3 = growing in small patches, cushions or large tussocks
- 4 = growing in extensive patches, in carpets or broken mats
- 5 = growing in great crowds or extensive mats completely covering the whole plot area; mostly pure populations

e.g. Triglochin maritimum 2.2
 / sociability
 \ cover value

WINDY BAY AUGUST 26, 1978

DISCUSSION: The salt marsh at Windy Bay is comparatively small and heavily browsed by deer; to the point of looking like a putting green in some areas. Enteromorpha intestinalis is the dominant large alga in the stream channel bisecting the marsh.

A salmon run appeared to be beginning during my stay (pink salmon possibly). In the evening the water rose up into the marsh and with it came twenty or more seals feeding on salmon. The presence and activities of so many seals at close range was spectacular. Early the following morning one adult and three young river otters were seen traveling along a game trail inside the spruce forest along the north side of the estuary. The active birdlife included bald headed eagles, ravens, kingfishers and a number of waterfowl species.

PLANT COMMUNITIES OF THE SALT MARSH (see Table 1):

- I. Calamagrostis nutkaensis - Galium trifidum upper marsh amongst washed-up debris and logs. The distributional range is a patchy narrow band.
- II. Stellaria humifusa upper marsh flats; intensely browsed, especially where Deschampsia caespitosa tussocks do not predominate. This is the most extensive community. A small subcommunity with Juncus effusus was recognized in the area of a small tributary stream on the north side of the marsh.
- III. Spergularia canadensis - Puccinellia pumila lower marsh mud-gravel flats. This community is moderately widespread. Fucus sp. is attached to stones or forms low vegetative mats with a cover value of 5 to 50%. ? Rivularia is the small light green alga associated with Fucus; its cover value is ca. 5%.

Table 1. Salt marsh species distribution in major communities of Windy Bay

I = Calamagrostis nutkaensis - Galium trifidum upper marsh drift

a = Juncus effusus fresh water seepage influence

II = Stellaria humifusa upper marsh flats

III = Spergularia canadensis - Puccinellia pumila mud flats

Community:	I	II				III	
Subcommunity:		a					
Number:	1	2	3	4	5	6	7
Original relevé number:	1	3	7	8	2	6	4
Area (m ²):	20	15	25	25	25	25	25
Number of species:	13	8	9	6	6	3	3
<u>Community character species:</u>							
<u>Calamagrostis nutkaensis</u>	5.5	.	.	.	.	.	.
<u>Galium trifidum</u> var. <u>pacificum</u>	2.1	.	.	.	.	.	.
<u>Stellaria humifusa</u>	.	1.1	2.1	2.2	1.1	.	.
<u>Triglochin maritimum</u>	.	1.2	1.1	.	1.2	.	.
<u>Sagina maxima</u>	.	.	1.1	+1	+1	.	.
<u>Spergularia canadensis</u>	.	.	.	.	.	2.2	1.1
<u>Puccinellia pumila</u>	.	.	.	.	.	1.2	1.2
<u>Community differential species:</u>							
<u>Juncus effusus</u>	1.3	4.5	.	.	.	.	.
<u>Others:</u>							
<u>Deschampsia caespitosa</u>	.	4.3	3.3	5.5	5.5	4.3	2.3
<u>Hordeum brachyantherum</u>	+2	+2	4.1	1.1	1.2	.	.
<u>Festuca rubra</u>	1.4	2.2	.	2.2	2.3	.	.
<u>Carex lyngbyei</u>	2.5	4.5	2.2	.	.	.	.
<u>Stokesiella stokesii</u>	+1	.	+2	.	.	.	.
<u>Plantago ? macrocarpa</u>	.	r	r	.	.	.	.
<u>Juncus bufonius</u> s. lat.	.	.	1.1	+1	.	.	.
<u>Agrostis exarata</u>	+2	.	.	.	.	.	.
<u>Vaccinium parvifolium</u>	+1	.	.	.	.	.	.
<u>Rhynchospora loreus</u>	+1	.	.	.	.	.	.
<u>Lysichiton americanum</u>	r	.	.	.	.	.	.
<u>Vicia ? americana</u>	r	.	.	.	.	.	.
<u>Oenanthe sarmentosa</u>	r	.	.	.	.	.	.

DISCUSSION: The salt marsh at the head of Kootenay Inlet is one of the largest and richest with regard to number of plant communities. Likewise, the bird life is impressive. The extreme isolation of this marsh area is evidenced by the lack of stray saw logs on its shores.

The slope of this marsh is so gradual that a number of low spruce groves and individuals reach far out into the upper marsh. These spruce are two to ten meters tall and of full open-grown form. Unfavorable soil conditions prevent these spruce from becoming like the giants seen up from the marsh on the flood plain bottomlands. Spruce scattered into the upper marsh is a feature noticed at no other salt marsh area visited.

Not all of the communities seen at Kootenay Inlet were studied.

SALT MARSH PLANT COMMUNITIES (see Table 2):

- I. Calamagrostis nutkaensis upper marsh flats community is widespread and contains scattered spruce on slightly elevated microsites.
- II. Apargidium boreale - Hordeum brachyantherum upper marsh riverside community with more freshwater influence; moderate grazing by deer was noticed here.
- III. Carex ? gmelinii - Eleocharis palustris middle marsh is a community limited to a number of small drainage channel pools with increased freshwater influence.
- IV. Carex lyngbyei - Triglochin maritimum is a middle marsh community of low species diversity and limited extent. At least two subcommunities may be distinguished: one with Triglochin and one without. Fucus moves up into this community, occasionally covering up to 50% of the plot (relevé). Fucus tends to decrease when Triglochin appears. Only those Fucus attached to rocks or in mats are considered, as large quantities of detached Fucus are often deposited as the tide ebbs.

V. Puccinellia pumila - Spergularia canadensis lower marsh community is widely distributed in response to the gradual slope. Fucus is scattered with low cover.

VI. Sagina maxima - Deschampsia lower marsh river islet community is located on a gravel bar in the slow meandering stream that bisects the marsh. With only one plot recorded and considering the small size of the gravel bar, this fragmentary community is relatively insignificant. Any strong current could easily denude this site.

VII. Ruppia maritima saline middle marsh ponds are a common feature. At least two ponds of greater than twenty square meters and one of greater than fifty square meters are present. Only one plot is recorded as each pond consists of the same pure stand of Ruppia.

Table 2. Species distribution among Kootenay Inlet salt marsh communities

- I = Calamagrostis nutkaensis upper marsh
- II = Apargidium boreale - Hordeum brachyantherum upper marsh riverside
- III = Carex ? gmelinii - Eleocharis palustris drainage channel pools with greater freshwater influence
- IV = Carex lyngbyei - Triglochin maritimum middle marsh
- V = Puccinellia pumila - Spergularia canadensis - Deschampsia lower marsh
- VI = Sagina maxima - Deschampsia river islet gravel bar
- VII = Ruppia maritima saline middle marsh ponds

Community:	I					II		III				IV								V				VI	VII			
Number:	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26		
Original relevé number:	9	10	12	19	11	13	14	20	17	16	15	29	36	24	35	33	32	34	30	31	25	28	26	27	23	22		
Area (m ²):	25	25	25	25	25	25	25	9	4	4	4	25	25	25	25	25	25	25	25	25	25	25	25	25	25	4		
Number of species:	10	12	13	12	11	11	11	6	2	2	2	3	3	4	3	3	4	5	2	3	5	4	4	4	3	1		
Community character species:																												
<u>Galium trifidum</u> var. <u>pacificum</u>	1.2	1.1	1.2	+1	1.1	+2	+1	1.2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
<u>Calamagrostis nutkaensis</u>	4.3	5.3	5.3	1.2	5.3	+1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
<u>Oenanthe sarmentosa</u>	1.2	1.1	1.1	r	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
<u>Montia siberica</u>	1.2	1.1	+1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
<u>Achillea millefolium</u>	1.1	.	+1	.	1.1	.	1.2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
<u>Carex pluriflora</u>	?	+1	?	+1	?	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
<u>Sisyrinchium littorale</u>	.	.	.	1.1	+1	1.1	+1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
<u>Apargidium boreale</u>	.	.	.	.	+1	2.2	1.1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
<u>Carex ? gmelinii</u>	.	.	.	.	.	.	.	5.5	5.3	3.2	+2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
<u>Eleocharis palustris</u>	.	.	.	.	.	.	.	3.3	3.2	3.2	3.1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
<u>Carex lyngbyei</u>	2.3	3.3	1.2	2.2	5.5	4.5	3.3	3.1	4.5	3.3	3.5	5.5	4.5	
<u>Triglochin maritimum</u>	.	.	.	.	.	1.1	1.1	.	.	.	.	1.1	1.2	2.2	2.1	+1	r	r	.	.	.	.	.	.	.
<u>Plantago maritima</u>	.	.	.	+1	+1	1.1	1.1	2.1	2.1	+1	.
<u>Spergularia canadensis</u>	1.1	2.1	2.2	1.1	.	
<u>Puccinellia pumila</u>	+1	1.1	1.1	+1	.	
<u>Sagina maxima</u>	1.2	3.2	
<u>Ruppia maritima</u>	5.5	
Others:																												
<u>Deschampsia caespitosa</u>	3.2	3.3	3.3	5.5	1.2	4.3	5.5	2.2	.	.	.	2.2	2.2	+2	1.2	5.5	5.5	5.5	4.3	4.5	3.2	3.1	+1	+1	2.1	.	.	
<u>Trifolium wormskjoldii</u>	1.2	+2	+1	1.1	1.2	2.2	1.2	
<u>Hordeum brachyantherum</u>	.	.	1.2	2.2	.	1.2	1.1	1.2	
<u>Isopterygium ? pulchella</u>	.	.	1.2	.	2.5	2.3	2.3	
<u>Festuca rubra</u>	.	.	2.3	.	2.3	3.3	1.2	
<u>Potentilla pacifica</u>	.	.	.	r	.	.	r	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
<u>Angelica lucida</u>	+2	+2	+1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1.1	.	r	.	.	.	.	.
<u>Bromus pacificus</u>	+1	.	1.1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
<u>Conioselinum pacificum</u>	.	r	.	.	+1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
<u>Plantago macrocarpa</u>	.	.	.	+1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
<u>Ranunculus uncinatus</u>	.	.	.	.	1.2	1.2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
<u>Glaux ? maritima</u>	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
<u>Stokesiella oregana</u>	.	+2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
<u>Fritillaria camschatcensis</u>	.	r	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.

PORT CHANAL AUGUST 31 to SEPTEMBER 2, 1978

DISCUSSION: The first of two salt marsh areas examined in Port Chanal was a small one just east of the mouth of the river from Mercer Lake, near Mt. Hobbs. Zostera marina beds of unknown extent were noticed at this first site. Next, two salt marshes at the head of Port Chanal were visited; this included the large marsh associated with Mace Creek and the smaller one at the mouth of the stream around the bay to the south. Mace Creek had the greatest water-flow volume of all the salt marsh systems studied. The quality of the cold clear water was likely also the best. With regard to surface area, the Kootenay Inlet marsh was larger.

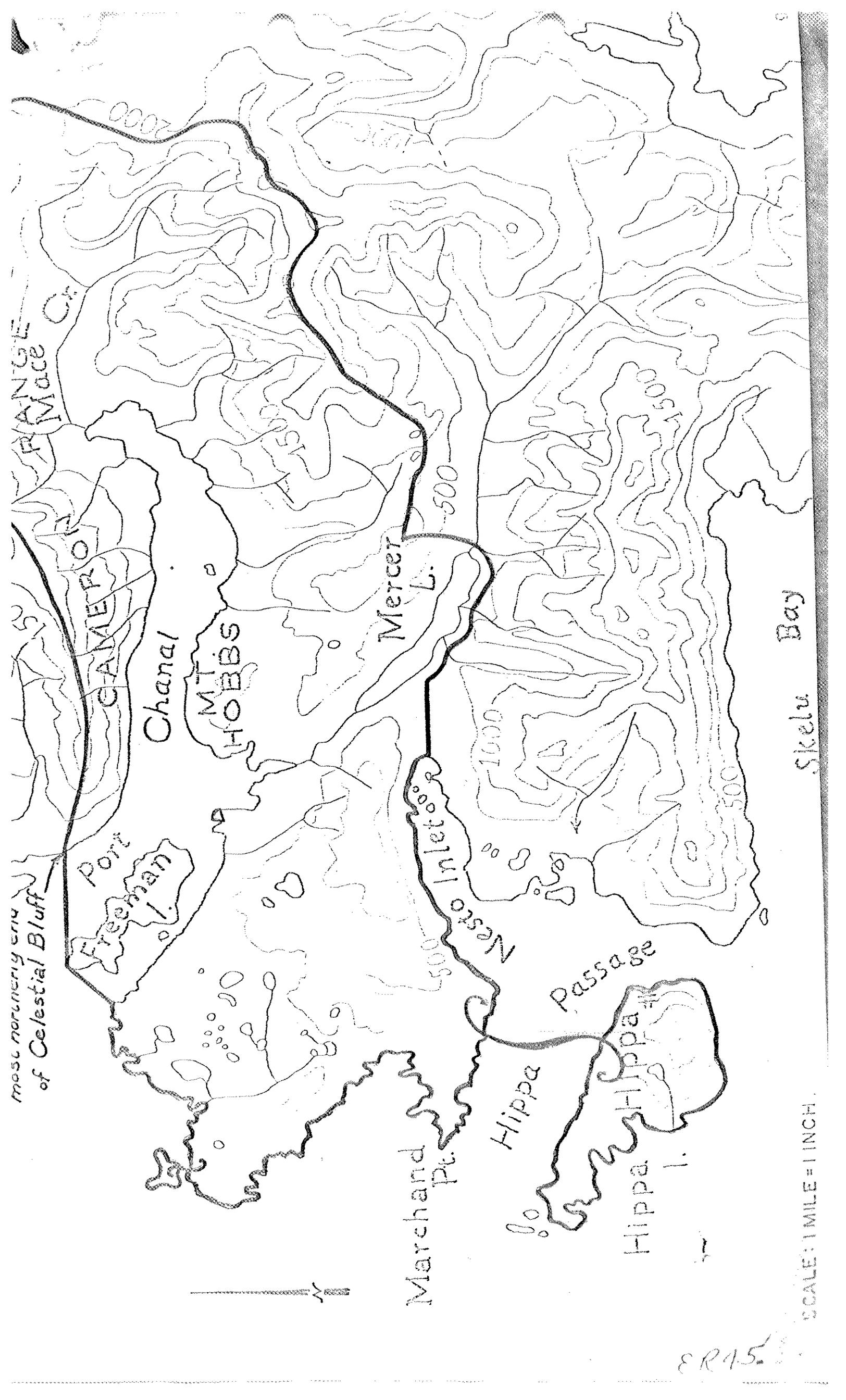
SALT MARSH PLANT COMMUNITIES (see Table 3):

- I. Calamagrostis nutkaensis upper marsh fringe with freshwater seepage (skunk cabbage of poor vigor in this area); limited to the northwest corner of Mace Creek marsh.
- II. Hordeum brachyantherum - Festuca rubra upper to middle marsh is a relatively widespread community. The major subcommunity is indicated by the presence of Galium trifidum and the absence of the Calamagrostis nutkaensis community major character species. The Elymus mollis subcommunity is essentially restricted to a long ridge of sand and gravel formed by the wave action from the open waters of Port Chanal, in association with the smaller marsh across the bay from Mace Creek. The third subcommunity is indicated by the community character species Hordeum brachyantherum and Festuca rubra; it lacks differential species. This third subcommunity is small and found at the marsh area near Mt. Hobbs.

Also found in the upper marsh region is Carex rostrata Stokes. This sedge forms moderately large pure stands on gravelly substrate with freshwater seepage along the east side of Mace Creek marsh.
- III. Carex lyngbyei middle marsh is a relatively extensive community found mainly at Mace Creek. Deschampsia and Carex lyngbyei appear to be the only vascular plants present.

IV. Puccinellia pumila lower marsh is also a widespread community. Fucus sp. attached to stones and gravel is an obvious feature of this lower reach of the salt marsh. The light green thalloid alga Gigartina stellata is associated with Fucus in this part of the intertidal zone at Mace Creek. A third smaller alga ? Rivularia is widely present.

The "a" subcommunity with very little or no cover of Spergularia canadensis is associated with the head of Port Chanal. The Spergularia canadensis - Atriplex patula "b" subcommunity is found at the smaller marsh near Mt. Hobbs.



most northerly rim
of Celestial Bluff

FRINGE Cr.
Mace Cr.

CAMERON
Chanal

Chanal

HOBBS

Mercer
L.

Marchand
Pt.

Hippan

Hippan
Passage

Hippan
I.

Skellu Bay

SCALE: 1 MILE = 1 INCH

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