

Objectives The Objectives in this first year of studies into marine aspects of estuaries was to undertake surveys of a wide range of estuary types in order to appraise the present states of marine sections, and to commence documentation of ecosystems present by environmental records and specimen collections.

Methods A graduate student marine ecologist (K. Coates) was employed May through August. Surveys were made of a series of 13 estuaries primarily on Vancouver Island utilizing the facilities of the MSSV John Strickland, the 55 ft oceanographic launch of the University of Victoria, for the more isolated areas. (See list Appendix 1) Four of the thirteen are already under application for Reserve status, and the others had been specified in 1975 as of high priority for consideration.

A preliminary report has been drafted on the state of each estuary, and samples sorted to levels of major taxa. Oligochaete specimens have been extracted for detailed studies, while the balance of specimens have been placed in museum-standard storage pending detailed studies of the taxa by the benthic research group at the University of Victoria or by other specialists on request.

Results The main generalization from the summer's surveys is that very few of the larger estuaries on Vancouver Island remain untouched by developments of one form or another. At almost all surveyed estuaries and others unnamed at which the Strickland made short overnight stops, there was evidence of active or abandoned logging operations, and consequent effects of wood debris mixing with beach or shallow water deposits. (Such effects are currently being researched by the UVic benthic research group outside the Ecological Reserves funded project.)

This general finding serves to direct priorities for further action.

Actions recommended

1. Those estuaries on Vancouver Island which are still untouched by developments, particularly if the whole watershed is untouched, should be pre-empted for non-destructive research by Ecological Reserve status as soon as possible. Examples are the Tsitika, the Moyeha, Stranby River (to Shuttleworth Bight), and the small river near Orchard Point in Brooks Peninsula. There are now so few untouched watersheds and estuaries left on Vancouver Island, that their rarity alone should be sufficient justification for commitment to the social need of research.

The same argument can probably be supported for the southern B. C. mainland.

2. For protection of an estuary, the whole watershed needs protection, not just the estuary component. In this way natural hydrological patterns and their consequences for the estuary can be retained.
3. Certain special marine ecosystem components can be protected by Ecological Reserve status in estuaries without whole watershed protection. The most important special component identified to date is the native oyster, Ostrea lurida. This species tends to be estuarine, and has declined almost to the verge of extinction as a result of commercial oyster growing with introduced species.

1974
ECOLOGICAL RESERVES COLLECTION
GOVERNMENT OF BRITISH COLUMBIA
VICTORIA, B.C.
VBV 1XA

4. Further special ecosystem components needing protection are unexploited beds of shellfish taken commercially in B. C. Such species include a variety of clams and crustacea. It may also be possible to locate such shellfish grounds in non-estuarine shoreline and shallow water areas.
5. A system for categorizing and appraising estuaries is needed to serve many functions including decision-making on Reserve status. Such a system would include at the ecosystem level, habitat and population-estimate categorization systems, at the organism level, rapid but accurate species identification systems. For instance marine habitat components of estuaries might be categorized as lagoons, fans or riverine (if these habitats can be shown to have characteristic ecosystem properties) while the crustacea predominant in many logging-affected estuaries need better identification and stock assessment procedures than are presently available.

Priorities for Continued Investigations 1977

1. Locate native oyster stocks, assess stocks and potential for protection, and make Reserve applications where appropriate.
2. Locate further untouched watersheds and estuaries on Vancouver Island and the southern mainland, particularly amongst smaller systems, and make Reserve applications where appropriate.
3. Locate unexploited beds of commercially significant shellfish, appraise stocks and potential for protection, and make Reserve applications where appropriate.
4. Extend surveys to date in estuaries in Reserves, e.g. Port Chanal, and others, in an attempt to develop an estuarine classification system for marine components.

Appendix 1. List of estuaries surveyed 1976

- | | |
|---------------------------------------------------------------|-----------|
| * Tsitika | Chemainus |
| Kingcome | Tsable |
| * Stranby(Shuttleworth Bight) | Salmon |
| Klaskish | Cluxewe |
| * Small river on Brooks Peninsula, southwest of Orchard Point | San Juan |
| Tahsish | |
| Sydney | |
| * Moyeha | |
| * Under Reserve application | |



10 Mile Point

HABITAT MAP

est'd %

10%



SORTED GRAVEL

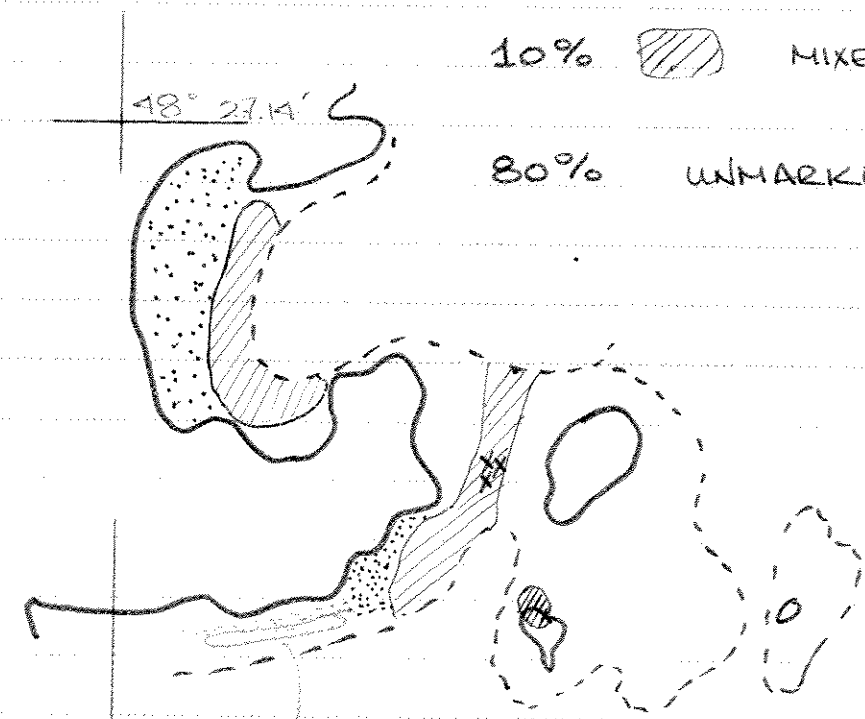
10%



MIXED - SAND, GRAVEL, MUD ETC.

80%

UNMARKED BEDROCK



48° 27.14'
123° 15.96'

Scissurella setacea
April 1976



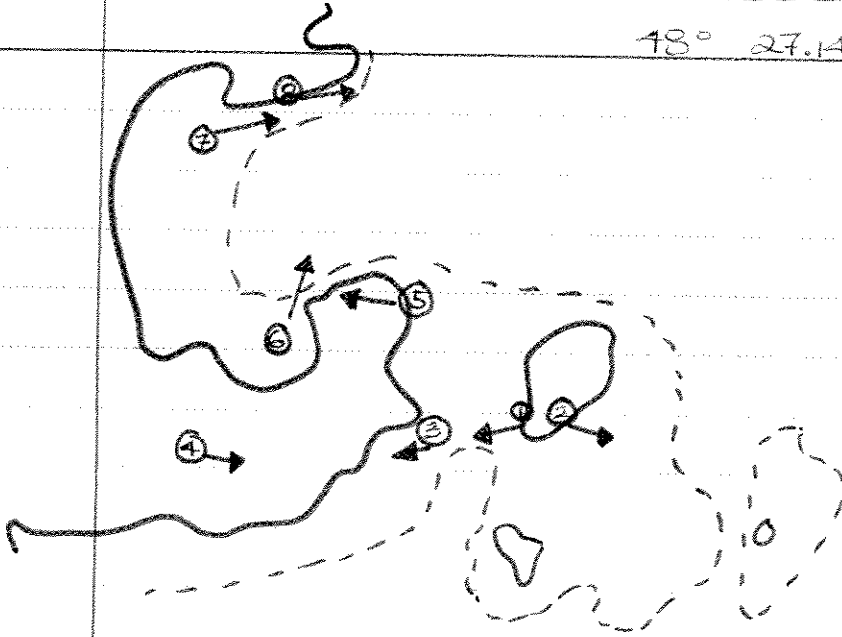
VERY LARGE BARNACLES
TUBE WORMS

PHOTOGRAPH CHART

— HIGH WATER LINE

- - - LOW WATER

48° 27.4' N. APRIL 15/76



123° 15.96' W.

MEMORANDUM

TO _____

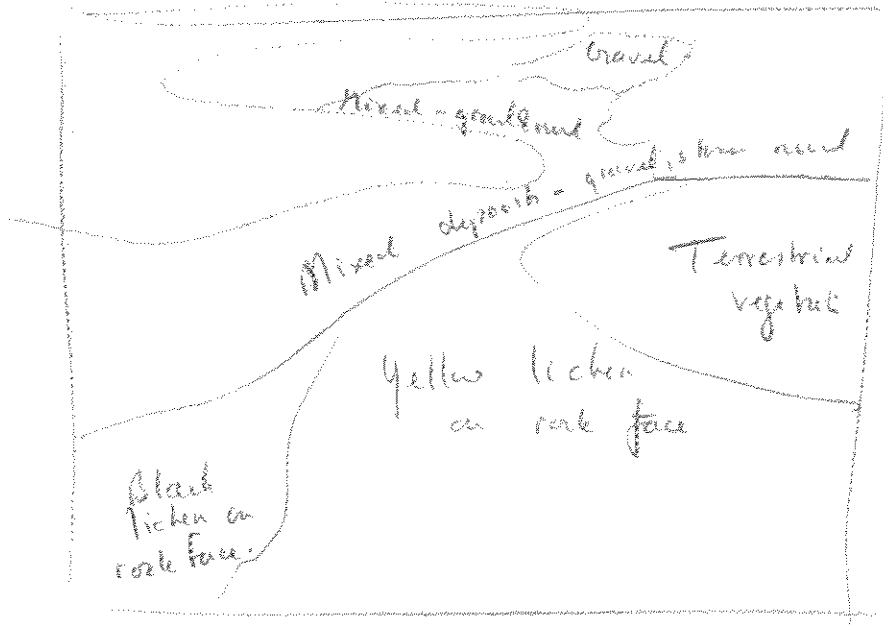
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Location

1

Date



Normal rocky shore.

Normal mixed deposits - clams squinking
rust algal growth.

Gravel & mud - polychaetes.

Gravel - above MTL

MEMORANDUM

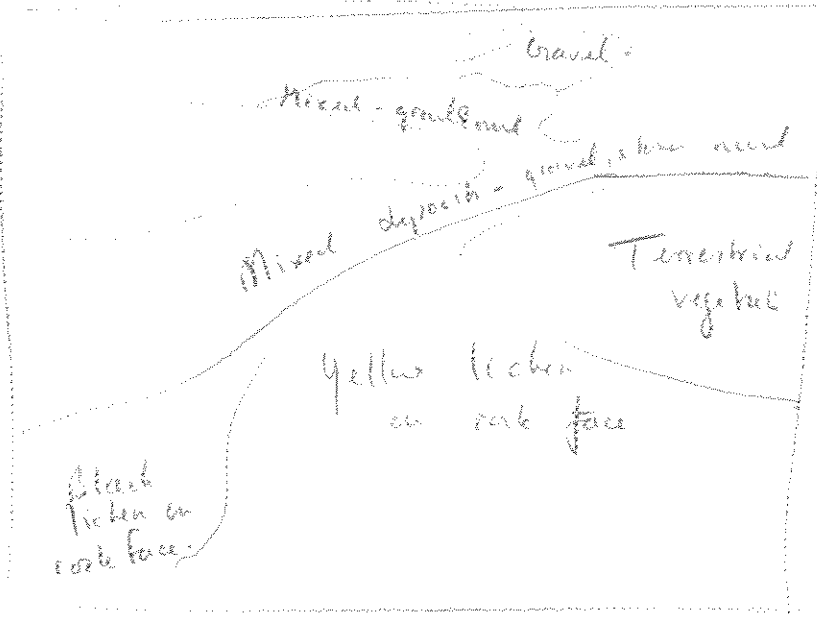
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Date

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Normal rocky shore

Normal mixed deposits - clams squinting
" mud about growth.

Gravel & mud - polychaetes.

Gravel - above MTL

MEMORANDUM

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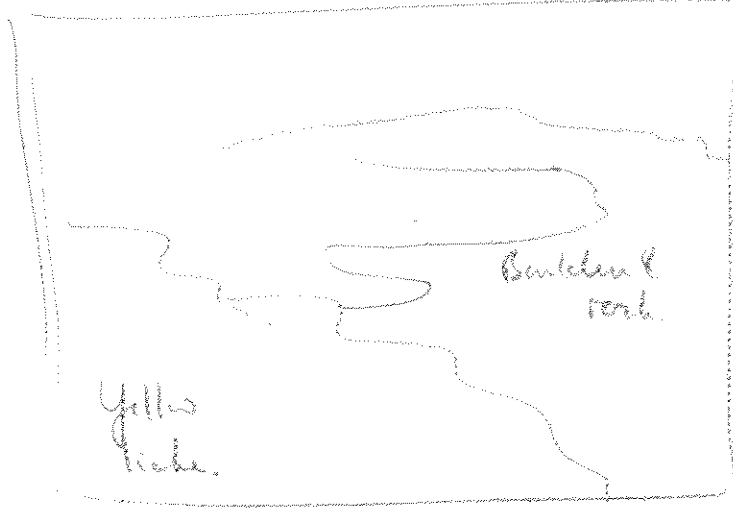
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Named zonation for rocky shore.

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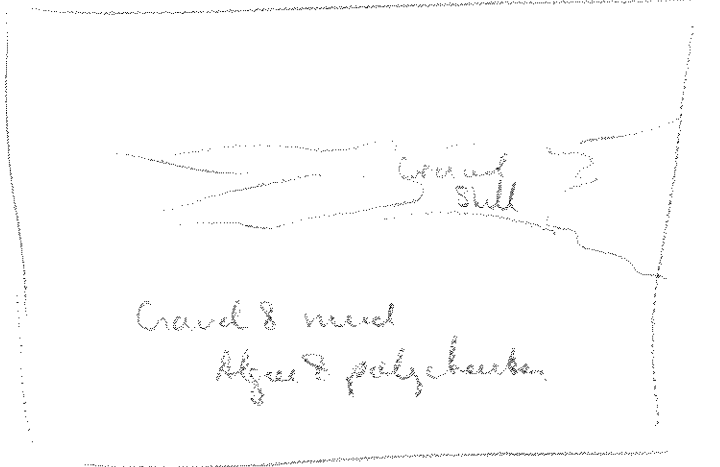
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Victoria

3

.....Date



Normal gravel-mud beach

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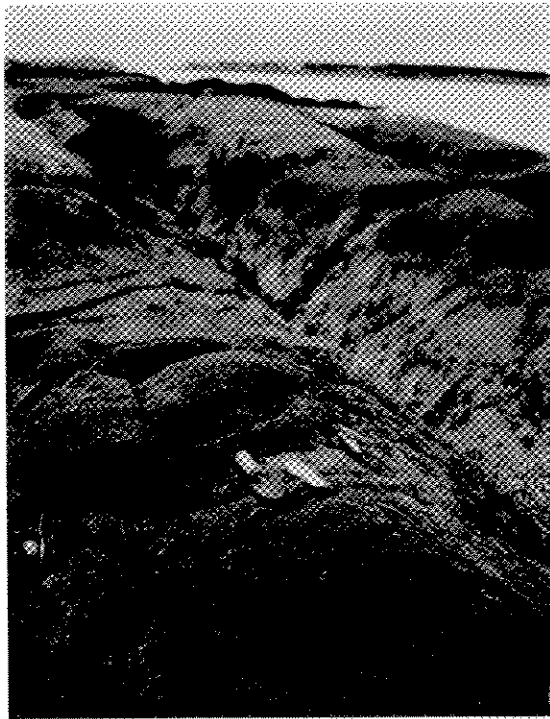
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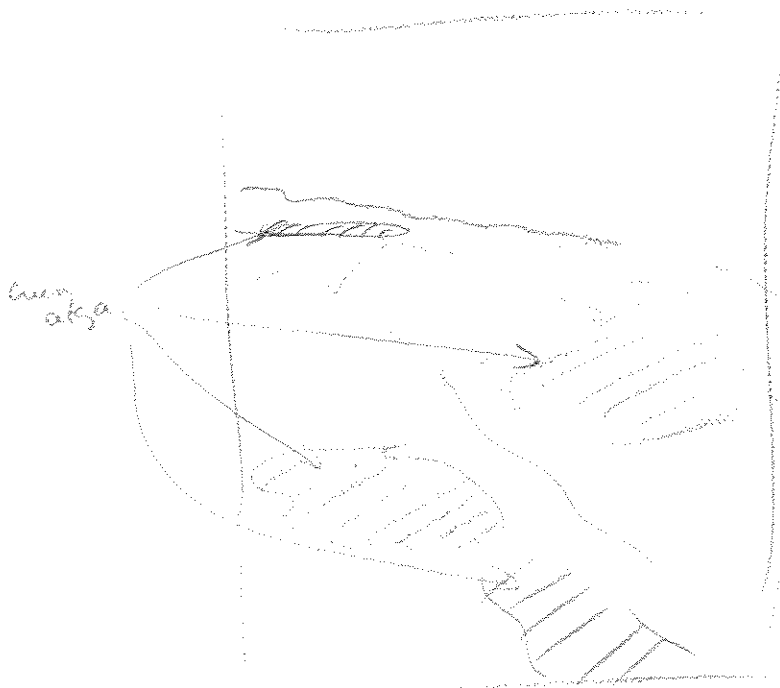
Date

FROM



Green algal turf in upper section of black lichen zone
 below yellow lichen. - Protonota

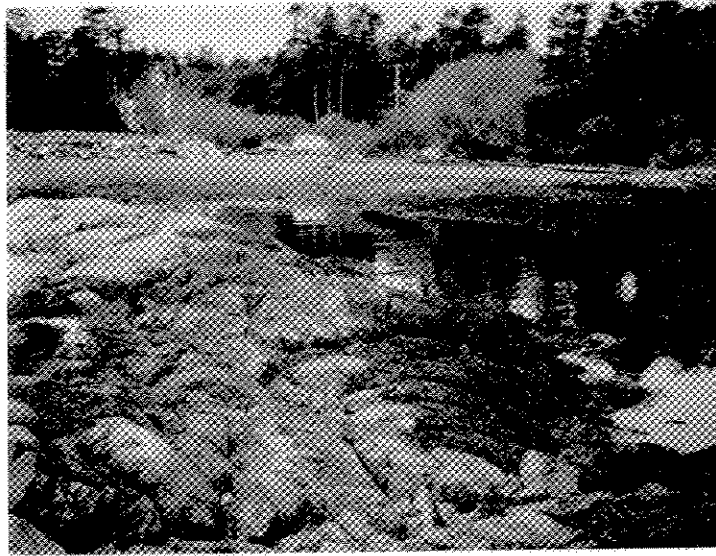
Several regions noted in various patches.



MEMORANDUM

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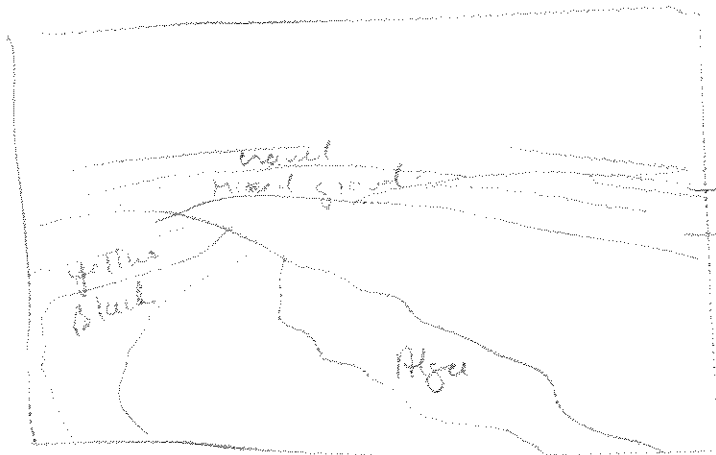


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Date

Playground - Camp



Normal variation patterns

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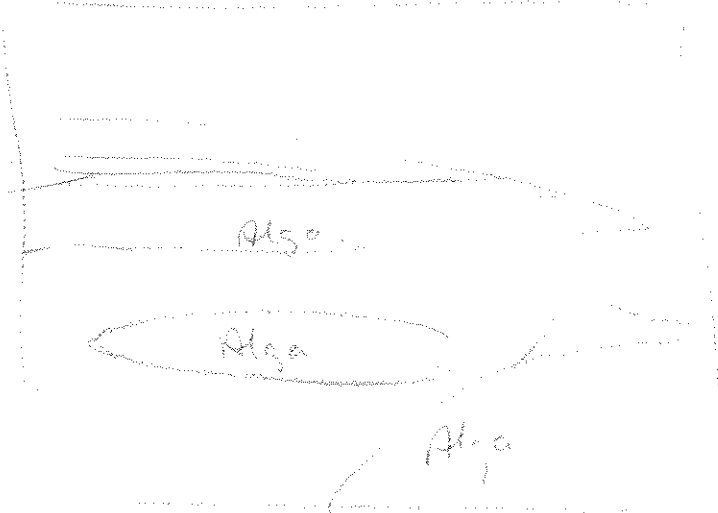


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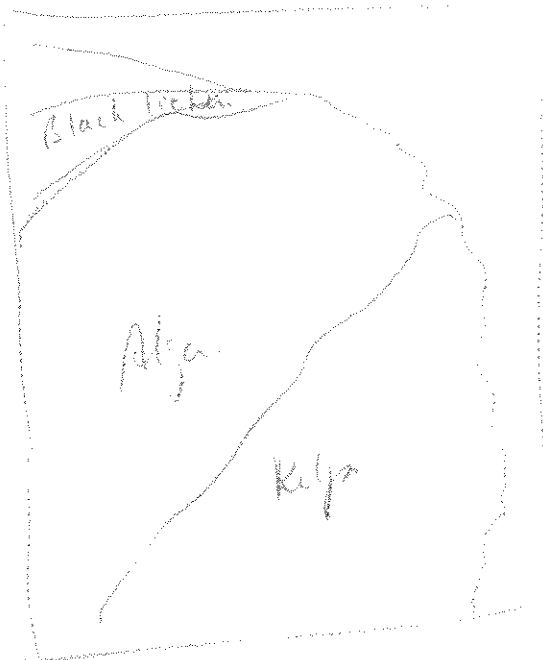
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Victoria

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Date



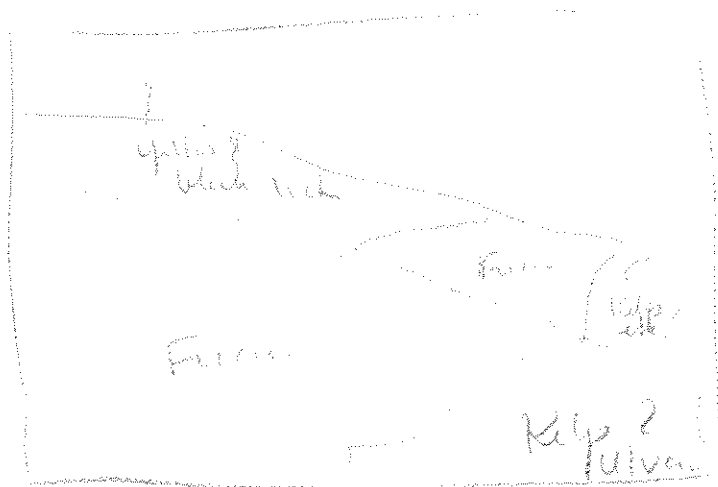
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K. Lead

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16-2

ENE 10

April 19, 1976

(ECOLOGICAL RESERVES SURVEY 1: TEN MILE PT.

A preliminary littoral habitat survey was done in the area of Ten Mile Point, now designated as an ecological reserve. The area is just south of Cadboro Point, Victoria, British Columbia - approximately 48° N. Latitude and 123° W, Longitude. Survey carried out on April 15, 1976 between 0830 and 1030 PST. Extreme tides from Victoria on survey day were: HW - 0235 : 2.8m; LW - 0935 : 0.5m; HW - 1260 : 2.3 m.

(Canadian Tide and Current Table, Environment Canada - Fisheries and Marine Service, V.5 Juan de Fuca and Georgia Straits. 1976).

Habitat Survey:

Three main habitat types were observed: well-santed^{or} gravel on shingle beach; poorly santed^{or} mixed beach, comprised of gravel, some large stones, broken shell mixed in mud; and bed rock (broken to some extent with boulders). A sketch map of the area with the various habitats indicated is included in the report as well as photographs of the various habitats. Percentages of habitat types in the intertidal area were estimated as 80% bedrock; 10% mixed; and 10% santed^{or} gravel.

The zonation of the rocky shore as illustrated in photos 5 and 6 is typical of southern Vancouver Island. From extreme high water mark to low water the zonation was observed to be a yellow lichen band, a black lichen band, a sparsely populated band with a few wisps of an attached green algae, then a wide fucus zone extending to low water.

(Verrucaria)

Small particles of grey-green lichens were occasionally mixed into the yellow lichen zone. The black lichen zone was almost exclusively unmixed; however, in parts of the upper level of the black lichen zone

a green algae, Prasiala sp. formed a spongy mat. Prasiala is often formed where a rock surface (see Photo 4) is exposed at high tide but subject to continuous spray and is frequently associated with an ^{concentration} ~~entrations~~ of bird droppings. Some small barnacles were observed in the sparse area above the Fucus sp. and limpets and winkles were noted in this same area in cracks and crevices sheltered from the sun and from breaking waves.

No evident abnormalities in the zonation of intertidal rock faces were seen.

No extensive survey or collection of organisms inhabiting areas of mixed deposits was made. Where attachment was available many green, brown and red algae were found. A little digging indicated that polychaetes were abundant and probably also clams. This digging was done on mixed beach shown in the foreground of Photo 3; this was the muddiest of all the mixed areas.

In one area - marked on sketch map with XXX - very large barnacles and a cluster of tube worms were found. Enriched currents with abundant particulate matter for large filter feeders must run continuously through this channel at higher tides. Unfortunately, the organisms around area were not closely photographed.

Numerous adult chironomids were observed throughout the area.

Preparation for Similar Surveys:

In order to optimize time usage between tides it is important to familiarize, as far as possible, with the observation area.

Documents available will include air photos, navigation charts, ecological reserve descriptions and prior data.

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F(local reserves maps indicating access road will be necessary.

Primary observations will be of intertidal habitats and organisms but important influences from outside the specified environ will also be noted.

K. Coates