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Sooke Harbour and Basin Fish Habitat Inventory

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ABSTRACT

Feakins, T.F. 1991. Sooke Harbour and Basin Fish Habitat Inventory. Can. Manuscr. Rep. Fish. Aquat. Sci. 2131:

An inventory of the marine foreshore fish habitat characteristics of Sooke Harbour and Basin was conducted to aid in the evaluation and planning of future foreshore development. Biophysical traits of the backshore, intertidal, and subtidal zones were assessed visually by walking, snorkelling, boating and/or diving. Sixty-two reaches within the Inlet are described in detail, based on substrate and/or vegetation composition. The location of major eelgrass and kelp beds, which are important fish habitat areas, is also reported.

To further examine the significance of fish habitat within Sooke Inlet, benthic invertebrate samples collected from two representative substrates (silt/mud and gravel/cobble) are analyzed and salmonid escapement, herring spawn and shellfish harvest data are presented. In addition, human use of the foreshore is described from records provided by the Provincial Ministry of Lands and Parks and from visual observations made during the survey.

In light of increasing development pressure, concentrated mainly in Sooke Harbour, recommendations are given for the protection and maintenance of the highly productive fish habitat within the Inlet.

RÉSUMÉ

Feakins, T.F. 1991. Sooke Harbour and Basin Fish Habitat Inventory. Can. Manuscr. Rep. Fish. Aquat. Sci. 2131:

Nous avons effectué dans le havreet le bassin Sooke un inventaire portant sur les caractéristiques de l'habitat du poisson situé dans la zone de l'estran en vue de perticiper à l'évaluation at à la planification du développement futur de cette zone. Les traits biophysiques de l'arrière-côte, de la zone intertidale et de las zone infratidale ont été évalués visuellement à pied avec masque et tuba, en bateau et/ou en plongée. Soixante-deux portions du littoral de l'inlet sont décrites en détail, en fonction du substrat et/ou de la végétation. Nous localisons aussi les principaux herbiers de zostère marine et de laminaires, qui sont des zones importantes pour l'habitat du poisson.

Pour analyser plus en profondeur l'importance de l'habitat du poisson dans l'inlet Sooke, nous examinons des échantillons d'invertébrés benthiques recueillis dans deux substrats représentatifs (limon/vase et gravier/galets), et nous présentons des données sur les échappés de salmmonidés,j la fraye du hareng at l'exploitation des mollusques et crustacés. De plus, nous décrivons l'utilisation humaine de l'estran à partir des dossiers fournis par le ministère des Terres et des Parcs et d'observations visuelles effectuées pendant l'étude.

La pression du développement augmente, particulièrement dans le havre Sooke, et nous présentons des recommandations concernant la protection et le maintien de l'habitat extrémement productif que constitue l'inlet pour le poisson.

SOOKE HARBOUR AND BASIN FISH HABITAT INVENTORY

1.0. INTRODUCTION

Sooke Harbour and Basin are located approximately 25 km west of Victoria, on the southern tip of Vancouver Island (Fig.1). Historically, the Town of Sooke, located on the northern shore of the harbour, was an independent rural settlement, with an economy based on natural resource industries such as fishing, forestry and aquaculture. After WWII, with the growth of Victoria, and the improvement of transportation links, the community also became a place of residence for commuters working in the city. As the town expanded, the use of the harbour and basin foreshore resources increased steadily, and concern over the degradation of the marine ecosystem grew.

The Department of Fisheries and Oceans is responsible for reviewing all foreshore development proposals which may potentially affect fish habitat. Little biophysical habitat information has been collected for the Sooke Harbour and Basin foreshore areas, and it is the intent of this study to add to the existing data. The completed habitat inventory will aid in the evaluation of future foreshore development proposals and will be used as part of an intensive Sooke Harbour and Basin Development Plan, which is intended to specify the pattern of foreshore development.

2.0 INVENTORY METHODS

Fish habitat characteristics of shallow reaches in the study area were surveyed by walking, snorkelling and boating at low tides. Divers, using SCUBA, assessed the substrate and marine life of deeper or opaque waters. Habitat characteristics and foreshore uses were noted visually and recorded on 1:12 000 scale charts, as well as on tables modified from the "Coastal/Estuarine Fish Habitat Description and Assessment Manual" (Williams, 1989). Following this manual, the 41 km of marine foreshore was divided into reaches on the basis of either a change in substrate, a change in vegetation, or both. These reaches are shown in Figure 2.

Depth contours in the study area were checked against both Canadian Hydrographic Service Chart No. 3430 and Map 6 of the Sooke Harbour and Basin Management Plan, 1989.

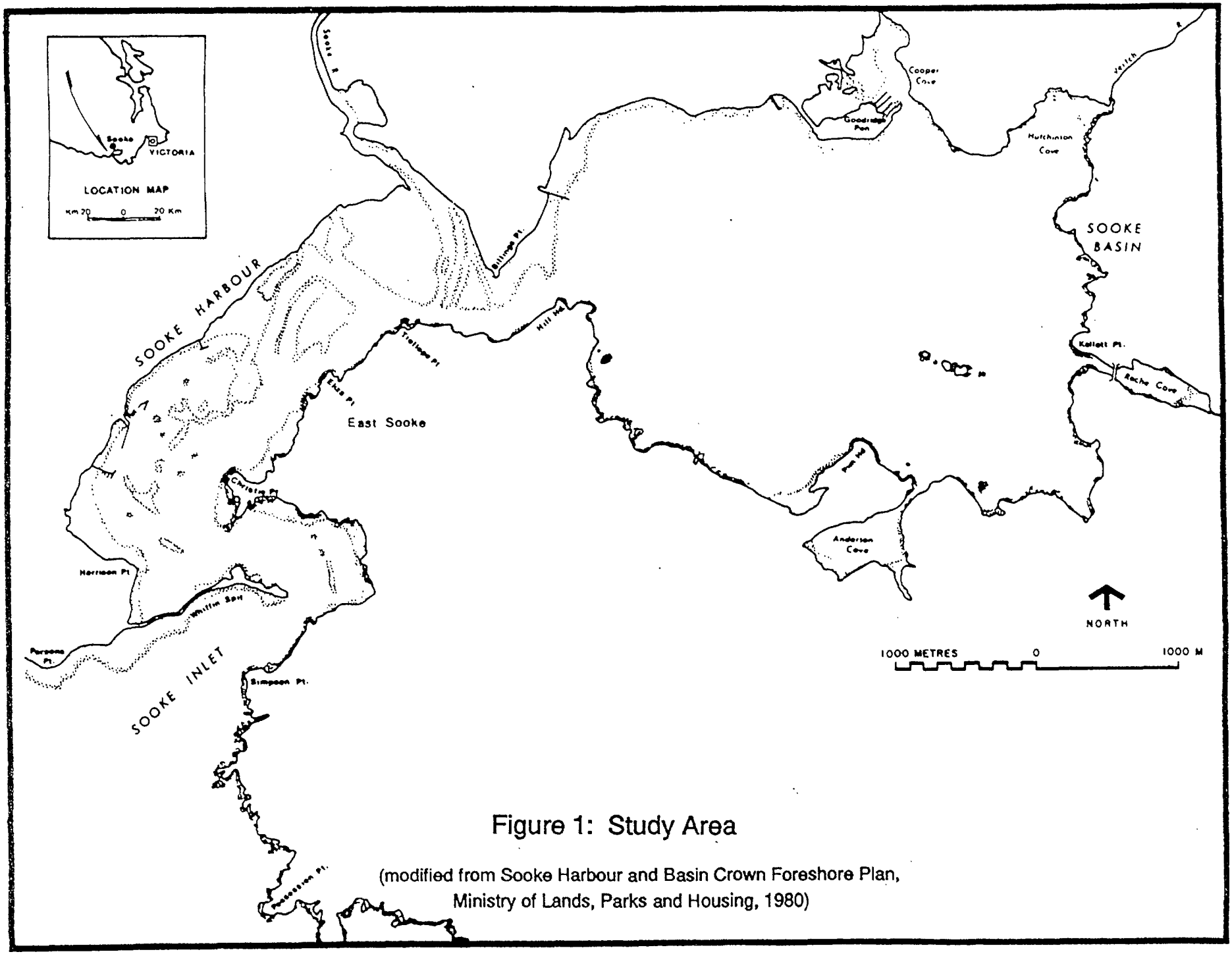

Figure 1: Study Area

(modified from Sooke Harbour and Basin Crown Foreshore Plan, Ministry of Lands, Parks and Housing, 1980)

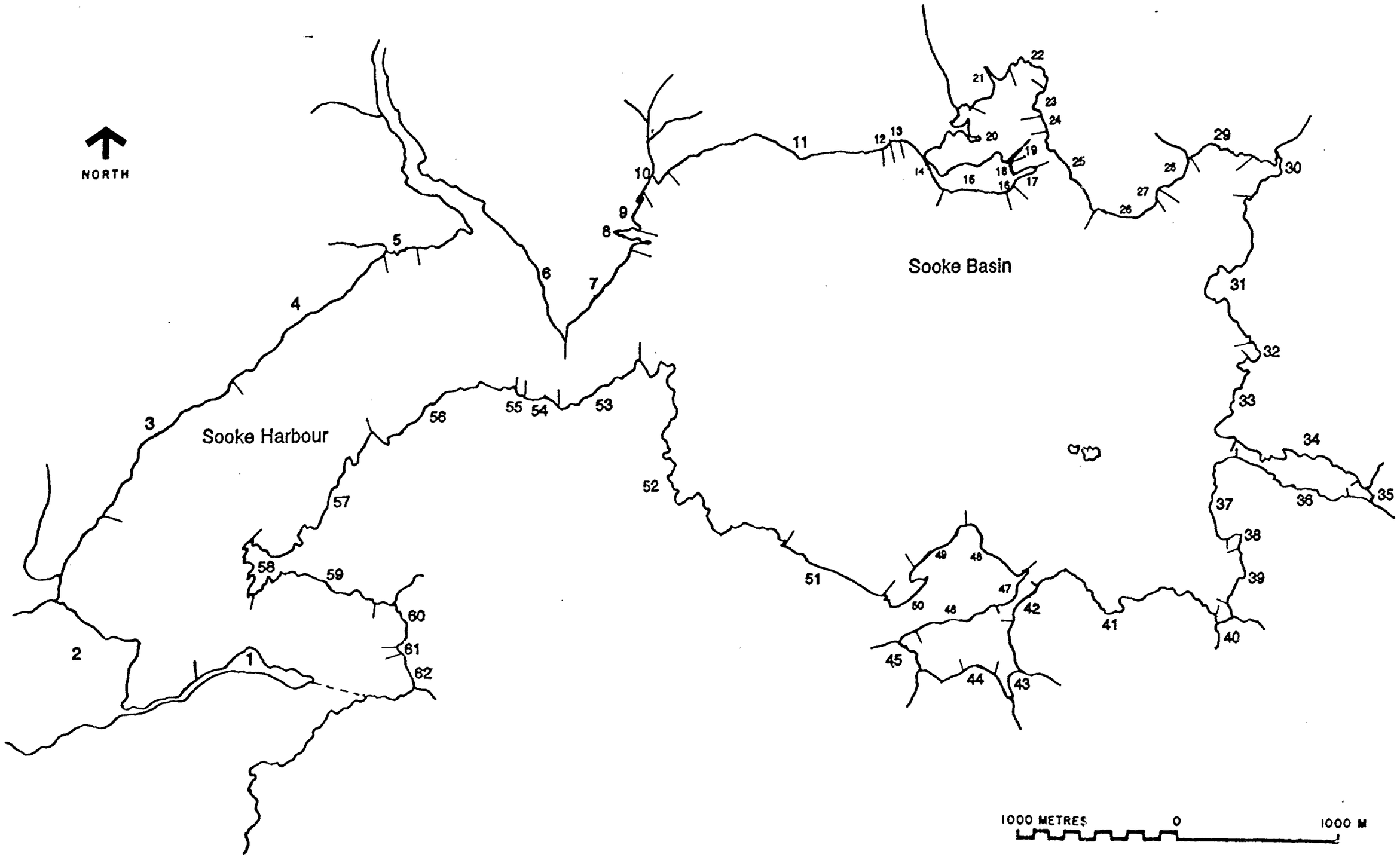

Figure 2: Foreshore Reaches

Benthic invertebrates were collected from two representative substrate areas, silt/mud and gravel/cobble, with a benthic sled following the methods of Sibert et al., (1977). Three replicate samples were taken at each site, then preserved immediately in 10% buffered formalin. After 36 hours the samples were washed and transferred into 70 % ethanol, then transported to a consultant for sorting and identification to Family level.

Utilization of Sooke Harbour and Basin by salmon, herring, shellfish, and crustaceans has been documented by fisheries officers and management biologists for several years. This information is summarized and presented in respective sections, figures, and appendices. Recent data regarding fish and shellfish presence was collected by Fisheries personnel, who sampled and beach seined numerous reaches in the area.

Current foreshore use was noted visually by boat, and additional information was obtained from the Victoria office of the Provincial Ministry of Lands and Parks, the lead agency responsible for the planning, allocation and management of Crown Lands**.

3.0 RESULTS

3.1 Physical Characteristics

3.1.1 Currents

The circulation in Sooke Harbour is estimated to be very good, for it is flushed not only by its own intertidal volume but also by the intertidal volume of Sooke Basin, which flows through Sooke Harbour. Sooke Harbour also receives the flushing and mixing action of the Sooke River discharge. Sooke Harbour water is almost entirely changed four times daily (Thomson, 1981).

Sooke Basin does not have significant fresh water inflow, and thus does not benefit from the mixing action of tidal and fresh waters. The basin undergoes only a partial exchange of water (the intertidal volume) twice each day. Strong winds cause some mixing of surface waters, but generally the bottom water of the basin remains relatively stagnant (Elliott, 1969; Thomson, 1981).

Anderson, Roche, and Cooper's Coves are relatively sheltered from wind and thus do not benefit measurably from surface water mixing; tidal action is the principle mixing agent. Although Hutchinson Cove is less sheltered, winds have a minimal effect on the water surface and tidal action is again the primary source of mixing.

3.1.2 Depth Contours

The depth contours of the Harbour and Basin are depicted in Figure 3. Note that Sooke Harbour is virtually a 3 km long sill, having an average depth of only 3 m. A large intertidal marsh area also exists at the Sooke River outlet. These shallow areas often become regions of conflict, for they provide valuable fish and shellfish habitat and are at the same time ideal locations for development (Russell, pers. comm.). Two navigational channels are maintained through the sill - one to the government dock on the western shore, and another along the eastern shore to Sooke Basin. The basin, however, is larger and much deeper; it covers over 6 sq km, and reaches depths of over 35 m at its seaward end. Four shallow, semi-enclosed coves open onto the Basin: Cooper's Cove, Hutchinson Cove, Roche Cove, and Anderson Cove.

3.1.3 Foreshore Morphology

The foreshore areas of the south and east inlet, from the Harbour entrance to Cooper's Cove, are typical rocky shorelines. Bedrock substrate was observed above the high water line to over 8 m below chart datum. Below the bedrock and boulders, silt and mud usually predominate.

In most reaches of the south harbour, bedrock and/or boulders are present to only 0.1 m, below which the substrate usually changes to mud or silt. However,in the south and east basin, bedrock cliffs extend as deep as 7.2 m below zero tide, and silt is the dominant substrate below this depth. The north basin, between Hutchinson and Cooper's Coves, is characterized by an extremely steep bedrock cliff, which extends from above the high water line to over 8 m below zero tide.

This rocky portion of the coast is broken up by numerous small pocket beaches and the four large coves. Each cove has a small estuarine-type wetland, the largest being in Cooper's Cove. The physiography of the Cooper's Cove system is diversified and complex. An estuarine marsh complex, a salmonid producing stream, islets, and areas of extensive development all coexist. Anderson Cove is basically a large, sheltered tidal flat, with the backshore varying from bedrock cliff to coarse, gravelly beach. Roche Cove is similar, but more diverse, for a small estuarine system and islet also exist. The less sheltered area of Hutchinson Cove is dominated by a large estuary, which is bordered by small pocket beaches and a bedrock cliff.

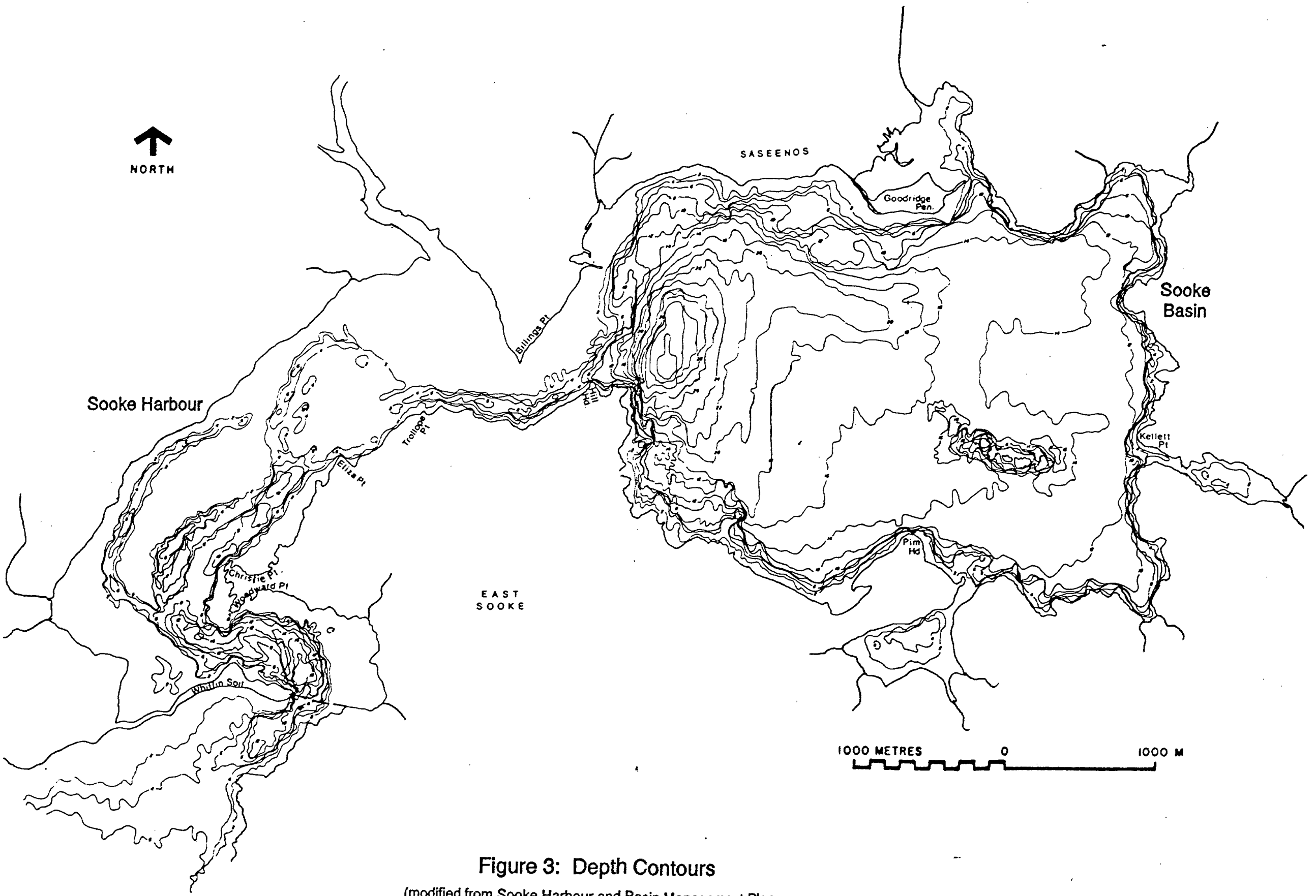

Figure 3: Depth Contours

(modified from Sooke Harbour and Basin Management Plan, Capital Regional District Planning Division, 1989)

From Cooper's Cove to Whiffin Spit, the shoreline is composed of softer materials, such as sand, silt and mud, and contains several coarse beaches and mudflats. Most bedrock is above the high water line.

A detailed account of the substrate distribution in the area is included in Appendix I.

3.2 BIOLOGICAL CHARACTERISTICS

3.2.1 Vegetation

A typical aquatic vegetation profile for Sooke Inlet is shown in Figure 4. The following section discusses the general distribution of the nine types of vegetation found in the study area. A detailed account is provided in Appendix I.

Of the 62 reaches present, Enteromorpha occurred in 47, making it the most widely distributed aquatic vegetation in the study area. Enteromorpha grows on all substrates in the basin, but is most prevalent on bedrock. In the harbour the plant exists exclusively on muddy, gravelly beaches. It grows between the 0.2 and 1.7 m tidal elevation, and provides important habitat for fish and fish food organisms.

Fucus grows solely on bedrock and boulders in the high intertidal region, between 1.7 and 3.5 m above chart datum. The most dense concentrations are found along the bedrock banks of the south harbour. Present in 10 of 15 harbour reaches, and 26 of 47 basin reaches, it is the second most common algae in the area. However, because Fucus grows only on rocky substrates and at high tidal elevations, it can provide only limited habitat for foraging fish.

The locations of major eelgrass beds in Sooke Inlet are given in Figure 5. Eelgrass (Zostera marina) grows on sand and mud substrates from 3.5 m below to 0.1 m above chart datum in the study area. Of the 62 reaches, eelgrass is present in 34 and dense in 20, with most of the dense stands occurring west of Cooper's Cove and in the harbour. Z. marina forms aquatic meadows, which are extremely important in stabilizing sediment and providing protection and food sources for fish.

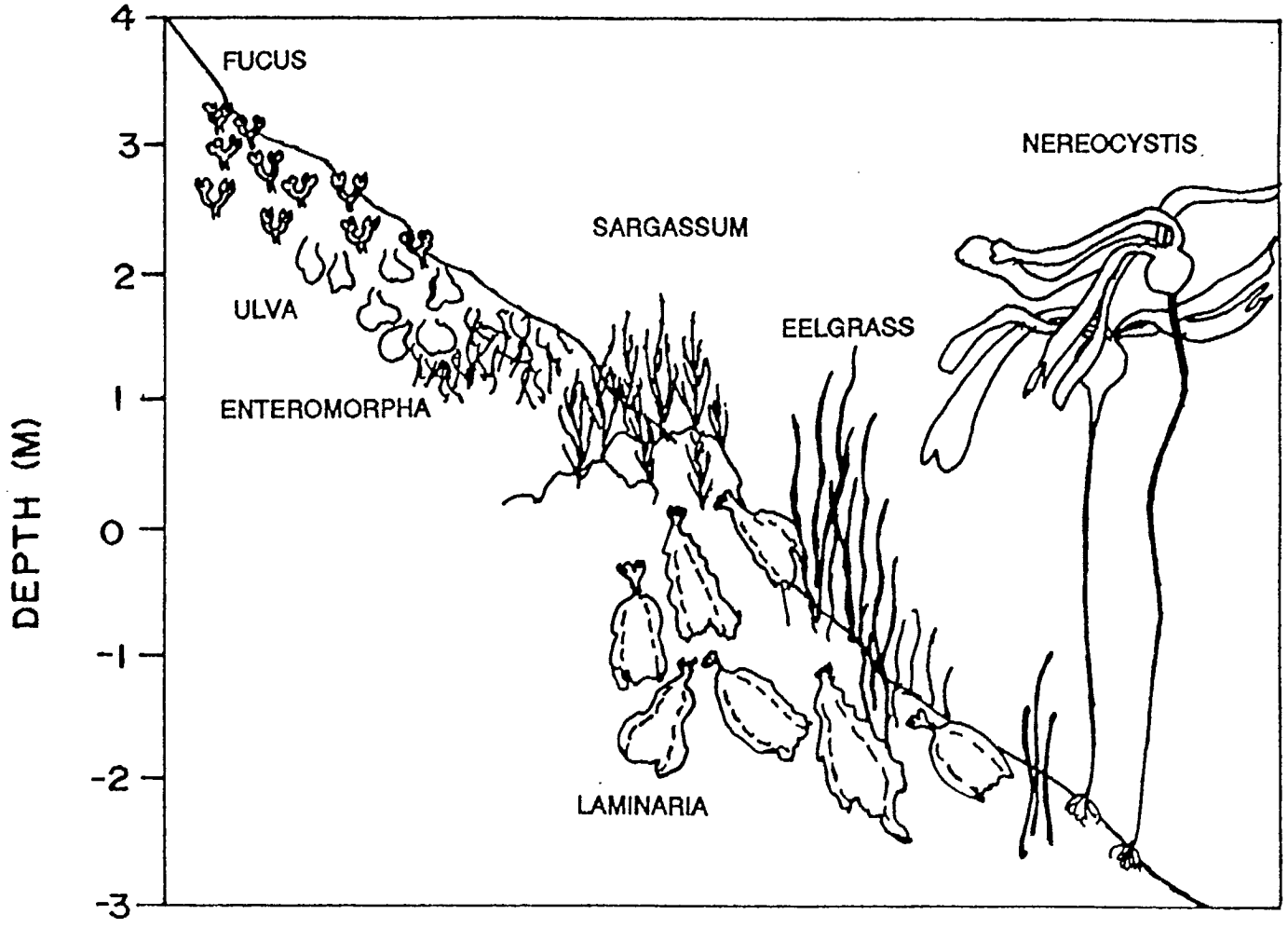

Figure 4: Marine foreshore vegetation profile

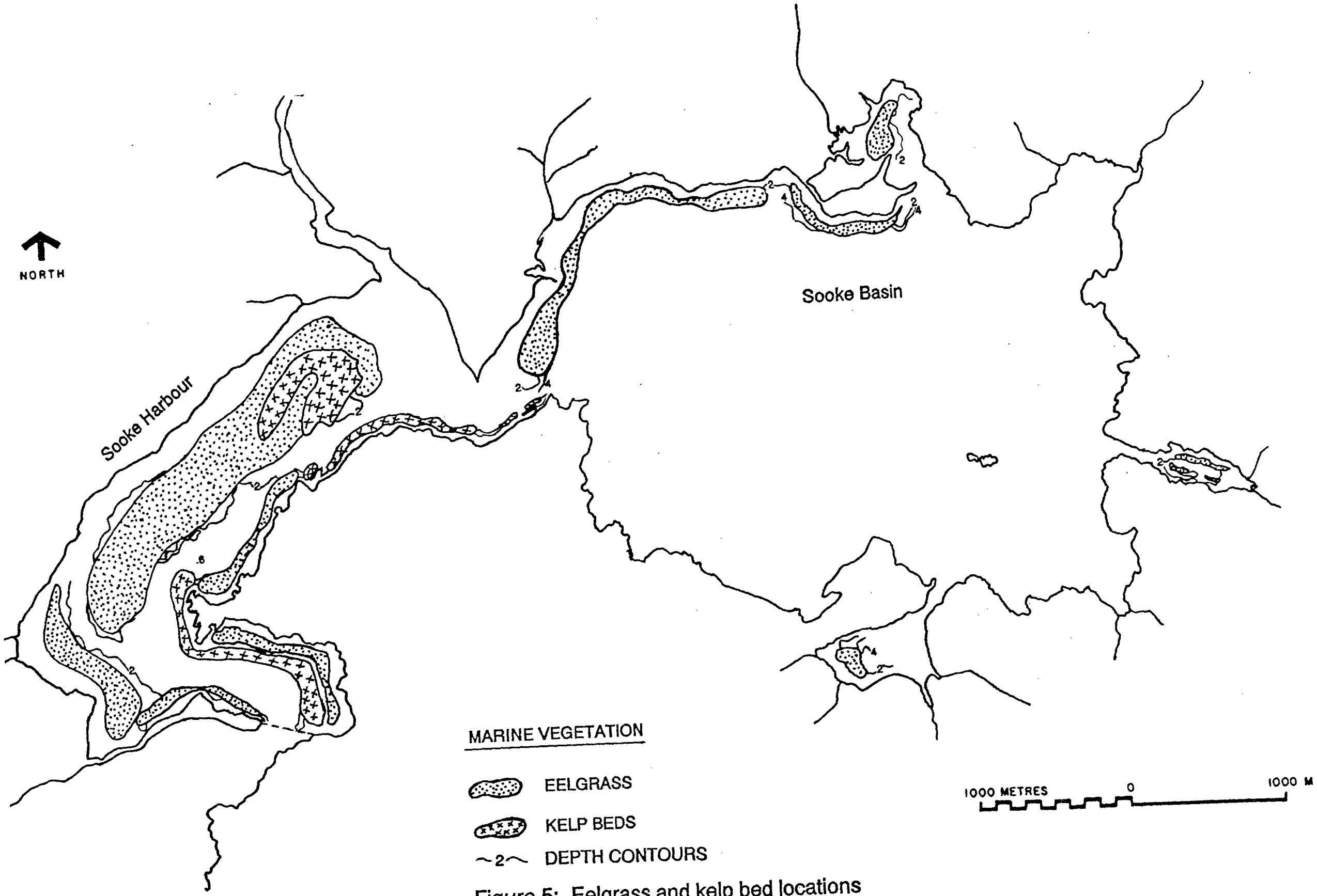

Figure 5: Eelgrass and kelp bed locations

Ulva is found mainly in the harbour, between 0.2 and 2.9 m above chart datum. Here the seaweed dominates bedrock/boulder substrates and forms dense mats with Enteromorpha on mud/gravel beaches. Because of their location and density, these mats act as important fish nurseries as well as ideal crab mating habitat.

Large kelp beds, composed mainly of Nereocystis and Laminaria, exist exclusively in the harbour. These seaweeds grow in association with mud substrates, wherever attachment surfaces such as shells, wood and rocks are present. Found from 0.4 m above to 4.0 m below zero tide, the kelp beds often border mature stands of eelgrass. Their long blades provide shelter and feeding areas for a variety of fish, including juvenile salmonids, kelp greenling, and striped and shiner perch. Kelp also represent important herring spawn substrate. The locations of major kelp beds are shown in Figure 5.

Sargassum and various other unidentified green and red algaes are also present in many locations throughout Sooke Basin. They exist on a variety of substrates between the lower subtidal (foliose reds) and the lower intertidal (Sargassum) regions. These seaweeds provide the majority of the fish habitat available in the basin.

3.2.2 Benthic Invertebrates

Because the sled was not functioning efficiently over the substrates sampled, accurate estimates of the abundance of benthic invertebrates in Anderson and Cooper's Coves were not obtained. However, potential prey for juvenile salmon were collected at both sites, and are listed in Table 1.

3.2.3 Shellfish/ Crustaceans

Sooke Inlet supports a large shellfish population. While individuals and isolated clumps are found in the mud and sand substrates of virtually the entire shoreline, major clam beds are located in the low intertidal zone of reaches 1, 6, 7, 20, 29, 45, 50, 60 and 62. The most abundant species inhabiting the area are native littleneck (Protothaca staminea) and manilla (Tapes japonica) clams.

Table 1: Potential Fish Food Organisms Collected from Sooke Inlet, July 12, 1991.

Taxa	Anderson Cove (mud/silt)	Cooper's Cove (cobble)
Oligochaeta	1	11
Polychaeta		
Spionidae		2
Copepoda		
Harpacticoid	4	1
Calanoid	18	3
Ostracoda	67	21
Amphipoda		
Corophium insidiosum	5	4
Cumacea		
Cumella vulgaris	3	2
Decapoda		
Brachyuran zoea	1	
Mollusca		
Littorinidae	1	
Unid. juvenile clam		1
Batillaria sp.		1
Insecta		
Collembola	2	
Arachnida		1

Due to bacterial contamination, the entire region is presently closed to the recreational or commercial harvest of shellfish. However, Cooper's Cove Oyster Farm, which is licenced to dig the beaches in the inlet because it operates a depuration plant, hauls approximately 180,000 lbs of clams from regional beaches per year (Ed Helgesen, Cooper's Cove Oyster Farms, pers.comm.). Roughly one quarter of this quota is harvested from the Sooke River Estuary.

Oyster production occurs as longline and off-bottom culture within designated leases in Anderson Cove and Sooke River Estuary. The intertidal zone between Wright Road and Possession Point at one time also supported a considerable oyster population (Sooke Harbour and Basin Crown Foreshore Plan, 1980), although at present very few individuals can be found on these beaches .

Several species of crab occupy diverse niches in the harbour and basin: shore crabs (Hemigrapsus nudus) inhabit the intertidal zone of rocky beaches; kelp crabs (Pugettia producta) are often found clinging to eelgrass and other large algae as well as to wooden structures such as pilings and docks; scattered individual red rock crabs (Cancer productus) occupy subtidal sandflats, and were not observed foraging on their typical rocky substrates: and helmet crabs (Telmessus cheiragonus) roam under large, subtidal seaweeds. However, the most abundant crustacean in the study area is the dungeness crab (Cancer magister), which utilizes virtually every substrate of the shoreline. Larger or breeding dungeness inhabit the silty bottom of deeper waters or often conceal themselves in dense eelgrass or kelp beds. Juvenile dungeness dwell in shallower waters, utilizing both bedrock crevices and sandy beaches.

Although the use of Sooke Inlet by commercial and recreational crab fishermen is not well documented, in the 1991 field season fisheries personnel recorded numerous crab pots in the area, indicating the harbour supports a valuable crab fishery.

3.2.4 Other Invertebrates

A variety of invertebrates other than shellfish and crustaceans inhabit Sooke Harbour and Basin. Plumose anemones, tunicates, sea cucumbers, barnacles, and several species of sea stars were observed during the study. For a more detailed record of the local invertebrates see Appendix I.

3.2.5 Salmon

Sooke River and its tributaries, and the other small streams entering Sooke Basin, provide spawning grounds for chum, chinook and coho salmon. The average recent (1984 - 1988) escapement for Sooke River and for Ayum, De Mamiel, and Lannon Creeks, are given below . A summary of the escapements, recorded since 1953, is given in Appendix II.

	Sooke	Ayum	De Mamiel	Lannon
Chum	34,400	1,141	13,976	
Chinook	282			
Coho	34	5	3,617	4

Rearing and migrating salmon also utilize the Inlet. During estuarine residency, juvenile chum, coho and chinook salmon feed extensively and in some instances, exclusively, upon invertebrates and larval fishes which are indigenous to the area.

In addition, steelhead and sea-run cutthroat trout, which mature in the ocean and spawn in fresh water, are also found in this system. Steelhead from Ayum Creek, De Mamiel Creek and Sooke River, utilize the basin and harbour mainly in April, May and June, both as adults returning to spawn and smolts heading out to the ocean. Cutthroat trout from De Mamiel Creek are present between April and October feeding over cobble beaches where submerged vegetation affords cover and food (Department of Fisheries and Oceans, 1987).

3.2.6 Herring

Utilization of the study area by spawning herring has been documented since 1937 (Hay et al., 1989). Sporadic, minor spawnings occurred along the south shore of Sooke Basin and Anderson Inlet between 1950 and 1970. Spawns have begun as early as March 20 and ended as late as April 26, and occur for an average duration of 8 days (Hourston, 1980). Although no spawns have been recorded in recent years, abundant juvenile herring were observed in Anderson Cove during the 1991 field season. Aquatic vegetation is abundant in the Inlet, and sufficient to support large herring spawns in future years.

4.0 DISCUSSION

4.1 Foreshore Utilization

Figure 6 shows foreshore lease and license locations within Sooke Inlet, as well as the position of recent foreshore applications. Of the 80 currently active leases and licenses, 2 are used for log storage or handling, 7 are used for commercial wharves or marinas, 5 are general commercial leases, 3 are classified as parks or reserves, 3 are used for aquaculture, 4 are used for miscellaneous purposes, and the remainder are designated for private moorage. Note that foreshore development is concentrated along the harbour and the seaward end of the basin, where important fish and shellfish habitats prevail. A complete list of the foreshore leases, licenses and applications and their designations is given in Appendix II. In addition to those foreshore developments which have been approved by the Ministry of Lands and Parks, a large log storage facility at the entrance to Cooper's Cove and several unregistered docks exist.

4.2 Habitat Evaluation

As noted previously, Sooke Harbour, with the exception of the two navigational channels, is extremely shallow. This shallowness, combined with the gravel/mud substrates which are predominant along the sill, and the excellent circulation in the harbour, provide conditions suitable for extensive vegetative growth.

The mature stands of eelgrass found in the harbour and northwest basin are an extremely important component of the marine ecosystem: they provide excellent shelter and substrate for fish prey items; they contribute spawning areas for herring; and they are utilized extensively as resting, feeding and mating areas by many fish and shellfish species. Large kelps and brown algae (eg. Nereocystis and Laminaria) are often found in association with the eelgrass beds, and also provide significant shelter and herring spawn substrate.

The tidal flats in the coves of Sooke Basin have similar characteristics, but support relatively small stands of eelgrass. However, the mud and coarse gravel subtrates of the coves have been shown to contain a wide variety of fish diet items. The other kelps and algaes identified in the vegetation survey also contribute valuable fish habitat, particularly when large enough to protect

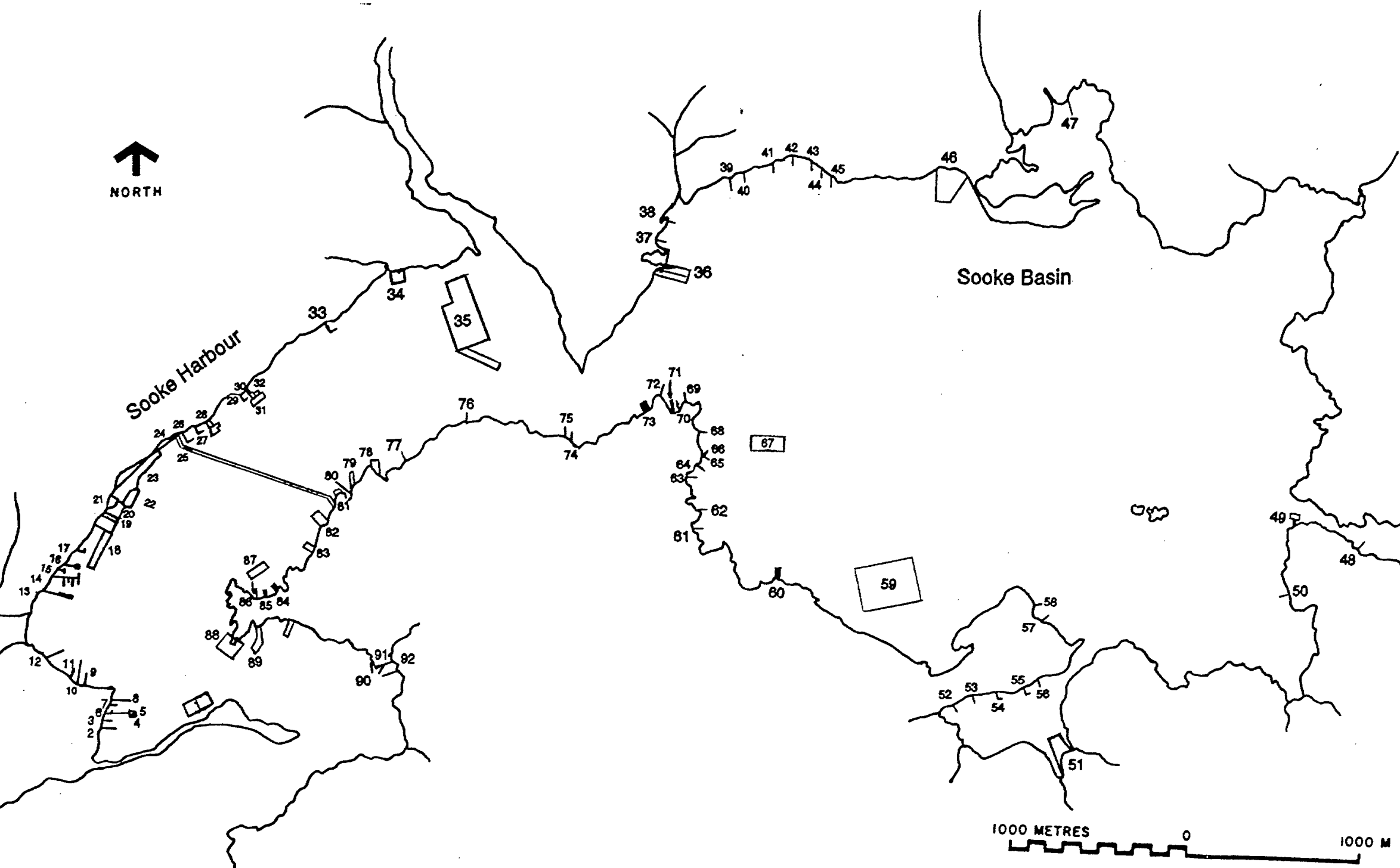

Figure 6: Foreshore leases, licenses and applications

small fish from predators and to provide spawning substrate for herring. Mature stands of vegetation often inhabit the small pocket beaches which are found among the bedrock cliffs in the basin. These areas are vital for they are utilized extensively by fish as refuges.

Yet another function of aquatic vegetation in the marine ecosystem is their contribution to the detrital food chain. As seaweeds decompose on the inlet bottom, they provide an organic food source for plants and animals at the bottom of the food chain (eg. bacteria, small invertebrates, etc.).

5.0 RECOMMENDATIONS

Several measures should be taken to protect and maintain the existing valuable fish habitats in the study area:

1/ Leasing/licensing of dock and marina construction should be strictly controlled and reviewed according to the Department of Fisheries and Oceans Policy for the Management of Fish Habitat.

2/ Upland uses should be compatible with foreshore designations, since land-based and marine activities are necessarily interrelated.

3/ Since the marine environment and the fish habitats which it provides are constantly changing, new applications for foreshore leases must be subject to review on an individual basis to ensure compliance with DFO policy.

4/ Extremely sensitive and valuable fish habitats such as the entire harbour (especially the Sooke River Estuary), Cooper's Cove Estuary, and the scattered tidal flats throughout Sooke Inlet, should be protected from certain forms of development (industrial, manufacturing, etc.) deemed detrimental to the fisheries resource.

5/Less sensitive areas, such as the bedrock shoreline of the northeast basin, comprise less productive fish habitats and may be more suitable for future development. The intertidal zones associated with these areas are steep, the adjacent waters are deep, and important fish habitat is not abundant. However, these less sensitive areas are often adjacent to or associated with sand/gravel pocket beaches which provide valuable fish habitats. Therefore, while the structures built to accommodate development in less productive areas may not directly damage adjacent prime fish

habitat areas, construction and maintenance activities at the development site may have some negative consequences (eg. machinery operation, waste disposal, etc. may negatively effect functioning of fish habitats). Accordingly, development in less sensitive areas of the basin should still be subject to DFO scrutiny and may be subject to mitigation and/or compensation provisions.

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APPENDIX 1. MARINE FORESHORE HABITAT DESCRIPTIONS

REACH	LENGTH (M)	ZONE	PHYSICAL CHARACTERISTICS	BIOLOGICAL CHARACTERISTICS
1	600	BACKSHORE	sand/dirt bank 45 slope	mixed sea grasses, barley, fir and broom undergrowth
		INTERTIDAL ZONE	sand and gravel beach 15 slope	VEGETATION dense Ulva between 0.4 and 2.0 m above chart datum sparse Enteromorpha between 0.3 and 1.5 m
				INVERTEBRATES little neck and manilla clams, dense to moderate throughout short spined stars shore crabs
				FINFISH/BIRDS sticklebacks pricklebacks blue heron
		SUBTIDAL ZONE	silt bottom 3 slope	VEGETATION thin, dense band of eelgrass, 0.2 to -2.8 m moderate nereocystis lining below, -1.5 to -3.5
				INVERTEBRATES large dungeness crabs leather and short-spined stars
				FINFISH/BIRDS cormorants pricklebacks rockfish and kelp greenling

REACH	LENGTH (M)	ZONE	PHYSICAL CHARACTERISTICS	BIOLOGICAL CHARACTERISTICS
2	1250 m	B	dirt bank with scattered cement walls dense underbrush	Alder underbrush
		I	mud and gravel beach in upper intertidal, with mud/silt only below	V dense Ulva covers mid intertidal, 0.2 to 2.8 m moderate Enteromorpha forms mats with Ulva in lower portion of range
				I sparse immature dungeness crabs; moderate helmit crabs; abundant kelp crabs sparse mussels on scattered rocks in high intertidal manilla and little neck clams sparse in upper intertidal
				F pile, shiner and striped perch near docks unidentified flat fish abundant on sandy areas pacific pricklebacks and sculpins also abundant; juvenile salmonid; blue heron
		S	silt bottom 3 slope	V large, dense eelgrass bed, 0.1 to -2.0 m thin, dense kelp bed lining the offshore extreme of the eelgrass bed,-2.0 to -2.7 m moderate foliose reds on scattered rocks within eelgrass
				I hermit, helmit and dungeness crabs large short spined and sunflower stars
				F trout species kelp greenling striped and pile perch; brandt cormorants

REACH	LENGTH (M)	ZONE	PHYSICAL CHARACTERISTICS	BIOLOGICAL CHARACTERISTICS
3	900	B	dirt and log cliff 70 slope	fir, alder, arbutus
		I	cobble and sand beach in high intertidal muddy beach below; 15 slope	V dense Ulva, 0.2 to 2.9 m above chart datum moderate Enteromorpha interspersed with Ulva, 0.6 to 1.3 m
				I few immature dungeness crabs, mussels sparse in high intertidal; little neck and soft shell clams barnacles
				F pacific snake pricklebacks, unidentified juvenile flatfish blue heron
		S	silt/mud bottom 3 slope	V no vegetation until the center of the harbour, where large eelgrass bed dominates (see figure 6)
				I plumose anemones on wooden structures, moderate adult dungeness crabs large short spined and sunflower stars
				F abundant pacific sneke pricklebacks and unidentified flat fish near shore kelp greenling, pile and striped perch toward center of harbour coonstripe shrimp

REACH	LENGTH (M)	ZONE	PHYSICAL CHARACTERISTICS	BIOLOGICAL CHARACTERISTICS
4	1060	B	dirt and log bank, with scattered cement walls 50 to 90 slope	alders, arbutus and douglas fir
		I	mud beach 5 slope	V dense Ulva, 0.5 to 2.5 m moderate Enteromorpha, 0.9 to 1.7 m dense Laminaria and Nereocystis bed in harbour center
				I numerous dungeness and sparse red rock crabs mussels in high intertidal moderate little neck and sparse manila clams
				F pacific snake pricklebacks unidentified juvenile stamonid striped perch; sculpins
		S	silt bottom 2 slope	V dense eelgrass beds, 0.3 to -3.2, stretches nearly the entire width of harbour moderate foliose reds and greens
				I numerous adult and juvenile dungeness crabs; short spined stars; helmit crabs california sea cucumbers
				F numerous unidentified fish striped perch

REACH	LENGTH (M)	ZONE	PHYSICAL CHARACTERISTICS	BIOLOGICAL CHARACTERISTICS
5	200	B	estuary covered with oyster shells	no vegetation oyster lease
		I	sand and cobble beach partially covered with shells in high intertidal zone 10 slope	V dense Ulva, 0.2 to 2.1 m sparse Enteromorpha, 0.6 to 1.2 m sparse Laminaria, 0.4 to 0.0 m
				I small, scattered oysters dense - moderate little neck and manila clams soft shell clams and butter clams sparse
				F school of larval shrimp sculpins, flatfish blue heron
		S	sand and silt bottom 2 slope	V dense eelgrass bed, 0.0 to -2.0 m dense Laminaria, 0.0 to -0.9
				I coonstripe shrimp sparse red rock crab abundant dungeness crab
				F juvenile salmonids shiner and juvenile striped perch

REACH	LENGTH (M)	ZONE	PHYSICAL CHARACTERISTICS	BIOLOGICAL CHARACTERISTICS
6	1100	B	sand dune and sand and cobble estuary 2 - 6 slope	tidal marsh Salicornia dense, broom, barley; above are deciduoe trees and Cedar
		I	sand, silt and cobble estuary 1 slope	V Ulva in dense mats, 0.6 to 2.5 m sparse Enteromorpha found between 0.4 and 1.5 m dense Fucus band from 2.3 to 2.9 m
				I dense clam bed little neck clams most abundant; manilla clams moderate; soft shell, horse and butter clams sparse; short spined stars; dungeness crabs
				F pacific snake pricklebacks, sculpins and unidentified flounder abundant juvenile chum salmon; juvenile herring blue heron and 6 oyster catchers
		S	sand and silt bottom 2 slope	V Dense eelgrass bed, 0.0 to -1.9 m moderate foliose reds Laminaria and Nereocystis line the eelgrass bed
				I red rock and dungeness crabs horse, little neck and manilla clams shot spined stars
				F pacific snake pricklebacks flat fish kelp greenling; striped perch

REACH	LENGTH (M)	ZONE	PHYSICAL CHARACTERISTICS	BIOLOGICAL CHARACTERISTICS
7	650	B	sand dune/dirt bank for 600 m, 60 slope log fence for 50 m, 90 slope	moderate Salicornia; barley; sea grasses; shrubs; brush sedge
		I	sand and gravel beach turning to silt at low intertidal zone 10 slope	V sparse Enteromorpha, 0.4 to 1.2 m sparse Fucus patches on cobble
				I dense little neck clams; moderate manila clams; sparse soft shell and butter clams dense patches of mussels in mid-high intertidal zone
				F shiner perch juvenile herring and coho salmon blue heron
		S	silt bottom with sparse boulders 27 slope	V dense eelgrass, 0.1 to - 3.5 m sparse Sargassum on boulders, about 0.0 m moderate foliose reds, 0.0 to -0.7 m
				I short spined and sunflower stars abundant dungeness crabs sparse red rock crabs
				F kelp greenling striped perch harbour seal

REACH	LENGTH (M)	ZONE	PHYSICAL CHARACTERISTICS	BIOLOGICAL CHARACTERISTICS
8	150	B	log/dirt bank, 25m; dock and wooden shelter, 75m; boulder bank, 50m	sparse Salicornia and grasses,douglas fir, 25m; no vegetation, 75m; sparse shrubs and underbrush, 50m
		I	coarse sand beach with moderate gravel and cobble (delta-like material) 10 slope	V moderate Enteromorpha 1.0 to 1.5m no vegetation under dock Fucus on wooden structures at high water line
				I moderate little neck and manilla clams, except under dock area sparse soft shell and butter clams short spined stars and dungeness crabs
				F juvenile starry flounder
		S	silt bottom with scattered boulders 20 slope	V moderate eelgrass, -1.2 to -3.5m less abundant directly in front of dock
				I plumose anemones abundant on pilings and dock barnacles and kelp crabs inhabit dock and pilings sunflower, short spine and leather stars; moderate dungeness throughout
				F shiner, striped and pile perch - shiner in shallower waters kelp greenling

REACH	LENGTH (M)	ZONE	PHYSICAL CHARACTERISTICS	BIOLOGICAL CHARACTERISTICS
9	150	B	cement wall 10 ft above high water line sand, silt and cobble beach between high water line (3.1) m and cement wall	Salicornia barley and various grasses swans, ducks and brandt
		I	beach of coarse sand, gravel and cobble 15 slope	V sparse Enteromorpha 0.9 to 1.5m
				I moderate little neck clams manila, soft shell, and bent nose clams sparse shore, hermit, and dungeness crabs
				F juvenile starry flounder juvenile salmonid
		S	silt bottom with sparse boulders 2 to 5 slope	V dense eelgrass, 0.1 to -2.5m sparse Sargassum on boulders, 0.1m
				I dungeness crabs abundant throughout short spined stars
				F pacific snake pricklebacks shiner perch striped perch in deeper water

REACH	LENGTH (M)	ZONE	PHYSICAL CHARACTERISTICS	BIOLOGICAL CHARACTERISTICS
10	125	B	small estuary silt/gravel shore, with dirt bank	Salicornia, douglas fir, broom, various sea grasses swans, seagulls, and merganzers
		I	silt and gravel beahc/bar 2 slope	V moderate Enteromorpha, 0.5 to 1.5m moderate foliose greens, 0.0 to 0.7m
				I moderate manila and little neck clams snails; short spine stars shore and hermit crabs
				F juvenile starry flounders juvenile herring
		S	silt and mud bottom with scattered boulders 5 slope	V dense eelgrass, -0.2 to -3.2 m sparse Sargassum on scattered boulders
				I short spine and leather stars juvenile dungeness abundant throughout
				F abundant striped perch

REACH	LENGTH (M)	ZONE	PHYSICAL CHARACTERISTICS	BIOLOGICAL CHARACTERISTICS
11	1200	B	cement wall, 50m; dirt banks with scattered boulders and logs	dense douglas fir arbutus, alder
		I	beach of gravel, cobble and boulders overlying sand/silt 15 slope	V moderate Fucus, 2.0 to 3.2 m moderate Enteromorpha, 0.7 to 1.7 m
				I shore crabs; nematodes; isopods ochre and short spine stars unidentified juvenile clams, and moderate native little neck clams
				F sculpins; starry flounder pacific snake pricklebacks; sticklebacks; shiner perch juvenile herring and salmonids
		S	silt with cobble and boulders 5 slope	V dense eelgrass, -0.5 to -3.5 m sparse Sargassum on boulders sparse foliosa reds and greens
				I sparse dungeness and moderate helmet and hermit crabs snails and barnacles short spine stars
				F pacific snake pricklebacks unidentified rock fish; kelp greenling; blackeye goby merganzers

REACH	LENGTH (M)	ZONE	PHYSICAL CHARACTERISTICS	BIOLOGICAL CHARACTERISTICS
12	60	B	small dirt bank (erosion), with logs protecting it	Arbutus, Maple and abundant variety of conifers
		I	silt/mud tidal flat 2 slope	V dense Enteromorpha, 0.7 to 1.6 m dense filamentous greens, 1.0 to 2.1 m
				I sparse native little neck clams shore and kelp crabs
				F sculpins chum fry shiner perch
		S	silt/mud bottom with scattered boulders 4 slope	V very dense eelgrass, -0.3 to - 3.5 m moderate foliose reds moderate Sargassum, 0.2
				I dungeness, hermit and helmit crabs short spine stars california sea cucumber
				F black eye goby kelp greenling shiner, pile and striped perch

REACH	LENGTH (M)	ZONE	PHYSICAL CHARACTERISTICS	BIOLOGICAL CHARACTERISTICS
13	70	B	70 boulder cliff, 25m; wood dock and cement loading ramp, 20m; dirt bank/mud beach, 25m	deciduous trees and shrubs mixed with cedar and douglas fir, 25m; no vegetation, 20m; grasses and salicornia, 25m
		I	sobbla and mud beach with log dock and breakwater; wood debris and metal scraps throughout; occasional boulders in lower intertidal	V sparse Enteromorpha, 0.9 to 1.6 m filamentous greens abundant except under docks Fucus on docks at high water line
				I mussels abundant at high water line on wooden structures kelp crabs clinging to docks; dungeness crabs moderate in deeper areas chitons also inhabiting docks; short spine stars
				F sculpins shiner and pile perch school of juvenile salmonids
		S	silt/mud beach with boulders 20 slope	V sparse eelgrass, -2.0 to -3.1 m sparse Sargassum on boulders
				I sparse, small dungeness crabs plumose anemones abundant on docks short spine stars; sparse juvenile clams
				F sculpins few striped and pile perch resident harbour seal

REACH	LENGTH (M)	ZONE	PHYSICAL CHARACTERISTICS	BIOLOGICAL CHARACTERISTICS
14	400	B	wood fence, 75m; boulder and dirt bank periodically covered with logs, 325 m;	sparse grasses, scattered Salicornia and conifers, 75 m remainder is more densely vegetated with same species
		I	silt/mud tidal flat, 10 slope, 50m remainder of beach is mainly gravel and cobble overlying mud scattered boulders more abundant at tip	V thin, dense Fucus line, 2.6 to 2.9m dense Enteromorpha, 0.2 to 1.7 m I short spine stars sparse manila and little neck clams moderate dungeness crabs F schools of coho fry sculpins; sticklebacks shiner perch
		S	silt/mud bottom with occasional large boulders 5 slope	V dense eelgrass, 0.0 to -3.5 m moderate Sargassum on boulders, 0.0 m I leather and short spine stars abundant dungeness and helmet crabs scarse red rock crabs F striped perch kelp greenling pacific snake pricklebacks

REACH	LENGTH (M)	ZONE	PHYSICAL CHARACTERISTICS	BIOLOGICAL CHARACTERISTICS
16	426	B	dirt cliff 15 to 20 ft high	conifers above and shrubs on and below cliff bank deer observed among shrubs
		I	beach mainly composed of cobble and boulders on mud 3 slope	V thin, sparse Fucus line, 2.8 to 3.1 m dense Enteromorpha, 0.2 to 1.6 m moderate filamentous greens, high intertidal
				I barnacles; little neck and soft shell clams, sparse short spined and ochre stars dungeness and hermit crabs
				F juvenile perch sculpins; sticklebacks juvenile herring
		S	silt/mud bottom with occasional boulders 5 slope	V dense eelgrass, -0.6 to -3.6 m dense Sargassum on rocks, 0.4 m
				I leather and sunflower stars dungeness crabs abundant coonstripe shrimp and california sea cucumber deeper
				F abundant striped perch and kelp greenling black eye goby

REACH	LENGTH (M)	ZONE	PHYSICAL CHARACTERISTICS	BIOLOGICAL CHARACTERISTICS
16	50	B	dirt and boulder bank 65 slope	cedar, maple and arbutus blackberries and a variety of other shrubs
		I	sand and cobble beach 15 slope	V moderate Enteromorpha, 0.5 to 1.7 m young Fucus line, 2.5 m
				I dungeness and shore crabs short spine stars sparse native little neck clams
				F sculpins numerous juvenile fish - coho, herring, shiner perch
		S	silt bottom with scattered boulders, 5 slope wood pilings	V dense eelgrass, 0.0 to -3.5 m moderate Sargassum on boulders
				I sunflower and short spine stars dungeness and sparse red rock crabs
				F abundant striped perch

REACH	LENGTH (M)	ZONE	PHYSICAL CHARACTERISTICS	BIOLOGICAL CHARACTERISTICS
17	200	B	sheet piling 90 slope	no vegetation
		I	sheet piling 90 slope	V moderate Enteromorpha, 1.5 to 1.7 m
				I hermit crabs barnacles
				F none observed
		S	sheet piling to -3.0 m, with silt below 90 to 60 slope; dense wood debris	V no vegetation
				I california sea cucumber sunflowar and short spine star plumose anemones on wood waste
				F harbour seal, 100m off shore pacific snake pricklebacks

REACH	LENGTH (M)	ZONE	PHYSICAL CHARACTERISTICS	BIOLOGICAL CHARACTERISTICS
18	200	B	sheet pilings 90 slope	sparse shrubs
		I	sheet pilings,90 slope booms and 3 long docks	V sparse Fucus on pilins and docks, 3.0 m sparse Enteromorpha on sheet pilling, 1.0 m
				I hermit crabs
				F none observed
		S	sheet pilings to -2.0 m, 90 slope silt bottom below; abundant wood debris	V no vegetation
				I moderate plumose anemones
				F pile perch

REACH	LENGTH (M)	ZONE	PHYSICAL CHARACTERISTICS	BIOLOGICAL CHARACTERISTICS
19	200	B	dirt/sand bank with scattered wood waste 10 slope	small cedars, numerous shrubs kingfishers
		I	sand and cobble beach/bank 30 slope	V nearly barren sparse Enteromorpha, 0.4 to 1.0 m
				I sparse little neck clams
				F sculpins
		S	silt bottom with scattered cobble dead clam shells moderate throughout	V no vegetation
				I sparse burrowing (horse?) clams
				F sculpins

REACH	LENGTH (M)	ZONE	PHYSICAL CHARACTERISTICS	BIOLOGICAL CHARACTERISTICS
20	350	B	silt/mud and gravel estuary 1 slope	Salicornia, dense grasses and broom hawk
		I	silt and gravel estuary 1 slope	V moderate Enteromorpha, 0.4 to 1.5 m sparse Ulva, 1.5 to 2.0
				I ochre star; dense little neck clams; moderate juvenile clams sand shrimp; immature dungeness crabs shore and hermit crabs
				F sculpins coho or chum fry blue heron
		S	silt bottom, with wood debris at southern portion, 5 slope	V dense eelgrass, - 0.5 to -2.0 m sparse foliose green algae
				I short spine stars larger dungeness california sea cucumber
				F shiner perch black eye goby resident harbour seal

REACH	LENGTH (M)	ZONE	PHYSICAL CHARACTERISTICS	BIOLOGICAL CHARACTERISTICS
21		B		
		I		V
				I
				F
		S		V
				I
				F

REACH	LENGTH (M)	ZONE	PHYSICAL CHARACTERISTICS	BIOLOGICAL CHARACTERISTICS
22	300	B	bedrock cliff 85 slope	maples, arbutus, dense conifers and sparse shrubs deer observed
		I	coarse sand beach with scattered cobble, 10 slope	V no vegetation
				I little neck and manila clams, moderate shore crabs short spine stars
				F sculpins
		S	silt and sand bottom, with scattered boulders	V sparse Sargassum on boulders moderate eelgrass, -1.0 to -2.0 m
				I short spine stars coonstripe shrimp dungeness crabs
				F shiner perch sticklebacks coho fry

REACH	LENGTH (M)	ZONE	PHYSICAL CHARACTERISTICS	BIOLOGICAL CHARACTERISTICS
23	200	B	bedrock cliff, 75 slope 25 m rock slide1	arbutus, conifers, numerous shrubs
		I	bedrock cliff to -3.0 m	V mossy brown algae at high water line Leathesia among high moss-like algae Enteromorpha, 1.0 to 1.7 m
				I ochre, short spine and sunflower stars baby dungeness
				F no fish observed
		S	silt bottom below bedrock cliff some wood debris on southern portion	V moderate Sargassum on hard surfaces in higher subtidal
				I dungeness crabs; coonstripe shrimp on woody debris california sea cucumber horse clams
				F no fish observed

REACH	LENGTH (M)	ZONE	PHYSICAL CHARACTERISTICS	BIOLOGICAL CHARACTERISTICS
24	100	B	dirt bank and bedrock cliff 80 angle	dense arbutus moderate doublas fir
		I	boulders and bedrock outcropping on a sandy bottom 10 slope	V sparse Enteromorpha on sand, 1.1 to 1.4 m dense line of Enteromorpha forms line at same height on bedrock
				I ochre and short spine stars hermit and kelp crabs
				F sticklebacks sculpins
		S	silt bottom with scattered wood debris	V sparse Sargassum on hard surfaces like wood and bedrock sparse foliose reds no vegetation on sand
				I plumose anemones on wood coonstripe shrimp; horse clams california sea cucumbers; sparse dungeness crabs
				F black eye goby

REACH	LENGTH (M)	ZONE	PHYSICAL CHARACTERISTICS	BIOLOGICAL CHARACTERISTICS
25	650	B	bedrock cliff with wood debris scattered along entire reach	maples, arbutus, douglas fir and various shrubs
		I	bedrock cliff and platforms, with small, scattered, sandy pocket beaches	V moss-like brown algae at high tide line, with Leathesia interspersed filamentous greens and Enteromorpha form a line at 1.4 m
				I ochre and short spine stars horse clams
				F no fish observed
		S	bedrock cliff to -0.5 m at places; sand found below bedrock, and silt found below sand; abundant wood debris	V moderate Sargassum on scattered boulders in high subtidal
				I coonstripe shrimp red rock and dungeness crabs california sea cucumber
				F pacific snake pricklebacks black eye goby

REACH	LENGTH (M)	ZONE	PHYSICAL CHARACTERISTICS	BIOLOGICAL CHARACTERISTICS
26	425	B	bedrock cliff 85 slope	douglas fir scattered arbutus and spruce
		I	bedrock cliff, 75 slope very small sand pocket beaches	V sparse Ulva, 0.4 to 1.4 m; thin Enteromorpha at same height foliose reds, moderate in mid-high intertidal zone moss-like brown algae with Leathesia interspersed at high
				I ochre and short spine stars abundant immature dungeness crabs hermit crabs
				F schools of shiner perch 1 coho fry
		S	bedrock cliff to -6.0 m 75 slope silt bottom below	V encrusting corallines Sargassum on flatter bedrock in upper subtidal Porphyra
				I light bulb tunicates; sea cucumbers hundreds of small dungeness crabs and moderate large leather and sunflower stars; broad-based tunicates
				F pricklebacks

REACH	LENGTH (M)	ZONE	PHYSICAL CHARACTERISTICS	BIOLOGICAL CHARACTERISTICS
27	75	B	bedrock and dirt cliff 75 slope	arbutus dominant deer observed
		I	sand and cobble beach 10 slope	V no vegetation
				I coonstripe shrimp little neck and horse clams
				F unidentified flounder sculpins
		S	silt bottom with some wood debris and large logs 10 slope	V sparse Sargassum on logs in upper subtidal
				I california sea cucumbers sparse dungeness crabs coonstripe shrimp hidden in log crevaces
				F no fish observed

REACH	LENGTH (M)	ZONE	PHYSICAL CHARACTERISTICS	BIOLOGICAL CHARACTERISTICS
28	300	B	bedrock cliff 80 slope	arbutus dominant interspersed with conifers and shrubs
		I	bedrock cliff to 0.0 m scattered small sandy areas	V moss-like brown algae and Leathesia at high water line Enteromorpha dense below, 1.0 to 1.7 m
				I sparse little neck clams in sandy areas shore and hermit crabs
			silt bottom with small bedrock outcropping and scattered logs	F black eye goby juvenile herring
		S		V no vegetation
				I smaller dungeness, moderate coonstripe shrimp, sparse on and in logs
				F pricklebacks

REACH	LENGTH (M)	ZONE	PHYSICAL CHARACTERISTICS	BIOLOGICAL CHARACTERISTICS
29	350	B	bedrock cliff 45 to 75 slopes	arbutus, douglas fir, spruce and alder
		I	gravel/sand beach with bedrock outcroppings	V moderate Ulva, 0.8 to 2.7 m Enteromorpha, 0.5 to 1.0 m Fucus, 2.8 to 3.2 m
				I little neck and manila clams moderate shore crabs ochre and short spine stars
				F shiner perch numerous coho fry
		S	silt bottom with cobble and scattered boulders 5 slope	V moderate Sargassum on boulders
				I juvenile dungeness crabs sun, sunflower and short spine stars
				F large, unidentified rock fish

REACH	LENGTH (M)	ZONE	PHYSICAL CHARACTERISTICS	BIOLOGICAL CHARACTERISTICS
30	250	B	outlet of Vetch Ck.;bedrock and dirt banks; log debris	dense trees and shrubs patch of dry grasses and flowering plants
		I	sand/gravel tidal flat, 2 slope bedrock bank on both sides of flat	V Fucus on bedrock, 2.0 to 3.0 m Enteromorpha on sand and bedrock, 1.3 to 1.7
				I short spine star shore and hermit crabs
				F sculpins sticklebacks juvenile salmon
		S	silt bottom with occasional boulders	V moderate Sargassum on boulders, in upper subtidal
				I coonstripe shrimp dungeness crabs
				F juvenile starry flounder

REACH	LENGTH (M)	ZONE	PHYSICAL CHARACTERISTICS	BIOLOGICAL CHARACTERISTICS
31	1200	B	bedrock cliff 60 slope	douglas fir alder, maple, arbutus
		I	bedrock cliff to -0.5 m, with few small pocket beaches interspersed	V dense Fucus, 2.0 to 3.3 m dense Enteromorpha, 1.1 to 1.7 m
				I barnacles, moderate dungeness crabs hermit crabs ochre and short spine stars
				F shiner perch tube snout; kelp greenling
		S	silt bottom below bedrock cliff 25 to 45 slope	V moderate foliose reds and greens at high subtidal moderate Sargassum on boulders in high subtidal
				I plumose anemones sun, sunflower and short spine stars broad-based tunicates; abundant dungeness
				F gunnel sculpin-like ground fish kelp greenling

REACH	LENGTH (M)	ZONE	PHYSICAL CHARACTERISTICS	BIOLOGICAL CHARACTERISTICS
32	100	B	dirt bank, bordered by bedrock on both sides	scattered douglas fir and spruce
			sand, gravel and cobble beach 3 slope	V sparse Enteromorpha, 1.1 to 1.7 m sparse Fucus, 1.7 to 2.9 m
		I	bedrock outcropping on south edge	I barnacles sparse dungeness crabs moderate little neck and sparse manilla and bent nose clams
				F sculpins unidentified flounder juvenile salmonid
			sand and silt bottom with an occasional boulder 1	V sparse Sargassum sparse foliose reds and greens
		S		I short spine stars horse clams
				F no fish observed

REACH	LENGTH (M)	ZONE	PHYSICAL CHARACTERISTICS	BIOLOGICAL CHARACTERISTICS
33	700	B	bedrock cliff 30 slope	dense douglas fir deer observed
		I	bedrock cliff to -2.0 m 80 slope	V dense Fucus, 1.7 to 2.8 m dense Enteromorpha, 1.2 to 1.7 m
				I barnacles; ochre stars; numerous small dungeness snails; hermit crabs
				F gunnel
		S	silt bottom below bedrock cliff 45 slope	V follose reds and greens, moderate sparse Sargassum on boulders, 0.0 m
				I larger dungeness sunflower, sun and leather stars broad-based and light bulb tunicates
				F sculpin-like groundfish

REACH	LENGTH (M)	ZONE	PHYSICAL CHARACTERISTICS	BIOLOGICAL CHARACTERISTICS
34	700	B	bedrock cliff 70 slope	douglas fir, arbutus, alder and maples abundant
		I	bedrock cliff to 0.8 m sand and gravel beach below	V sparse foliose reds on bedrock cliffs moderate Fucus line on bedrock, 2.0 to 3.0 m
				I dungeness, kelp and abundant hermit crabs barnacles; little neck and unidentified juvenile clams; moderate; ochre stars; short spine stars
				F none observed
		S	silt bottom 1 to 3 slope	V moderate eelgrass, 0.2 to -2.0 m
				I dungeness crabs
				F kelp greenling tube snout

REACH	LENGTH (M)	ZONE	PHYSICAL CHARACTERISTICS	BIOLOGICAL CHARACTERISTICS
35	150	B	cobble beach with bedrock outcropping; 10 slope	arbutus, dense fir, cedar, alder
		I	cobble, sand and gravel beach 2 to 5 slope estuarine environment	V sparse Enteromorpha, 1.1 to 1.5 m
				I shore crabs nematodes; short spine star scattered individual juvenile clams
				F sculpin school of juvenile fish sticklebacks
		S	silt and sand bottom with one islet 1 slope	V moderate eelgrass, -0.1 to -2.0 m moderate foliose reds on any rock substrate sparse Sargassum on high subtidal rocks
				I juvenile dungeness crabs
				F gunnel sculpins shiner perch

REACH	LENGTH (M)	ZONE	PHYSICAL CHARACTERISTICS	BIOLOGICAL CHARACTERISTICS
36	700	B	bedrock cliff 70 slope	douglas fir dominant; arbutus, blackberries, ferns and abundant underbrush
		I	bedrock cliff to 0.2 m 70 slope	V sparse Fucus line, 2.9 m moss-like brown algae interspersed with Leathesia
				I ochre and short spine stars hermit and kelp crabs sparse juvenile clams in soft beach substrate
				F none observed
		S	sand/silt beach with scattered cobbles	V moderate eelgrass, 0.0 to 2.5 m moderate foliose reds, sparse foliose greens
				I larger dungeness short spine star burrowing clam
				F black eye goby

REACH	LENGTH (M)	ZONE	PHYSICAL CHARACTERISTICS	BIOLOGICAL CHARACTERISTICS
37	550	B	bedrock cliff 75 slope	dense douglas fir scattered arbutus and maple
		I	bedrock cliff with small, scattered, sandy pocket beaches 5 to 75 slope	V dense Fucus line, 2.0 to 3.3 m dense enteromorpha below, 1.0 to 1.7 m
				I short spine stars on sand; ochres on bedrock hermit crabs juvenile dungeness crabs
				F black eye goby
		S	bedrock cliff to -7.0 m at points, with sand and silt below and on flatter beach surfaces 45 slope	V foliose reds, moderate foliose greens, dense
				I sunflower and sun stars broad-based tunicates larger dungeness crab; california sea cucumber
				F unidentified rock fish

REACH	LENGTH (M)	ZONE	PHYSICAL CHARACTERISTICS	BIOLOGICAL CHARACTERISTICS
38	50	B	dirt and bedrock bank 80 slope	douglas fir scattered alder and arbutus
		I	coarse sand and gravel beahc/bay 20 slope	V sparse Enteromorpha, 0.7 to 1.5 m
				I shore crabs short spine star; little neck clams nematodes
				F sculpins unidentified flounder small school of shiner perch
		S	silt bottom with one bedrock outcropping 15 slope	V foliose green algae, moderate
				I moderate dungeness crabs sunflower star california sea cucumber
				F unidentified rock fish

REACH	LENGTH (M)	ZONE	PHYSICAL CHARACTERISTICS	BIOLOGICAL CHARACTERISTICS
39	400	B	bedrock cliff 65 slope	dense douglas fir
		I	bedrock cliff/platform to -5.0 m at points 5 to 65 slope	V dense Fucus line, 1.7 to 3.3 m dense Enteromorpha, 0.6 to 1.7 m
				I ochre stars hermit and juvenile dungeness crabs
				F black eye goby
		S	silt with scattered bedrock/ boulders 10 slope	V Sargassum on boulders in high subtidal dense foliose greens throughout
				I sun, sunflower and leather stars broad-based tunicates few, large dungeness crabs
				F striped perch unidentified flat fish

REACH	LENGTH (M)	ZONE	PHYSICAL CHARACTERISTICS	BIOLOGICAL CHARACTERISTICS
40	150	B	dirt/bedrock bank 70 slope	dense douglas fir scattered cedar and arbutus
		I	beach of cobble and gravel over sand 10 slope small bedrock outcropping	V moderate Enteromorpha, 1.0 to 1.7 m moderate Fucus, 1.7 to 2.9 m
				I moderate mussels above Fucus barnacles; ochre and short spine stars juvenile dungeness crabs
				F school of shiner perch coho fry sculpins
		S	silt bottom with an occasional boulder 5 slope	V sparse Sargassum on boulders sparse foliose greens on boulders and sand
				I california sea cucumber sunflower star
				F unidentified large sculpin

REACH	LENGTH (M)	ZONE	PHYSICAL CHARACTERISTICS	BIOLOGICAL CHARACTERISTICS
41	1400	B	bedrock cliff 80 slope	douglas fir scattered arbutus and maple
		I	bedrock cliff with scattered sand/gravel pocket beaches from 3 to 80 slope	V dense Fucus, 2.0 to 3.5m dense Enteromorpha below, 0.8 to 1.7 m
				I juvenile dungeness crabs shore crabs; snails; ochre and short spine stars dense mussel bed above Fucus
				F black eye goby school of juvenile shiners school of unidentified fish larvae
		S	bedrock cliff to -5.0 m at points silt/sand below and surrounding bedrock	V moderate foliose greens and reds throughout sparse Sargassum on rocky surfaces
				I sunflower, leather, and sun stars broad-based tunicates california sea cucumbers
				F unknown flat fish (flounder?) striped perch

REACH	LENGTH (M)	ZONE	PHYSICAL CHARACTERISTICS	BIOLOGICAL CHARACTERISTICS
42	125	B	bedrock cliff 80 slope	dense cover of Douglas Fir, Alder, Cedar deer
		I		V dense Fucus, high dense Enteromorpha below to
				I shore crab; moderate ochre stars; butter clams, sparse; sparse short spined stars
				F none observed
		S	silt and cobble bottom to -2m 7 slope	V no vegetation
				I moderate horse clams sparse short spined stars
				F none observed

REACH	LENGTH (M)	ZONE	PHYSICAL CHARACTERISTICS	BIOLOGICAL CHARACTERISTICS
43	475	B	cobble and bedrock bank,250m, 10 slope; gravel and oyster shells,225	dense cover of fir, alder and cedar, where house is not erected
		I	sand and silt tidal flat 2 slope	V sparse Fucus, 2.0 to 3.1 m
				I mussels sparse in high intertidal dense oysters throughout
				F unidentified flounder school of juvenile herring sticklebacks; sculpins
		S	silt and sand bottom 2 slope	V sparse seigrass, 0.0 to -1.3 m sparse foliose greens
				I few immature dungeness crabs sparse oysters helmet crabs
				F shiner perch

REACH	LENGTH (M)	ZONE	PHYSICAL CHARACTERISTICS	BIOLOGICAL CHARACTERISTICS
44	200	B	bedrock cliff 90 slope	arbutus, cedar, alder and douglas fir
		I	bedrock cliff 85 slope	V sparse fucus, 2.8 to 3.1 m
				I hermit and kelp crabs ochre and false ochre stars
				F none observed
		S	sand and silt bottom with scattered cobble and boulders 2 slope	V sparse eelgrass, -0.2 to - 2.0 m Sargasssum, colonizing sparse boulders, 0.0 m
				I sparse juvenile dungeness crabs kelp crabs
				F sculpins unidentified flounder

REACH	LENGTH (M)	ZONE	PHYSICAL CHARACTERISTICS	BIOLOGICAL CHARACTERISTICS
45	500	B	sand/cobble beach with small bedrock platform; 6 slope	scattered Douglas Fir and Cedar
		I		V sparse Fucus between
				I mussels moderate on high intertidal rocky substrates; moderate native little neck clams; sparse manilla clams; shore crabs
				F sticklebacks sculpins abundant juvenile herring
		S		V sparse eelgrass,
				I sparse juvenile dungeness crabs kelp crabs clinging to eelgrass blades
				F sculpins shiner perch

REACH	LENGTH (M)	ZONE	PHYSICAL CHARACTERISTICS	BIOLOGICAL CHARACTERISTICS
46	550	B	bedrock cliff with 25 m pocket sand/gravel pocket beach; 70 to 10 slope	scattered Douglas Fir and Alder, with dense underbrush where houses aren't erected
		I	bedrock cliff extends to -1 m sand beach continues to subtidal	V patches of mederate Enteromorpha on bedrock, scattered patches of Fucus on docks and bedrock at high tide mark
				I hermit crabs foraging on bedrock; shore crabs on beach area; kelp crabs on wooden docks and pilings ochre stars on bedrock in high intertidal small patches of mussels; sparse native little neck clams
				F juvenile herring sculpins sticklebacks
		S	silt and sand bottom with few scattered boulders	V sparse japweed on boulders, sparse eelgrass, -0.6 to -1.2m
				I short spined stars unidentified burrowing clam
				F small unidentified sculpin-like fish pacific pricklebacks

REACH	LENGTH (M)	ZONE	PHYSICAL CHARACTERISTICS	BIOLOGICAL CHARACTERISTICS
47	125	B	Arbutus and Alder	
		I	gravel cobble beach with bedrock outcroppings 15 slope	V dense Fucus, moderate Eteromorpha,
				I abundant ochre stars on bedrock; dense line of mussels above and interspersed with Fucus; moderate butter clams; sparse dungeness crabs
				F none observed
		S	silt and sand bottom with few boulders 7 slope	V sparse japweed on boulders in high subtidal zone
				I unidentified burrowing clams
				F none observed

REACH	LENGTH (M)	ZONE	PHYSICAL CHARACTERISTICS	BIOLOGICAL CHARACTERISTICS
48	600	B	bedrock cliff with one main pocket beach, 5 to 80 slope	douglas fir and alder; arbutus blackberry bushes
		I	bedrock cliff and platform with one main, coarse sand/cobble pocket beach 2 to 70 slope	V moderate Fucus line, 1.7 to 3.1 m moderate Enteromorpha below, 1.1 to 1.7 m
				I short spine and ochre stars scattered individual little neck and manila clams sparse mussels at high tide line
				F none observed
		S	silt bottom with small bedrock outcroppings	V moderate Sargassum on rocky surfaces foliose reds and greens also moderate, but lower than Sargassum
				I sunflower and leather stars coonstripe shrimp; sea cucumbers broad-based and light bulb tunicates
				F striped perch kelp greenling

REACH	LENGTH (M)	ZONE	PHYSICAL CHARACTERISTICS	BIOLOGICAL CHARACTERISTICS
49	500	B	coarse sand and dirt bank 50 slope	arbutus, alder and various firs; blackberries deer observed
		I	coarse sand and gravel beach, with scattered cobble and boulders toward south end, 15 slope	V sparse Fucus on rocks, 2.5 to 3.1 m moderate Enteromorpha on sandy area, 0.9 to 1.8 m
				I little neck, butter and manila clams in clumps short spine stars; shore crabs
				F sculpins
		S	silt and sand bottom, with an occasional scattered boulder	V moderate Sargassum on rocks in higher subtidal
				I california sea cucumbers sunflower star one large dungeness crab
				F none observed

REACH	LENGTH (M)	ZONE	PHYSICAL CHARACTERISTICS	BIOLOGICAL CHARACTERISTICS
50	300	B	large tidal marsh/estuary rock pile in front of residence	douglas fir; arbutus; alder
		I	sand/gravel bars front marsh and tidal lagoons 1 slope scattered boulders	V sparse Fucus on rocks, 2.0 to 3.0 m sparse Enteromorpha on rocks and beach, 0.5 to 1.7 m
				I short spine and ochre stars (sparse) shore and sparse juvenile dungeness crabs sparse little neck clams
				F sculpins
		S	sand and silt bottom with scattered rocks	V sparse eelgrass, 0.0 to -0.5 m moderate Sargassum on rocks
				I abundant short spine stars unidentified burrowing clams
				F none observed

REACH	LENGTH (M)	ZONE	PHYSICAL CHARACTERISTICS	BIOLOGICAL CHARACTERISTICS
51	700	B	gravel/sand bank tree root bank for 25m	scattered spruce and douglas fir large opening with dried grasses
		I	tidal beach (sand and gravel)with an occasional bedrock/boulder outcropping 2 slope	V moderate Fucus on rocks, 1.7 to 3.3 m dense Enteromorpha below and on sand, 0.2 to 1.7 m moderate foliose greens
				I moderate mussel bed, high intertidal abundant short spine and sparse ochre stars sparse little neck and butter clams
				F sculpins sticklebacks
		S	silt and sand bottom 3 slope	V sparse eelgrass 0.0 to -1.0 m sparse Sargassum on rocks, 0.0
				I moderate dungeness short spine stars unidentified burrowing clams
				F none observed

REACH	LENGTH (M)	ZONE	PHYSICAL CHARACTERISTICS	BIOLOGICAL CHARACTERISTICS
52	1750	B	bedrock cliffs ranging from 0.6 to 25 m in height,50 to 85 slope	douglas fir, arbutus, maple, alder, cedar deer observed
		I	bedrock to 2.0 to -1.0 m numerous large gravel/sand pocket beaches	V dense Fucus, 1.7 to 3.5 m dense Enteromorpha, 0.2 to 1.7 m dense Ulva on rocks, 1.0 to 2.5 m
				I clumps of dense mussels at high water line;abundant ochre and short spine stars;moderate little neck and sparse manilla, butter and soft shell clams; shore and dungeness
				F shiner perch and juvenile coho near beached areas juvenile herring school
		S	silt bottom with occasional bedrock outcroppings	V foliose greens,dense, middle subtidal dense Laminaria, -0.5 to - 2.0 m; moderate Sargassum Neosgardhiella moderate at middle subtidal
				I california sea cucumbers; sunflower, sun and leather stars; broad-based and light bulb tunicates moderate dungeness crabs and coonstripe shrimp
				F pile and striped perch unidentified rock fish kelp greenling

REACH	LENGTH (M)	ZONE	PHYSICAL CHARACTERISTICS	BIOLOGICAL CHARACTERISTICS
53	600	B	cement wall, 250 m bedrock cliff, 60 to 85 slope	douglas fir, arbutus, alder, maple blackberries and various shrubs
		I	cobble beach 5 slope	V moderate Fucus, 1.7 to 2.2 m, on cobble of beach moderate Ulva on rocks, 1.5 to 2.5 m
				I clumps of mussels at 3.1 m moderate helmet and sparse dungeness crabs
				F shiner perch and smaller striped perch smaller kelp greenling
		S	sand and cobble with a few large boulders	V mature dense bands of eelgrass, 2.0 to 3.5 m; Sargassum, also in dense clumps on stray boulders; Costaria, Alaria, and Palmaria = dense kelp bed with Nereocystis,-2.0 to -4.0m
				I leather and ochre stars helmet and few large dungeness
				F abundant large kelp greenling and striped perch

REACH	LENGTH (M)	ZONE	PHYSICAL CHARACTERISTICS	BIOLOGICAL CHARACTERISTICS
54	300	B	bedrock and boulder cliff 50 slope	various firs alder and cedar
		I	boulders with small sand pockets 45 slope	V Dense Fucus, 2.0 to 3.5 m Laminaria, 0.0 m Ulva on bedrock, 0.2 to 2.5 m
				I orange sea cucumbers leather ochre and sunflower stars
				F abundant kelp greenling school of anchovy
		S	silt and sand bottom with some cobble 5 slope	V dense Nereocystis, -2.5 to -4.0 m moderate Laminaria,-0.5 to -2.5 m
				I more abundant orange sea cucumbers leather and sun star red rock and helmit crabs
				F abundant kelp greenling black eye goby

REACH	LENGTH (M)	ZONE	PHYSICAL CHARACTERISTICS	BIOLOGICAL CHARACTERISTICS
55	50	B	bedrock bank and cedar fence	alder, douglas fir and maples
		I	gravel/sand beach with small boulder outcrop average 10 slope	V moderate Enteromorpha on beach, 0.2 to 1.3 m patches of Fucus on boulders, 2.0 to 2.8 m Ulva dense on boulders, 0.3 to 2.9 m; Laminaria, dense, 0.4 to -3.5 m
				I short spine and ochre stars dungeness and red rock crabs
				F school of unidentified larval fish sculpins
		S	sand and cobble with large boulders interspersed	V Laminaria to -3.5 m, dense dense Nereocystis, -3.5 to -4.0 m dense patches of eelgrass, -0.3 to -2.0 m
				I dungeness and red rock crabs sunflower and ochre stars california sea cucumbers; tunicates
				F kelp greenling

REACH	LENGTH (M)	ZONE	PHYSICAL CHARACTERISTICS	BIOLOGICAL CHARACTERISTICS
58	800	B	bedrock bank 70 to 85 slope	cedar, douglas fir, spruce deer observed
		I	bedrock bank to between 0.0 and 0.6 m 70 to 85 slope	V dense Fucus, 2.6 to 3.5 m dense Ulva, 0.2 to 2.6 m
				I ochre stars shore crabs sparse mussels
				F none observed
		S	silt bottom 6 slope	V dense Laminaria, -0.3 to -3.8 m dense Nereocystis beds, -3.5 to -4 m moderate patches of eelgrass, -0.4 to - 3.0 m
				I abundant dungeness sunflower, ochre and large short spine stars coonstripe shrimp; california sea cucumbers
				F abundant unidentified rock fish kelp greenling striped perch; blak eye goby

REACH	LENGTH (M)	ZONE	PHYSICAL CHARACTERISTICS	BIOLOGICAL CHARACTERISTICS
67	1000	B	bedrock cliff 45 to 70 slope	douglas fir, alder and spruce blue heron
		I	tidal beach surrounded by bedrock banks and with occasional bedrcok outcrops	V dense Fucus on rocks, 2.0 to 3.1 m dense Ulva, on rocks and beach,0.2 to 2.4 m moss-like brown algae dense on rocks with Ulva
				I ochre stars hermit, kelp and juvenile dungeness crabs little neck and manila clams, moderate
				F school of fish larvae sticklebacks shiner perch
		S	silt bottom 2 slope	V dense, thick band of eelgrass, 0.2 to -2.9 m
				I dungeness and helmet crabs orange sea cucumber leather star, short spined star
				F numerous fish, including abundant rockfish, kelp greenling and striped perch

REACH	LENGTH (M)	ZONE	PHYSICAL CHARACTERISTICS	BIOLOGICAL CHARACTERISTICS
58	400	B	bedrock cliff 45 to 60 slope	alder scotch broom dried grasses
		I	bedrock cliff 45 slope	V dense Fucus, 1.0 to 3.0 m dense Ulva, 0.2 to 1.2 m
				I ochre stars dungeness, red rock and helmit crabs
				F unidentified rockfish coho fry blue heron, hawk
		S	silt/mud bottom	V large kelp bed of Nereocystis, with some Laminaria and Alaria, 0.0 to -4.0 m
				I light-bulb tunicates helmit and dungeness crabs california sea cucumber
				F trout species, kelp greenling, anchovy seal

REACH	LENGTH (M)	ZONE	PHYSICAL CHARACTERISTICS	BIOLOGICAL CHARACTERISTICS
59	600	B	bedrock bank with scattered wood at places	blackberry, scotch broom, arbutus and douglas fir
		I	large mud beach with sand at higher intertidal abundant clam shells	V moderate Fucus line, 1.5 to 2.9 m dense Ulva on rocks, moderate Ulva and Enteromorpha mixed on beach, 0.2 to 1.6 m
				I moderate little neck clams short spine stars
				F juvenile starry flounder
		S	silt and clam shell bottom	V large, dense eelgrass bed, from 0.0 to -1.7 m dense kelp bed from -1.7 to -3.2 m
				I sunflower, leather and blood stars dungeness, helmit and red rock crabs
				F kelp and painted greenling gunnel; tube snout striped perch

REACH	LENGTH (M)	ZONE	PHYSICAL CHARACTERISTICS	BIOLOGICAL CHARACTERISTICS
80	350	B	bedrock bank, with scattered logs	dense douglas fir; small, scattered alders cormorants on pilings
		I	large tidal flat, with mud at lower intertidal and sand above small bedrock outcrop near north end. 2 slope	V sparse Enteromorpha, 0.2 to 1.2 m moderate Ulva, 0.4 to 1.8 m sparse Fucus, 2.0 to 2.5 m
				I moderate little neck and manila clams; sparse butter ane soft shell clams short spine stars;shore crabs
				F sculpins tube snout pacific snake prickleback
		S	silt/ mud bottom with small patches of cobble	V dense eelgrass bed, 0.1 to -1.8 m dense kelp bed with Laminaria, Nereocystis, and Costaria dominating, -1.8 to -4.0 m
				I short spined and sunflower stars dungeness and red rock crabs california sea cucumbers
				F kelp greenling

REACH	LENGTH (M)	ZONE	PHYSICAL CHARACTERISTICS	BIOLOGICAL CHARACTERISTICS
B1	26	B	bedrock bank 60 slope	dense arbutus
		I	bedrock bank to 0.0 m 45 slope	V sparse Fucus on rocks, 2.7 to 3.0 m moderate Ulva, 0.2 to 2.5 m
				I hermit crabs ochre and short spine stars broad-based tunicates
				F none observed
		S	mud/silt bottom below bedrock 2 slope	V dense eelgrass bed, 0.1 to -1.6 m dense kelp bed, -1.6 to -4.0 m
				I blood, leather and sunflower stars dungeness and helmit crabs unidentified burrowing clams
				F painted and kelp greenling copper rockfish

REACH	LENGTH (M)	ZONE	PHYSICAL CHARACTERISTICS	BIOLOGICAL CHARACTERISTICS
62	300	B	bedrock bank 60 slope	alder, arbutus and douglas fir blackberry
		I	large tidal flat of mixed sand and mud 2 slope	V sparse Enteromorpha on beach mixed with moderate Ulva, 0.3 to 2.2 m sparse Fucus on rocks, 2.5 to 3.5 m
				I moderate little neck and sparse manila clams short spine stars nematodes; shore crabs
				F sculpins sticklebacks
		S	silt/mud bottom with some rocks and cobble at depths	V dense eelgrass bed, 0.1 to -1.6 m dense kelp bed, -1.6 to -4.0 m
				I short spine and sunflower stars dungeness and helmet crabs california sea cucumbers
				F kelp greenling predominant few striped perch

AYUM CREEK

YEAR	COHO	CHUM
1953	75	3500
1954	25	3500
1955	25	3500
1956	0	150
1957	0	750
1958	75	3500
1959	0	200
1960	0	25
1961	25	25
1962	25	750
1963	0	25
1964	0	75
1965	0	750
1966	0	30
1967	0	750
1968	0	3500
1969	0	750
1970	0	3500
1971	0	3500
1972	0	3500
1973	0	3500
1974	0	1500
1975	25	400
1976	0	400
1977	25	3500
1978	40	1500
1979	0	1200
1980	25	2000
1981	6	4000
1982	0	1000
1983	8	1500
1984	6	1000
1985	0	1500
1986	16	305
1987	3	300
1988	2	3500

DE MAMIEL CREEK

YEAR	COHO	CHUM	CHINOOK
1953	400	15000	0
1954	1500	7500	0
1955	75	15000	0
1956	400	7500	0
1957	400	7500	0
1958	3500	35000	0
1959	750	7500	0
1960	200	3500	0
1961	3500	3500	0
1962	3500	3500	0
1963	3500	3500	0
1964	1500	15000	0
1965	3500	7500	0
1966	7500	7500	0
1967	750	7500	0
1968	3500	35000	0
1969	750	15000	0
1970	3500	15000	0
1971	1500	7500	0
1972	3500	15000	0
1973	6400	35000	0
1974	1500	3500	0
1975	750	3500	0
1976	400	1500	0
1977	750	3500	25
1978	800	8000	15
1979	1200	800	12
1980	800	9000	0
1981	800	6000	0
1982	700	2500	0
1983	230	8000	0
1984	365	8000	0
1985	700	11000	4
1986	862	1900	
1987	1340	4980	0
1988	350	44000	28

LANNON CREEK
(NR =NO RECORDS)

YEAR	COHO
1953	NR
1954	NR
1955	NR
1956	NR
1957	NR
1958	NR
1959	NR
1960	NR
1961	NR
1962	NR
1963	NR
1964	NR
1965	NR
1966	NR
1967	NR
1968	NR
1969	NR
1970	NR
1971	NR
1972	NR
1973	NR
1974	NR
1975	NR
1976	NR
1977	NR
1978	NR
1979	0
1980	11
1981	2
1982	4
1983	12
1984	6
1985	0
1986	15
1987	0
1988	0

SOOKE RIVER

YEAR	COHO	CHUM	CHINOOK
1953	400	35000	0
1954	200	35000	75
1955	75	35000	25
1956	25	15000	0
1957	200	15000	25
1958	200	35000	200
1959	200	15000	200
1960	200	3500	400
1961	200	3500	200
1962	400	3500	750
1963	200	7500	1500
1964	75	35000	750
1965	25	7500	400
1966	25	7500	750
1967	25	35000	1500
1968	75	35000	3500
1969	0	35000	1500
1970	25	35000	1500
1971	75	15000	750
1972	200	75000	200
1973	400	75000	3500
1974	75	15000	200
1975	200	3500	400
1976	25	3500	30
1977	75	7500	25
1978	100	9500	6
1979	40	4500	45
1980	5	14500	36
1981	0	11000	30
1982	6	8000	3
1983	0	9000	18
1984	120	12000	400
1985	9	35000	400
1986	40	40000	112
1987	0	25000	250
1988	0	60000	250

APPENDIX 3. FORESHORE LEASES AND LICENCES WITHIN SOOKE INLET

Reach	Number	File		Foreshore Use Designation
1	1	0266319	(lot 157)	Industrial log handling/storage
2	2	1404226		Private moorage
	3	1400471		Private moorage
	4	1405267		General commercial (App)
	5	1400385	(lot 230)	Private moorage
	6	1405241		Private moorage
	7	1400470		Private moorage
	8	1400364	(lot 229)	Commercial wharf
	9	1406346		Private moorage
	10	1405385		Private moorage
	11	1405307		Private moorage
	12	1405399		Private moorage
	13	0349971	(lot 169)	Private moorage
	14	0244116	(lot 214)	Commercial marina
	15	1404838		Private moorage
	16	1401239		Private moorage
3	17	1406334		Private moorage
	18	0187835	(lot 201) (173,202)	General commercial
	19	0239785	(lot 211)	Commercial wharf
	20		(lot 193)	Reserve
	21	0184089		Public wharf (App)
	22	0269645	(lot 203A)	Reserve
	23	1406521	(lot 203B)	Public wharf (App)
	24	1405264		Local park
	25	0298556		R/W, telecommunication cable
	26	1405042		Private moorage
	27	0261041	(lot 205)	Commercial wharf
	28	0168089	(lot 181) (227)	Commercial wharf
4	29	0349939	(lot 167)	Private moorage
	30	0348260	(lot 166)	General commercial
	31	1406344		Commercial wharf (App)
	32	1406386		Private moorage (App)
	33	1406021		Private moorage
5	34	0245706		General commercial
6	35	0145115		General commercial
8	36	0235909		Marina
9	37	1404979		General commercial (App)
	38	0345581	(lot 168)	Residential Misc.
11	39	1400334		Private moorage
	40	0180129		Private moorage
	41	0280541		Private moorage
	42	1404945		Private moorage

APPENDIX 3. FORESHORE LEASES AND LICENCES WITHIN SOOKE INLET

Reach	Number	File	Foreshore Use Designation
	43	1406110	Private moorage
	44	1406291	Private moorage (App)
	45	1406143	Private moorage
13	46	0295380 (lot 100)	Commercial marina
22	47	1404201 (lot 99)	Private moorage
36	48	1406145	Private moorage
37	49	1406542	Private moorage
	50	1406175	Private moorage
43	51	1401741	Shellfish aquaculture
45	52	1400370	Private moorage
46	53	1406126	Private moorage
	54	1406113	Private moorage
	55	1406109	Private moorage
	56	1406114	Private moorage
48	57	1406279	Private moorage
49	58	1405969	Private moorage
51	59	1401508	Shellfish aquaculture
52	60	1406528	Private moorage
	61	1400172	Private moorage
	62	1406128	Private moorage
	63	1406087	Private moorage
	64	1400220	Private moorage
	65	1406149	Private moorage
	66	1401189	Private moorage
	67	1403903	Fin fish aquaculture
	68	1406085	Private moorage
	69	1406088	Private moorage
	70	1405321	Private moorage
	71	1405525	Private moorage
	72	1405500	Private moorage
53	73	1406312	Private moorage
54	74	1405989	Private moorage
	75	1406590	Private moorage (App)
56	76	1406783	Private moorage (App)
	77	1406036	Private moorage
	78	1406031	General commercial
57	79	1406552	Private moorage (App)
	80	1405085	Private moorage
	81	1406077	Private moorage (App)
	82	1406192	Private moorage
	83	1400354	Private moorage
	84	1401102	Private moorage
	85	1404728	Private moorage
	86	1405587	Private moorage

APPENDIX 3. FORESHORE LEASES AND LICENCES WITHIN SOOKE INLET

Reach	Number	File	Foreshore Use Designation
	87	0246631 (lot 216)	Log handling/storage
58	88	0186760	Miscellaneous land uses
59			(Ministry of Lands and Parks)
	89	1405371	Private moorage
	90	1406122	Private moorage
	91	1404526	Private moorage
	92	1404515	Private moorage