COWICHAN ESTUARY ENVIRONMENTAL MANAGEMENT PLAN COMMITTEE MEETING

THURSDAY, JUNE 19, 2014 AT 1:00 P.M.

COWICHAN VALLEY REGIONAL DISTRICT BOARD ROOM
175 INGRAM STREET, DUNCAN, BC

AGENDA

			Pages
1.	**APPROVAL OF AGENDA**		1
2.	**ADOPTION OF MINUTES**		
	M1	Adoption of the Minutes of the Cowichan Estuary Environmental Management Committee Meeting of May 1, 2014	2 - 4
3.	**BUSINESS ARISING FROM THE MINUTES**		
	BA1	Cowichan Tribes, Tracy Fleming reporting on a response from the Minister of FLNRO regarding R1 (Unused Industrial Tenures).	
	BA2	Resolve of renewal of stilt home leases (Hylton McAllister).	5
4.	**DELEGATIONS**		
	D1	Western Forest Products 2013 and log boom lease renewals. Report on Log Booming Lease Use, Intertidal and Subtidal Habitat Assessment and Environment Impact Statement done by AquaTerra Environmental Ltd.	6 - 59
5.	**CORRESPONDENCE**		
	C1	Verbal report by Tracy Fleming regarding letter to Mark Harvey regarding "indefinite" moorage replacements.	TBD
6.	**REPORTS**		
	R1	Verbal report by Peter Law of BCCF Living Rivers regarding Living Rivers Salmon Smolt update.	
	R2	Discussion on Cowichan Bay Fisherman's Wharf replacement/upgrade.	
7.	**UNFINISHED BUSINESS**		
	UB1	Verbal Lands update on Lease 103103 and other tenures by Mark Harvey, MFLNRO.	
8.	**ADJOURNMENT**		

The next regular meeting of the CEEMC is scheduled to be held at the call of the chair.

Cowichan Estuary Environmental Management Plan Committee
Ron Diederichs, Chair, MFLNRO ron.diederichs@gov.bc.ca
Rob Conway, CVRD rconway@cvrd.bc.ca
Mark Harvey, MFLNRO mark.harvey@gov.bc.ca
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Laura Robertson, CVRD lrobertson@cvrd.bc.ca

Minutes of the Cowichan Estuary Environmental Management Committee Meeting held on Thursday, May 1, 2014, at 1:00 p.m. in the Board Room at the Cowichan Valley Regional District, 175 Ingram Street, Duncan, BC

PRESENT: Chair Ron Diederichs, Ministry of Forests, Lands & Natural Resource Operations
Tracy Fleming, Cowichan Tribes
Brigid Reynolds, District of North Cowichan
Ann Kjerulf, Cowichan Valley Regional District
Lori Iannidinardo, Cowichan Valley Regional District, Cowichan Bay Director

OTHER: Laura Robertson, Cowichan Valley Regional District, Recording Secretary

APPROVAL OF AGENDA

The Chair noted changes to the agenda which included adding three items of New Business and the addition of a Delegation.

It was moved and seconded that the agenda as amended be approved.

MOTION CARRIED

ADOPTION OF MINUTES

M1 **It was moved and seconded that the Minutes of the Cowichan Estuary Environmental Management Committee Meeting of January 30, 2014, be adopted.**

MOTION CARRIED

BUSINESS ARISING

Unused Industrial Tenures Cowichan Tribes, Tracy Fleming reporting on a response from the Minister of FLNRO regarding R1.

DELEGATIONS

Hylton McAlister presented a Chronology of Events regarding his timeline issues with his Stilt Home Lease and Dock – this is the first meeting that Stilt Home Leases has been discussed within CEEMC including this specific lease renewal.

CORRESPONDENCE

C1 – Ministers response to Chief Seymour's letter Verbal report by Tracy Fleming regarding the Ministers' Response to Chief Seymour's letter dated January 10, 2014.

ACTION: The CEEMC Chair to ask Ministry of Forests, Lands & Natural Resource Operations if they have a date to conclude discussion on this issue.

C2 – Stilt House Leases Discussion on renewal of stilt house leases by request of FLNR. (see attached email)

It was moved and seconded that the CEEMC Chair compile all past correspondence on Hylton McAlister's dock application and forward to Ministry of Forests, Lands & Natural Resource Operations, suggesting that a recommendation for approval be made for the dock to proceed with conditions.

MOTION CARRIED

It was moved and seconded that the CEEMC Chair review all past correspondence on Stilt Homes and reconvene an abbreviated meeting before the end of May to make a decision and, following that make a recommendation to Lands, & Natural Resource Operations.

MOTION CARRIED

It was moved and seconded that in accordance with the Order in Council that actions occurring in CEEMC area taken by local or senior government agencies be approved by CEEMC including crown leases and licenses.

MOTION CARRIED

ACTION:
Tracy Fleming will report to the Chair regarding Stilt Home Leases, after reviewing with other staff members at Cowichan Tribes.

C3 – CERCA regarding the proposed breaching of the Westcan

Letter dated March 18, 2014, and attachments from CERCA regarding the proposed breaching of the Westcan Causeway and the construction of the bridge.

It was moved and seconded that

1) **The CEEMC acknowledges and conceptually supports the proposal to breach the 'Westcan Causeway" and replace it with a bridge to restore intertidal habitat, improve natural water flow regimes, and assist with investigations into salmonid juvenile habitat usage by others.**
2) **The CEEMP Committee's support is conditional upon review and authorization by the Department of Fisheries and Oceans, authorization by the Ministry of Forests, Lands & Natural Resource Operations, and Crown Lands of an amendment of the development plan for the lease at this site (Lands file # 1405504).**
3) **The CEEMP Committee notes that, in order to proceed, the proposal must also be authorized by the Cowichan Valley Regional District through its development permit approvals process.**
4) **There shall be at least one Cowichan Archaeology member onsite during the digging process to monitor activities.**

MOTION CARRIED

C4 – Cowichan Bay Zoning Bylaw No. 3773

Letter dated March 6, 2014, from the Cowichan Tribes regarding a response to CVRD referral of proposed Electoral Area D – Cowichan Bay Zoning Bylaw No. 3773 (Marine Zoning Bylaw)

The letter was received as information.

NEW BUSINESS

NB1 – Cowichan Bay Zoning Bylaw Nos. 3705 & 3773

Letter from Cowichan Tribes regarding CVRD Electoral Area D – Cowichan Bay Zoning Bylaw Nos. 3705 and 3773.

The letter was received as information.

NB2 – Update by K. Miller

Correspondence from Kate Miller, Cowichan Valley Regional District, regarding an update on the Cowichan River Stewardship Roundtable and the current Diking Program just outside the CEEMC boundary.

Kate Miller requested to hold a one hour workshop with CEEMC regarding Climate Adaptation and Resilience Planning as a component of the Regional Strategy Sustainability process.

It was moved and seconded that Kate Miller hold a workshop regarding Climate Adaptation and Resilience Planning.

MOTION CARRIED

ACTION:
The chair respond to Kate Miller, and arrange to have her at the next regular meeting which is to be announced.

NB3 – Letter from Chief Seymour regarding Lease 1405504

The letter was received as information.

NEXT MEETING

Next meeting TBA, a special meeting at Forests, Lands & Natural Resource Operations, Nanaimo

ADJOURNMENT

It was moved and seconded that the meeting be adjourned.

MOTION CARRIED

The meeting adjourned at 2:55 p.m.

_____ _____

Chairperson Recording Secretary

BA 2

BRITISH COLUMBIA

MEMORANDUM

Date: June 11, 2014

Files: 47250-25/CEEMP 4104
Lands Files 0109815 & 0124761

To: Bonita Wallace
Major Projects Specialist

Re: Premature Renewal of Stilt Home Leases and new Dock Facility; Crown Land Files 0109815 & 0124761 (Hylton McAlister)

The Cowichan Estuary Environment Management Committee has reviewed these proposals and, subject to the following conditions, has not identified issues that would prevent their adjudication by your group:

Conditions

The dock facility is to be constructed in a manner that ensures that:

1. grounding of the dock is prevented by ensuring 0.5 metres of clearance above the sea floor at low tide elevations; and
2. exposed Styrofoam floatation is not included as part of the dock structure (either non-Styrofoam floats or concrete encapsulated foam floats); and
3. decking is constructed of an open grating material to allow significant light to penetrate to the sea bottom; and
4. constructed works are in compliance with any regulations or guidelines from another governing agency (local, provincial and federal).

R. Diederichs

Ron Diederichs
Chair, Cowichan Estuary Environment Management Committee and
Ecosystems Section Head, Resource Stewardship

cc: Ann Kjerulf, Senior Planner, Cowichan Valley Regional District
Alain Magnan, Department of Fisheries and Oceans Canada

Ministry of Forests, Lands and Natural Resource Operations
West Coast Region
Resource Stewardship
Mailing Address:
2080A Labieux Road
Nanaimo BC V9T 6J9
Telephone: 250 751-3100
Facsimile: 250 751-3103
Website: http://www.nrs.gov.bc.ca/

D1

Cowichan Bay Log Storage
FLNRO meeting
May 14 2104

Discussion Points

WFP (Doman) Agreement with BC and Canada, dated May 1, 1986

- Intertidal log storage (50 acres)
- Appendix B (log storage area map by Wright Hillyard & Parry, Surveyors & Engineers)

OIC # 1652 (September 1986)

- Written approval of the Minister Of Environment that licence issuance will have no significant detrimental impact and is in conformity with the plan

Cowichan Estuary Environmental Management Plan (February 1987)

- Log storage reduction (WFP 128 acres to 50 acres)
- Land Properties dedicated by WFP to MOE (23 acres and 17 acres)
- Area Designations (Industrial/Commercial)
- Project Review Process – Activities consistent with Area Designations

FLNRO Policies and Procedures

- Land Use Operational Policy – Log Handling (Licence of Occupation – standard term)
- Log Handling Application Requirements List (Site Plan Maps, surveys)

Licence of Occupation Areas/boundaries

- Available Imagery Sep 2004 – Jul 2013

Cowichan Bay Intertidal and Subtidal Habitat Assessment and Environmental Impact Statement - WFP Log Storage Tenures (March 2014)

Cowichan Bay

Intertidal and Subtidal Habitat Assessment and
Environmental Impact Statement
Western Forest Products Ltd. Log Storage Tenures

Prepared for:

Western Forest Products
Cowichan Bay Sawmill
1291 Tzouhalem Road
Cowichan Bay, BC
V0R 1N0

March 5, 2014

Prepared by:

Shane Servant
Subtidal Surveying & Environmental Assessors (SSEA)
1479 The Outrigger
Nanoose, BC
V9P 9B6

Chris Lee
AquaTerra Environmental Ltd.
25 Brackenridge Place
Port Moody, BC
V3H 4H8

TABLE OF CONTENTS

Contents

List of Figures

1.0 BACKGROUND

As an associate of AquaTerra Environmental Ltd., Subtidal Surveying and Environmental Assessors (SSEA) conducted an intertidal and subtidal habitat assessment for existing log storage lease tenures in Cowichan Bay. SSEA's primary objective was to collect relevant information on the existing marine intertidal and subtidal foreshore conditions to assist the assessment of impacts, if any, associated with existing mill operations. This report summarizes observed fish and fish habitat present in the existing log storage lease tenure areas and an adjacent reference site.

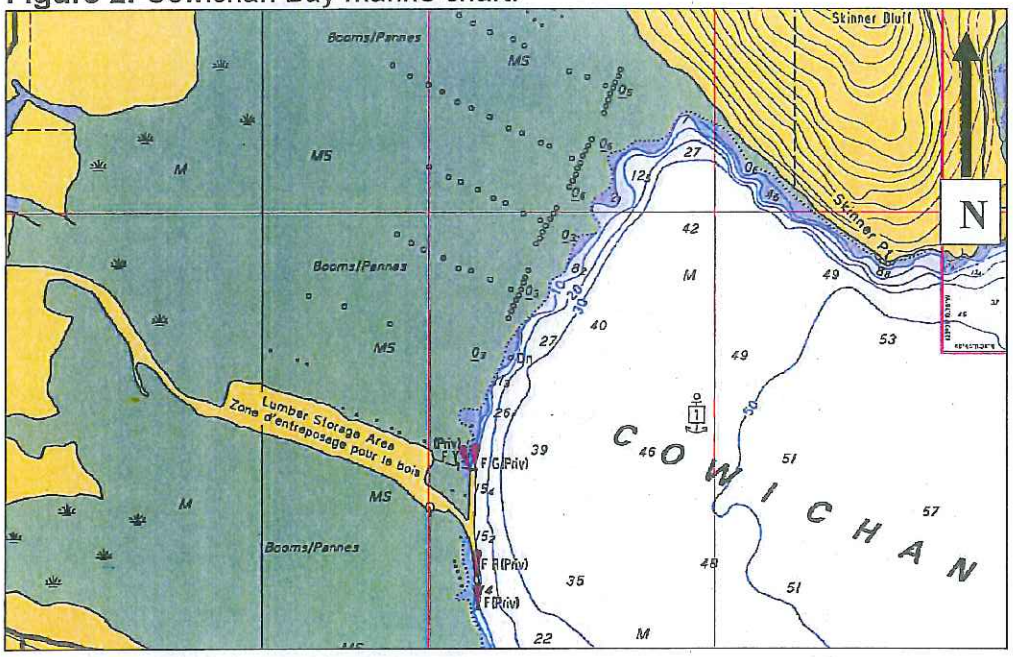
2.0 SITE LOCATION

2.1 Location

Cowichan Bay is located is located at the south east side of Vancouver Island BC (**Figure 1**). The Tenure is in the head of Cowichan Bay (**Figure 2**).

Figure 1: Location of Cowichan Bay from Victoria, B.C.

Figure 2: Cowichan Bay marine chart.



2.2 *Study Area*

The study area encompasses the marine ecosystem in the Cowichan Bay log storage lease tenures (**Figure 3** and **Figure 4**).

Figure 3: Transect locations in Cowichan Bay.

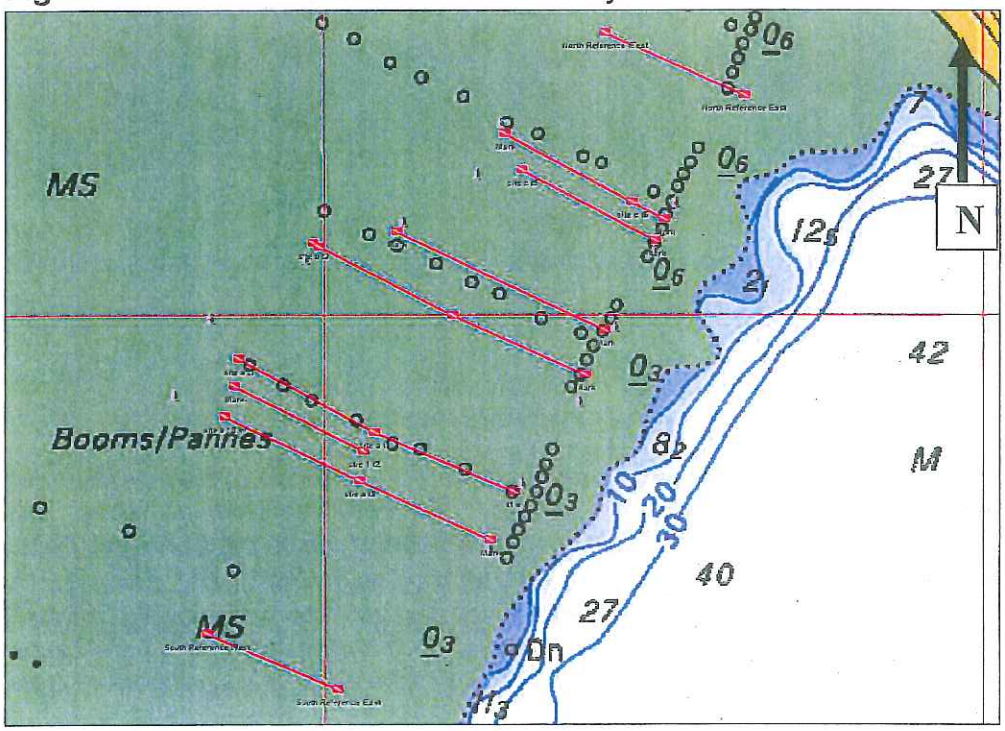
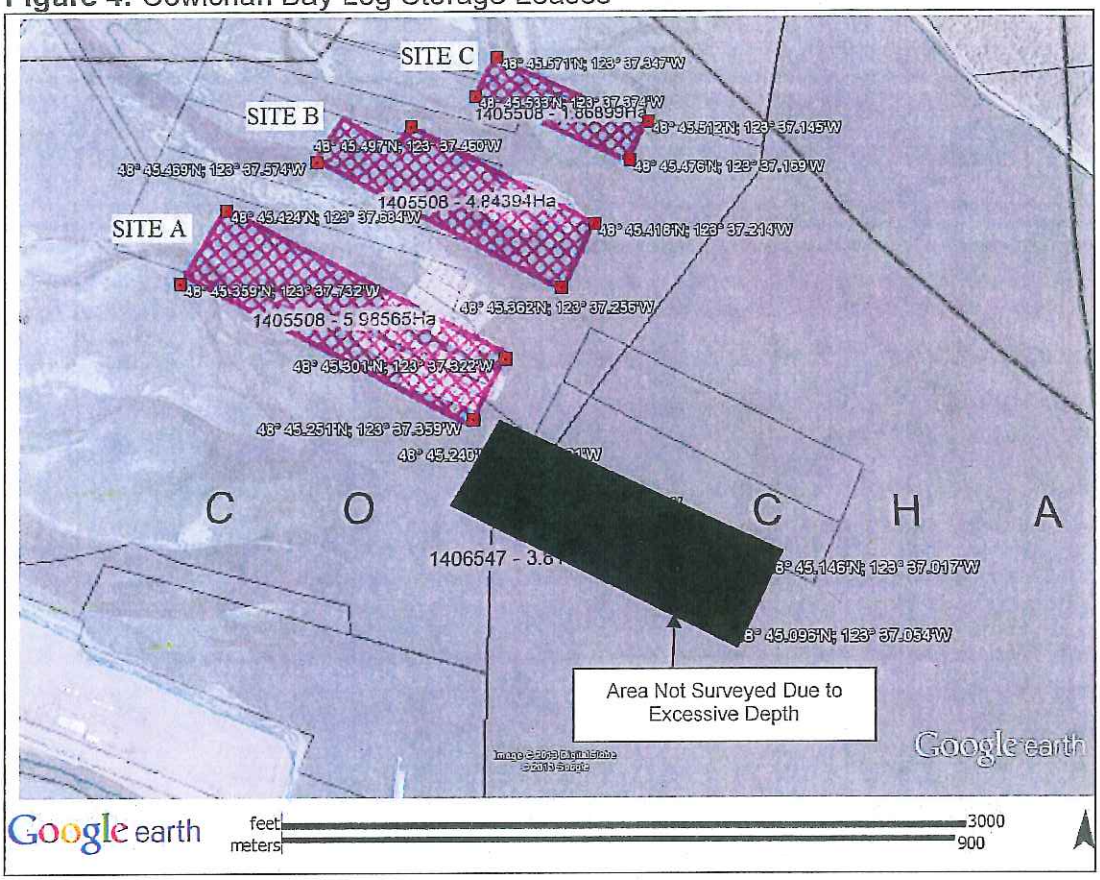


Figure 4: Cowichan Bay Log Storage Leases



3.0 METHODOLOGY

3.1 SCUBA Survey

On September 29th and 30th 2013 Shane Servant, B.Sc. of SSEA and his team conducted a marine intertidal and subtidal habitat assessment using SCUBA. AquaTerra provided supervision and management support. The crew mobilized from Victoria and prepared for the survey on September 29th, 2013. The dive vessel was launched at Cowichan Bay Fisherman's Wharf in Cowichan on September 29th, 2013.

Lead transect lines were laid out in the three (3) lease areas to representatively cover the tenures (**Figure 4**). Spacing and placement of the transects was rearranged in the field due to tug activity and logs being stored at some of the log lease tenures. Two reference transects was also selected North and South of the tenures in Cowichan Bay. Underwater video and photos were taken using a Canon HF S20 HD video camera in an Ikelite underwater housing of the entire transect. Habitat was characterized every 20m or if there was a significant habitat

change. Video was reviewed and compared to field notes. A DVD video accompanies this report, which is playable on the computer or in a DVD player.

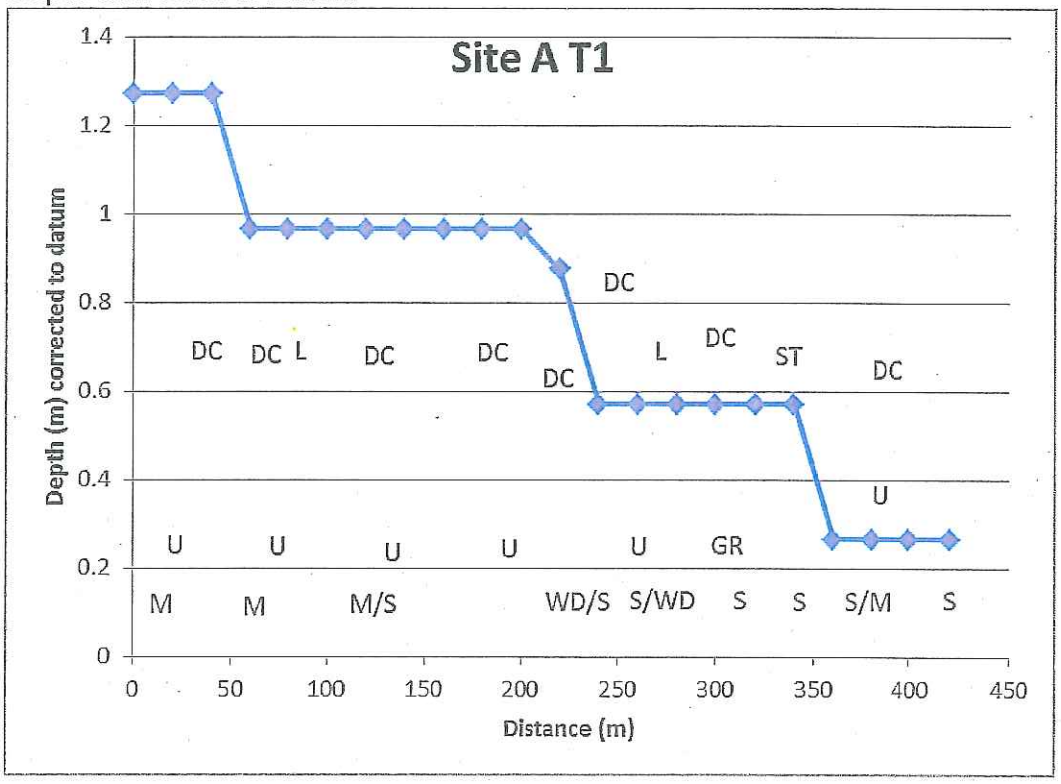
4.0 RESULTS

The log lease tenures were identified as Site A (southernmost tenure), Site B (center tenure) and Site C (northernmost tenure). Site D was not assessed due to excessive depth. Refer to **Figure 4** for location specifics. Survey results for each site and each transect are discussed in the following sections.

4.1 Site A - Transect 1

The substrate is comprised primarily of fine sand or mud. The primary seaweed was Ulva with a patch of eelgrass. Dungeness crab were some of the macro fauna were observed. Spatial distribution of observations within this transect is provided in **Figure 5**.

Figure 5: Spatial Distribution of Site A – Transect 1 Observations, Distance and Depth Corrected to Datum



Flora and Fauna	Substrate
U - Ulva	M - Mud
GR - Grass	C - Cobble
HC - Horse clam	G - Gravel
	S - Sand
RR - Red rock crab	L - Log

DC - Dungeness crab

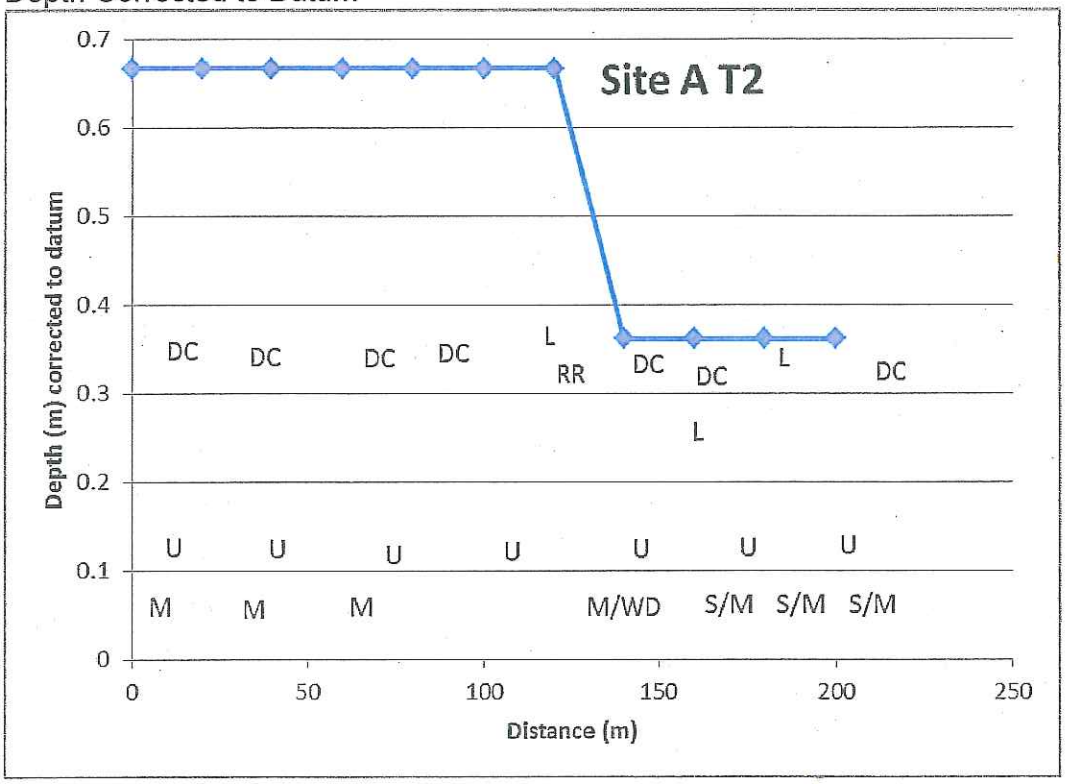
WD - Woody Debris

ST – Steel cable

4.2 *Site A - Transect 2*

The substrate is comprised primarily of fine sand or mud. Ulva is the primary seaweed. Dungeness crab, and red rock crabs comprised some of the macro fauna observed. Spatial distribution of observations within this transect is provided in **Figure 6**.

Figure 6: Spatial Distribution of Site A – Transect 2 Observations, Distance and Depth Corrected to Datum

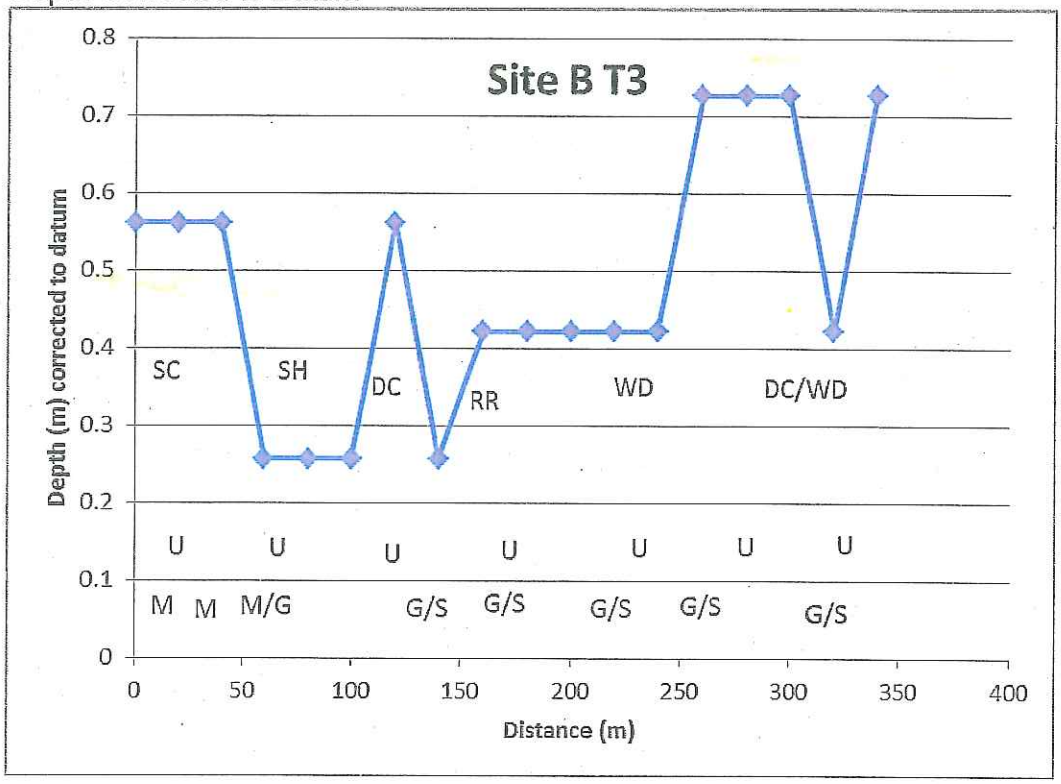


Flora and Fauna	Substrate
U - Ulva	M - Mud
GR - Grass	C - Cobble
HC - Horse clam	G - Gravel
	S - Sand
RR - Red rock crab	L - Log
DC - Dungeness crab	WD - Woody Debris
	ST – Steel cable

4.3 *Site B - Transect 3*

The substrate is comprised primarily of gravel and cobble with some sand and mud. The dominant seaweed is Ulva. Dungeness crab and red rock crabs were observed. Spatial distribution of observations within this transect is provided in **Figure 7.**

Figure 7: Spatial Distribution of Site B – Transect 3 Observations, Distance and Depth Corrected to Datum



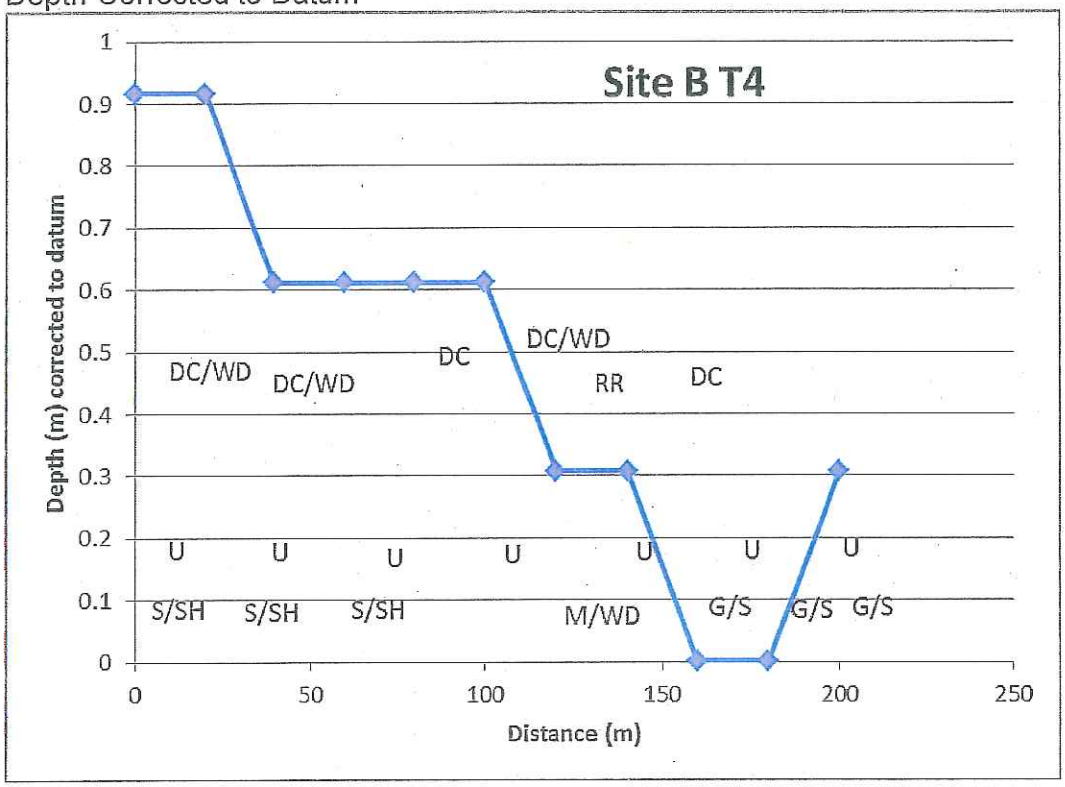
Flora and Fauna	Substrate
U - Ulva	M - Mud
GR - Grass	C - Cobble
HC - Horse clam	G - Gravel
	S - Sand
RR - Red rock crab	L - Log
DC - Dungeness crab	WD - Woody Debris
SC - sculpin	
SH – shore crab	

4.4 *Site B - Transect 4*

The substrate changes throughout transect 4, transitioning from sand and shell to gravel and sand. The dominant seaweed is Ulva. Dungeness crab, shore crabs

and red rock crab were observed during the dive. Spatial distribution of observations within this transect is provided in **Figure 8**.

Figure 8: Spatial Distribution of Site B – Transect 4 Observations, Distance and Depth Corrected to Datum

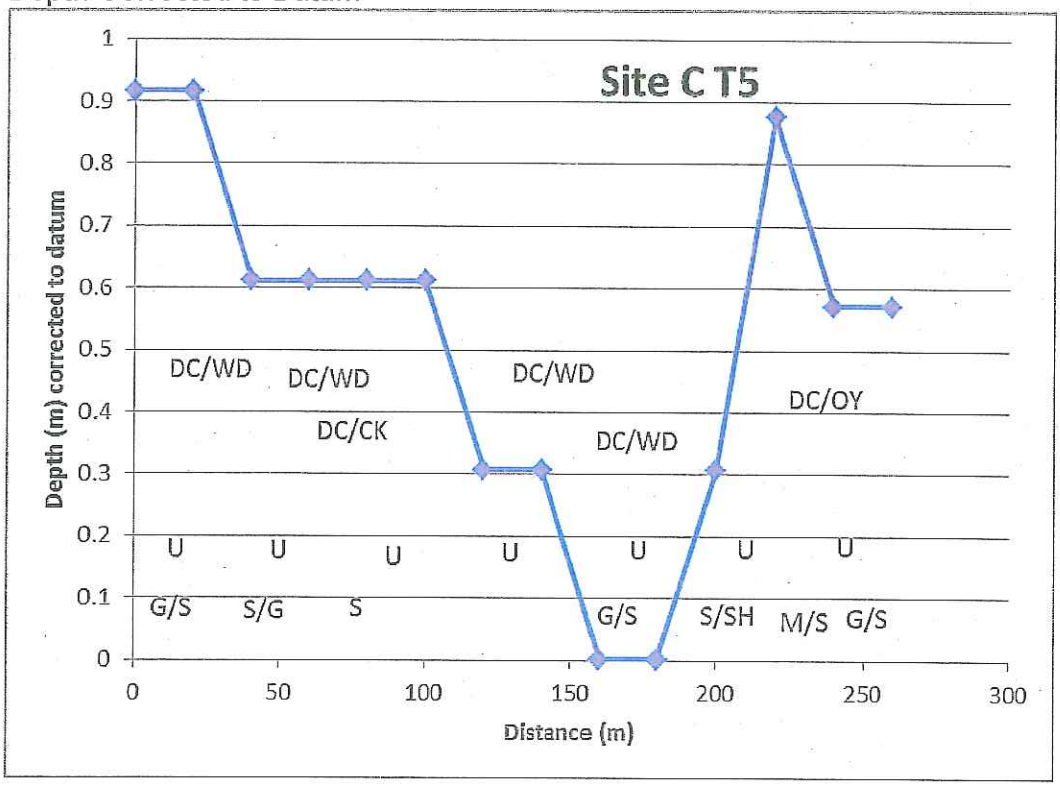


Flora and Fauna	Substrate
U - Ulva	M - Mud
RR - Red rock crab	C - Cobble
DC - Dungeness crab	G - Gravel
	WD - Woody Debris
	S - Sand
	SH - Shell

4.5 *Site C - Transect 5*

The primary substrate is gravel and sand. The dominant seaweed is Ulva. Oysters, cockles and Dungeness crab were observed. Woody debris was present along transect. Spatial distribution of observations within this transect is provided in **Figure 9**.

Figure 9: Spatial Distribution of Site C – Transect 5 Observations, Distance and Depth Corrected to Datum

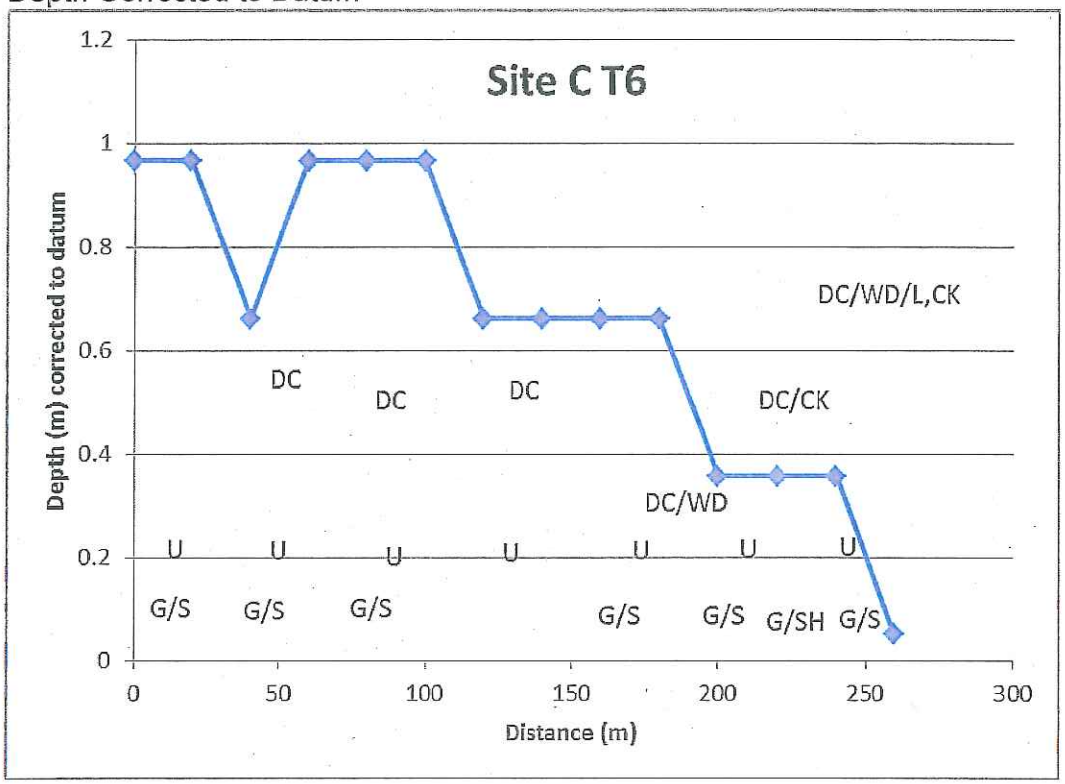


Flora and Fauna	Substrate
U - Ulva	M - Mud
CK - Cockle	C - Cobble
RR - Red rock crab	G - Gravel
	S - Sand
DC - Dungeness crab	SH - Shell
OY - Oyster	WD - Woody Debris

4.6 *Site C - Transect 6*

The primary substrate is gravel and sand with Ulva covering it. Cockles and Dungeness crab were observed. Woody debris was present along transect. Spatial distribution of observations within this transect is provided in **Figure 10**.

Figure 10: Spatial Distribution of Site C – Transect 6 Observations, Distance and Depth Corrected to Datum

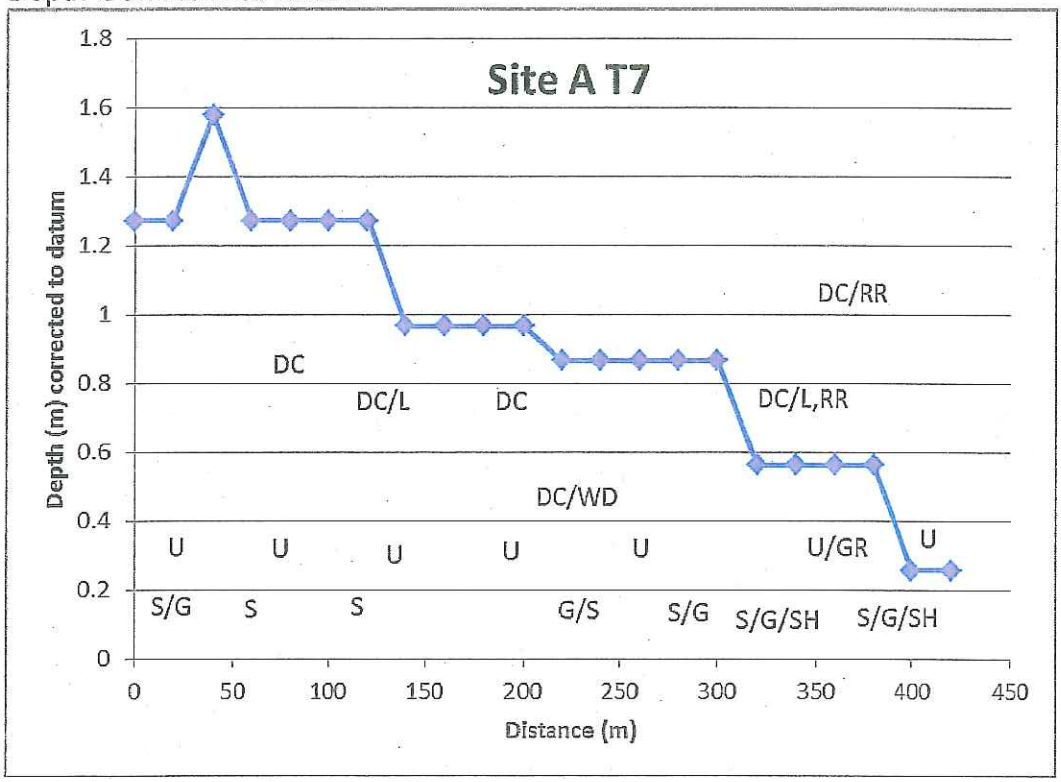


Flora and Fauna	Substrate
U - Ulva	M - Mud
GR - Grass	C - Cobble
HC - Horse clam	G - Gravel
	S - Sand
RR - Red rock crab	SH - Shell
DC - Dungeness crab	WD - Woody Debris
CK - Cockle	ST – Steel cable
	L - Log

4.7 *Site A - Transect 7*

The primary substrate is sand with a mix of sand, gravel and shell in many areas. Ulva covers the substrate and a small patch of eelgrass was observed. Dungeness crab and red rock crabs were present. Woody debris was present in lower amounts. Spatial distribution of observations within this transect is provided in **Figure 11.**

Figure 11: Spatial Distribution of Site A – Transect 7 Observations, Distance and Depth Corrected to Datum

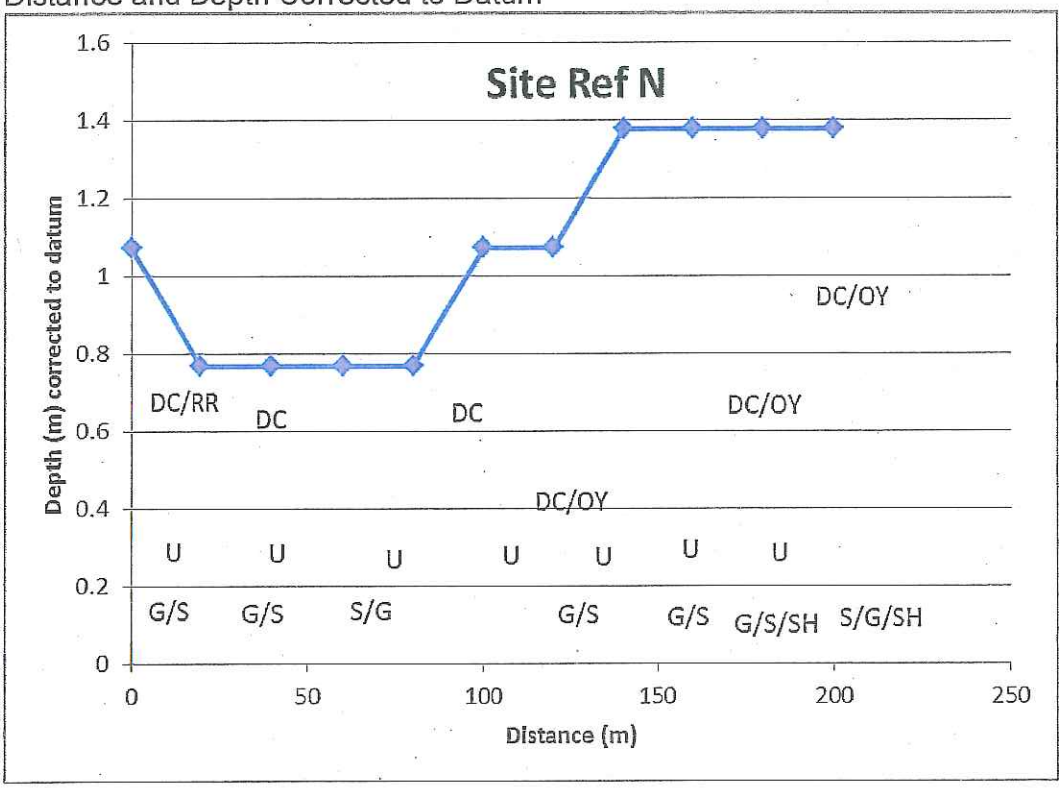


Flora and Fauna	Substrate
U - Ulva	M - Mud
GR - Grass	C - Cobble
HC - Horse clam	G - Gravel
	S - Sand
RR - Red rock crab	SH - Shell
DC - Dungeness crab	WD - Woody Debris
CK - Cockle	ST – Steel cable
	L - Log

4.8 *North reference transect*

The primary substrate is gravel and sand. Ulva covers the substrate. Red rock crabs, Dungeness crab, oysters and shore crabs were observed. Spatial distribution of observations within this transect is provided in **Figure 12.**

Figure 12: Spatial Distribution of North Reference Transect Observations, Distance and Depth Corrected to Datum

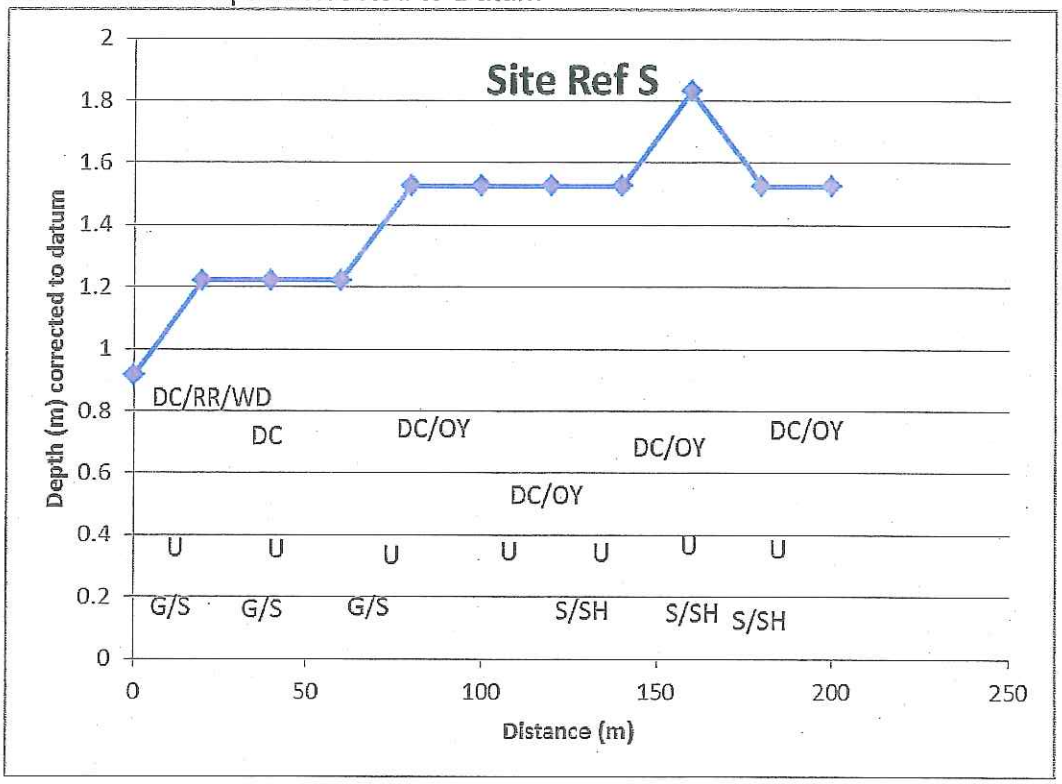


Flora and Fauna	Substrate
U - Ulva	M - Mud
GR - Grass	C - Cobble
HC - Horse clam	G - Gravel S - Sand
RR - Red rock crab	SH - Shell
DC - Dungeness crab	WD - Woody Debris
CK - Cockle	ST – Steel cable
OY - Oyster	L - Log

4.9 *South reference transect*

The primary substrate is sand and gravel with some shell. Ulva covers the substrate. Dungeness crab, red rock crabs, and oysters were observed. Woody debris was observed in lower amounts. Spatial distribution of observations within this transect is provided in **Figure 13**.

Figure 13: Spatial Distribution of South Reference Transect Observations, Distance and Depth Corrected to Datum



Flora and Fauna	Substrate
U - Ulva	M - Mud
GR - Grass	C - Cobble
HC - Horse clam	G - Gravel
	S - Sand
RR - Red rock crab	SH - Shell
DC - Dungeness crab	WD - Woody Debris
CK - Cockle	ST – Steel cable
OY - Oyster	L - Log

5.0 VALUED ECOSYSTEM COMPONENTS AND ANTHROPOGENIC DISTURBANCES

Conclusions relating to Valued Ecosystem Components (VECs) are based on field observations at the time of the dive survey. Dive survey photographs are attached at the end of the report.

5.1 Transects

Transect 1

- Dungeness crab and eelgrass are valued ecosystem components (VECs) identified along this transect. Various shellfish and varying density of Ulva were also observed. Minor woody debris, logs (n=2) and steel cable were observed (refer to Sections 5.2 and 5.3 for details).

Transect 2

- Dungeness crab and red rock crabs are VECs identified along this transect. Species diversity particularly high in portions of this transect with numerous shellfish, sea stars, fish (e.g., sculpin, Starry Flounder), and hermit crabs. Woody debris and logs (n=3) were observed (refer to Section 5.2 for details).

Transect 3

- Dungeness crab and red rock crabs are VECs identified along this transect. Ulva fields of varying density were also observed throughout this transect. Localized woody debris was observed (refer to Section 5.2 for details); however no logs were observed.

Transect 4

- Dungeness crab and red rock crabs are VECs identified along this transect. Localized woody debris was observed (refer to Section 5.2 for details); however no logs were observed.

Transect 5

- Dungeness crab, oysters and cockles are VECs identified along this transect. Generally high diversity along this transect with high abundance of Dungeness Crab in particular. Ulva abundance and density were also high relative to other transects. Localized woody debris and two (2) logs were observed (refer to Section 5.2 for details).

Transect 6

- Dungeness crab and cockles are VECs identified along this transect. Ulva abundance and density were also high relative to other transects. Species diversity generally decreased with increased proportion of sand substrate towards the end of the transect.

Transect 7

- Dungeness crab, red rock crabs and eelgrass are VECs identified along this transect. Ulva abundance and density were also high, particularly at the start of the transect, which was utilized by hermit crabs, sculpins and cockles. Localized woody debris and one (1) log were observed (refer to Section 5.2 for details).

Transect Reference North

- Dungeness crab, oysters and red rock crabs are VECs identified along this transect. Dungeness crab abundance was particularly high in localized areas along the transect. Ulva abundance and density were also high at the start of the transect, decreasing with increasingly sandy substrate.

Transect Reference South

- Dungeness crab, oysters and red rock crabs are VECs identified along this transect. Localized woody debris and one (1) log were observed (refer to Section 5.2 for details).

A summary of species identified during the survey as well as photographs from each transect are included in **Attachment I** and **Attachment II**, respectively.

5.2 Prevalence of Coarse and Fine Woody Debris

Transect 1

Minor, isolated / scattered amounts of woody debris was observed in Transect 1 (at a distance of 220 m and 260 m along the length of the transect). Additionally, no anaerobic bacterial mats or evidence of anoxic conditions were observed. Two logs were observed near the western (mill side) portion of the transect; however, the dive survey observations indicate that the logs were being utilized by species including hermit crabs, wood-boring invertebrates and ulva. Species diversity was generally higher in the vicinity of the logs.

Transect 2

Presence of woody debris generally low. Isolated pockets of woody debris spanning approximately 10-15 m in linear length along the transect between 50-60 m and 150 m along the length of the transect. Underlying substrate was observed amongst the woody debris, suggesting that the depth of the woody debris was low. This area was utilized by Dungeness crabs, red rock crabs, barnacles and sea stars. No anaerobic bacterial mats or evidence of anoxic conditions were observed. Of the logs observed, they appear to have been present for a significant amount of time, with evidence of utilization by a variety of wood-boring invertebrates (refer to photographs for details).

Transect 3

Substrate in this transect was fairly rocky with an increasingly higher proportion of fine sediments towards shore. Minor wood debris was observed approximately

90-100 m in from the start of the transect. Woody debris was also observed at 150 m and 170 m along the length of the transect in isolated patches. Underlying substrate was observed amongst the woody debris, suggesting that the depth of the woody debris was low. No anaerobic bacterial mats or evidence of anoxic conditions were observed. Generally, woody debris presence was lower than in Transects 1 and 2. No logs were observed.

Transect 4

Isolated, scattered areas containing fine woody debris was observed at 25 m, 60 m, and 140 m along the length of the transect. Species diversity was generally higher where wood was present. Conversely, where the substrate was dominated by sand with pockets of ulva, diversity was lower. Underlying substrate was observed amongst the woody debris, suggesting that the depth of the woody debris was low. No anaerobic bacterial mats or evidence of anoxic conditions were observed.

Transect 5

Two logs were observed and both were in advanced states of decay, being utilized by hermit crabs, ulva and wood-boring invertebrates. Isolated, scattered areas containing fine woody debris was observed at 30 m, 60 m, 150 m and 160 m along the length of transect, typically in patches of less than 10 m in length. Underlying substrate was observed amongst the woody debris, suggesting that the depth of the woody debris was low. No anaerobic bacterial mats or evidence of anoxic conditions were observed.

Transect 6

Very little woody debris was observed in Transect 6, limited to areas at a distance of 200 m and 250 m along the length of the transect.

Transect 7

Very little woody debris was observed in Transect 7, limited to areas at a distance of 240 m along the length of the transect. One (1) log was observed at 350 m along transect, being utilized by numerous hermit crabs, ulva and wood-boring invertebrates.

Transect Reference North

No significant woody debris or logs were observed along the reference north transect.

Transect Reference South

Woody debris was observed in minor amounts at the beginning of the transect. One (1) partial log was also observed, in an advance stated of decay. The log was being utilized by numerous hermit crabs and barnacles.

5.3 Other Refuse and Debris

Refuse (discarded material that is anthropogenic in origin) and other debris (waste) observed during the dive survey are discussed below.

Transect T1 - Old steel cable (no location details available)

Transect T3 - Portion of a rusty chain (located at distance of 340 m along transect)

No other significant refuse or littoral debris were observed during the dive survey or dive survey video review.

6.0 ENVIRONMENTAL IMPACT STATEMENT

AquaTerra and SSEA thoroughly reviewed the booming grounds dive survey video and survey notes. Although minor amounts of fine woody debris were observed sporadically along the lengths of transects 1-5 (with very little woody debris observed in transects 6 & 7), the depth or amount of the debris did not appear to adversely affect habitat function. In numerous cases, species diversity and abundance were observed to be higher where woody debris was present, relative to surrounding areas dominated by sand substrate. The woody debris depth appeared to be generally shallow, allowing for cockles, clams, mussels and crabs to continue to burrow in the underlying substrate. Similarly, the presence of observed logs was low, generally limited to 1-2 logs per transect. Logs were often in an advanced state of decay and were utilized as habitat by a variety of sessile and non-sessile organisms. Evidence of anoxic conditions, indicated by the presence of anaerobic bacterial mats, were not observed along the length of the transects. Similarly, evidence of scour, prop wash or compaction were not observed. The north reference transect did not have a significant amount of woody debris; however, although there were isolated areas where high amounts of ulva and Dungeness crab were observed, overall species diversity and abundance did not appear to be higher than the transects within the log lease areas, which also had numerous areas where species diversity and abundance were high. Similarly, the south reference transect had a similar species diversity and abundance relative to many of the transects within the log lease areas.

Based on the dive survey results, no significant adverse impacts to identified VECs were identified as a result of periodic log storage within the log lease areas (booming grounds). Moreover, in some cases, the presence of woody debris and logs appeared to increase the variability of local area habitat conditions, resulting in habitat nodes utilized by a higher diversity of species relative to surrounding areas. These areas provide unique attachment habitat that was not readily observed or prevalent in other areas within the dive transects or reference transects.

7.0 CLOSURE STATEMENT

Underwater video and photos should accompany this report on DVDs. If you have any questions or comments regarding this report please feel free to contact SSEA or AquaTerra, as follows:

Subtidal Surveying & Environmental Assessors (SSEA) Shane Servant, B.Sc. Director 1479 The Outrigger Nanoose, B.C. V9P 9B6 250-927-7732 (cell) www.ssea.bc.ca director@ssea.bc.ca	AquaTerra Environmental Ltd. Chris Lee, M.Sc., RPBio, QEP Principal 25 Brackenridge Place Port Moody, B.C. V3H 4H8 604-765-2993 (cell) www.aquaterra.ca chris@aquaterra.ca

ATTACHMENT I
Species List

Species List for September 29 and 30th, 2013
Intertidal & Subtidal Survey

Percent cover of survey area: + = <5%, 1 = 6-25%, 2 = 26-50%, 3 = 51-75%, 4 = 76-100%

Biota	Substrate	Species Name	Common Name	Presence
Seaweeds/Seagrasses				
		Ulva fenestrata	Sea lettuce	3
		Zosteria sp.	Eelgrass	+
		Fucus gardneri	Rockweed	1
Invertebrates				
	Planktonic	*Aurelia labiata*	Moon jellies	1
		Melibe leonina	Hooded nudribranch	+
	Boulder	*Pagurus* sp.	Hermit crab	+
		Hemigrapsus sp.	Shore crab	1
		Cancer producta	Red rock crab	+
		Cancer magister	Dungeness crab	1
		Crassostrea gigas	Pacific oyster	+
		Balanus glandula	Acorn barnacle	1
	Soft bottom	*Tresus nuttallii*	Horse clam	1
		Clinocardium nuttallii	Nuttall's cockle	+
		Nucella lamellose	Wrinkled dogwinkle	+
Fish				
		Enophrus bison	Buffalo sculpin	+
		Lepidopsetta bilineata	Rock sole	+
Mammal		*Phoca vitulina*	Harbor seal	+

ATTACHMENT II
Select Photographs

Transects – Above Water References

Photo 1: Transect one looking from west to east mid-way

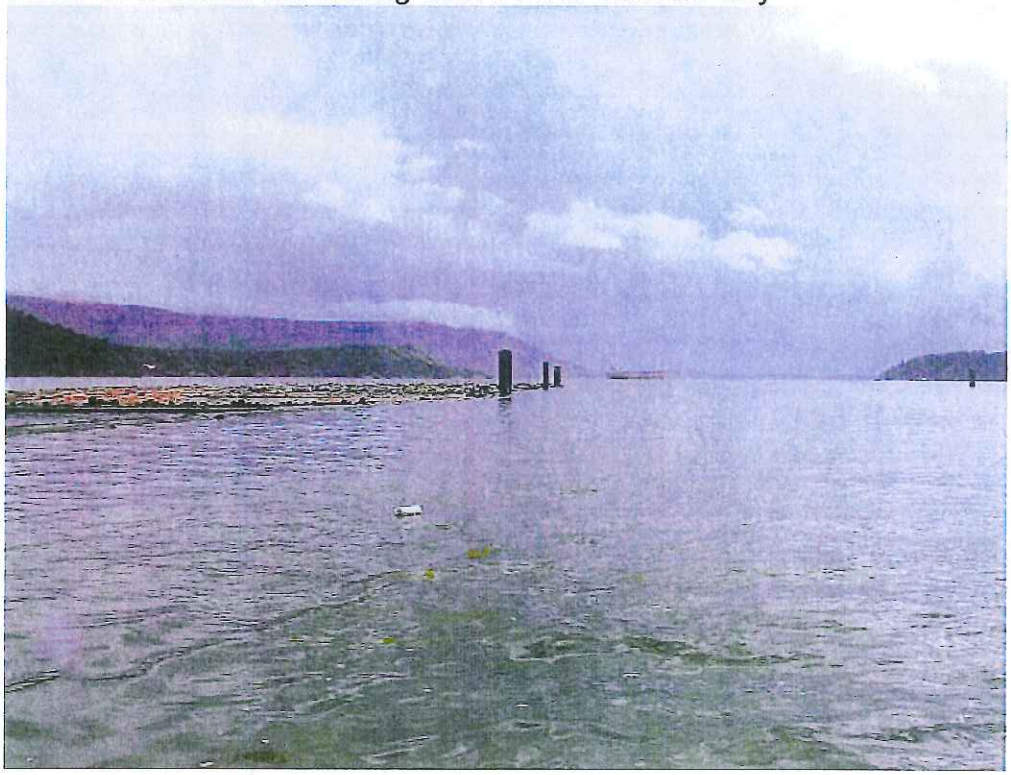


Photo 2: Transect two looking from west to east

Photo 3: Transect four looking west to east

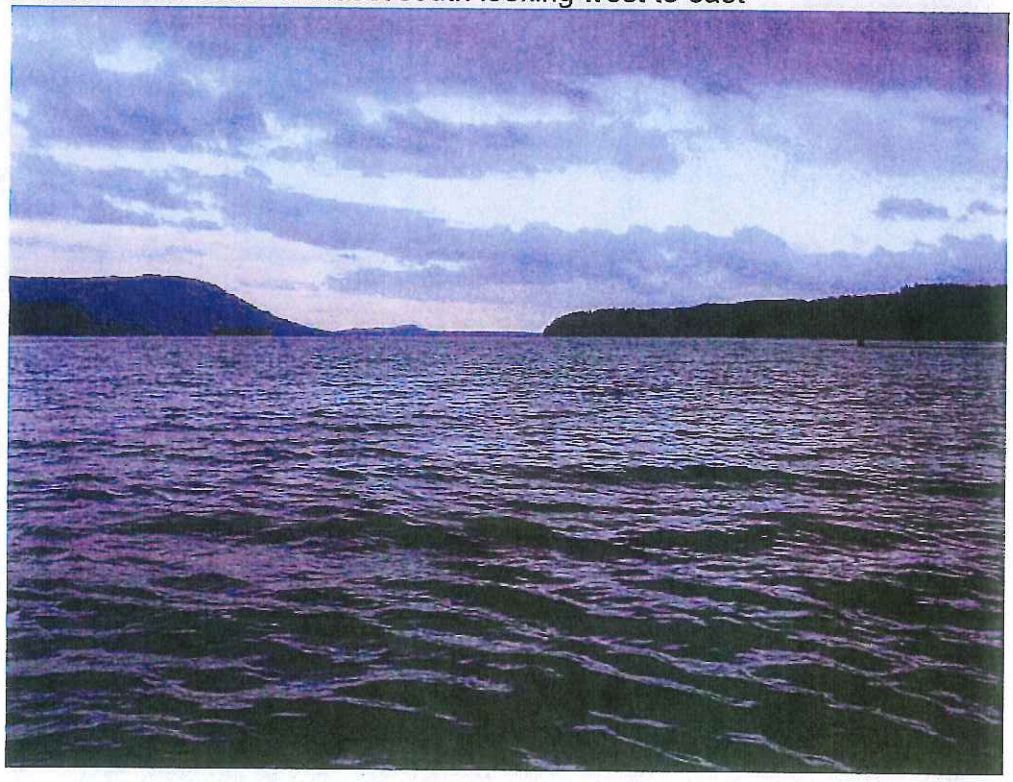
Photo 4: Transect five looking from west to east

Photo 5: Transect six looking from west to east

Photo 6: Transect 8 looking west to east

Photo 7: Reference transect north looking east to west.

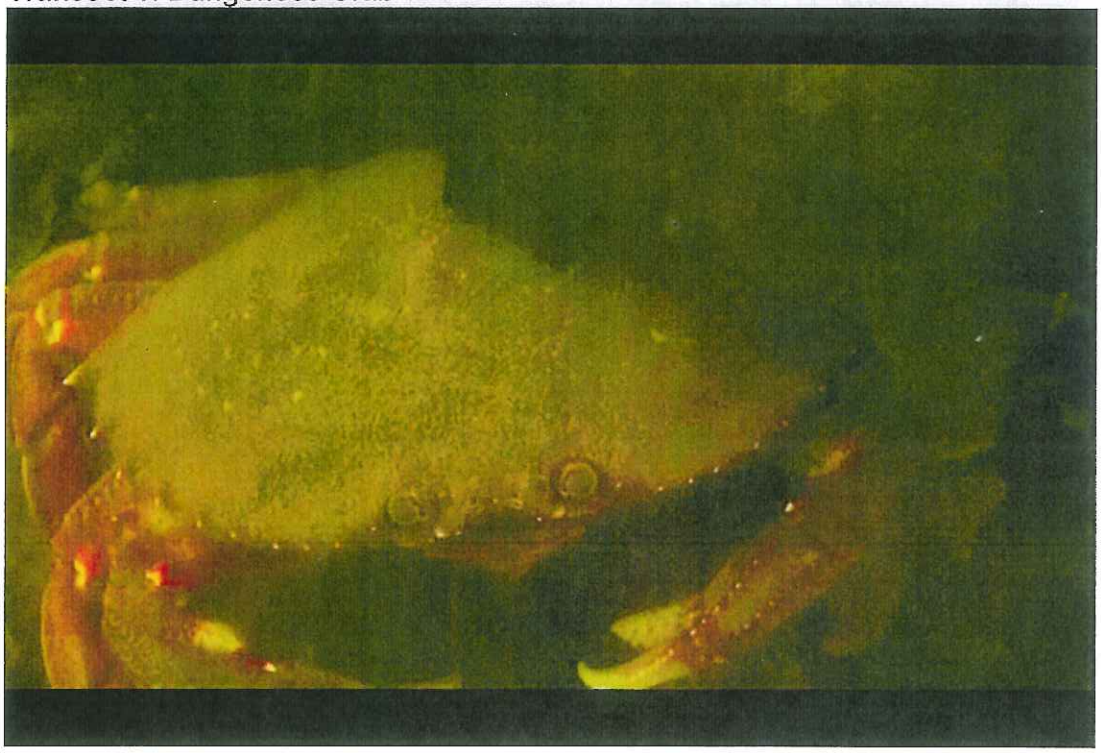
Photo 8: Reference transect south looking west to east



Transects – Below Water

Transect 1: Western Portion – typical substrate and Ulva

Transect 1: Dungeness Crab



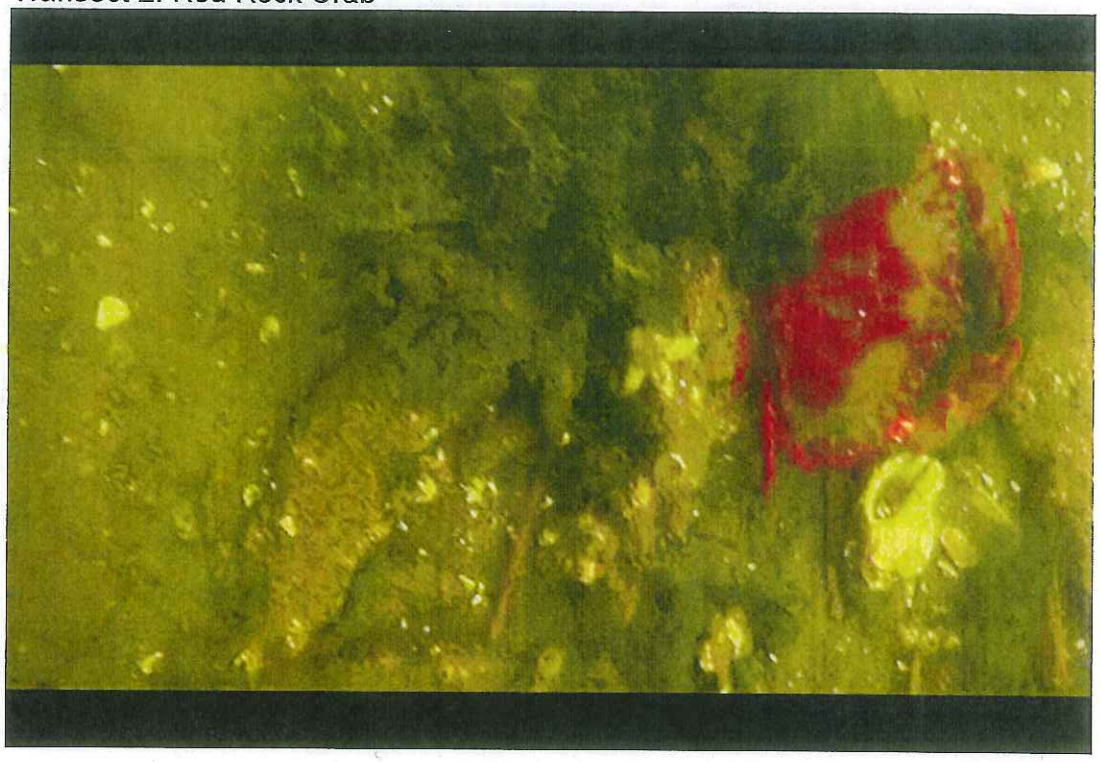
Transect 1: Small Patch of Eelgrass

Transect 1: Sporadic Woody Debris

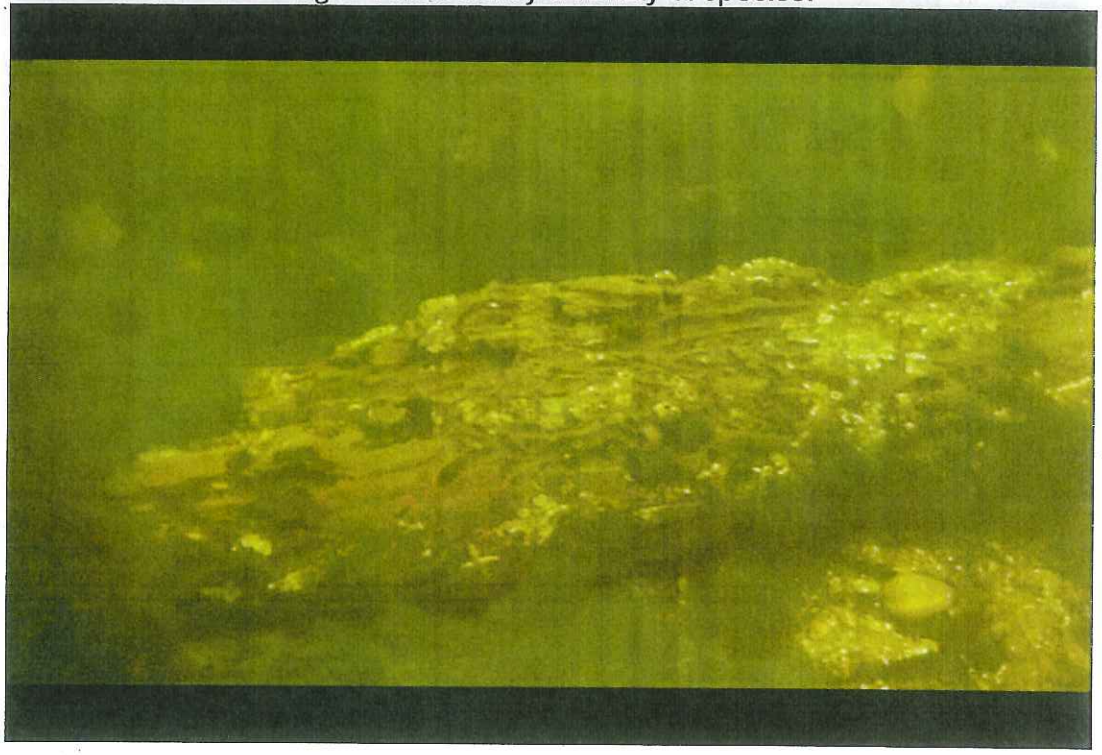
Transect 1: Crab utilizing log for cover

Transect 2: Dungeness Crab

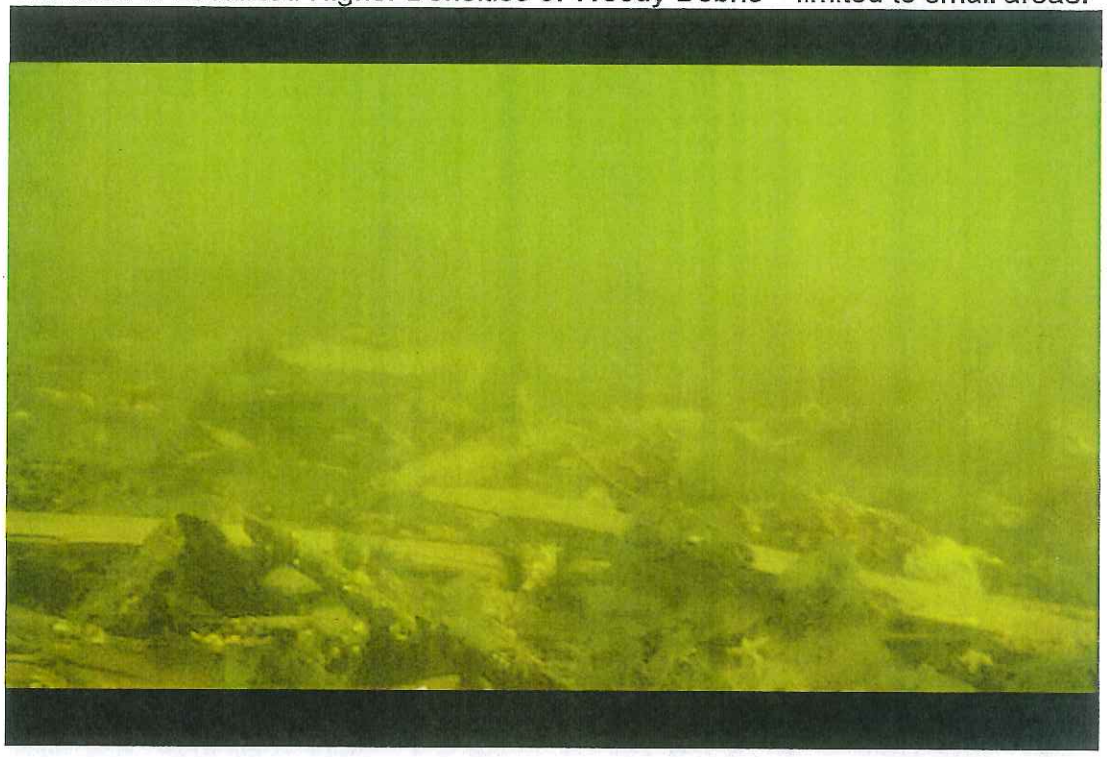
Transect 2: Red Rock Crab



Transect 2: Sunken Log – Colonized by a variety of species.



Transect 2: Localized Higher Densities of Woody Debris – limited to small areas.



Transect 2: Abundance of Filter Feeders in Muddy Substrate

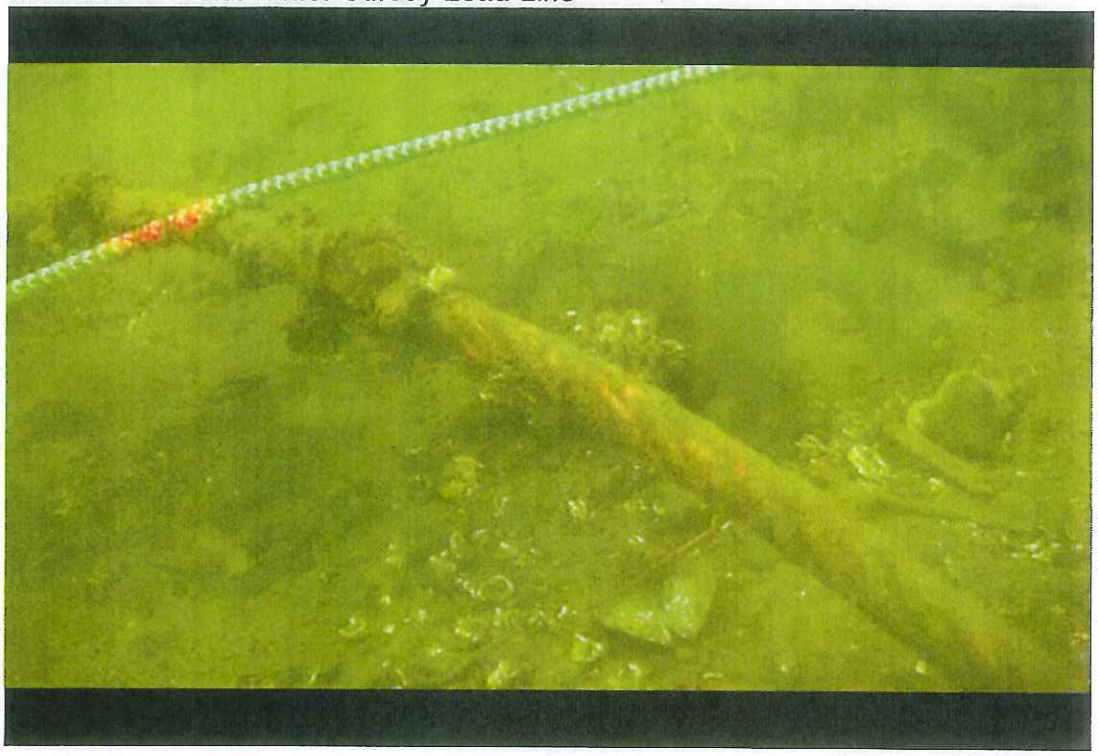
Transect 3: Live Cockle

Transect 3: Typical Mud and Gravel Substrate

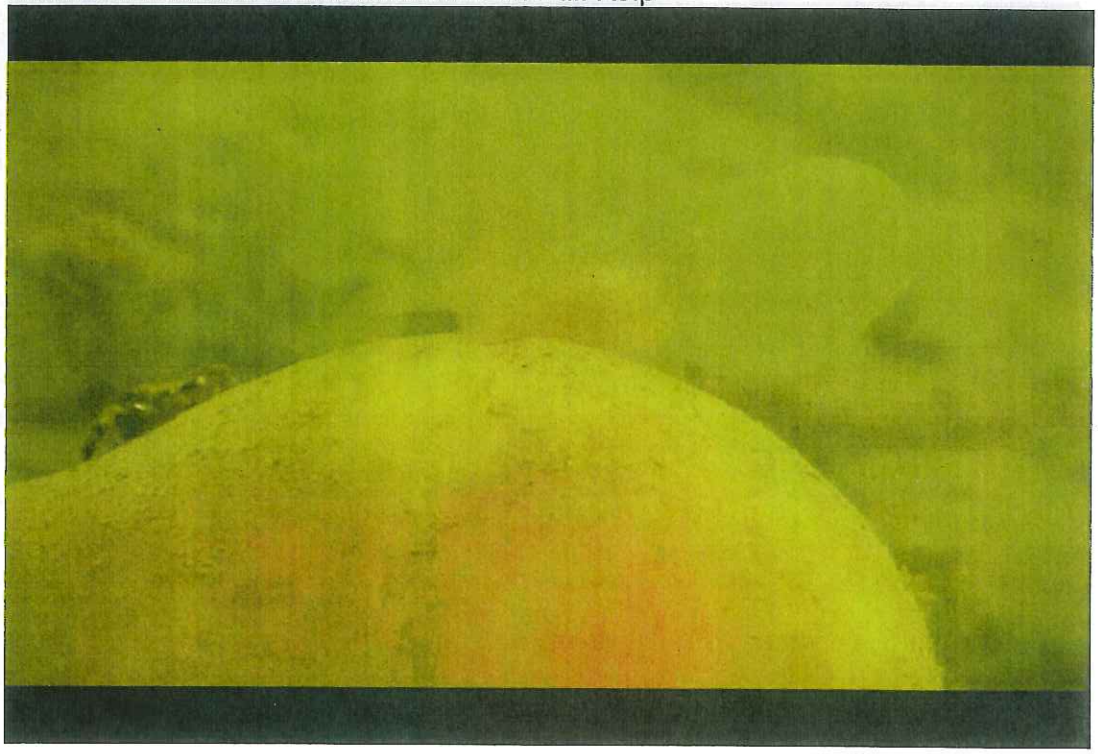
Transect 3: Cable and Gravel Substrate

Transect 3: Localized Woody Debris

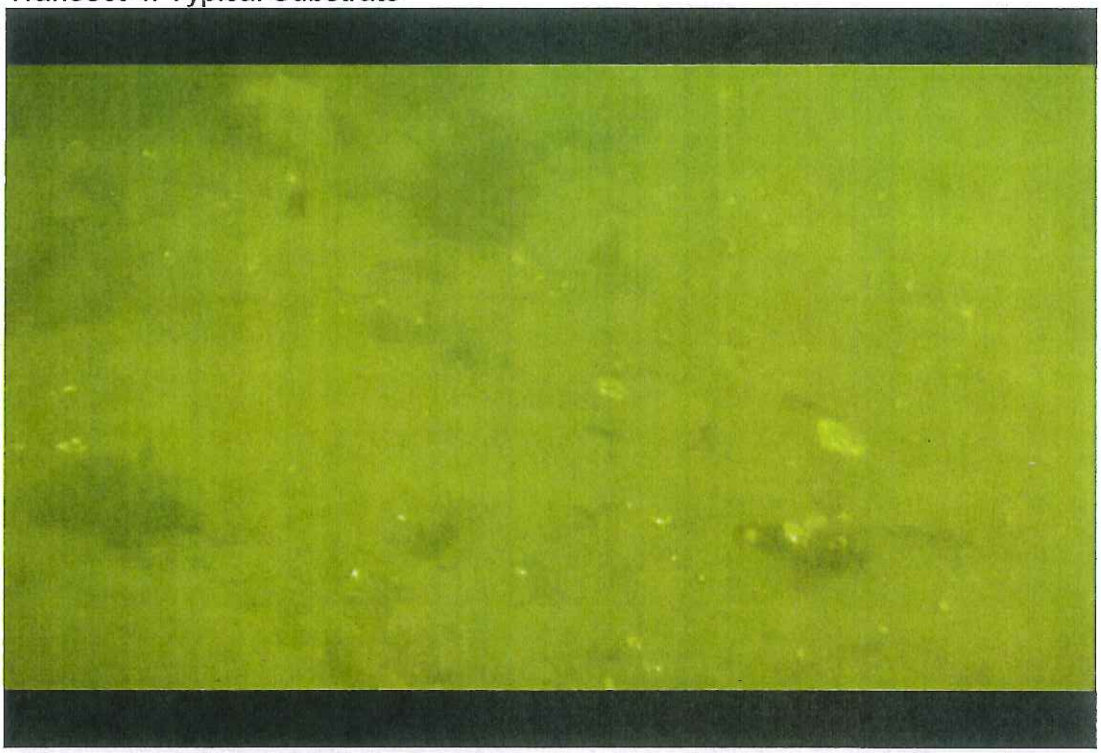
Transect 4: Cable under Survey Lead Line



Transect 4: Melibe and Hermit Crab on Bull Kelp



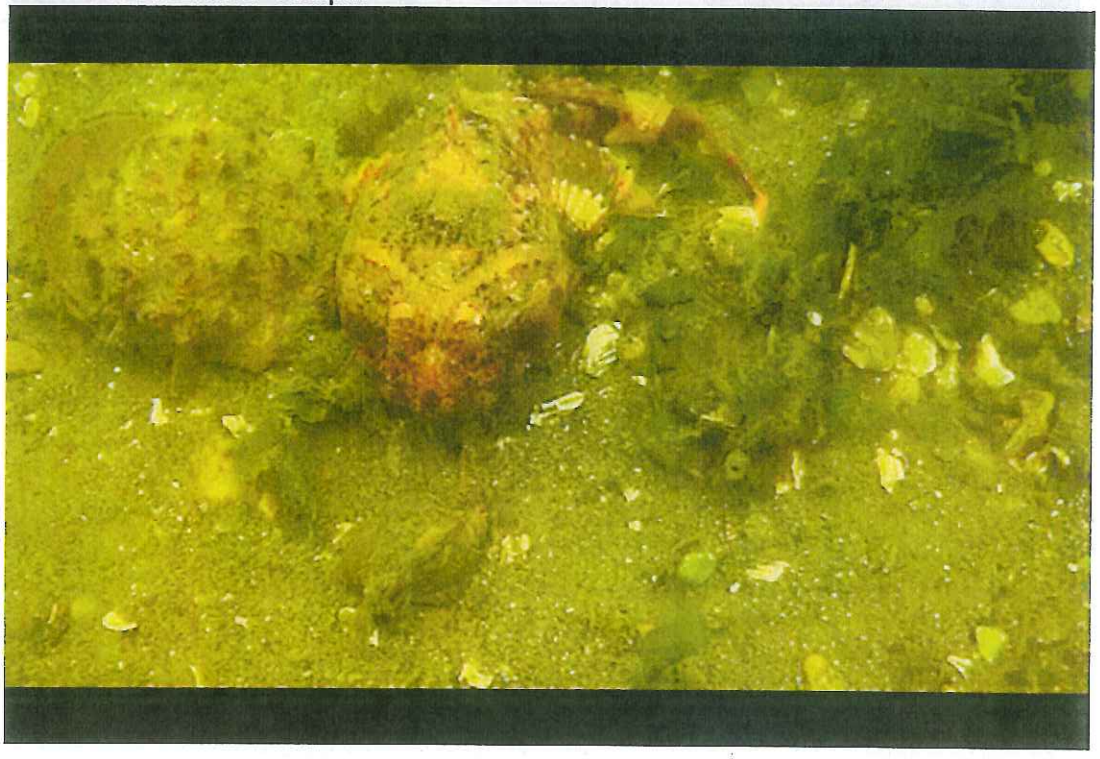
Transect 4: Typical Substrate



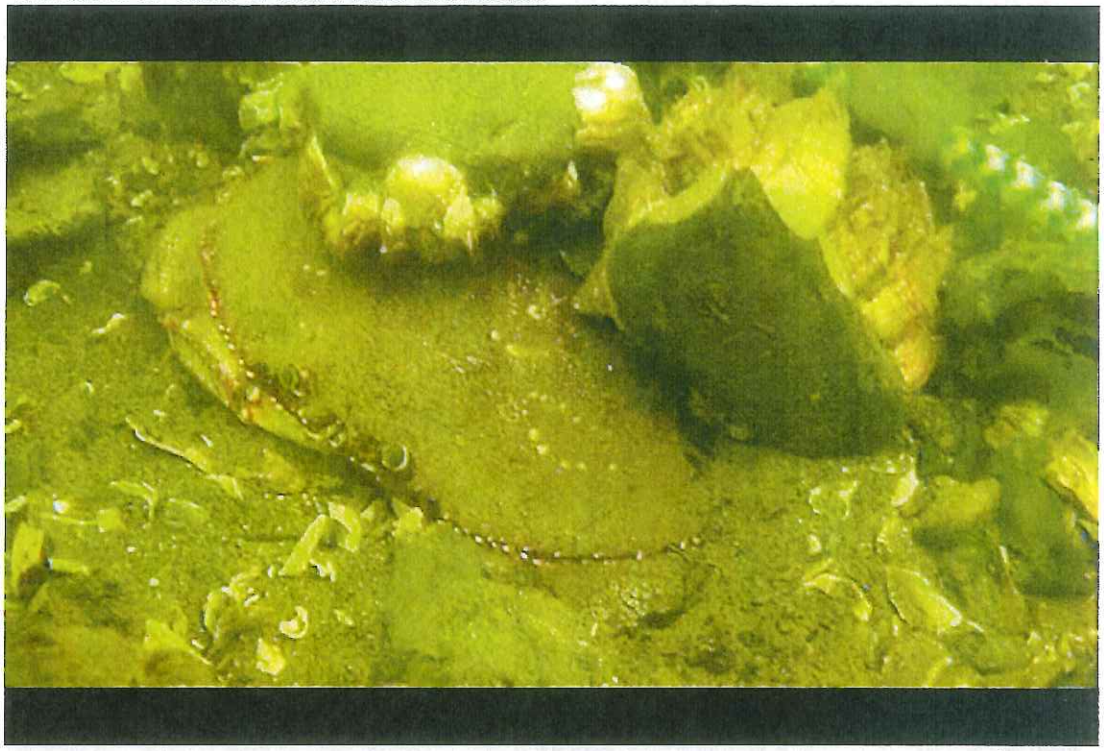
Transect 4: Whelk

Transect 4: Barnacles and Hermit Crab Utilizing Woody Debris

Transect 5: Buffalo Sculpin



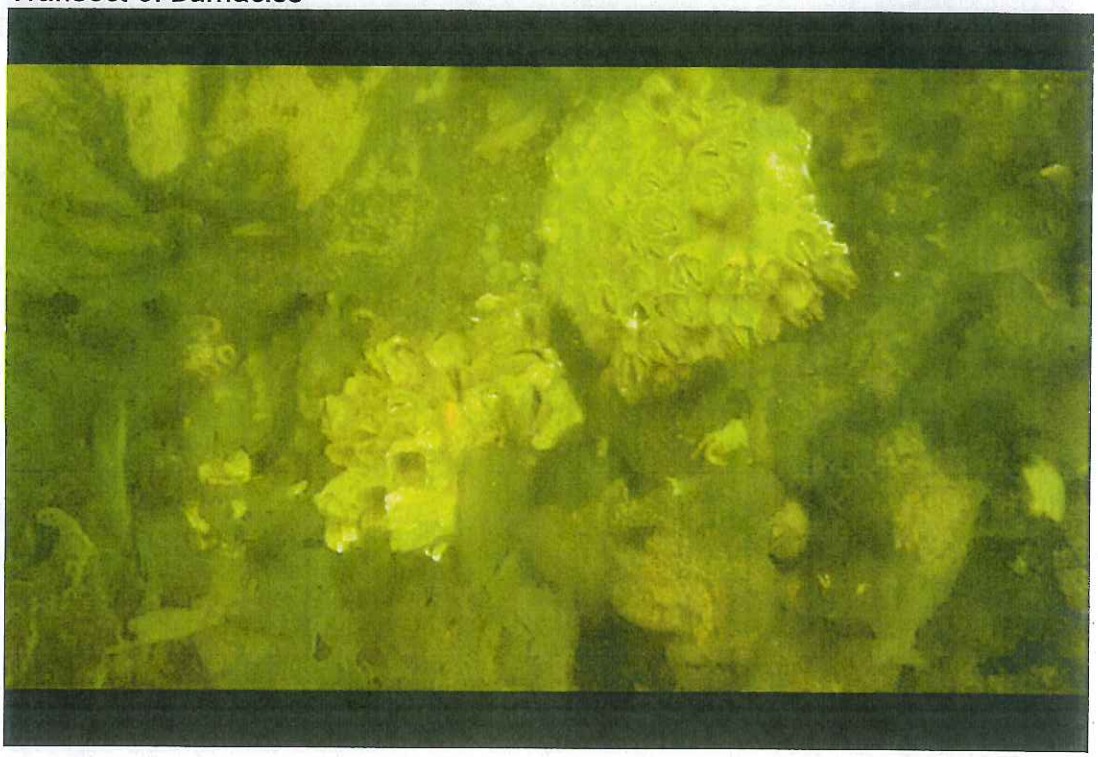
Transect 5: Crab in Sand and Barnacles



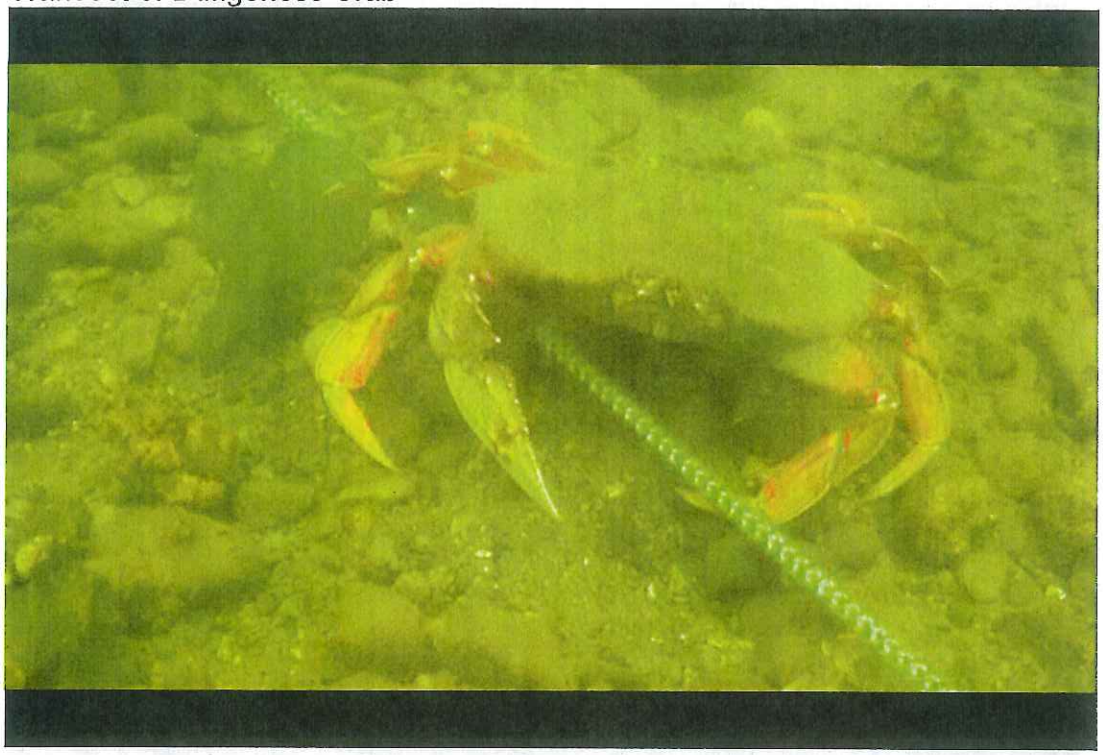
Transect 5: Typical Sand Substrate

Transect 5: Localized Sunken Wood Utilized by Wood-boring Invertebrates

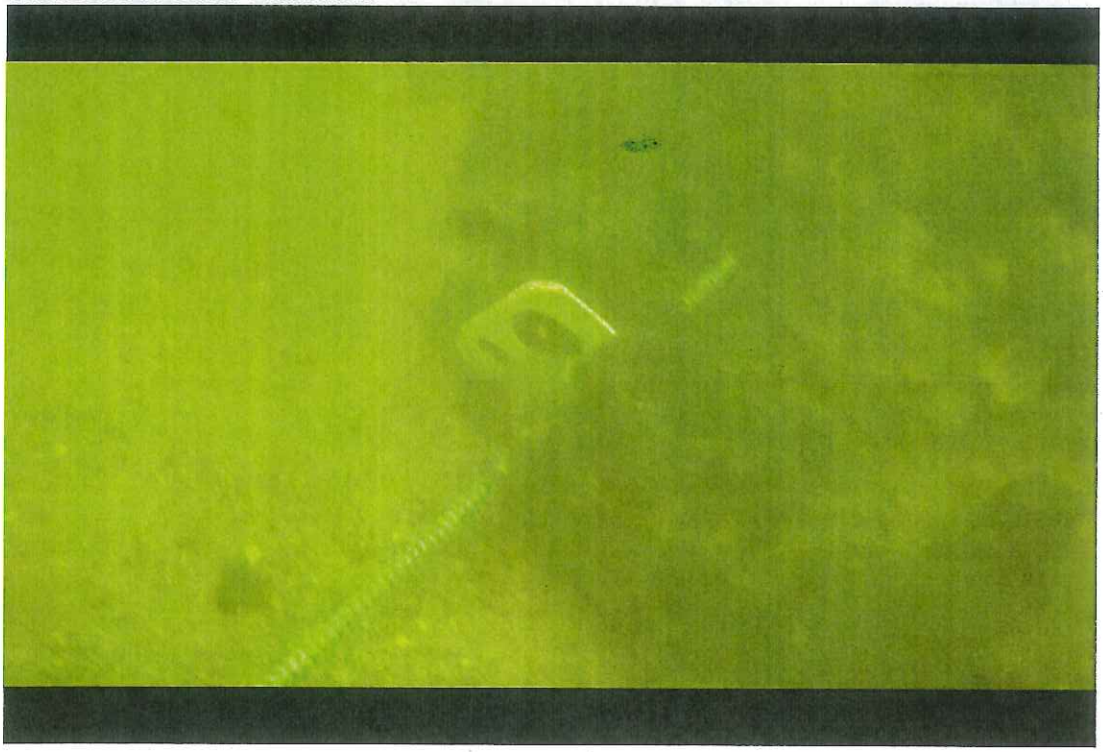
Transect 6: Barnacles



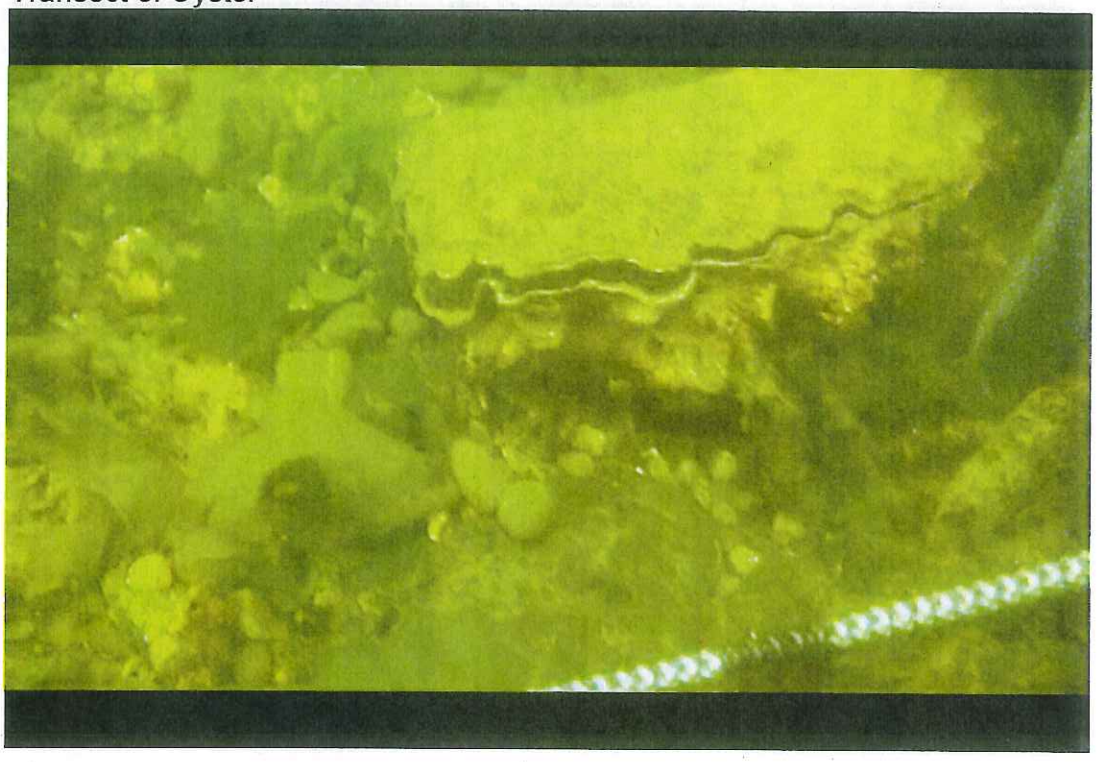
Transect 6: Dungeness Crab



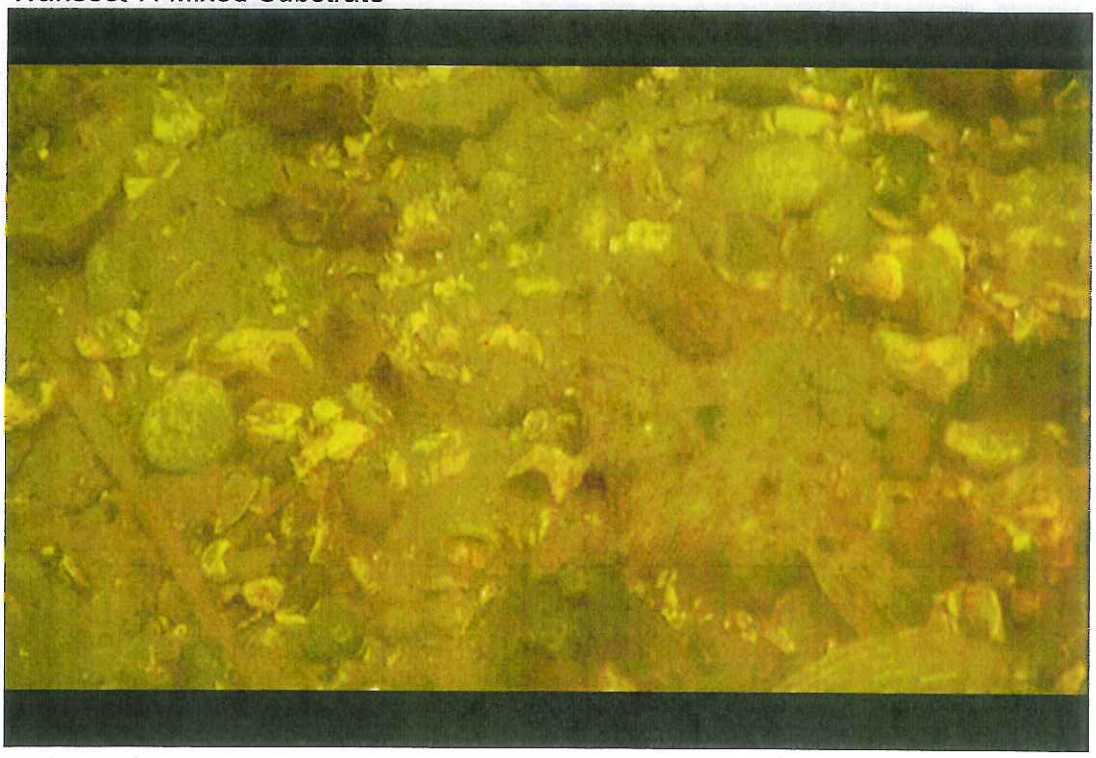
Transect 6: Sand Substrate



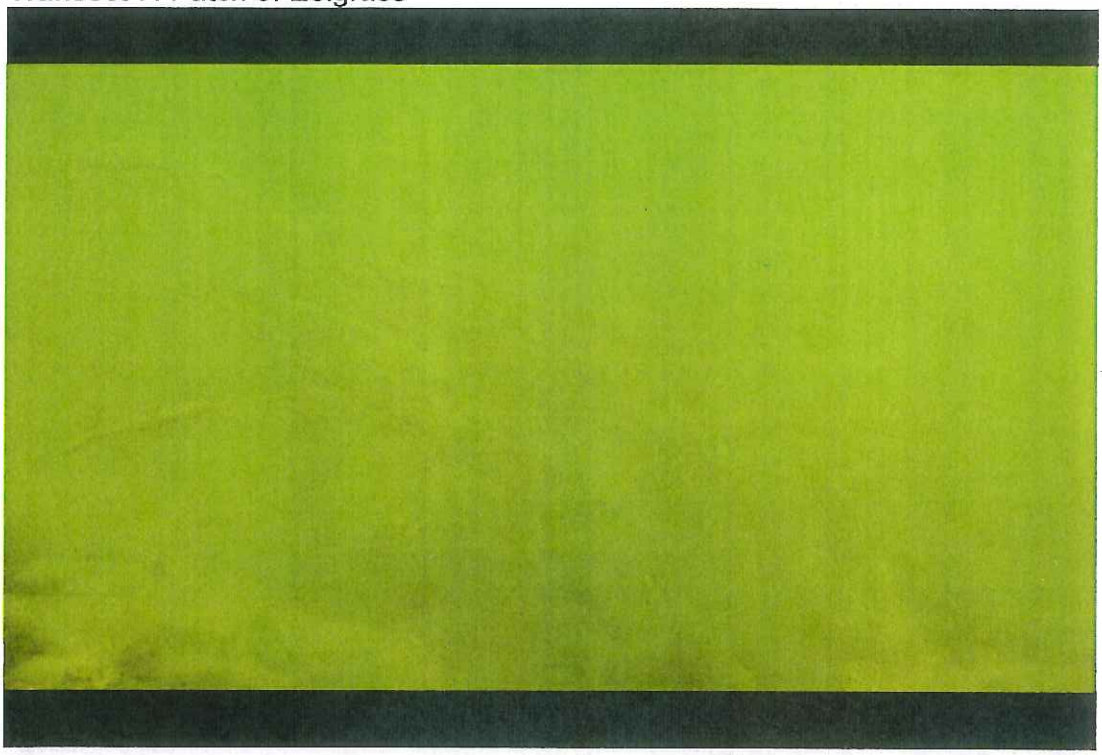
Transect 6: Oyster



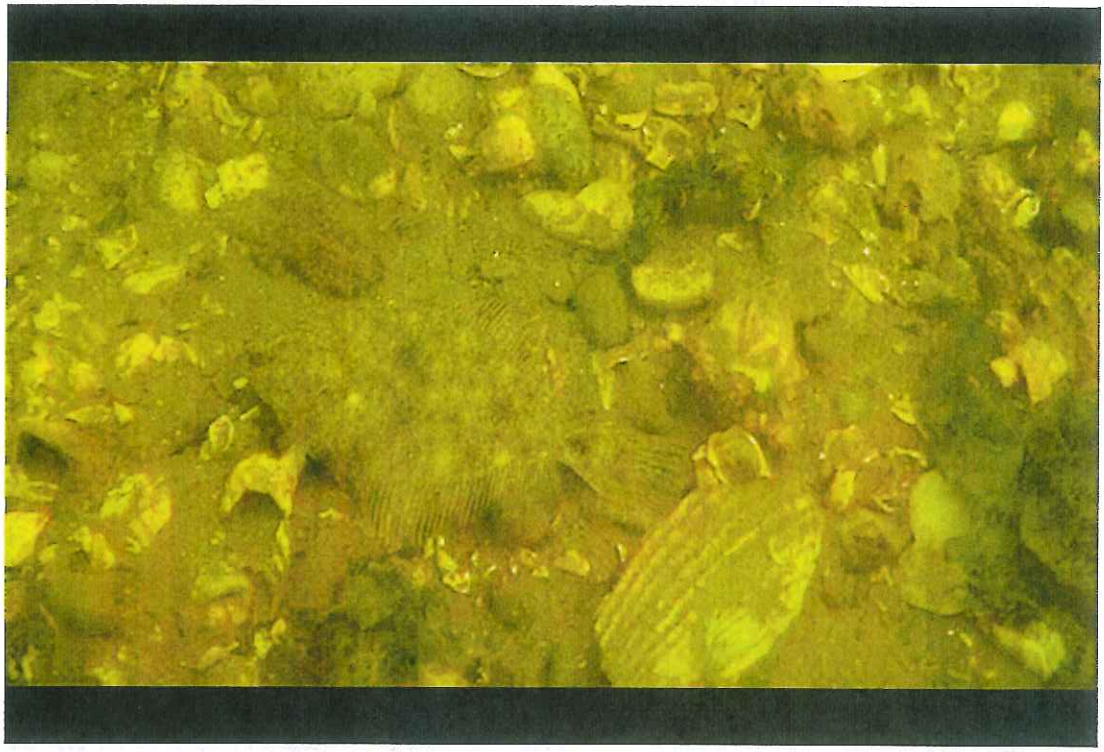
Transect 7: Mixed Substrate



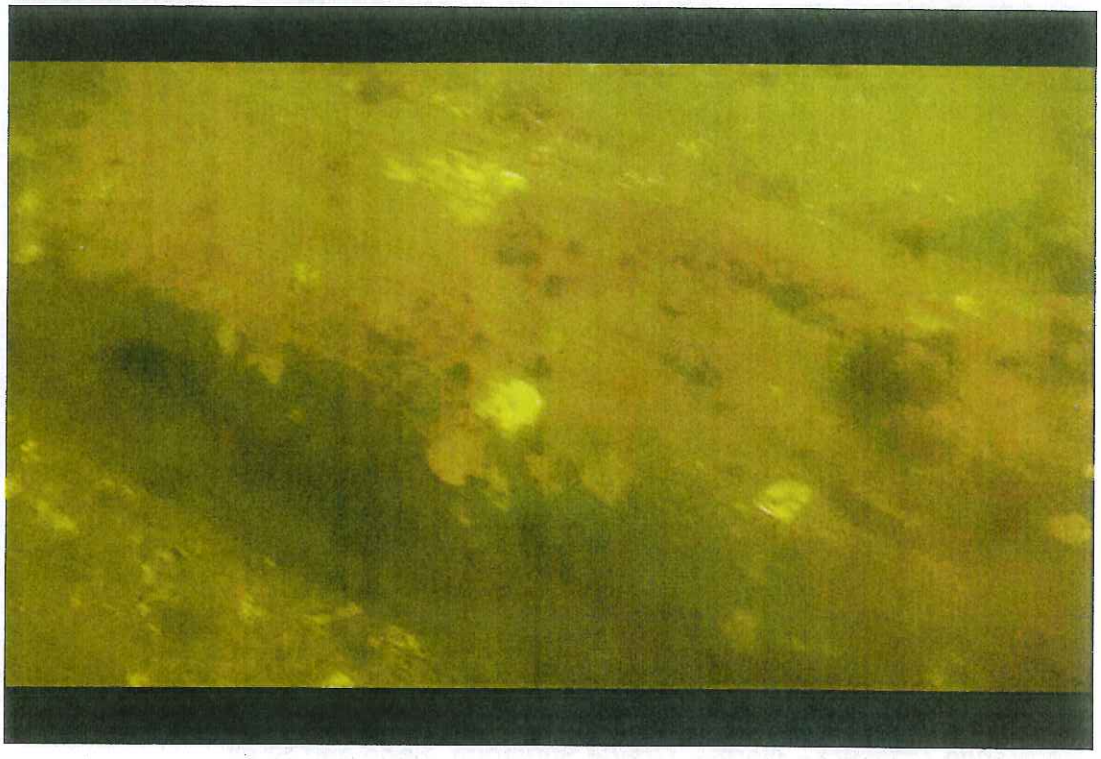
Transect 7: Patch of Eelgrass



Transect 7: Rock Sole



Transect 7: Single Sunken Log, Colonized by Numerous Species and Used as Cover for Fish



Transect 7: Log Utilized by Hermit Crabs

Reference Transect – North – Gravel Substrate

Reference Transect – North – Gravel Substrate, Sand and Shell

Reference Transect – North – Red Rock Crab

Reference Transect – South - Dungness Crab in Sand

Reference Transect – South – Sand Substrate near Start of Transect

Reference Transect – South – Sporadic Ulva on Sand Substrate