Log Transfer Facility Permit Monitoring Services - Seven Sites

USDA Forest Service Order # 43-0116-6-0037

by

Craig's Dive Center

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Introduction

This report is the Log Transfer Facility (LTF) underwater bark debris survey of the seven sites encompassed by the USDA Forest Service Permit Monitoring Services contract (order number 43-0116-6-0037).

Purpose

The survey is designed to fully comply with Environmental Protection Agency (EPA) permit monitoring requirements of a National Pollution Discharge Elimination System (NPDES) permit for a LTF. The technique we evolved for debris monitoring satisfies the requirements for accurate, cost effective and reproducible data.

Methods

The key to creating a reproducible data base is the selection of a permanent reference point location. Rather than use some type of marker that will likely be obscured by damage or debris in time, we have found that using the exact center of the log transfer structure (A-frame, bulkhead, drive-down ramp, low angle slide, etc.) will allow reestablishment of the reference point regardless of marker condition. This location will be marked for reference during the immediate survey.

From this exact center location, the reference point is positioned directly below at a elevation as close to zero feet Mean Low Low Water (MLLW) as possible. This depth is estimated prior to the survey dives. After the dives, using the nearest subordinate station in the current NOAA Tide Table, the averaged dive time is used to calculate the exact correction to apply to the tidal height .

Using the centerline axis of the entry structure as the reference from which five transects in 30 degree (magnetic compass headings) intervals are selected, with the middle transect in line with that centerline axis (for example the centerlines of a drive down ramp or low angle slide). Or, for a site with a bulkhead/A-frame structure, the middle transect is perpendicular to the face of the bulkhead. The permanent reference point is the origin for all of the transects.

Each transect is sampled at five meter intervals starting from the origin at the permanent reference point. Sample points continue to be established along a transect until a water depth of 60 feet MLLW is reached or the measured bark debris depth becomes insignificant. At each sample point the diver measures and records: water depth of sample point in feet, wood debris depth to the nearest centimeter, the percent of bark cover to the nearest ten percent of the area within one meter of the sample point. Also recorded by the diver are observations on; bark debris

size and character, marine life present and their condition, substrate type, direction and strength of current and presence of any significant man made debris. Transects will be labelled by their magnetic compass heading for individual identification.

The reports are written and the transect data is organized in Geoworks. Water depth measurements will be taken from a SeaQuest dive computer with an accuracy of +/- 1%. A Suunto compass will be used for the transect compass headings.

Additionally, 35mm photographs are taken of representative sample points to document substrate, bark debris, algal and animal life and any debris or objects that may be of concern. The photographs are organized so that photo number one is top left in the holder and numbering continues in clockwise fashion.

The field data was analyzed to meet the criteria of the contract. Without the extensive data necessary to calculate bark debris coverage area to a reasonable confidence level, areal extent was calculated with the outermost two transects as the boundaries of bark coverage. Debris surface area calculation was made by taking the triangle formed by two of the transects and using the transect with the most sample points (longest distance) as the base leg of a right triangle area calculation. The total square footage of the debris field area was a summation these four triangle areas. This figure was converted to acres as required by the guidelines.

To determine areal extent of substrate with 100% coverage by bark debris and the area of 100% cover and debris depth greater than ten centimeters, the percentage of sample points with that coverage was calculated and multiplied by the total sample area acreage to give the respective areal coverages.

If there are any questions about the surveys or this report, please call or fax us.
Thank you for allowing Craig's Dive Center to be of service.

Craig Sempert

Diver

Results

Site 1:

Site: Traitors Cove 8 (Marguerite), NPDES no. AK-004559-4)	
Date Surveyed: 3/13&7/796	Total # of Sample Points: 55
Time of Sampling: 1430	Average Bark Depth: 5.5 cm
Sampler: C. Sempert	Calculated Survey Area: 1.04 acre

Area with some Debris Cover	Area of sample pts. with 100%Cover	Area of sample pts. with Debris >10 cm & 100%
1.04 acre	0.42 acre	0.23 acre

The permanent reference point was established at the lower end of the center stringer of the slide, directly below and located at a measured depth of four feet, corrected to a depth of one feet MLLW. A total of 55 sample points were taken on the five transects, all of the sample points had some debris. Of these, twelve (22%) had a measured debris depth of ten centimeters or greater and 100% cover and 22 of the sample points (40%) had an estimated 100 % coverage by debris. Surface area covered with at least a trace of bark debris, using transects 130 and 250 as outer boundaries, computes to 1.04 acres. Total area covered by the dive survey is 1.04 acres.

Observations:

Weather conditions at survey time were overcast skies in light rain and rainshowers, easterly winds at 25 knots and air temperature in the low forties. The diving started at 1340 and took place during the beginning of a flooding tide cycle. Low tide occured at 1311 with a height of 1.5 feet (corrected to subordinate station #1427, Traitors Cove (lower section), on the Ketchikan tide tables) and a tidal exchange of10.6 feet. Light current paralleled the shoreline in a roughly west to east direction at depth and a strong surface current running in the opposite direction on the surface - outflow from the creek. Water temperature was measured at 42°, underwater visibility was less than five feet at the surface in the freshwater runoff and estimated at approximately 25 feet at depth.

Situated in a large bay in lower Traitors Cove, the alluvial plain of a good sized creek is the dominating feature all the way to the westernmost edges of the site. The alluvial shelf itself is nearly flat up to where it breaks sharply to a steep drop down to a nearly flat bay bottom of silt and mud. The alluvial shelf tapers off, in horizontal distance from the shoreline, to become the

normal substrate slope.

Method of bundle entry was a high angle slide from an A-frame with a moderate high tide necessary to float the bundles. The slide has been rebuilt using three steel slide rails set on large steel pipes. A new layer of fill rock was placed over the existing fill. Using the center rail as the lineup axis for the middle transect it was determined that the transect headings have been shifted 20 degrees. This survey followed the new headings, which also put the easternmost transect so close to shore and so shallow it was determined to forgo that transect.

An old site with a large volume of wood transferred in the past, the distinction between old bark debris and natural sediment was difficult for two main reasons. First, the estimation of bark depth was hampered by lack of clear distinction between old debris and sediment. Some of the bark debris appeared recent and some was estimated to be quite old. The second bark debris identification problem is the apparently large volume of natural forest detritus washed down from the creek watershed. The transects most affected by this problem are 160 and 190, which are directly in the path of the creek debris, but lighter debris such as leaves were present on all transects and especially at the base of the steep slope.

The marine life community has not changed noticeably from the previous surveys. A few clam siphons were observed, especially up on the flats. Near the base of the slope and out on the flats some Dungeness crabs (almost all small) were on the surface of the substrate/debris moving about. Also on the bay bottom some small flatfish would swim off when disturbed by the diver. Large, white Metridium anemones were numerous in this area also, attached to whatever solid substrate was available. Sea cucumbers in low numbers were present at the deeper sample points. And the everpresent sea stars were observed throughout the survey area, represented by a few species.

Bark debris present was a mixture of sizes, from fine debris characterized as sawdust to larger debris composed of bark chips, chips being defined as pieces larger than 1.3 cm (1/2 inch) and smaller than 10.2 cm (4 inches). Concentration of debris size components varied throughout the area with no discernible pattern. Some bark chunks (>10.2 cm up to two meters in length) and slabs were present throughout the sample area but only occasionally along as were the scattered branches. How much of this debris is detritus from the creek input is very difficult to determine. Another factor is the age of the LTF debris - none of it is fresh which makes differentiation much more difficult.

No prominent manmade debris was observed. The only item to note is the old pipeline running across the shelf in front of the input area.

Transect 130 was surveyed on July 7, 1996.

Table 1

Transect Location - Traitors Cove 8

Transect	Reference Point Location
130 160 190 220 250	Positioned beneath the bottom end of the middle rail of the slide, just in front of the horizontal pipe frame. Actual measured depth was 4 feet, corrected to MLLW depth of 1 feet.

Transect Data - Traitors Cove 8

Transect/ Sample Pt.	Depth from MLLW	Debris Depth (cm)	Percent Coverage
Ref. Pt.	1	<2.5	90
160/1	4	<2.5	50
160/2	4	<2.5	75
160/3	4	<2.5	50
160/4	4	2.5	75
160/5	4	5.1	90
160/6	4	2.5	90
160/7	4	2.5	90
160/8	4	2.5	90
190/1	5	2.5	100
190/2	5	12.7	100
190/3	9	<2.5	50
190/4	17	7.6	100
190/5	24	5.1	100
190/6	24	17.8	100
190/7	31	27.9	100
190/8	36	7.6	100
190/9	40	5.1	100
190/10	44	5.1	100
190/11	46	2.5	90
190/12	48	2.5	90
190/13	51	2.5	75
220/1	4	10.2	100
220/2	6	12.7	100

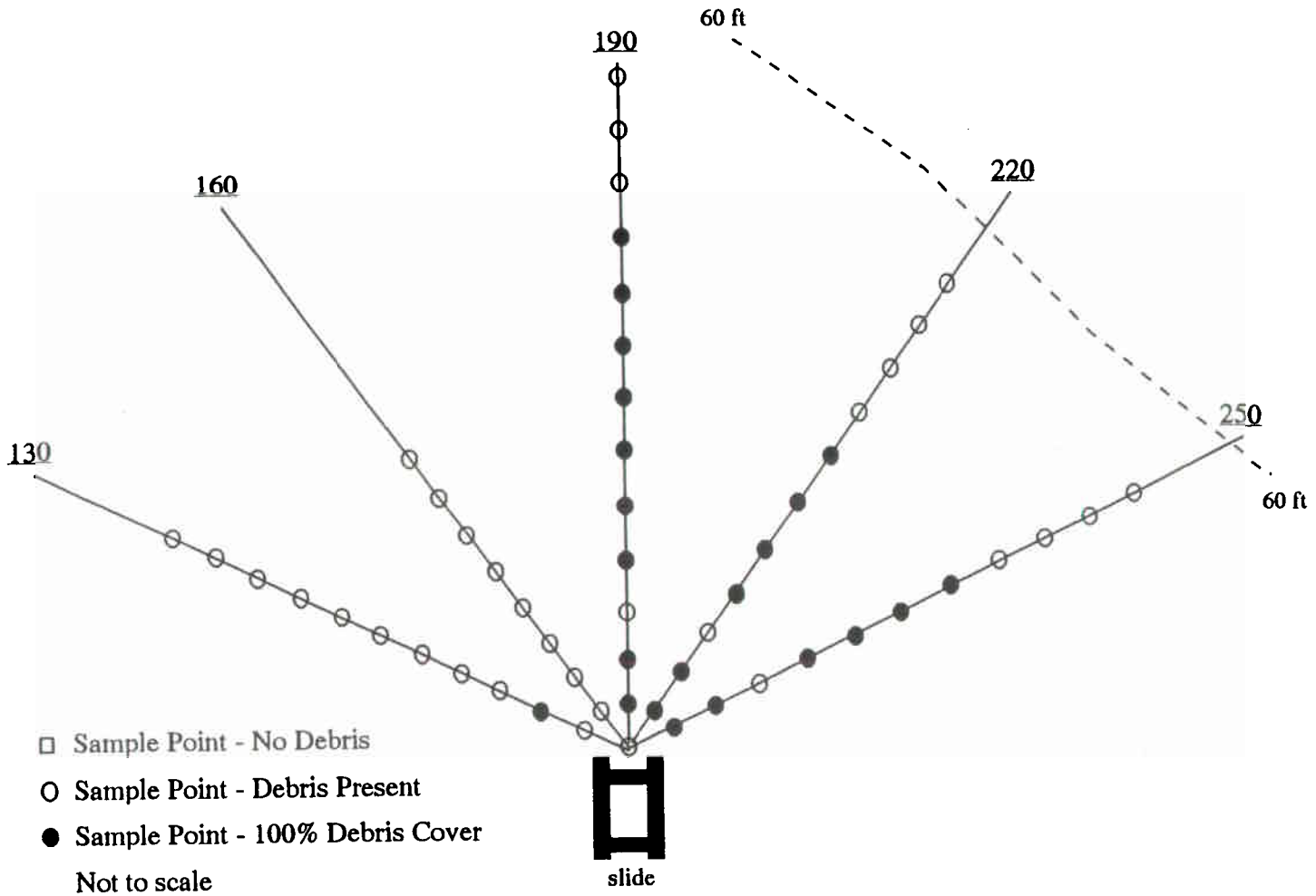
Table 1 (cont.)

Transect/ Sample Pt.	Depth from MLLW	Debris Depth (cm)	Percent Coverage
220/3	10	<2.5	50
220/4	18	12.7	100
220/5	28	10.2	100
220/6	36	10.2	100
220/7	40	5.1	100
220/8	43	2.5	75
220/9	46	2.5	75
220/10	49	2.5	50
220/11	51	<2.5	25
250/1	3	17.8	100
250/2	5	12.7	100
250/3	11	<2.5	75
250/4	20	5.1	100
250/5	30	10.2	100
250/6	36	5.1	100
250/7	41	5.1	100
250/8	44	2.5	75
250/9	46	2.5	75
250/10	49	2.5	50
250/11	50	<2.5	25
130/1	+2	<2.5	25
130/2	1	10.2	100
130/3	0	<2.5	25
130/4	+1	<2.5	10
130/5	+2	<2.5	10
130/6	+1	<2.5	10
130/7	+1	<2.5	50
130/8	+1	<2.5	50
130/9	+1	<2.5	75
130/10	0	<2.5	25
130/11	0	<2.5	10

Photograph Key

Traitors Cove 8

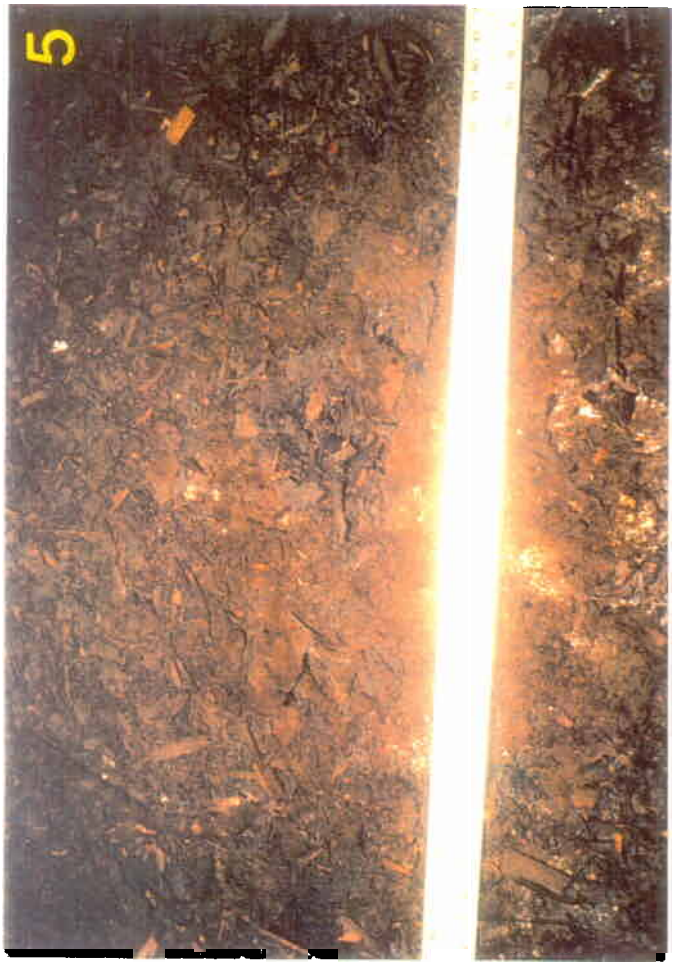
Photo #	Transect/ Sample Pt.	Description
1	Surface	View from southwest
2	Surface	Closeup from straight out
3	Ref. Pt.	Blurry due to freshwater layer
4	250/1	Bark chips, chunks and sticks
5	250/2	Diatom film on surface of debris
6	250/3	Thin debris layer on substrate
7	250/4	Debris with some bacterial patches
8	250/5	Fairly uniform debris
9	250/6	Some shell visible
10	250/7	Leaves, natural detritus
11	250/8	Silt mixed in
12	250/9	Silt and debris mixture
13	250/11	Large Metridium anemone
14	190/1	Thin debris layer
15	190/2	Larger debris pieces
16	190/3	Debris patch over fine gravel, sand
17	190/6	Debris accumulation on slope
18	190/7	Natural detritus mixed in
19	190/8	Zone of leaf accumulation
20	190/10	Sea cucumber, some silt on surface
21	190/11	More of a silt component
22	160/1	Light debris, bacterial patch on pea gravel
23	160/3	A little debris, diatom film
24	160/5	Varied debris of different origins
25	130/2	100% bark debris
26	130/3	Mixture of debris, substrate and shell
27	130/4	Protruding cable end
28	130/5	Large shell component of substrate
29	130/6	Slightly more bark debris
30	130/7	Debris piling up by pipe
31	130/8	More woody debris
32	130/9	Some larger wood pieces

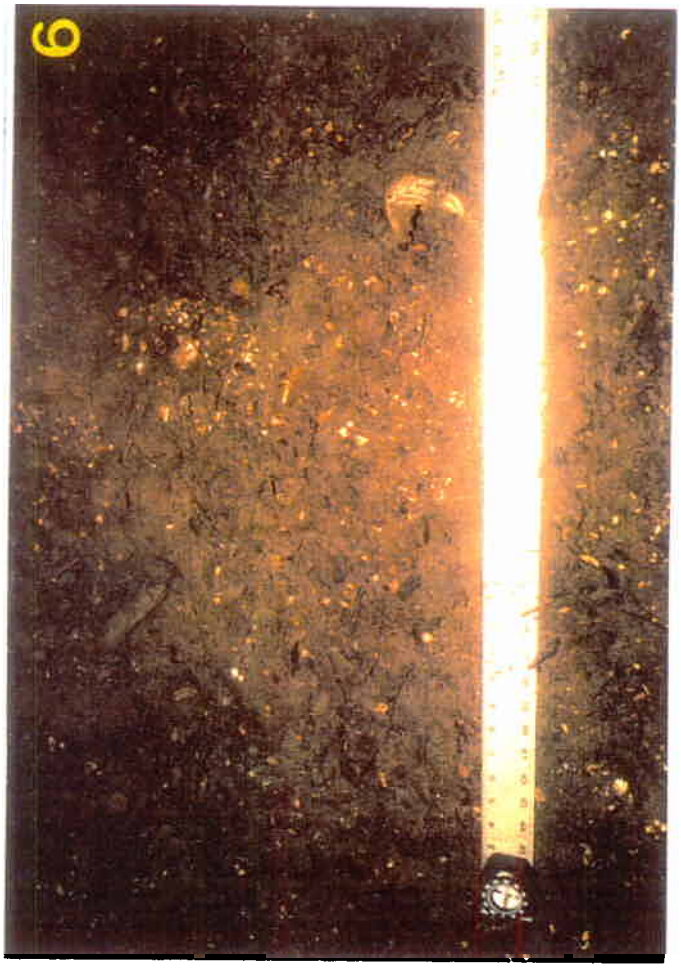


3/13/96 Traitors Cove 8 Dive Survey

SITE 1

TRAITORS COVE 8 (MARGUERITE BAY)





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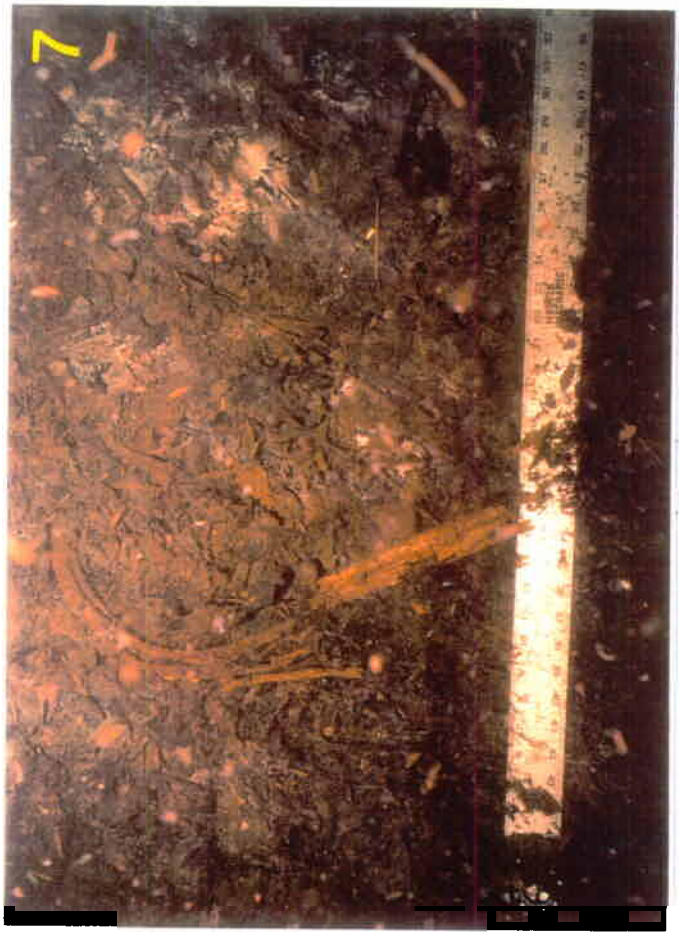

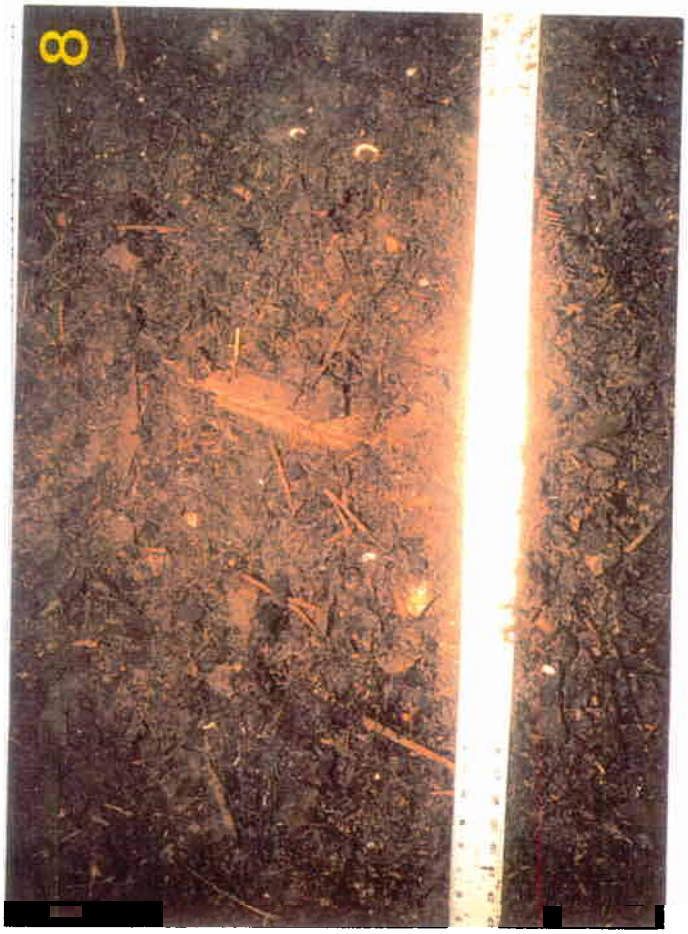

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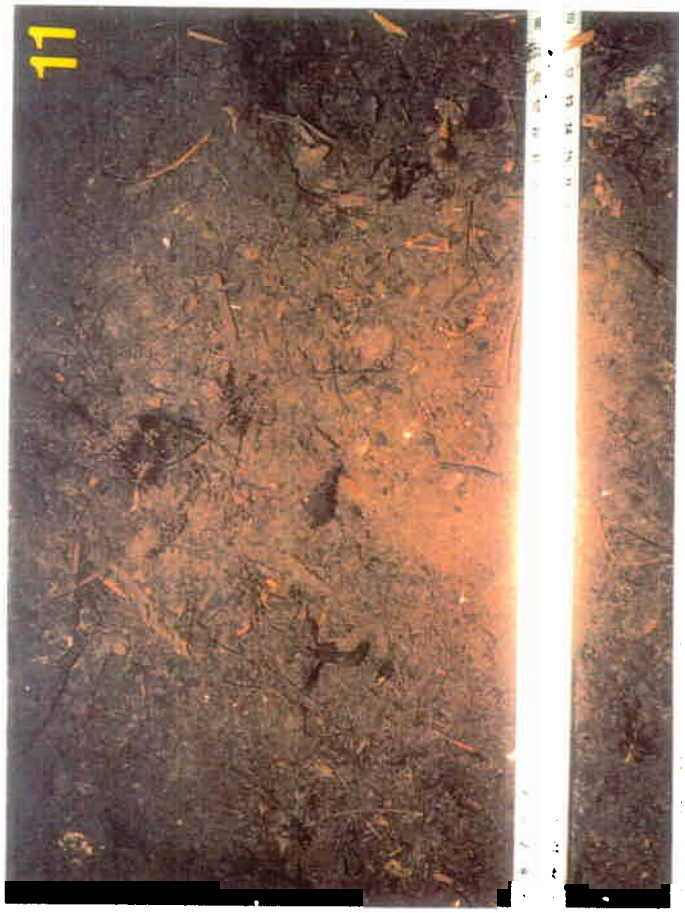

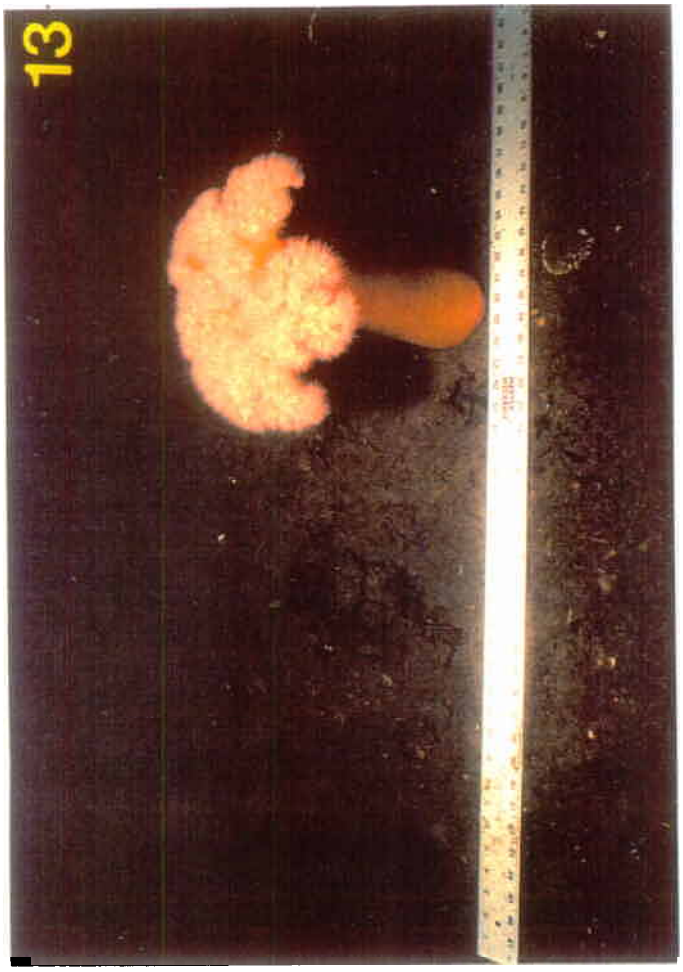

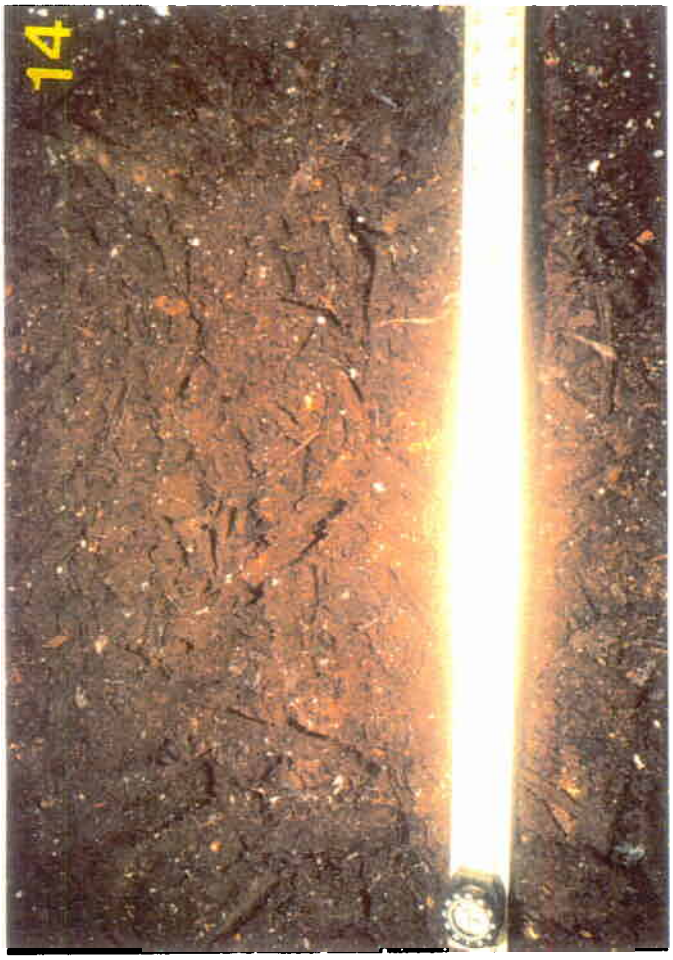

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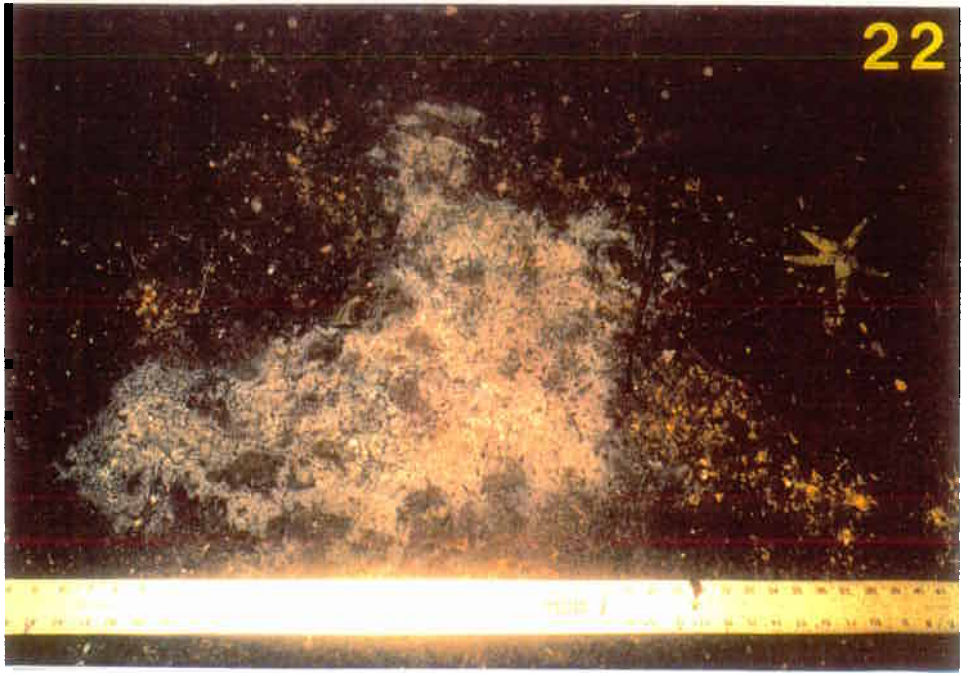

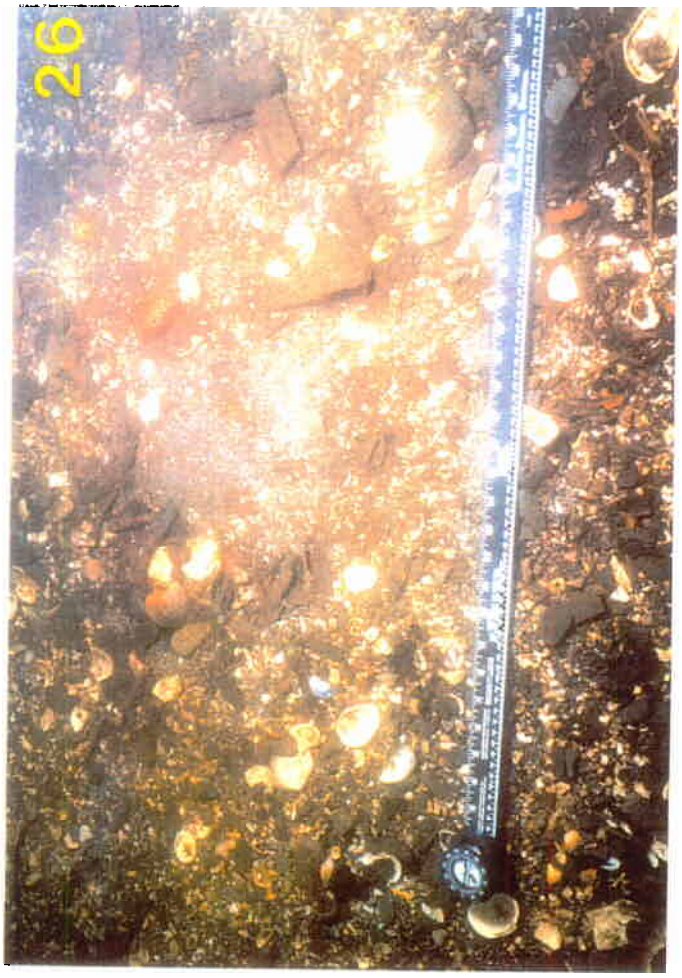

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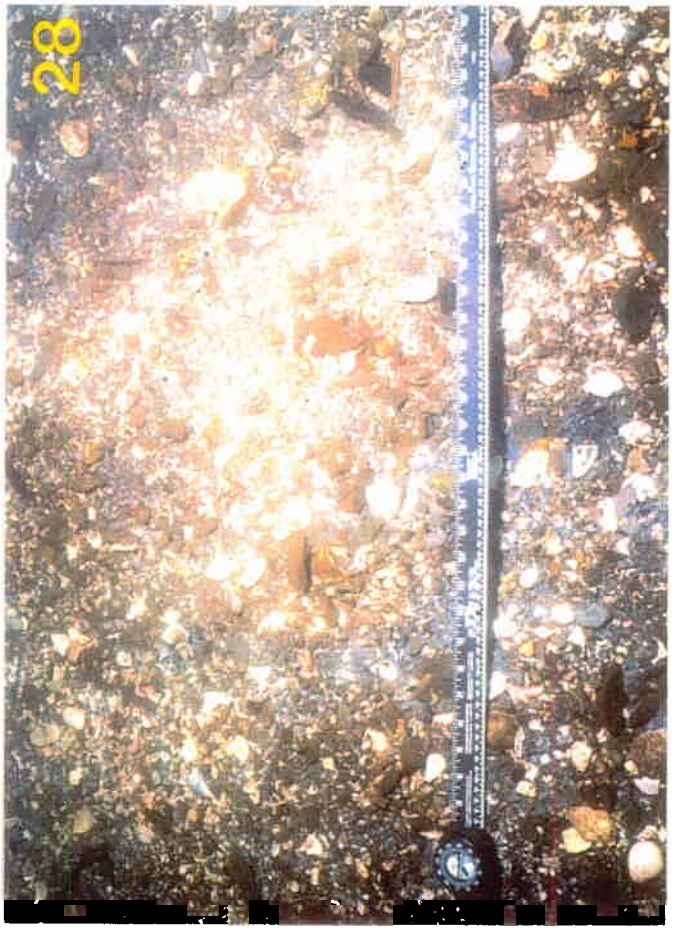

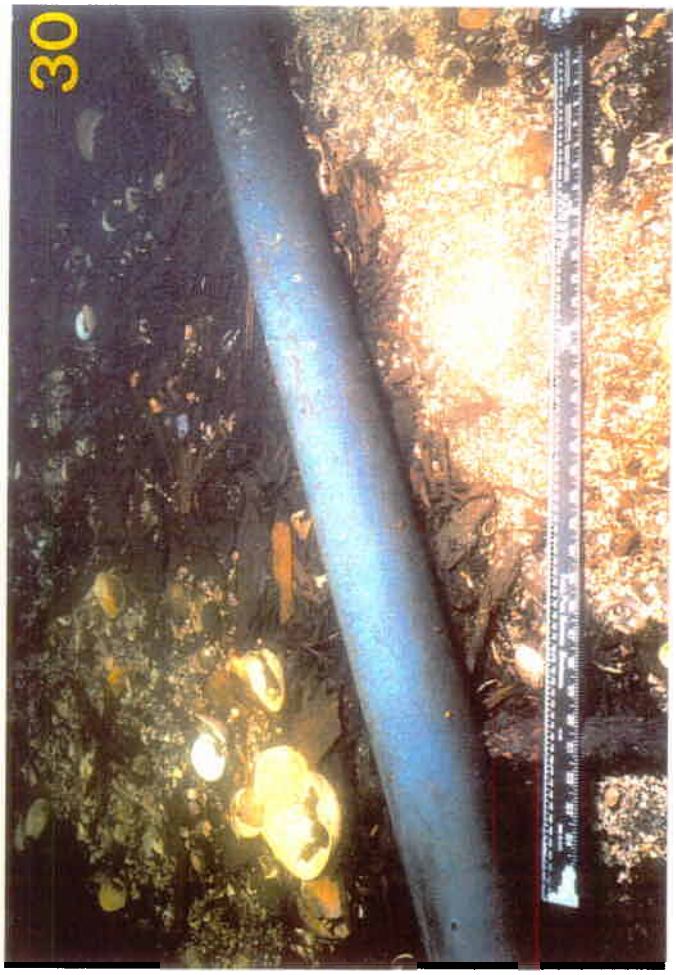

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