Tolstoi Bay 1 - Sealaska

1	2	3	4	5
90	165	165	75	90
60	60	60	60	60

90 - 165 = 3713 sf
165 - 165 = 6806
165 - 75 = 3094
75 - 90 = 1688
15,301
- 3600
11,701 / 43,560 = 0.269 ac

60 - 60 = 900
60 - 60 = "
60 - 60 = "
60 - 60 = "
3600

HAGGITT CONSULTING

2003 Bark Monitoring Survey Report

2-24-03
0.25 ac CC

Tolstoi Bay LTF

FEBRUARY 24, 2003 SURVEY

Tolstoi Bay Log Transfer Facility

Submitted to:
Sealaska Timber Corporation
2030 Sealevel Dr., Suite 202
Ketchikan, Alaska 99901

Prepared By:
Haggitt Consulting
15912 14th Ave NW
Gig Harbor WA. 98332

Submitted On:

March 30, 2003

Abstract

An underwater reconnaissance was conducted on February 24, 2003 at the Tolstoi Bay Log Transfer Facility (LTF) to determine the extent of bark debris accumulation. The site surveyed is located in Tolstoi Bay, Prince of Wales Island, Alaska. This inspection was done to satisfy the bark-monitoring program required by the NPDES permit.

The radial pattern used to survey the site consisted of five transects at 30 degree intervals. The sampling frequency was at 15 foot intervals. The survey methods remained in compliance with the standard methods that can be found in **"Required Method for Bark Monitoring Surveys under the LTF General Permits".**

The survey documented that the Log Transfer Facility contained both continuous and discontinuous bark debris. The survey using the radial transect pattern quantified the extent and type of coverage as 0.25 acres continuous bark debris and 0.25 acres of discontinuous bark debris in a survey area of 0.56 acres.

Table of Contents

Introduction

The Tolstoi Bay LTF was not operational at the time of the survey. The Log Transfer Facility is located in the western portion of Tolstoi Bay, with a northern exposure. The weather conditions and underwater visibility were optimal during this bark monitoring survey. The bathymetric conditions at the site are that of a fill slope that descends into a series of riffs and valleys created by a rock reef providing relief to the sand and silt substrate. Bark debris and other organic debris were noted in continuous and discontinuous coverage and tended to congregate in the valleys.

A summary of the approach and techniques used in the LTF survey are provided below in the Methods Section. The result of the survey is then presented together with estimates of the spatial extent and depth of bark on the seafloor.

Methods

Standard methods were used to survey the Tolstoi Bay Log Transfer Facility. The methods used can be found in the publication "Required Method for Bark Monitoring Surveys under the LTF General Permits".

Radial Transects

The fixed hub reference point for the transects radiating from the log transfer ramp was initially located by assessing maps and diagrams created by Diversified Diving Service in the February 22, 2002 bark monitoring survey. The hub location was then "fixed" at the center of the ramp by DGPS coordinates.

The reference hub was located as close as possible to the center of the discharge site to facilitate future reconnaissance. Five transects were established, radiating from the reference hub at 30-degree intervals. Two separate magnetic compasses were compared to determine the bearings. Shore based and vessel based personal monitored the divers' progress and used radio/diver-telephone communications for course adjustments. Transect end points were recorded on DGPS to provide actual headings traveled.

The transects were terminated by the requisite of beyond the area of significant bark accumulation, or at a depth of 60 feet MLLW, whichever came first.

Sample Points

Samples were taken at intervals of 15 linear feet along each radial transect. This interval distance was established with the use of a rolling tape measure, the accuracy is reported as +/- 3 inches at 1000 feet. At each sample point observations were noted on the abundance and type of marine organisms present, the native vegetation, and composition of the substrate. Data including the water depth, current direction, and estimated current velocity also were incorporated into the field notes. Each of the sample points also included relevant observations on operational debris and existing bark debris. Photographic documentation was used at representative sample locations to record algal life, animal life, substrate, and debris present. Sample location depth notations are based on readings from a Cochran Consulting Nemeses IIA dive computer calibrated for saltwater and altitude.

Area of Bark Cover

For each survey, the percentage of bark coverage was determined by using the protocol for operating a bark-monitoring program given in the EPA General Permit. The area calculation used in this report is outlined in the ADEC publication "Required Method for Bark Monitoring Surveys under the LTF General Permits". Area calculations were accomplished by drafting scaled transect diagrams from the sample point tables in TurboCAD Professional V6. The TurboCAD program then accomplished the area calculations. ADEC has approved the use of AutoCAD programs for area calculations.

The area calculation used in this survey is considered to be a conservative estimate of the area of continuous bark coverage. Some sample points were considered to represent 100 percent bark coverage, when the cover material did not appear to be entirely bark. This cover material could have been provided by other organic material in the area. This observation is discussed in more detail in Chapter 1.

Tolstoi Bay LTF Dive Survey

Surveyed on February 24, 2003

The survey was conducted at the request of Sealaska Timber Corporation. An underwater reconnaissance was requested to determine the representative condition of an area operating as a Log Transfer Facility (LTF). The survey dive was conducted on February 24, 2003. The site surveyed is located in Tolstoi Bay, Prince of Wales Island, Alaska.

This inspection documented findings according to the Alaska Department of Environmental Conservation (ADEC), Environmental Protection Agency (EPA) and NPDES requirements. The percentage of bark coverage was determined by using the protocol for operating a bark-monitoring program given in the EPA General Permit. The area calculation used in this report is outlined in the ADEC publication **"Required Method for Bark Monitoring Surveys under the LTF General Permits".**

Findings

Continuous Coverage	Discontinuous Coverage	Total Survey Area
0.25 Acres / M_2	0.25 Acres / M_2	0.56 Acres / M_2

0.27 - DCA

Log Transfer ramp
The reference point hub position, located along the shore line of Prince of Wales Island was recorded using a Raytheon DGPS. The coordinates for this hub are: 55° 37' 825 N by 132° 26' 091 W.

Weather conditions during the survey consisted of overcast skies with winds at less than 5 knots. Diving commenced at 10 a.m. on February 24, 2003 during mid water. The tidal station (subordinate station #1461) was used to correct depths to MLLW. The station reported a tide level of 7.7 ft at 10 a.m. The current conditions remained negligible. Seawater temperature was recorded at 43 degrees F. The horizontal visibility was estimated to be 25 feet.

Five transects, radiating from a central hub traversed the bottom on bearings labeled T^1 270°, T^2 300°, T^3 330°, T^4 000°, and T^5 at 030°. A total of 57 sample locations at 15-foot interval distance were assessed.

Site conditions remained steady with winds less than 5 knots and overcast skies. Diving concluded at 12:00 p.m. on February 24, 2003 during low tide. The tidal station (subordinate station #1461) was used for depth corrections, reporting a 2.7 ft tide level at 12 p.m. The tidal current velocity was estimated by the diver to be 0.0 knots. The horizontal visibility remained constant and was estimated to be 25 feet. The grade for these transects averaged 3:1.

Observations

The site bathymetry consisted of a cobble/sand grade of about 3:1 until approximately sample point 3 (on each transect) when the grade increased to 2:1 at the edge of the fill slope. At the base of the fill slope the sand/silt substrate returned to about a 3:1 grade, but varied considerable as the rock reef relieved the substrate.

The Tolstoi Bay Log Transfer Facility contained continuous and discontinuous bark debris. The debris was generally coarse in texture near the LTF ramp and reduced in particulate size the farther away from the central discharge point observations were recorded.

Natural decomposing materials (Kelp, grasses and branches) were observed in abundance in and amongst the bark debris, but at approximately 45 ft MLLW both the bark debris from the LTF and the natural organic matter had reduced in particulate size as to make discerning between the two difficult. This observational problem was compounded by the mixing of fine silts with the reducing materials. All areas observed as having organic degrading material coverage were recorded as bark debris, therefore the coverage of bark debris in this report should be considered conservative, as the bark debris recorded may have been exaggerated in volume and spatial extent by the additional materials.

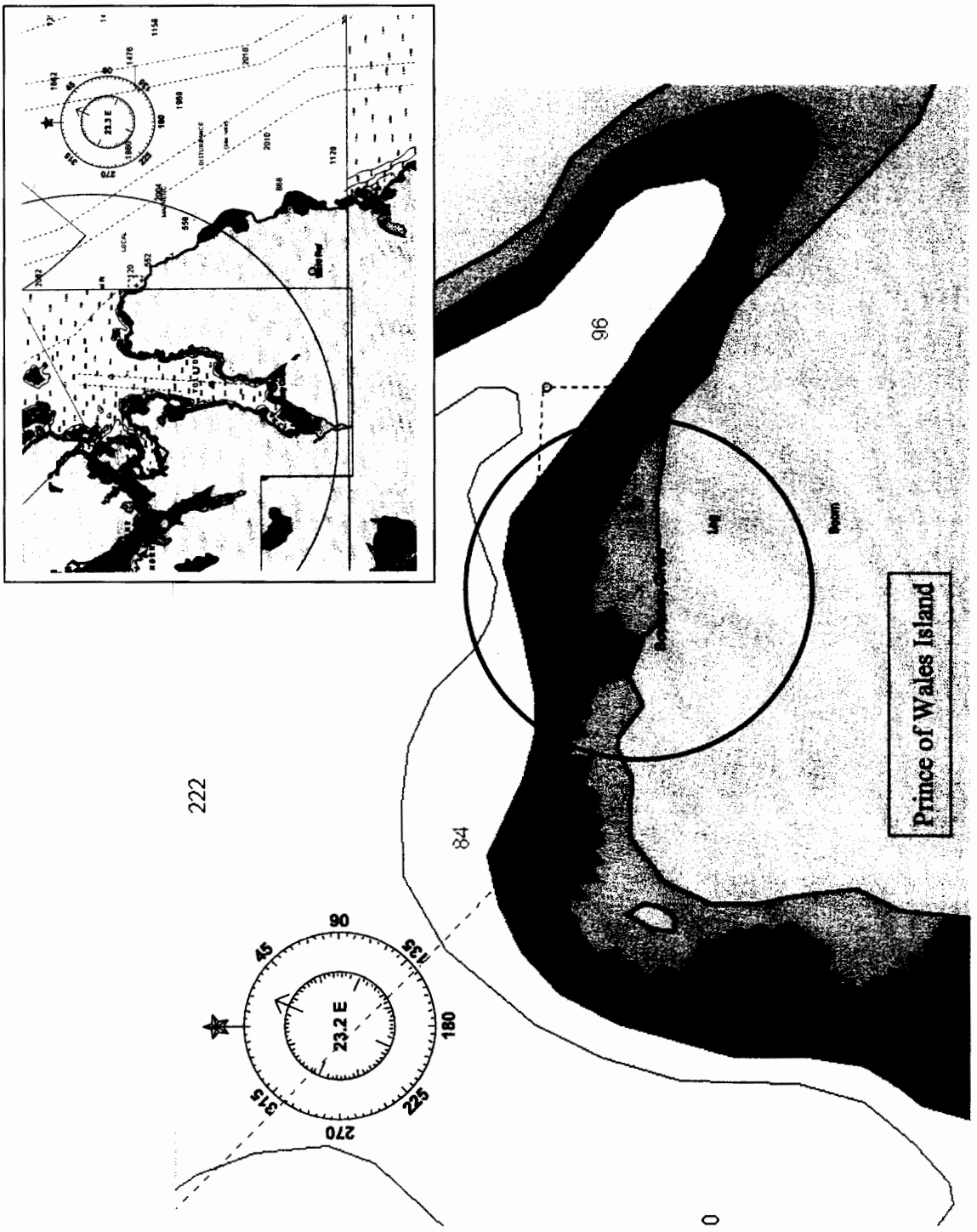
Approximately half of the observed debris at this site could be considered fine in particle size and well mixed with the substrate. The bark debris near the LTF discharge point is generally characterized as small chunks and pieces. No operational debris was observed.

This determination is based on the calculations derived from the transect data collected for this report only. For further service regarding this report, please direct inquiries to (253) 209-9380 or e-mail at Haggitt1@juno.com.

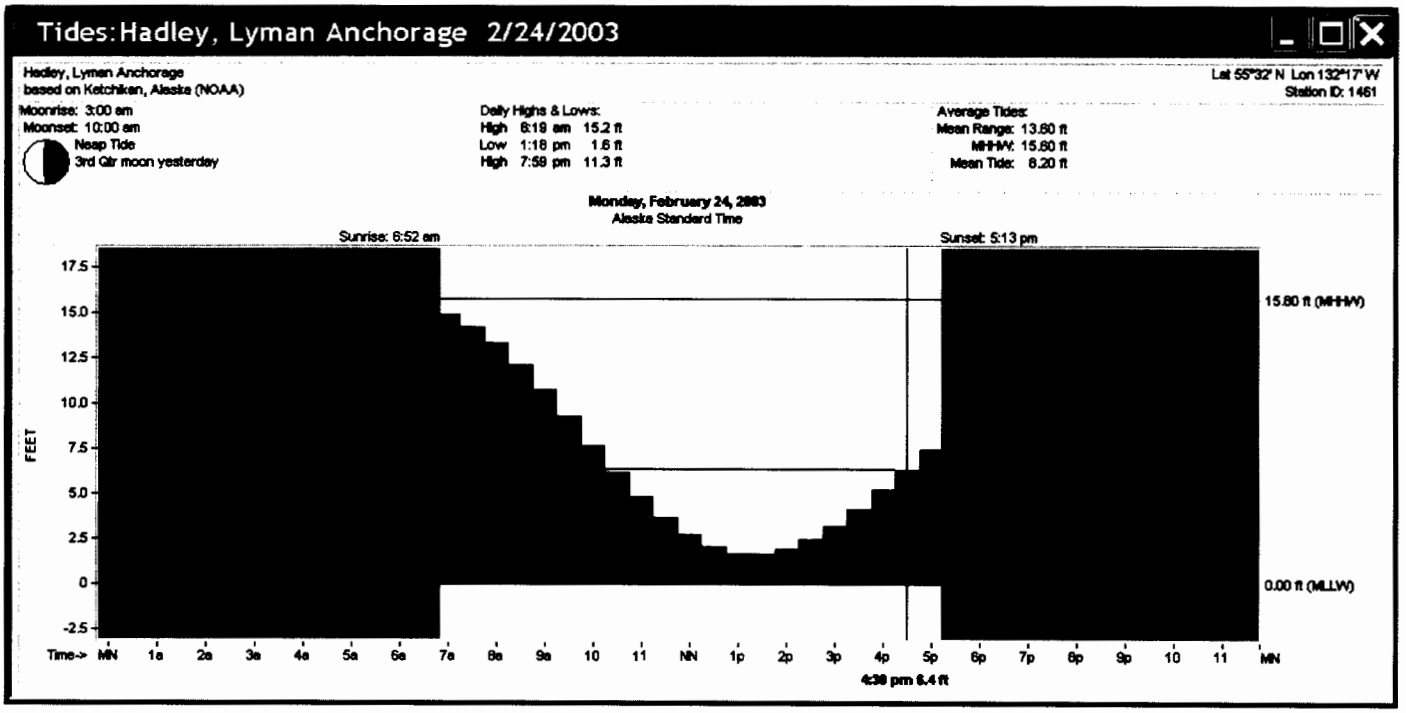
Respectfully submitted,

Stephen Haggitt
April 17, 2003

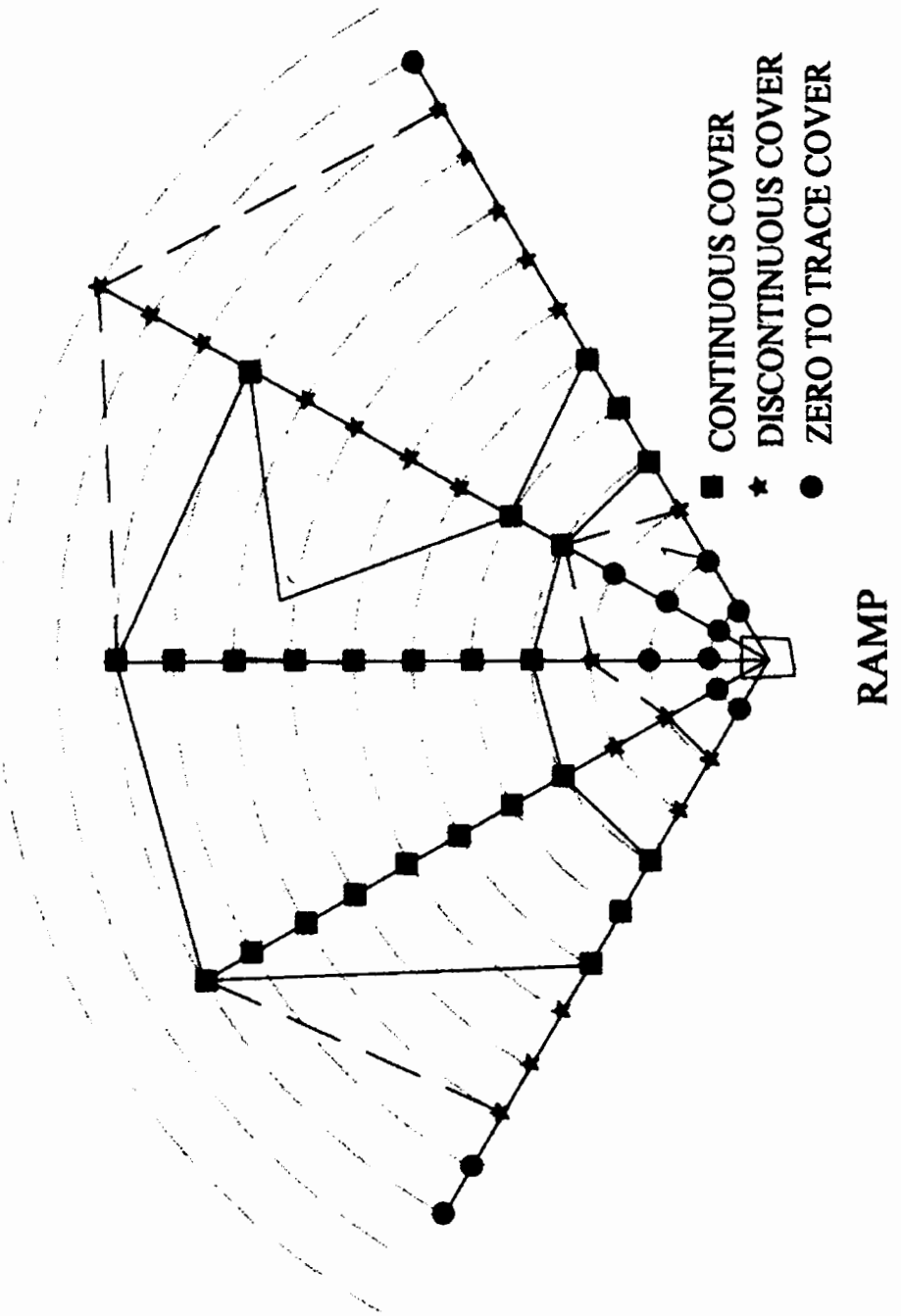
Vicinity Map



Tidal Chart


Tides:Hadley, Lyman Anchorage 2/24/2003
Hadley, Lyman Anchorage
based on Ketchikan, Alaska (NOAA)
Lat 55°32' N Lon 132°17' W
Station ID: 1461
Moonrise: 3:00 am
Moonset: 10:00 am
Neap Tide
3rd Qtr moon yesterday
Daily Highs & Lows:
High 6:19 am 15.2 ft
Low 1:18 pm 1.6 ft
High 7:59 pm 11.3 ft
Average Tides:
Mean Range: 13.60 ft
MHHW: 15.80 ft
Mean Tide: 8.20 ft
Monday, February 24, 2003
Alaska Standard Time
Sunrise: 6:52 am
Sunset: 5:13 pm
FEET
17.5
15.0
12.5
10.0
7.5
5.0
2.5
0
-2.5
15.80 ft (MHHW)
0.00 ft (MLLW)
Time-> MN 1a 2a 3a 4a 5a 6a 7a 8a 9a 10 11 NN 1p 2p 3p 4p 5p 6p 7p 8p 9p 10 11 MN
4:38 pm 6.4 ft

Calculation Diagram



Data Tables

Transect 1 270 Degrees

Sample Point	Depth at MLLW	Bark Depth *(Inches)*	% of Cover	Substrate Type
1	10	0	0	C
2	12	<1	10	C
3	14	<1	50	Sl
4	21	8	100	Sl
5	23	8	100	Sl
6	24	4	100	Sl
7	22	<1	80	Sl
8	20	<1	25	Sl
9	20	<1	20	Sl
10	17	Trace	Trace	Sl
11	15	0	0	R
12				
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14				
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Key:
SH=Shell, S=Sand, M=Mud, SL=Silt, R=Rock, C=Cobble, G=Gravel
Bark Depth Recorded in Inches

Transect 2 300 Degrees

Sample Point	Depth at MLLW	Bark Depth *(Inches)*	% of Cover	Substrate Type
1	7	0	0	S
2	10	<1	50	S
3	16	<1	50	Sl
4	28	7	100	Sl
5	35	4	100	Sl
6	42	3	100	Sl
7	48	3	100	Sl
8	53	2	100	Sl
9	56	4	100	Sl
10	61	2	100	Sl
11	63	2	100	Sl
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34				

Key:
SH=Shell, S=Sand, M=Mud, SL=Silt, R=Rock, C=Cobble, G=Gravel
Bark Depth Recorded in Inches

Transect 3 330 Degrees

Sample Point	Depth at MLLW	Bark Depth *(Inches)*	% of Cover	Substrate Type
1	5	0	Trace	R
2	8	0	Trace	C
3	16	<1	50	S, Sl
4	26	9	100	Sl
5	34	11	100	Sl
6	40	14	100	Sl
7	45	9	100	Sl
8	50	8	100	Sl
9	52	3	100	Sl
10	56	2	100	Sl
11	63	2	100	Sl
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Key:
SH=Shell, S=Sand, M=Mud, SL=Silt, R=Rock, C=Cobble, G=Gravel
Bark Depth Recorded in Inches

Transect 4 000 Degrees

Sample Point	Depth at MLLW	Bark Depth *(Inches)*	% of Cover	Substrate Type
1	4	0	0	R
2	5	0	0	R
3	10	0	0	C
4	20	6	100	Sl
5	30	5	100	Sl
6	30	3	50	Sl
7	32	3	50	Sl
8	38	4	80	Sl
9	42	3	80	Sl
10	43	4	100	Sl
11	54	1	60	Sl
12	62	<1	40	Sl
13	63	<1	50	Sl
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Key:
SH=Shell, S=Sand, M=Mud, SL=Silt, R=Rock, C=Cobble, G=Gravel
Bark Depth Recorded in Inches

Transect 5 030 Degrees

Sample Point	Depth at MLLW	Bark Depth *(Inches)*	% of Cover	Substrate Type
1	3	0	0	C
2	5	0	0	S
3	7	<1	20	S
4	15	4	100	S
5	14	3	100	S
6	18	2	100	S
7	20	<1	50	S
8	21	<1	10	S
9	21	<1	20	S
10	19	<1	20	S
11	20	<1	20	S
12	18	0	0	R
13				
14				
15				
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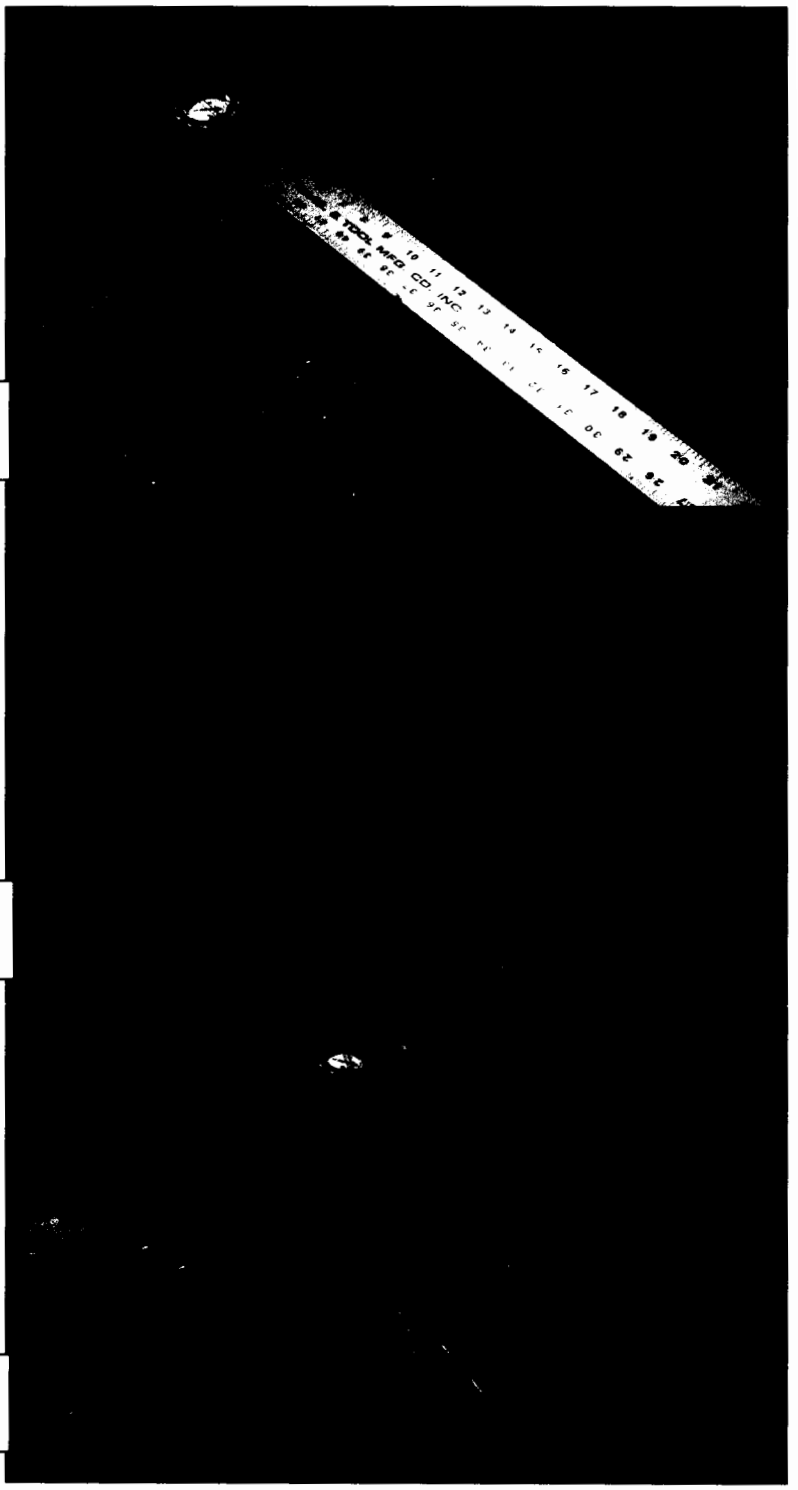
34				

Key:
SH=Shell, S=Sand, M=Mud, SL=Silt, R=Rock, C=Cobble, G=Gravel
Bark Depth Recorded in Inches

Abundance Tables

Scientific Name	Common Name	Abundance
Plants		
Ulva / Monstroma spp.	Sea lettuce	C
Lithothamnion spp.	Crustose red algae	L
Agarum clathratum	Sieve Kelp	L
Laminaria saccharina	Suger kelp	L
Invertebrates		
Mediaster aequalis	Red star	C
Luidia foliolata	Sand star	L
Pycnopodia helianthoides	Sunflower star	L
Pisaster ochraceus	Ochre star	L
Pododesmus macrochisma	Jingle	L
Cucumaria miniata	Orange sea cucumber	L
Dermasterias imbricata	Leather star	L
Solaster sp.	Sun star	C
Ophiuroidea spp.	Brittle star	L
Chionoecetes bairdi	Tanner crab	L
Cancer products	Red rock crab	L
Pandalus spp.	Shrimp	L
Pagurus spp.	Hermit crab	L
Bankia setacea	Shipworm	L
Protothaca staminea	Littleneck clam	C
Beggiatoa sp.	Bacteria	L
Polyplacophora spp.	Chiton	L
Unidentified Benthic Infauna	Benthic Infauna	L
Metridium senile	Anemone	C
Parastichopus californicus	Sea cucumber	C
Invertebrates		
Cottidae spp.	Sculpin	L
Hexagrammos decagrammus	Kelp greenling	L

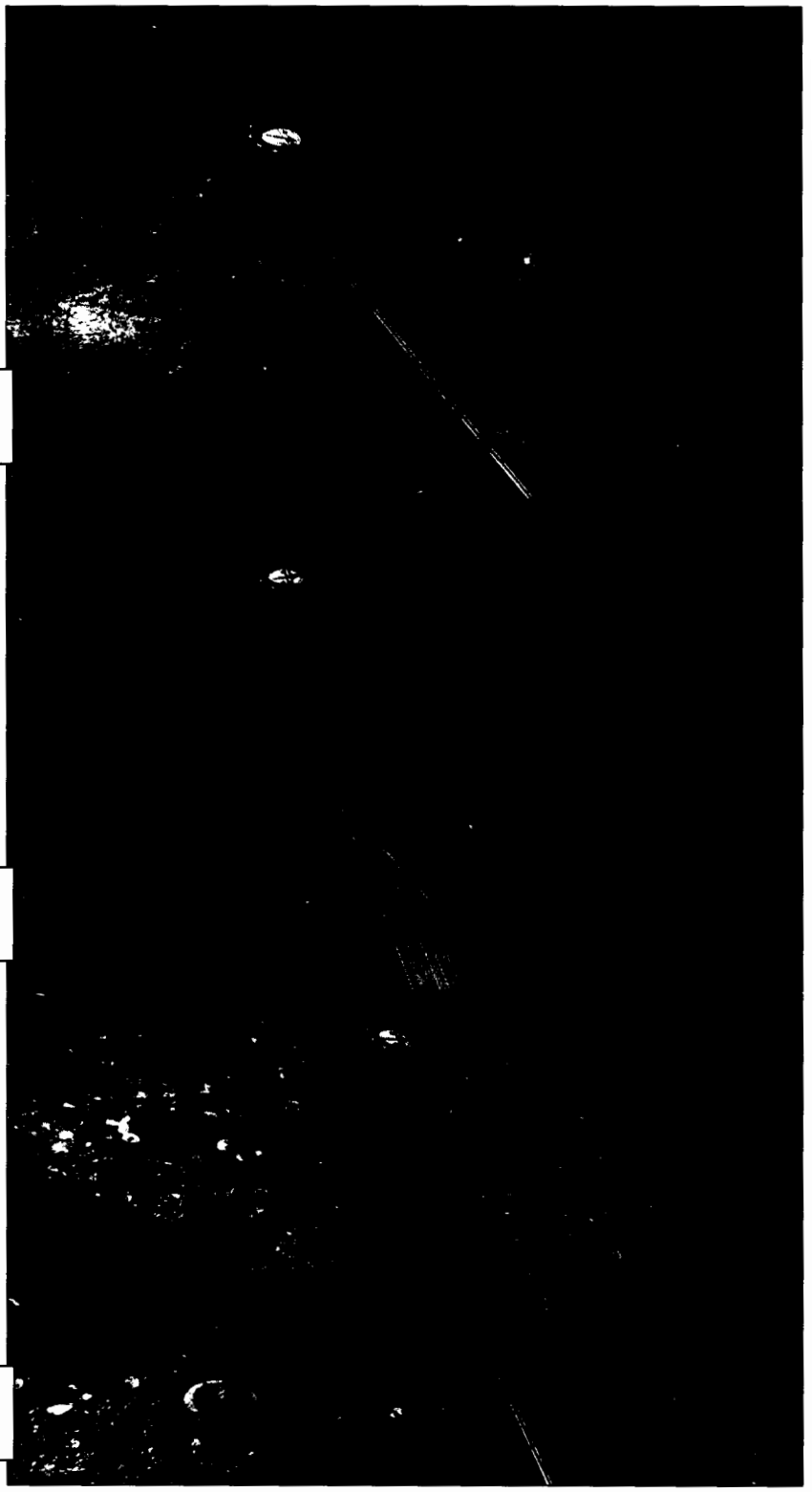
Photographic Representation



T1 S2
12 FT MLLW 10% COVER

T1 S4
21 FT MLLW 100% COVER

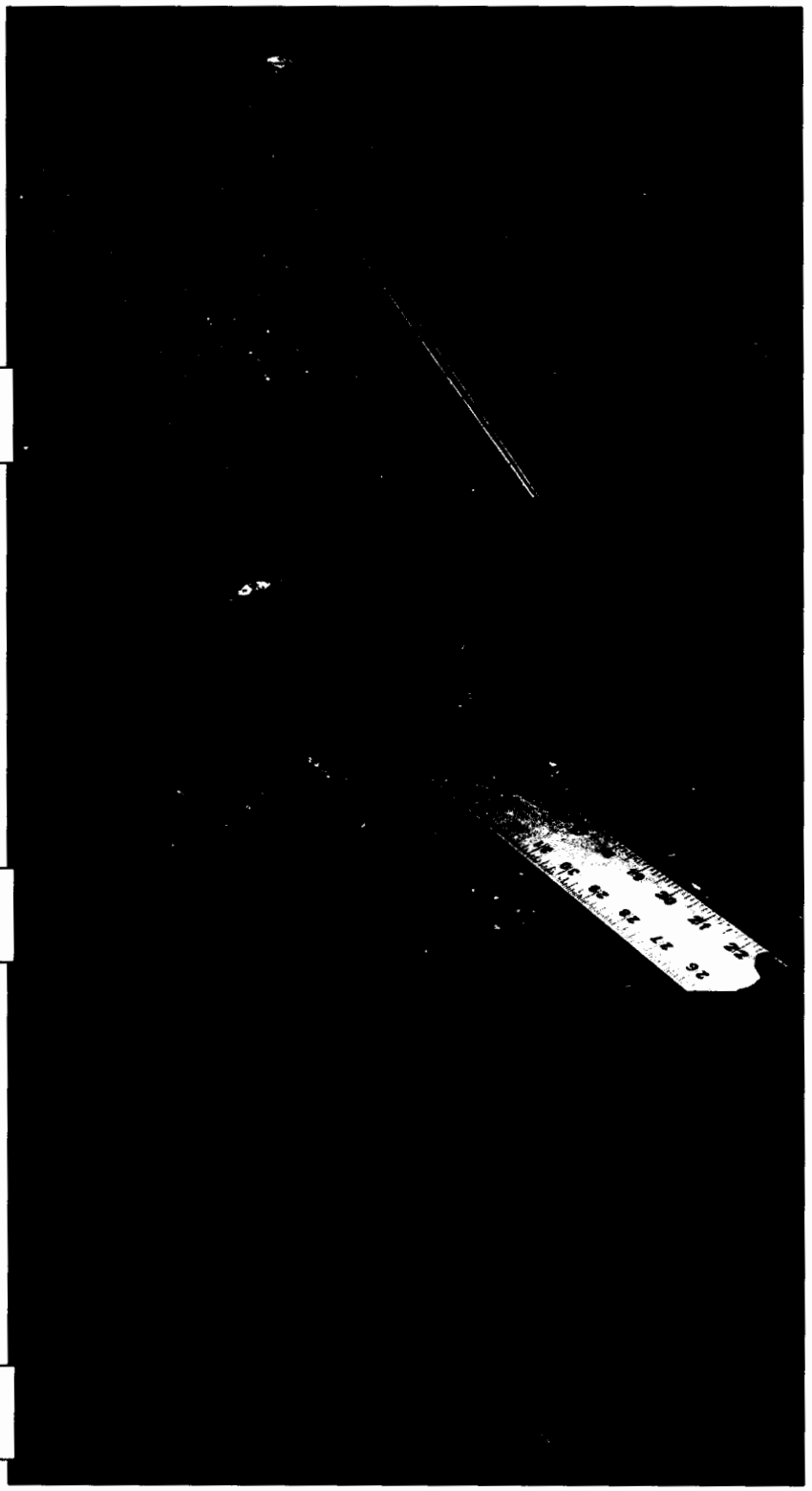
T1 S5
23 FT MLLW 100% COVER



T1 S6
24 FT MLLW 100% COVER

T1 S7
22 FT MLLW 80% COVER

T1 S9
20 FT MLLW 20% COVER



T2 S1
7 FT MLLW 0% COVER

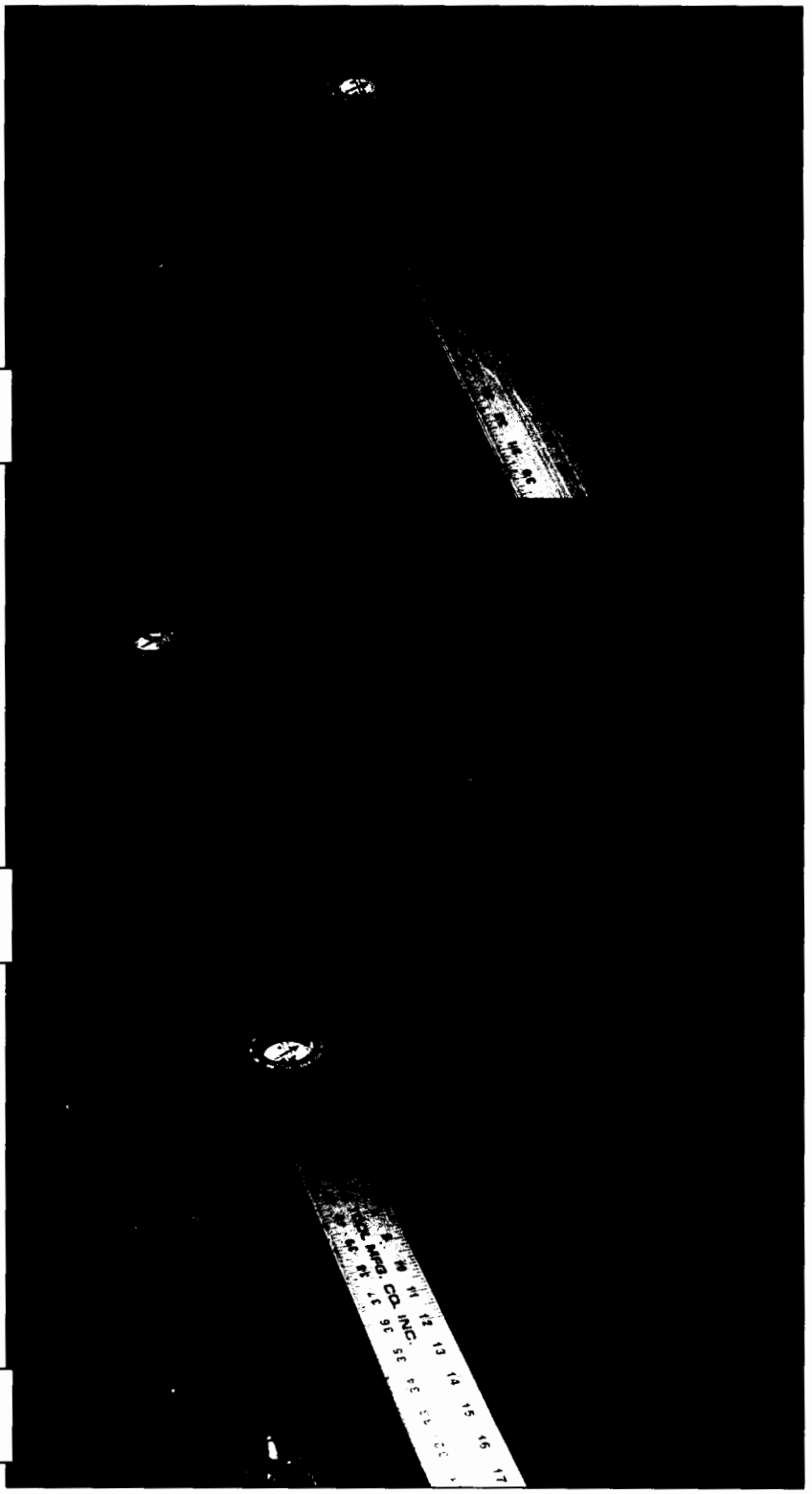
T2 S3
16 FT MLLW 50% COVER

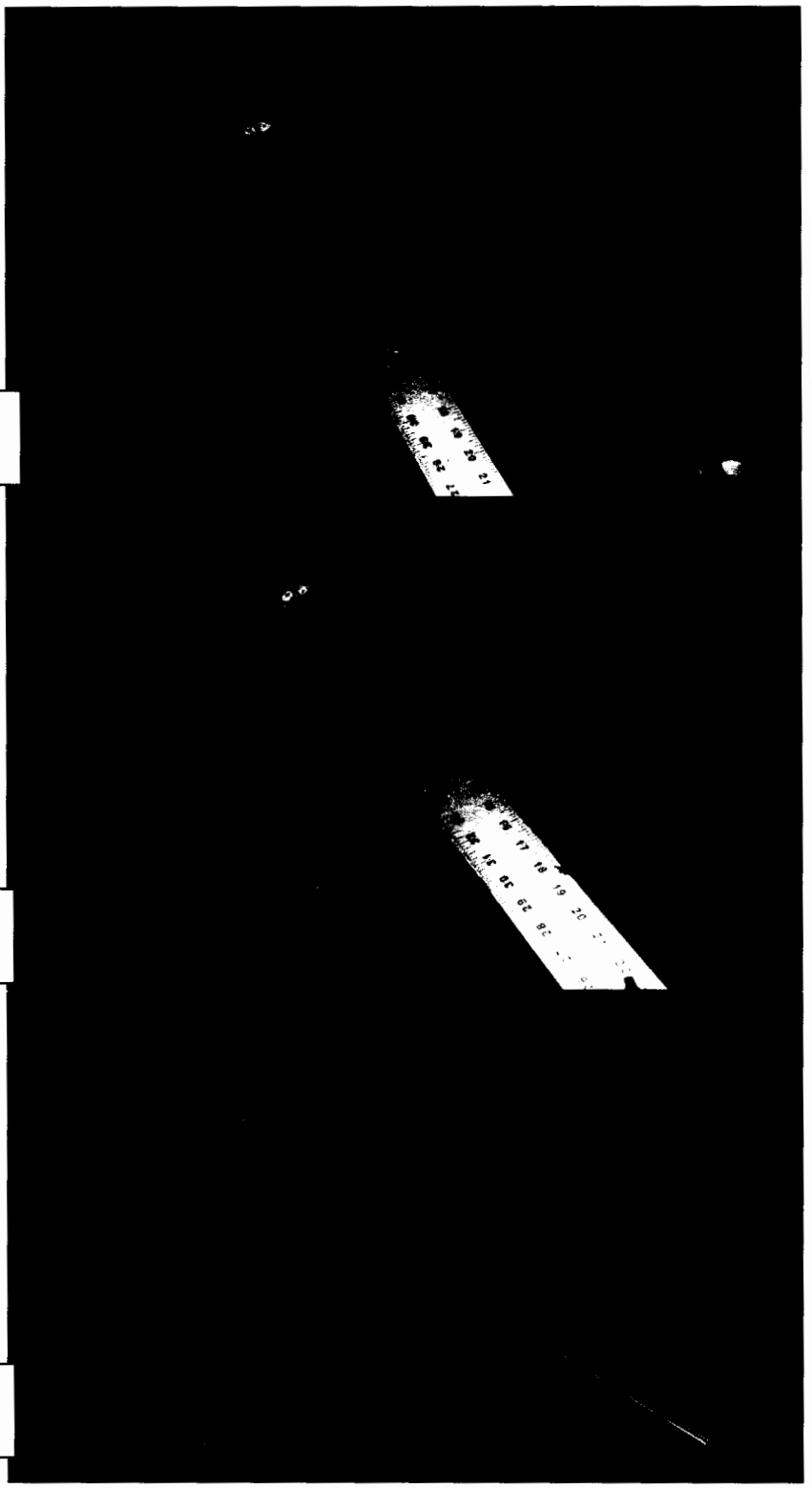
T2 S5
35 FT MLLW 100% COVER

T2 S6
42 FT MLLW 100% COVER

T2 S7
48 FT MLLW 100% COVER

T2 S9
56 ft MLLW 100% COVER





T2 S11
63 FT MLLW 100% COVER

T3 S1
5 FT MLLW TRACE COVER

T3 S3
16 FT MLLW 50% COVER

T3 S5
34 FT MLLW 100% COVER

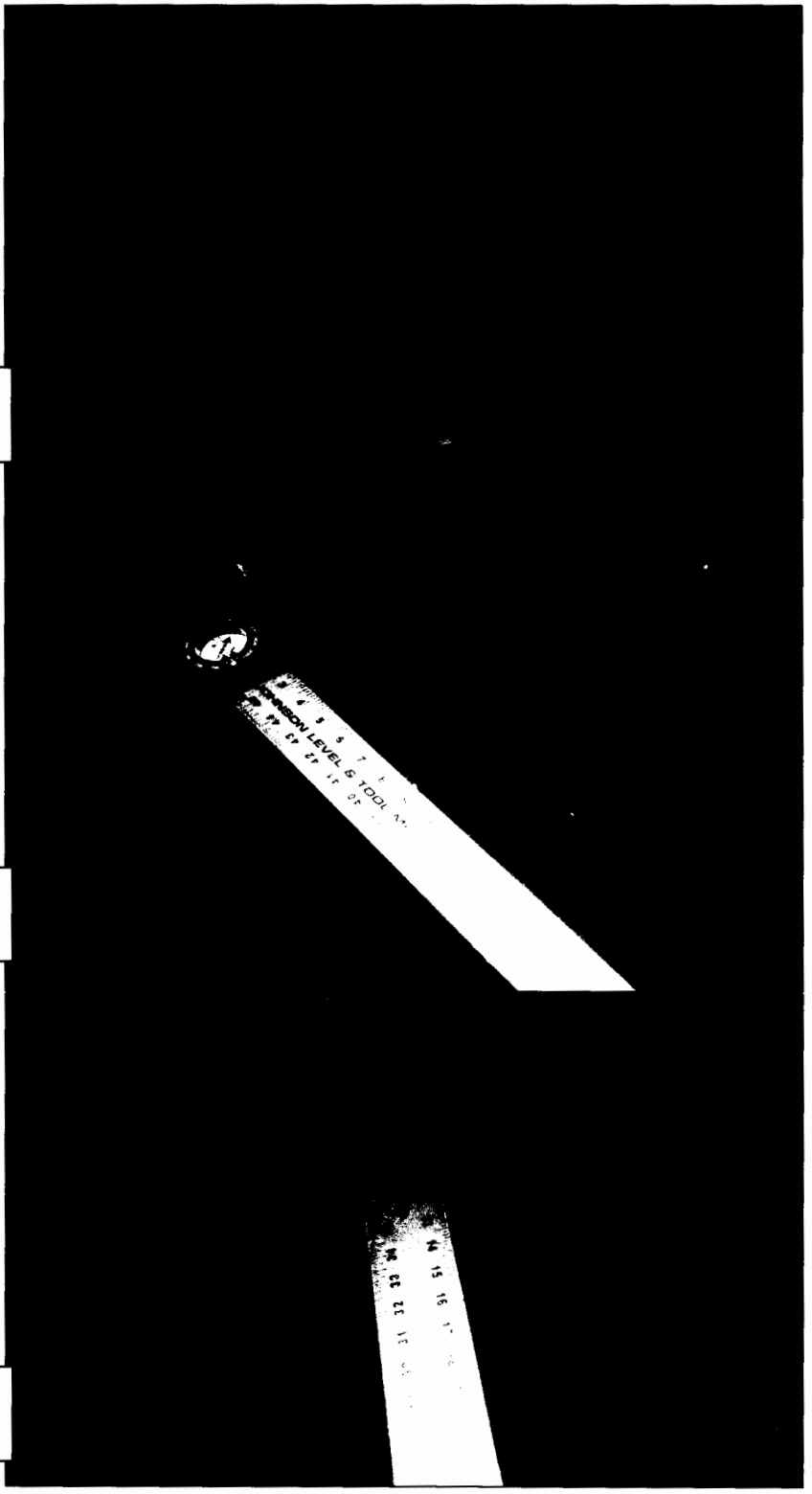
T3 S7
45 FT MLLW 100% COVER

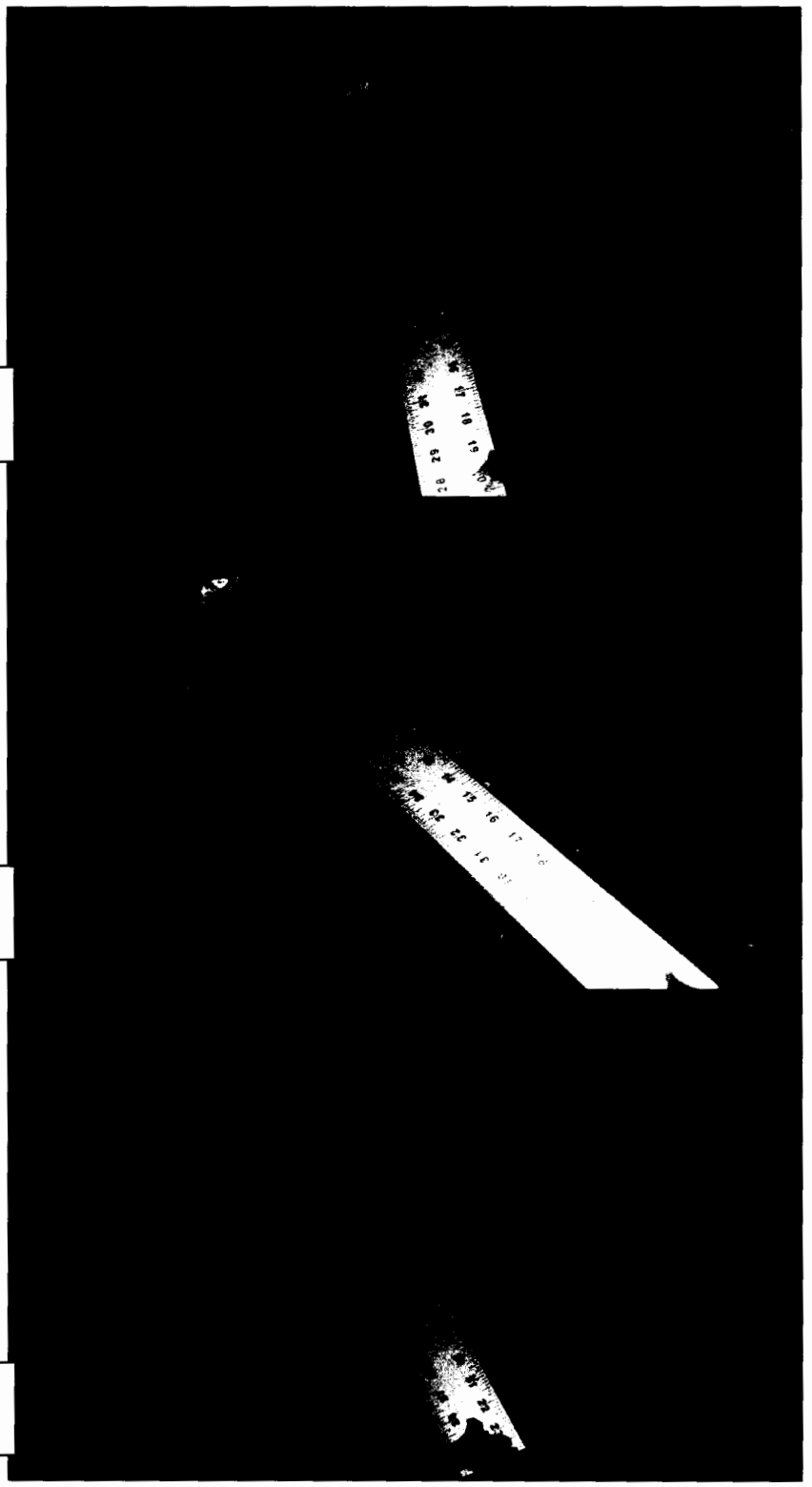
T3 S8
50 FT MLLW 100% COVER

T3 S9
52 FT MLLW 100% COVER

T3 S11
63 FT MLLW 100% COVER

T4 S1
4 FT MLLW 0% COVER





T4 S3
10 FT MLLW 0% COVER

T4 S4
20 FT MLLW 100% COVER

T4 S5
30 FT MLLW 100% COVER

T4 S6
30 FT MLLW 50% COVER

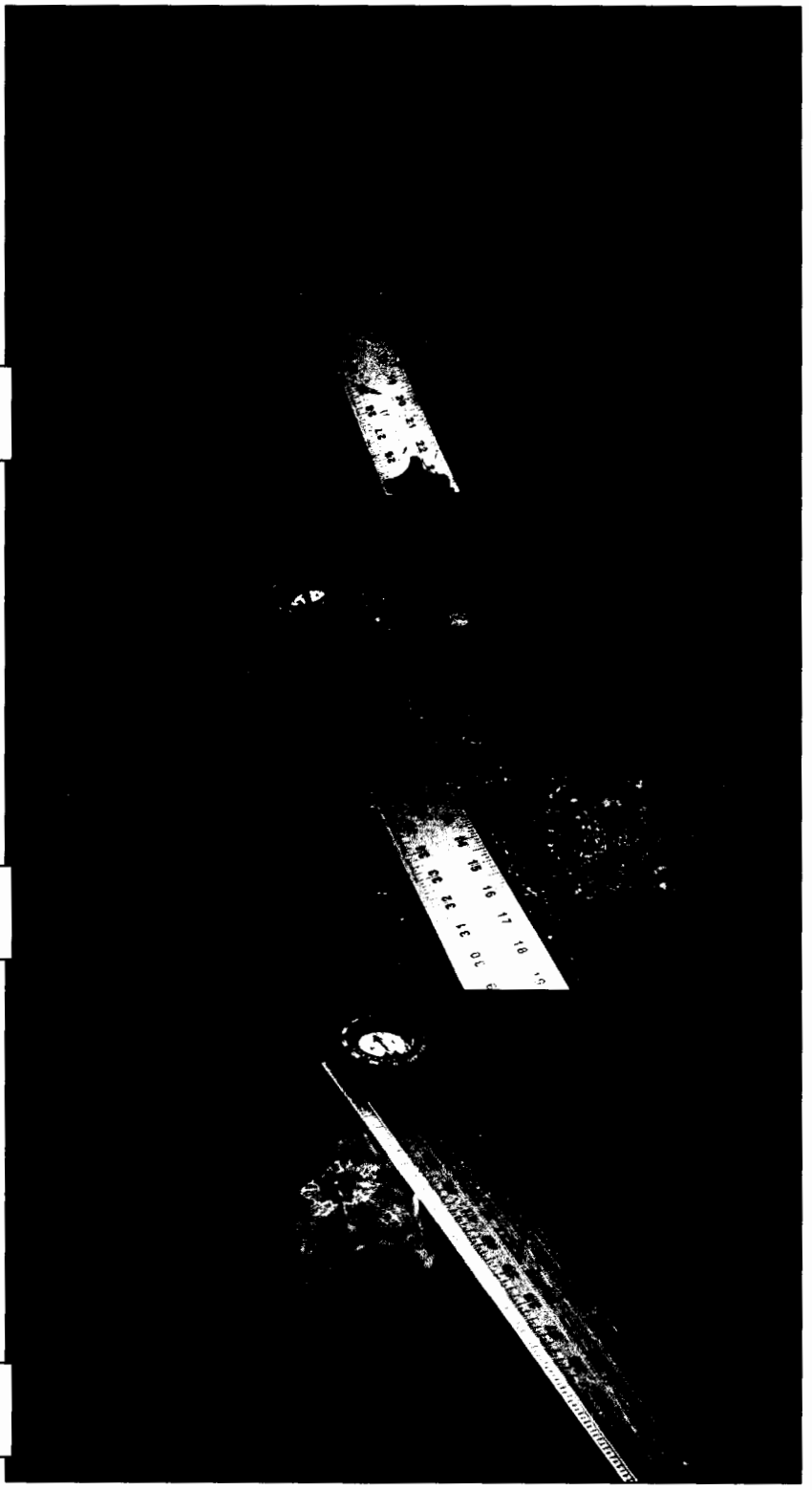
T4 S9
42 FT MLLW 80% COVER

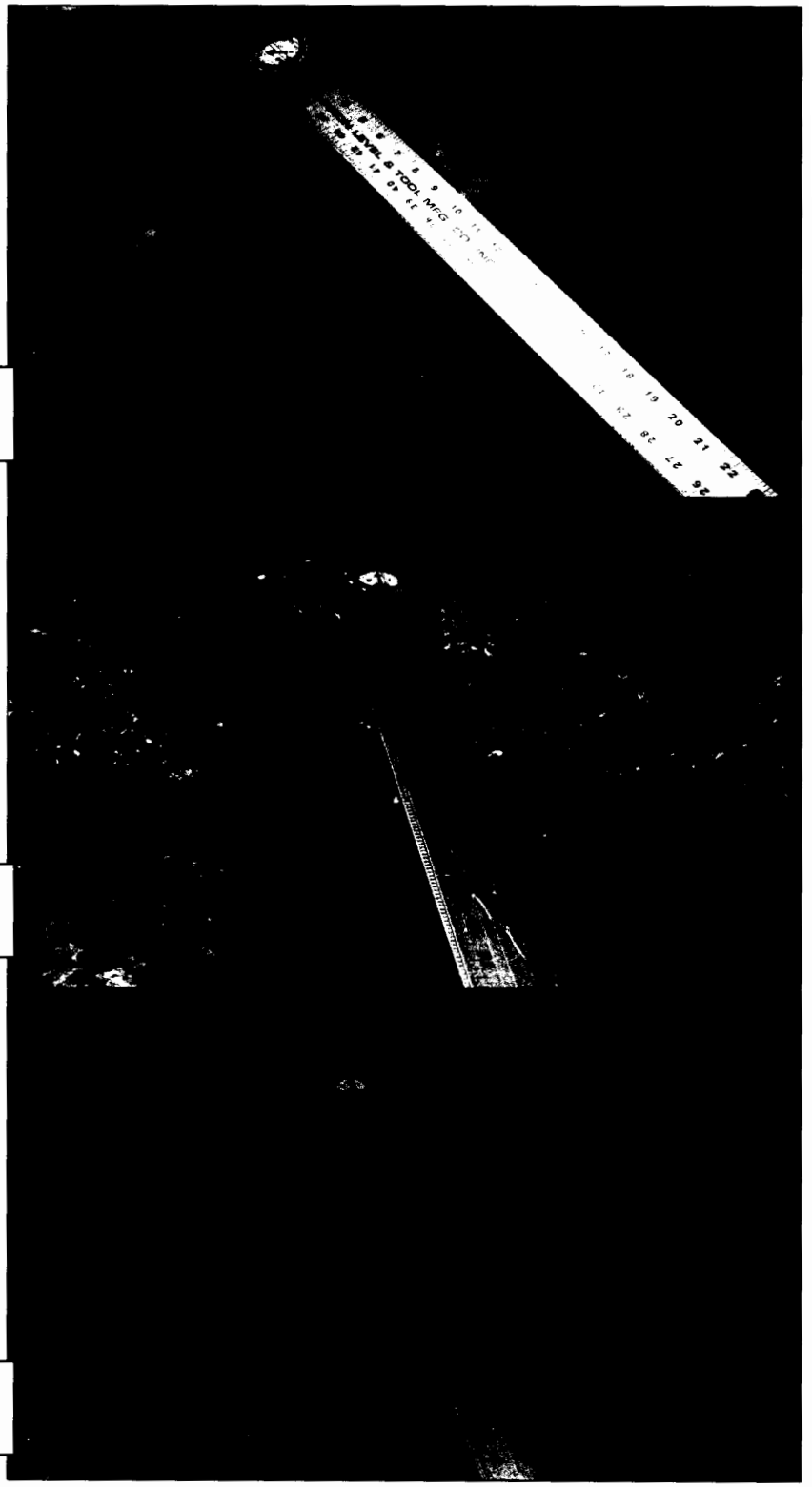
T4 S10
43 FT MLLW 100% COVER

T4 S12
62 FT MLLW 40% COVER

T4 S13
63 FT MLLW 50% COVER

T5 S1
3 FT MLLW 0% COVER





T5 S2
5 FT MLLW 0% COVER

T5 S3
7 FT MLLW 20% COVER

T5 S4
15 FT MLLW 100% COVER

T5 S5
14 FT MLLW 100% COVER

T5 S7
20 FT MLLW 50% COVER

T5 S9
21 FT MLLW 20% COVER

Chapter

Survey Summary

A comparison of the survey conducted on February 22, 2002 and the findings of this survey present the following results:

1. A decrease of 0.3 acres in total survey area.
2. A decrease of 0.5 acres of continuous bark deposit coverage.
3. An increase of 0.1 acres of discontinuous bark deposit coverage.

The extent of this survey was reduced in overall scope by 12 sample points. The abbreviated number of sample points of this survey reduced the total survey area by 0.3 acres.

The area of continuous coverage reduced in spatial extent by 0.5 acres. The conversion of continuous to discontinuous debris can explain some of this shift in results. It is also likely from a review of the data tables of both reports that some discrepancy as to the distance of the 60 ft MLLW line from the discharge hub is at least partially responsible for the reduced finding of the area of continuous debris.

The area of discontinuous coverage was increased in this report by 0.1 acres. The 2002 survey included zero coverage (0%) and trace coverage of bark (1%-9%) in the area calculation for discontinuous coverage. The calculation sheet contained in the 2002 report indicates that the area of continuous coverage (0.712 acres) was subtracted from the total survey area (0.86 acres) to determine the area of discontinuous coverage (0.15 acres).

This survey used standard reporting methods and included only coverage that was determined to be 10% to 90% in discontinuous coverage area calculations.