

Bayport Channel Seagrass Baseline and Monitoring Event Information



**HERNANDO COUNTY PORT AUTHORITY
BAYPORT CHANNEL
SEAGRASS MONITORING PROJECT
DEP Permit No. 271422133**

Baseline Report

Prepared For:

**HERNANDO COUNTY PORT AUTHORITY
4146 Pine Dale Court
Hernando Beach, Florida 34607-2953.**

Prepared By:

**BERRYMAN & HENIGAR
Division of Environmental Services
640 East Highway 44
Crystal River, Florida 34429
(904) 795-6551
Job No. 55685.00**

March 22, 1995



Department of Environmental Protection

Lawton Chiles
Governor

Southwest District
3804 Coconut Palm Drive
Tampa, Florida 33619

Virginia B.
Secr

April 14, 1995

RECEI'

Mr. John O'Connell
Hernando County Port Authority
4146 Pine Dale Court
Hernando Beach, FL 34607-2953

Permit No.: 271422133
Date of Issue: 11-16-90
Expiration Date: 11-9-95
County: Hernando
Project: Dredging & Rip-ra

Re: Document Approval

Dear Mr. O'Connell:

This letter will serve as Department's approval of the Seagrass Monitoring; Baseline Report and the Channel Marker Benchmark Su submitted on March 29, 1995 and January 6, 1994 respectively, pursuant to Specific Condition Nos. 21 through 23 and 18 through of the above mentioned permit.

If you have any questions concerning this matter, please call m extension 417.

Sincerely,

William L. Vorstadt
Environmental Supervisor
Submerged Lands and
Environmental Resource Pro
Enforcement & Compliance



Berryman & Henigar

BSI Consultants, Inc. - Henigar & Ray, Inc.

RECEIVED

MAR 28 1995

March 22, 1995

Mr. John O'Connell
Hernando County Port Authority
4146 Pine Dale Court
Hernando Beach, Florida 34607-2953

B&H Ref. No. 55685.00

Subject: DEP Permit No. 271422133: Hernando County Port Authority - Bayport Channel Seagrass Monitoring; Baseline Report (March 1995).

Dear Mr. O'Connell:

The enclosed information constitutes the baseline report for the above-referenced project. On site monitoring, comprising data collection associated with this report, was conducted on March 15, 1995. The report details the methodology and results of this baseline monitoring event. The Department of Environmental Protection (DEP) permit specified the sampling stations and methodology for this and future monitoring events.

Do not hesitate to call either of us should you have any questions regarding the enclosed report or this project.

Sincerely,

BERRYMAN & HENIGAR

Frederic F. Gaines, III
Environmental Scientist

John M. Post Jr.
Environmental Coordinator

FFG/fg

Enclosure - Report

**HERNANDO COUNTY PORT AUTHORITY
BAYPORT CHANNEL
SEAGRASS MONITORING PROJECT
DEP Permit No. 271422133**

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March 22, 1995

TABLE OF CONTENTS

	<u>PAGE</u>
Project Summary	ii
1.0 Introduction	1
2.0 Methodology	1
2.1 <i>Groundcover</i>	1
2.2 <i>Photodocumentation</i>	4
3.0 Results	4
3.1 <i>Groundcover</i>	4
3.1.1 <i>General</i>	4
3.1.2 <i>Non-vegetation Groundcover</i>	6
3.1.3 <i>Vegetation Groundcover</i>	6
3.2 <i>Seagrass Shoot Density</i>	6
4.0 Wildlife Utilization/Occurrence	6
5.0 Photodocumentation	7
6.0 Summary and Conclusions	7
7.0 Anticipated Activities	7
8.0 Appendix	8
9.0 Photofigures	15

LIST OF TABLES

Table 1 - Percent Cover Results of Groundcover Vegetation Sampling	5
Table 2 - Results of Seagrass Shoot Density per Meter Squared	5

LIST OF FIGURES

Figure 1 - Project Site Location Map	2
Figure 2 - Channel Area Transects	3

Project Summary - Bayport Channel Seagrass Monitoring Project

A. Project name:	Hernando County Port Authority - Bayport Channel Seagrass Monitoring
B. Permit Number:	DEP: 271422133
C. Maintenance Entity:	Hernando County Port Authority 4146 Pine Dale Court Hernando Beach, FL 34607-3953
D. Environmental Consultant:	Berryman & Henigar 640 E. Hwy 44 Crystal River, FL 34429 (904) 795-6551
E. Monitoring Date:	March 15, 1995
F. Current Year of Monitoring:	Baseline

1.0 INTRODUCTION/PROJECT HISTORY

This report provides the results of the first formal (baseline) seagrass monitoring event conducted at the Bayport Channel, maintained by the Hernando County Port Authority. The project site is located in Section 25 and 36, Township 22 South, Range 16 East, Hernando County, Florida, at the western terminus of CR 550/SR50 (Figure 1). The DEP permit is for a channel maintenance dredging project. The permit conditions specified that permanent sampling stations be established at six groups of channel markers within the existing Bayport Channel. A general channel area map with channel marker and established quadrat locations is presented in Figure 2.

The objective of this monitoring event was to perform an initial assessment of the site conditions prior to the commencement of dredging and other channel maintenance activities. Qualitative and quantitative monitoring activities summarized in this report were conducted on March 15, 1995 by a Berryman & Henigar environmental scientist.

2.0 METHODOLOGY

Field sampling methodologies followed permit criteria and represent the guidelines that will be used for future monitoring events. Qualitative and quantitative sampling conducted for this monitoring event included marine vegetation composition, estimated percent cover by the various species present, and seagrass shoot counts for a portion of each individual quadrat.

Standardized quantitative sampling provides objective, reproducible information about the plant community for use in assessing existing conditions, as well as the extent of recruitment during future monitoring events. The composition and percent cover of the marine vegetation were qualitatively assessed by estimating the aerial extent of cover by individual species, community types or vegetative assemblages and averaging the percent covers for each internal group of channel markers. The quadrat data in the appendix shows information gathered from each individual quadrat. Figure 2 provides the general locations of the channel marker groups and established vegetative quadrats utilized during quantitative monitoring of the channel.

2.1 GROUND COVER

Percent groundcover was qualitatively sampled at three quadrats per channel marker group with two internal quadrats, Q1 to the south side within the channel and Q2 to the north side within the channel, and one external quadrat, Q3 located outside of the channel. For this baseline monitoring event the six external quadrats were permanently established alternating 50 feet due south or north of one of the six channel group markers. The corner points of the quadrats are demarked by rebar spaced one meter apart to create an area 1m² in extent

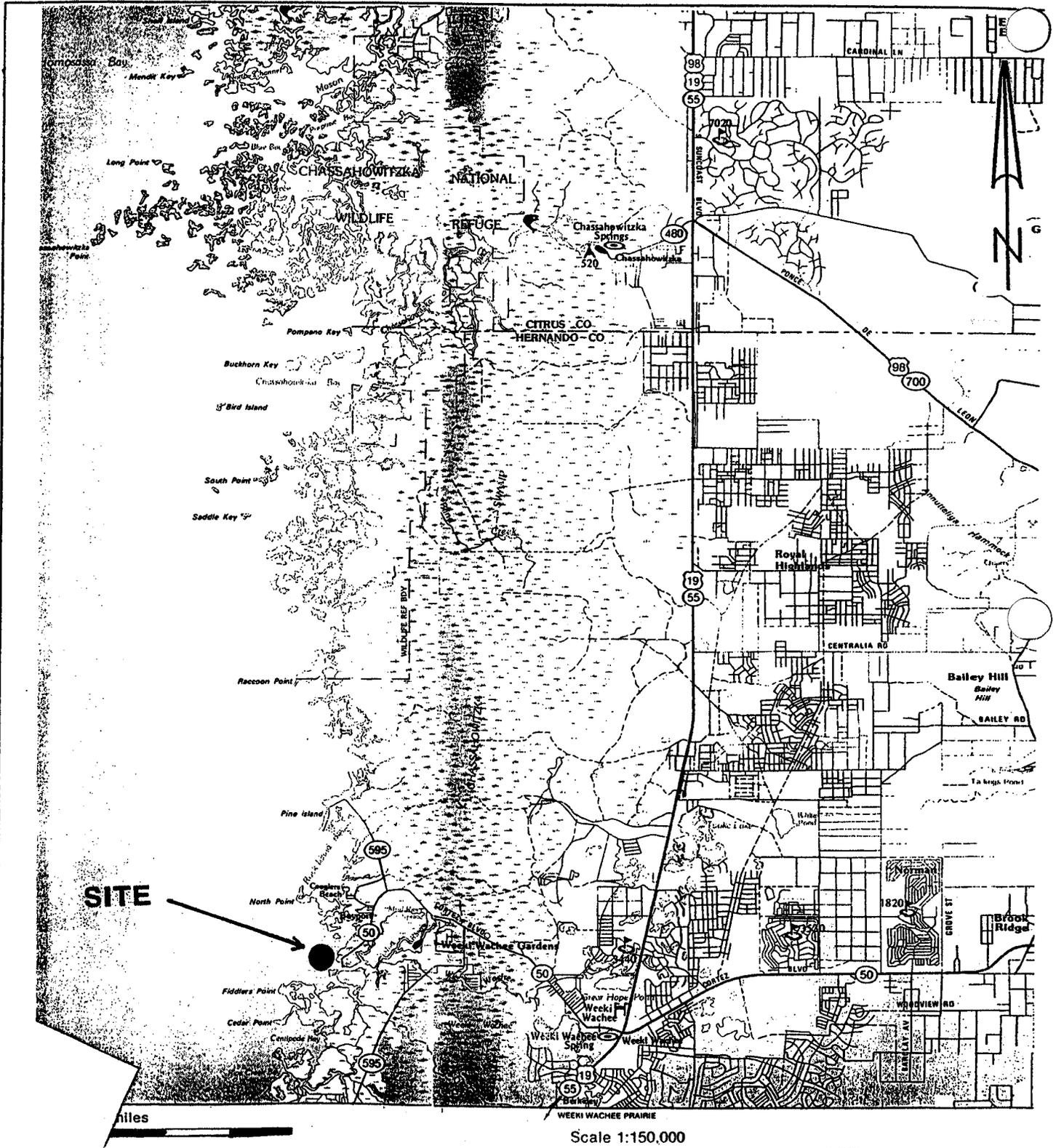


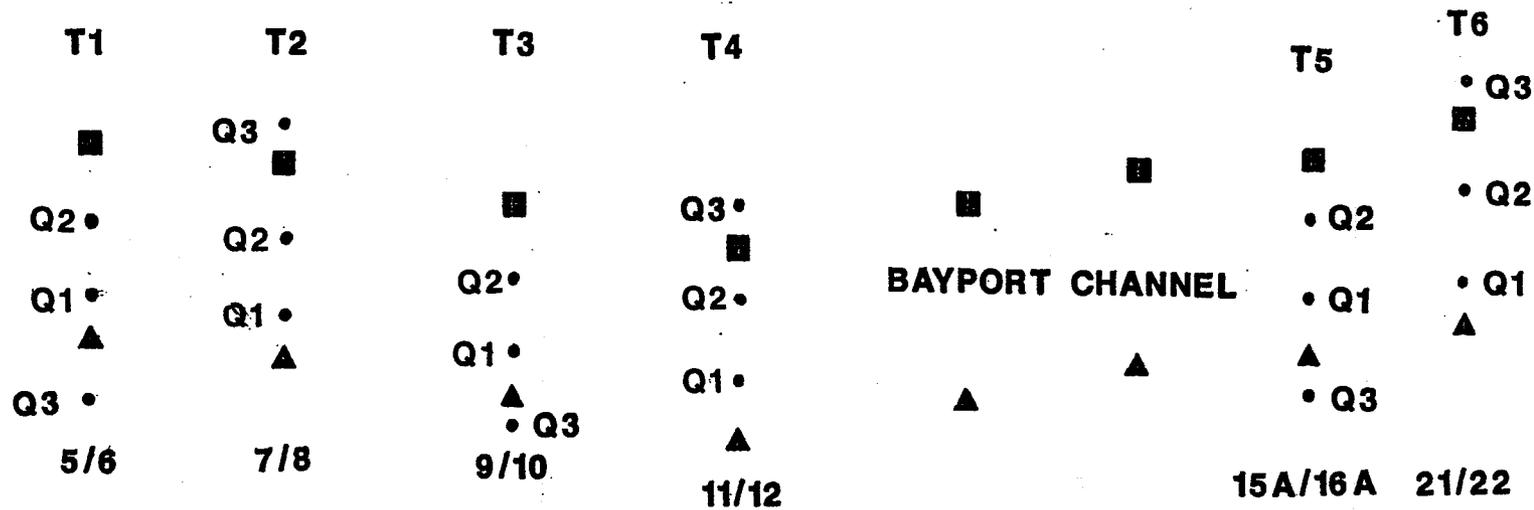
FIGURE 1

PROJECT SITE LOCATION MA



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640 EAST HIGHWAY 44 CRYSTAL RIVER, FL 34429-4399 (904) 795-6551



5/6 = CHANNEL MARKER GROUP

▲, ■ = CHANNEL MARKER LOCATION

T1 = TRANSECT #1

Q1 = QUADRAT #1



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FIGURE 2

CHANNEL TRANSECTS

to be used for all future monitoring events in conjunction with a 1m² pvc sampling quad. The location of the external quadrats are marked above the surface by a single pvc pipe sufficiently tall to be seen at high tide, and placed in the middle of the quadrat. The twelve internal quadrats were not permanently established for this monitoring event, but will be re-established (based on measurements taken between channel markers) by placing rebar at each corner point after dredging and channel maintenance activities are completed.

The aerial coverage by graminoid and algal groundcover species, as well as bare ground, was visually estimated and recorded at each of the 18 quadrats using the 1m² sampling quad. Vegetative shoot counts were conducted for each of the 18 quadrats using a modified version of the 1m² sampling quad divided into sixteenths by numbered and notched areas along the sampling quad. Graminoid shoots were counted in three randomly selected one-sixteenth areas and recorded. Water depth and time of the sampling of the quadrat was measured and recorded at each quadrat. In order to report the vegetative percent cover for the internal channel marker group area as a community, the quadrats were combined, so that the relevant percent cover by a species in an area was averaged over the entire internal channel site. Transect averages were also calculated for representation of the channel marker group area. Water depths at the channel marker groups measured over a time period of approximately 25 minutes did not vary much (6-inch mean). Coupled with no apparent vegetation changes between internal vegetation conditions and external conditions, it is assumed that transect averages are good representatives of the condition of channel area at that location.

2.2 PHOTODOCUMENTATION

Photo-stations are situated underwater along the east side of each quadrat with the bottom of each picture being the east side of the quadrat. Eighteen photographs are taken with the 1m² sampling quad in place. The locations of photo-stations are provided in Figure 2.

3.0 RESULTS

3.1 GROUNDCOVER

3.1.1 General

A total of six (6) different seagrass and algal species were found in the channel area during the monitoring event. The species observed on-site are listed in Table 1, along with a summary of data by internal quad averages (Q1 and Q2), each external quad (Q3), and by transect average of the groundcover collected during this monitoring event. Complete groundcover data collected by individual quads is presented in the Appendix.

Table 1
Percent Cover Results of Groundcover Vegetation Sampling

Species	T1			T2			T3			T4			T5			T6		
	Q1/Q2	Q3	All															
<u>Thalassia testudinum</u>	10.0	5.0	8.3	55.0	5.0	38.3	52.5	70.0	58.3	45.0	70.0	53.3	2.5	70.0	25.0	0	0	0
<u>Halodule wrightii</u>	0	0	0	0	0.0	0	0	0	0	0	0	0	47.5	0	31.7	40.0	75.0	51.7
<u>Penicillus sp.</u>	1.5	2.0	1.7	4.0	1.0	3.00	0	3.0	1.0	0	0	0	0	0	0	0	0	0
<u>Halimeda sp.</u>	0.50	95.0	32.0	1.0	30.0	10.7	3.5	0	2.3	52.5	25.0	43.3	0.5	15.0	5.3	0	30.0	10.0
<u>Udotea sp.</u>	0	0	0	0	0	0	0	0	0	1.0	1.0	1.0	0	0	0	1.0	1.0	1.0
<u>Unknown algae</u>	0	0	0	0	0	0	6.0	5.0	5.7	10.0	10.0	10.0	0	20.0	6.7	30.0	10.0	23.3
<u>Bare ground</u>	90.0	3.0	61.0	40.0	70.0	50.0	40.0	30.0	36.7	1.5	3.0	2.0	50.0	0.0	33.3	42.5	2.0	29.0
Total	102.0	105.0	103.0	100.0	106.0	102.0	102.0	108.0	104.0	110.0	109.0	109.6	100.5	105.0	102.0	113.5	118.0	115.0

NOTE: Percent aerial coverage can add up to more than 100%, as different layers often overlap.

Table 2
Results of Seagrass Shoot Density per Meter Squared

	T1	T2	T3	T4	T5 ¹	T6 ¹
Q1	277.33	244.00	714.67	453.33	1226.67	800.00
Q2	266.67	554.67	341.33	400.00 ²	101.33	346.67
Q3	133.33	26.67	437.33	373.33	752.00	730.67
Average	225.78	268.45	497.78	408.89	762.00	625.78

¹ Represents transects where seagrass dominance shifted from Thalassia testudinum to Halodule wrightii.

² So as not to disturb the quadrat area, an estimate of 1 one-sixteenth area was made outside of the sampling quad by removing the Halimeda sp. so seagrass shoots could be counted.

3.1.2 Non-Vegetative Groundcover

The amount of bare ground varied from transect to transect with ranges from 1.5 to 90% for internal quad combined averages. While transect averages indicate bare ground coverage from 2 to 61%. Bare ground and unknown algal associations were considered to be an integral part of the site, with all but one of the transects averaging over 40% bare ground and unknown algae coverage.

3.1.3 Vegetative Groundcover

Table 1 provides a summary of the results of groundcover sampling. Percent coverage by vegetative groundcover exceeded 39% when averaging all quadrats within a transect. Dominant seagrass species on-site in the channel area include *Thalassia testudinum*, and *Halodule wrightii*. Algal species present were identified by B&H ecologists, understanding that due to the complex nature of algal complexes, species identification can be misinterpreted by the taxonomist. Dominant algal species present include *Penicillus* sp., *Halimeda* sp., *Udotea* sp., and an unidentifiable epiphytic alga. Collectively, seagrass and algal species' aerial coverage for an entire transect ranged from approximately 42 to 100% of the existing cover within the channel area. Three transects (T2, T3 and T4) were vegetatively dominated in percent coverage by *Thalassia testudinum*. Two transects (T5 and T6) were dominated by *Halodule wrightii*, while one transect (T1) was dominated by *Halimeda* sp.

3.2 SEAGRASS SHOOT DENSITY

Seagrass shoot density (the number of shoots per 1m²) was calculated by dividing the 1m² sampling quad into sixteenths, then randomly selecting three one-sixteenth areas, and counting the number of seagrass shoots within each area. The number of seagrass shoots for the three one-sixteenth areas were averaged and multiplied by 16 to estimate the number of seagrass shoots for each 1m² quad. Averaging the three quads for each transect estimated a number of seagrass shoots per 1m² for the area of the transect. Seagrass shoot density depicted a basic trend of increasing number of shoot density with increasing distance towards the land, from T1 (channel marker group 5/6) to T6 (channel marker group 21/22). The transition in seagrass dominance from *Thalassia testudinum* to *Halodule wrightii* significantly increased the number of shoots per 1m². Transect averages for seagrass shoot density per 1m² ranged from approximately 226 to 763 shoots/m². Individual transect results are presented in Table 2, while complete shoot counts by one-sixteenth area per quad are presented in the Appendix.

4.0 WILDLIFE UTILIZATION/OCCURRENCE

Numerous faunal species were observed in the channel area during the monitoring event. These species include a wide variety of fauna typically associated with marine seagrass areas, such as starfish (probably *Oreaster* sp.), goby (probably *Gobisoma* sp.); grunt (probably *Lutjanus* sp.); pinfish (*Lagodon rhomboides*); horseshoe crab (*Limulus* sp.) and stone crab

(*Callinecthus* sp.). This list is not a complete list of species that one should find in a seagrass area, but instead represents fauna observed at this monitoring event.

5.0 PHOTODOCUMENTATION

Photodocumentation of the site taken during this monitoring event is provided in Photo-Figures 1 through 18, attached. Photo-station locations are shown in Figure 2.

6.0 SUMMARY/CONCLUSIONS

Based on the results of this quantitative monitoring event, the six transects represent a good cross section of different locations within the channel area. There were a diversity of conditions and vegetative coverage between quadrats during the baseline monitoring event. The transects sampled generally were representative of the Bayport channel area which has varying coverage and species composition throughout. Post maintenance events will provide a wide diversity of conditions as well.

7.0 ANTICIPATED ACTIVITIES

Anticipated activities to be conducted after channel maintenance include the following:

- Permanent establishment of the 12 internal channel quadrats with rebar at the four corners of each 1m² plot area.
- Continued quantitative monitoring to be performed quarterly the first year and biannually thereafter. The first event will begin three months following channel maintenance activities.

8.0 APPENDIX

Quadrat Data

HERNANDO COUNTY PORT AUTHORITY
 BAYPORT CHANNEL SEAGRASS MONITORING
 BH JOB No. 55685

TRANSECT NO:	T1	CHANNEL GROUP 5/6			average % cover	
DATA (% cover)	Q1	Q2	Q3	COMMENT	internal	all
Water depth (inches)	60.00	63.00	61.00	STARFISH	61.50	61.33
Bare ground	90.00	90.00	3.00	GOBY	90.00	61.00
Thalassia testudinum	10.00	10.00	5.00	GRUNT	10.00	8.33
Halodule wrightii	0.00	0.00	0.00		0.00	0.00
Penicillus sp.	1.00	2.00	2.00		1.50	1.67
Halimeda sp.	0.00	1.00	95.00		0.50	32.00
Udotea sp.	0.00	0.00	0.00		0.00	0.00
Unknown alga	0.00	0.00	0.00		0.00	0.00

SHOOT DENSITY (one-sixteenth section/1 m ²)		average shoot density/m ²	
section 7	22.00		
section 10	25.00	Quad 1	277.33
section 12	5.00		
section 11			
section 13	13.00	Quad 2	266.67
section 14	20.00		
section 3	17.00		
section 8		Quad 3	133.33
section 9			
		total	225.78

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 BH JOB No. 55685

TRANSECT NO:	T2	CHANNEL GROUP 7/8			average % cover	
DATA (% cover)	Q1	Q2	Q3	COMMENT	internal	
Water depth (inches)	58.00	56.00	53.00	HORSESHOE CRAB	57.00	55.
Bare ground	75.00	5.00	70.00	PINFISH	40.00	50.
Thalassia testudinum	20.00	90.00	5.00		55.00	38.
Halodule wrightii	0.00	0.00	0.00		0.00	0.
Penicillus sp.	3.00	5.00	1.00		4.00	3.
Halimeda sp.	1.00	1.00	30.00		1.00	10.
Udotea sp.	0.00	0.00	0.00		0.00	0.
Unknown alga	0.00	0.00	0.00		0.00	0.
					0.00	0.

SHOOT DENSITY (one-sixteenth section/1m2)			average shoot density/m2	
section 3	18.00			
section 7	20.00		1	224
section 13	4.00			
section 6		46.00		
section 10		30.00	2	554
section 14		28.00		
section 1				
section 7			3	26
section 10				
			total	268

HERNANDO COUNTY PORT AUTHORITY
 BAYPORT CHANNEL SEAGRASS MONITORING
 BH JOB No. 55685

TRANSECT NO:	T3	CHANNEL GROUP			9/10	average % cover	
DATA (% cover)	Q1	Q2	Q3	COMMENT	internal	all	
Water depth (inches)	64.00	64.00	56.00	PINFISH	64.00	61.33	
Bare ground	20.00	60.00	30.00	STONE CRAB	40.00	36.67	
Thalassia testudinum	70.00	35.00	70.00		52.50	58.33	
Halodule wrightii	0.00	0.00	0.00		0.00	0.00	
Penicillus sp.	0.00	0.00	3.00		0.00	1.00	
Halimeda sp.	2.00	5.00	0.00		3.50	2.33	
Udotea sp.	0.00	0.00	0.00		0.00	0.00	
Uknown alga	10.00	2.00	5.00		6.00	5.67	
					0.00	0.00	

SHOOT DENSITY (one-sixteenth section/1m2)			average shoot density/m2	
section 2	41.00			
section 3	55.00		1	714.67
section 7	38.00			
section 5		7.00		
section 12		5.00	2	341.33
section 15		52.00		
section 2				
section 4			3	437.33
section 9				
			total	497.78

HERNANDO COUNTY PORT AUTHORITY
 BAYPORT CHANNEL SEAGRASS MONITORING
 BH JOB No. 55685

TRANSECT NO:	T4	CHANNEL GROUP			11/12	average % cover	
DATA (% cover)	Q1	Q2	Q3	COMMENT	internal	all	
Water depth (inches)	68.00	66.00	58.00		67.00	64.00	
Bare ground	3.00	0.00	3.00		1.50	2.00	
Thalassia testudinum	90.00	0.00	70.00		45.00	53.33	
Halodule wrightii	0.00	0.00	0.00		0.00	0.00	
Penicillus sp.	0.00	0.00	0.00		0.00	0.00	
Halimeda sp.	5.00	100.00	25.00		52.50	43.33	
Udotea sp.	0.00	2.00	1.00		1.00	1.00	
Unknown alga	20.00	0.00	10.00		10.00	10.00	
					0.00	0.00	

SHOOT DENSITY (one-sixteenth section/1m2)				average shoot density/m2
section 8	15.00			many stolons
section 11	39.00			1
section 14	31.00			453.33
section 5		25.00		
section 13		25.00		2
section 16		25.00		400.00
section 3			5.00	
section 9			33.00	3
section 14			32.00	373.33
				total
				408.89

HERNANDO COUNTY PORT AUTHORITY
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 BH JOB No. 55685

TRANSECT NO:	T5	CHANNEL GROUP 15A/16A			average % cover	
DATA (% cover)	Q1	Q2	Q3	COMMENT	internal	all
Water depth (inches)	72.00	75.00	66.00	both seagrasses	73.50	71.00
Bare ground	10.00	90.00	0.00	in Q2	50.00	33.33
Thalassia testudinum	0.00	5.00	70.00		2.50	25.00
Halodule wrightii	80.00	5.00	0.00		42.50	28.33
Penicillus sp.	0.00	0.00	0.00		0.00	0.00
Halimeda sp.	1.00	0.00	15.00		0.50	5.33
Udotea sp.	0.00	0.00	0.00		0.00	0.00
Unknown alga	0.00	0.00	20.00		0.00	6.67
					0.00	0.00

SHOOT DENSITY (one-sixteenth section/1m2)			average shoot density/m2	
shoot 4	70.00			
shoot 8	80.00		1	1226.67
shoot 12	80.00			
shoot 1		8.0(12.0)		
shoot 9		5.0(15.0)	2	101.33
shoot 16		6.0(12.0)		
shoot 2				
				48.00
shoot 8			3	752.00
				41.00
shoot 12				52.00
			total	762.67

Note: Quad 2 had shoots of both seagrasses, Thalassia shoot numbers are on the left side, and Halodule shoot numbers are on the right side. Both numbers were added together to calculate shoot density/m2.

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TRANSECT NO:	T6	CHANNEL GROUP			21/22	average % cover	
DATA (% cover)	Q1	Q2	Q3	COMMENT	internal	all	
Water depth (inches)	80.00	75.00	46.00		77.50	67.00	
Bare ground	15.00	70.00	2.00		42.50	29.00	
Thalassia testudinum	0.00	0.00	0.00		0.00	0.00	
Halodule wrightii	70.00	10.00	75.00		40.00	51.67	
Penicillus sp.	0.00	0.00	0.00		0.00	0.00	
Halimeda sp.	0.00	0.00	30.00		0.00	10.00	
Udotea sp.	0.00	2.00	1.00		1.00	1.00	
Unknown alga	20.00	0.00	10.00		10.00	10.00	
algae mat	20.00	20.00	0.00		20.00	13.33	

SHOOT DENSITY (one-sixteenth section/1m2)	average shoot density/m2	
section 6	62.00	
section 10	58.00	1 800.00
section 14	30.00	
section 7	25.00	
section 11	22.00	2 346.67
section 15	18.00	
section 2	41.00	
section 9	51.00	3 730.67
section 12	45.00	
		total 625.78

9.0 PHOTOFIGURES

BAYPORT CHANNEL SEAGRASS QUADRAT PHOTODOCUMENTATION (Photodocumentation of March 15, 1995)

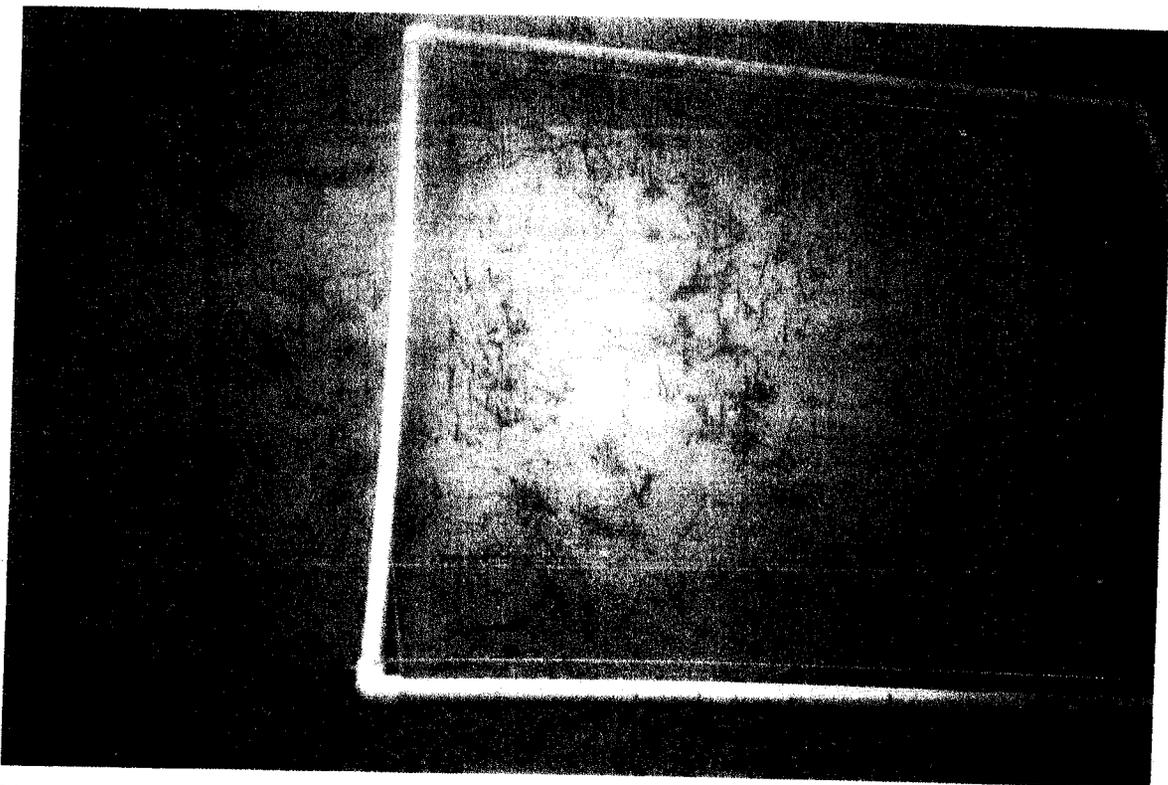


Photo-Figure 1. Below water photograph at Quad No. 1 (south side within channel),
Transect No. 1, Channel Group No. 5/6, Bayport Channel.

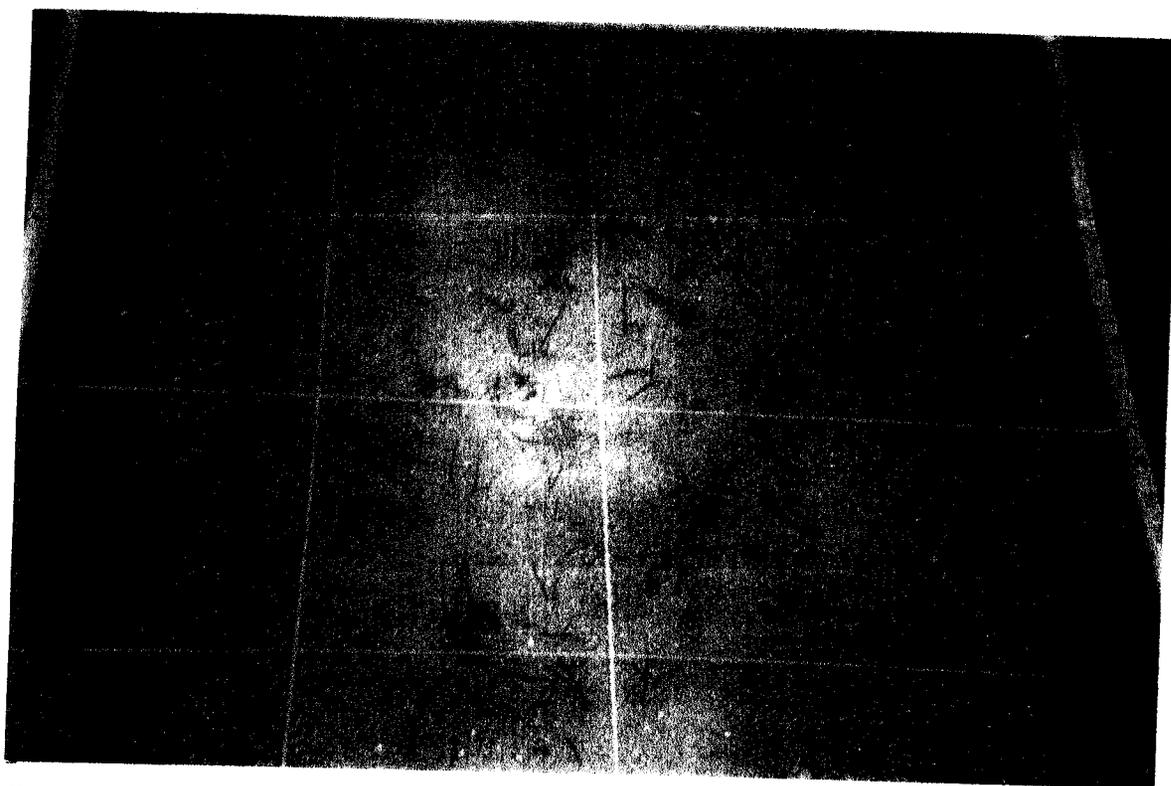


Photo-Figure 2. Below water photograph at Quad No. 2 (north side within channel),
Transect No. 1, Channel Group No. 5/6, Bayport Channel.

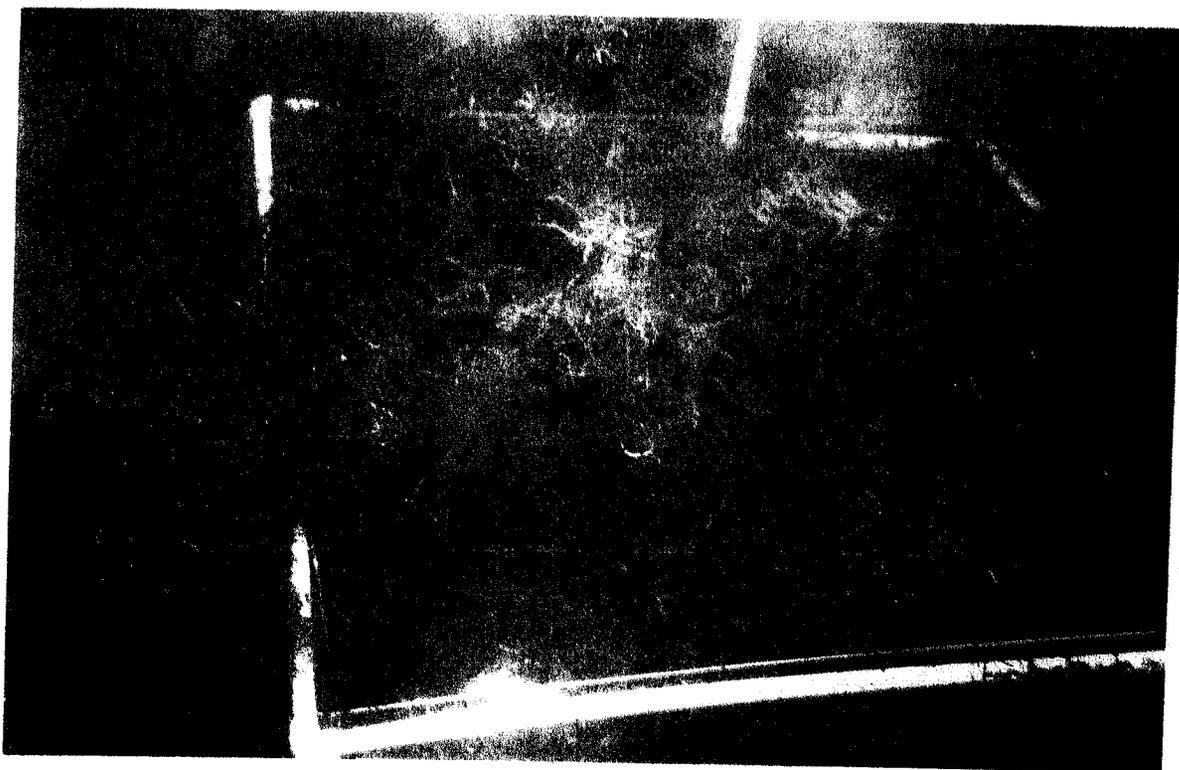


Photo-Figure 3. Below water photograph at Quad No. 3 (outside of channel to south),
Transect No. 1, Channel Group No. 5/6, Bayport Channel.

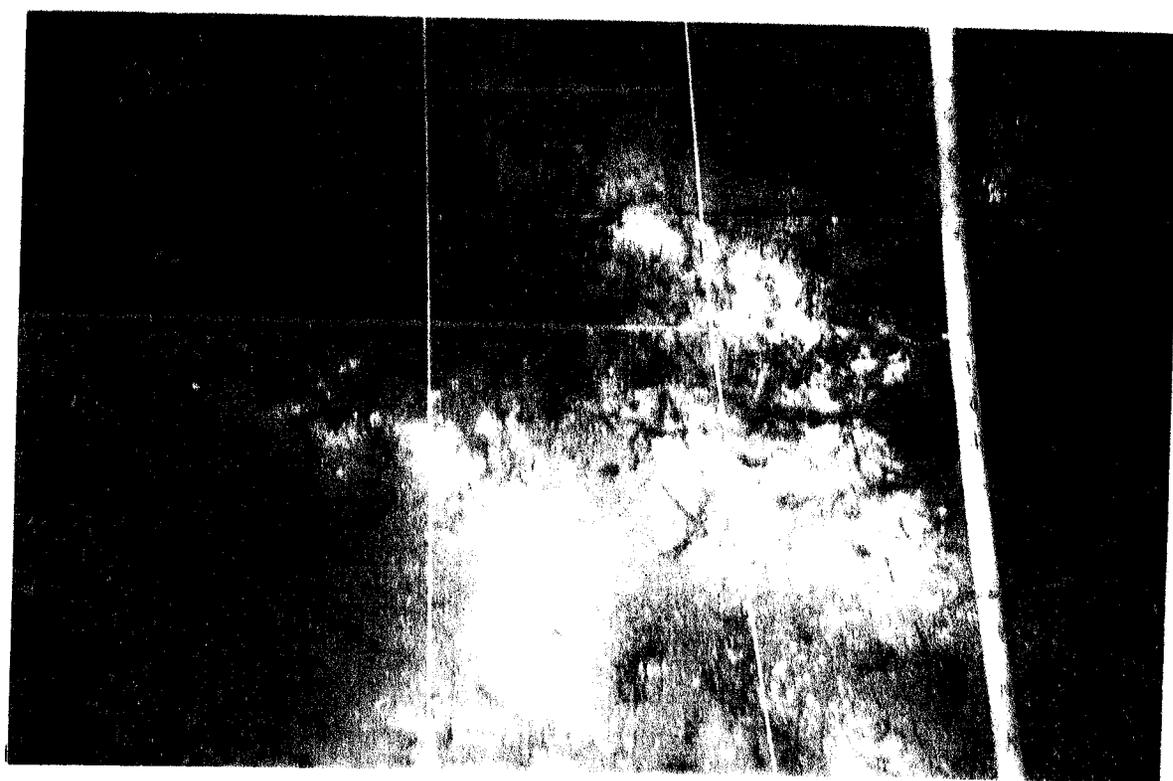


Photo-Figure 4. Below water photograph at Quad No. 1 (south side within channel),
Transect No. 2, Channel Group No. 7/8, Bayport Channel.

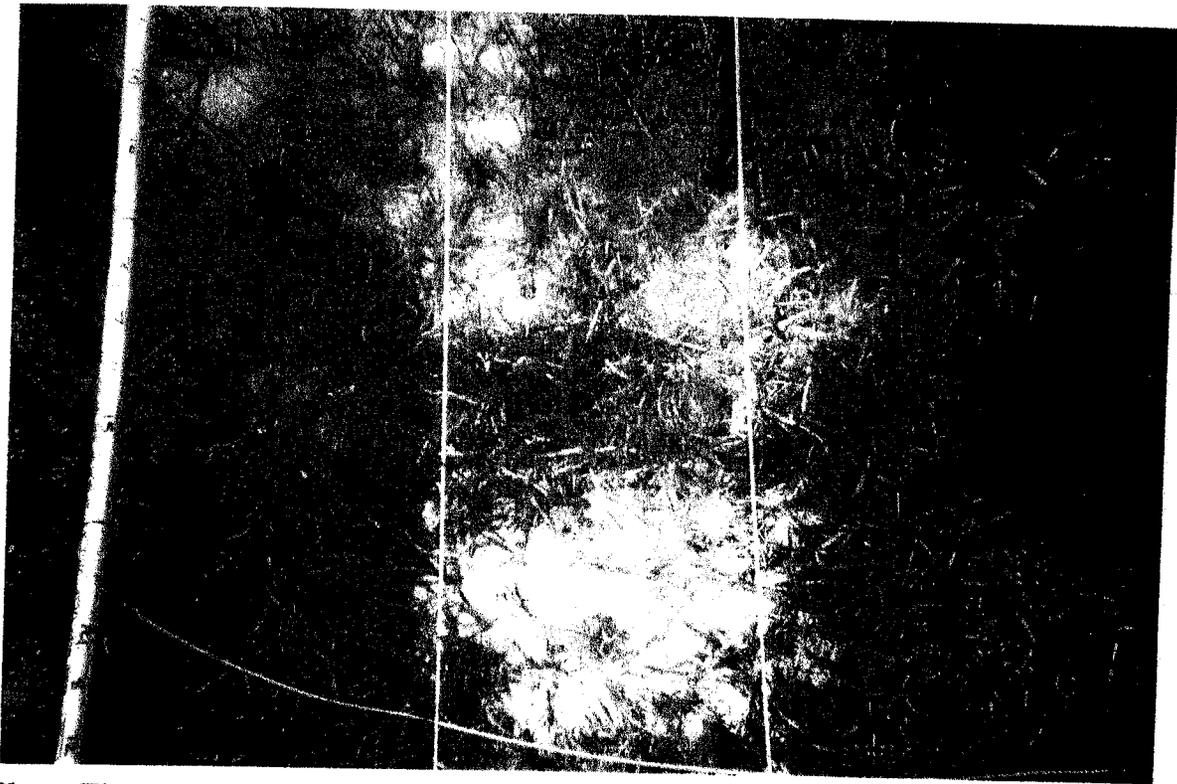


Photo-Figure 5. Below water photograph at Quad No. 2 (north side within channel),
Transect No. 2, Channel Group No. 7/8, Bayport Channel.

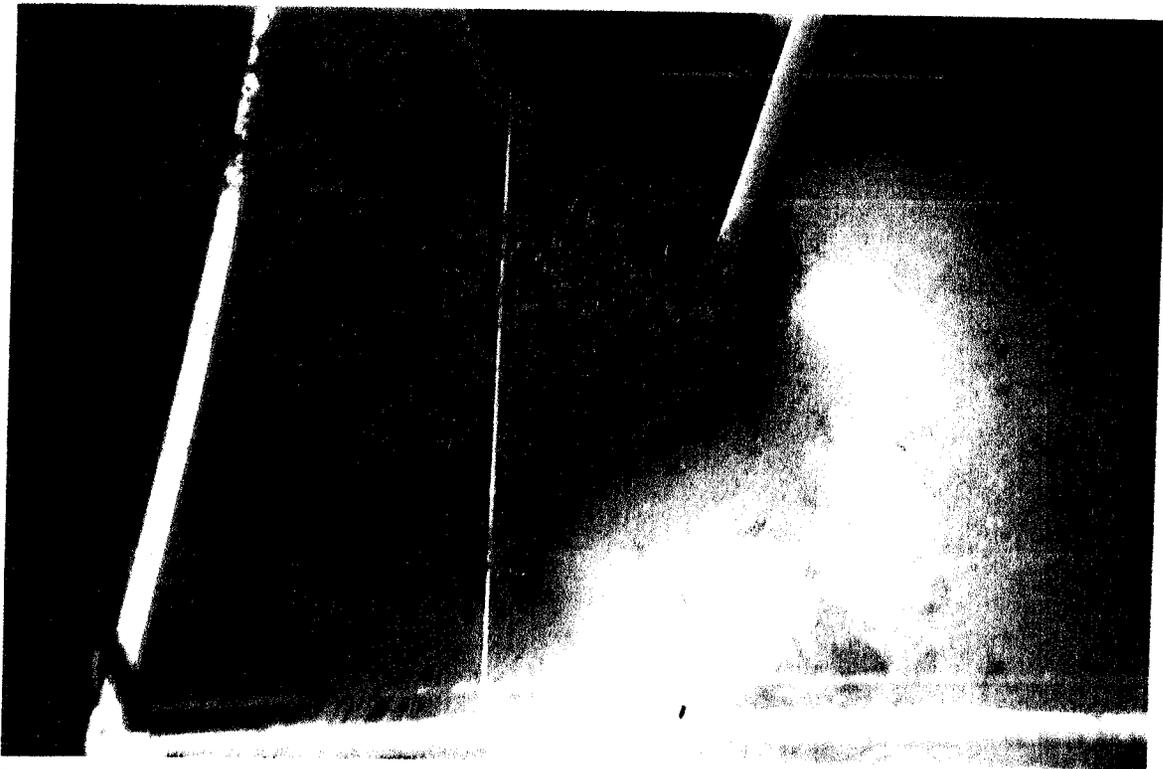


Photo-Figure 6. Below water photograph at Quad No. 3 (outside of channel to north),
Transect No. 2, Channel Group No. 7/8, Bayport Channel.

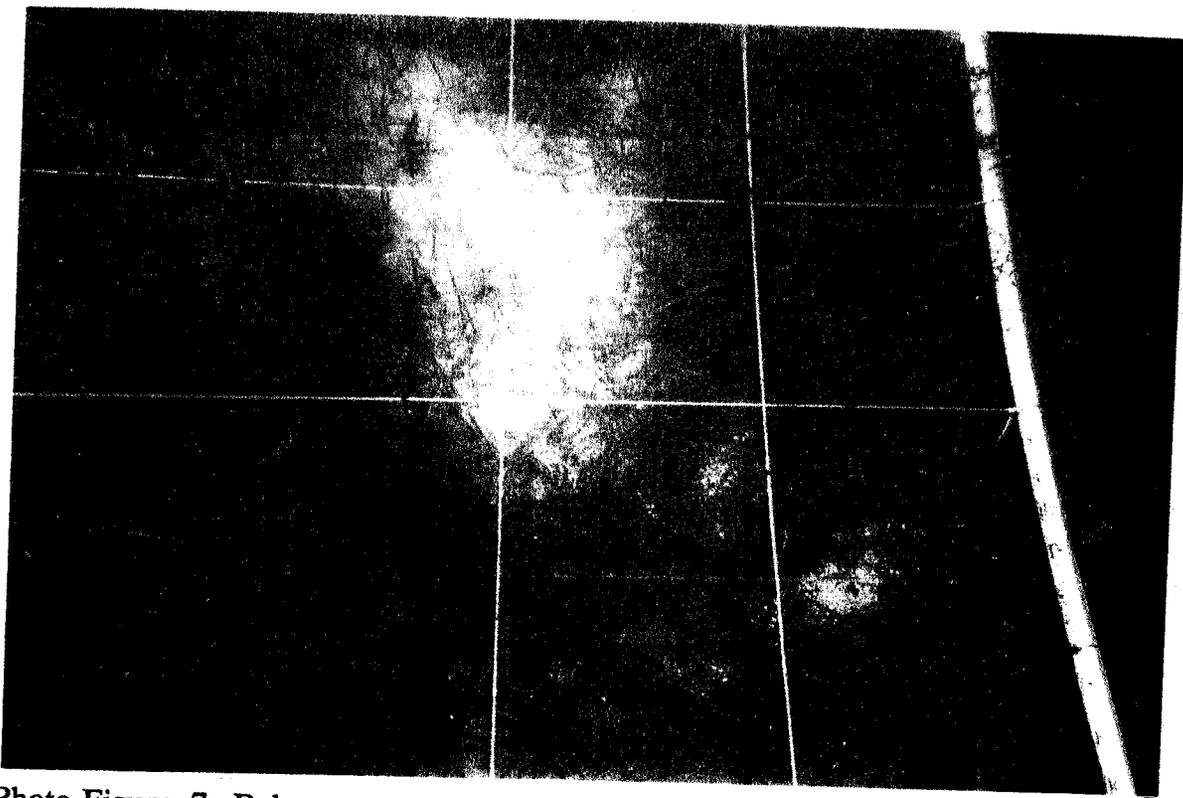


Photo-Figure 7. Below water photograph at Quad No. 1 (south side within channel),
Transect No. 3, Channel Group No. 9/10, Bayport Channel.

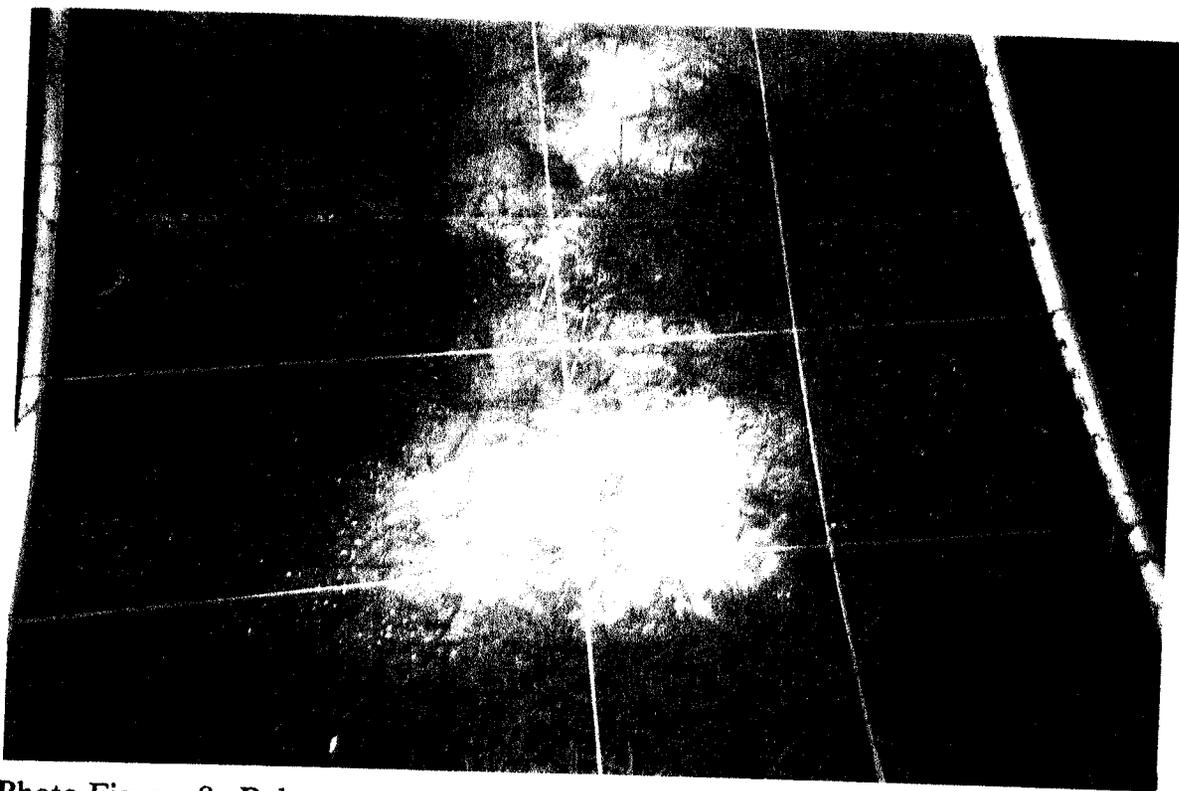


Photo-Figure 8. Below water photograph at Quad No. 2 (north side within channel),
Transect No. 3, Channel Group No. 9/10, Bayport Channel.

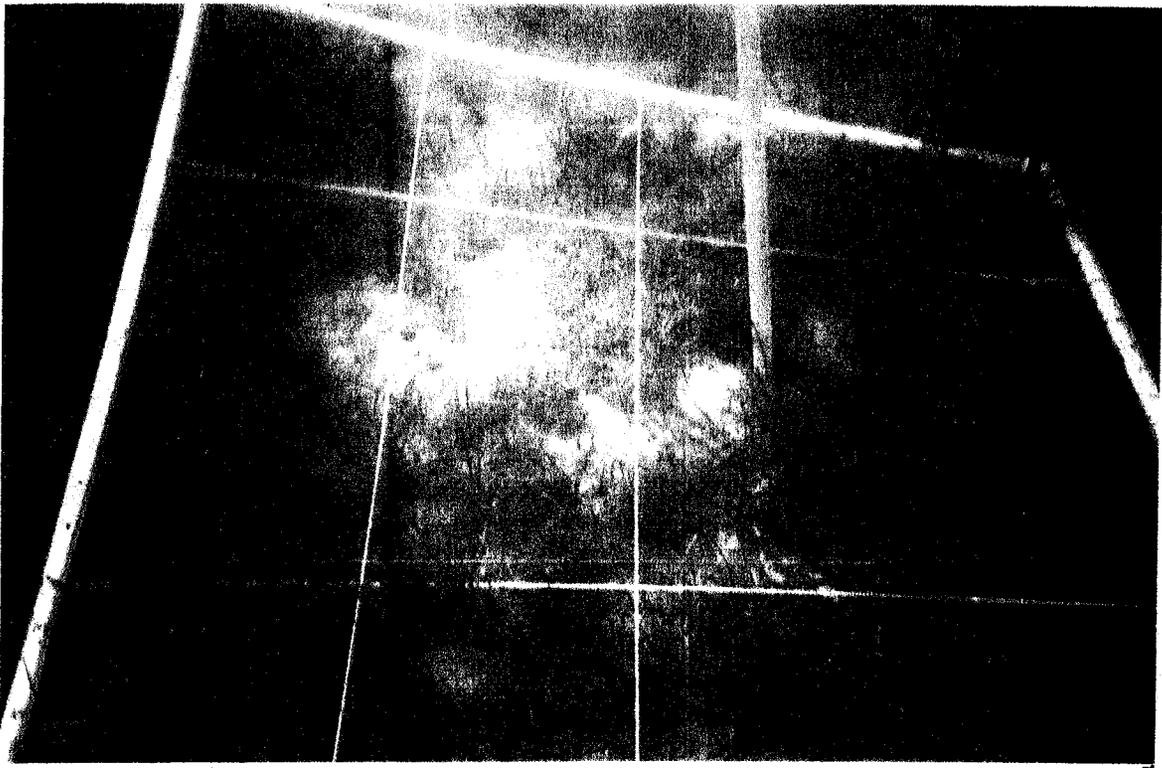


Photo-Figure 9. Below water photograph at Quad No. 3 (outside of channel to south),
Transect No. 3, Channel Group No. 9/10, Bayport Channel.

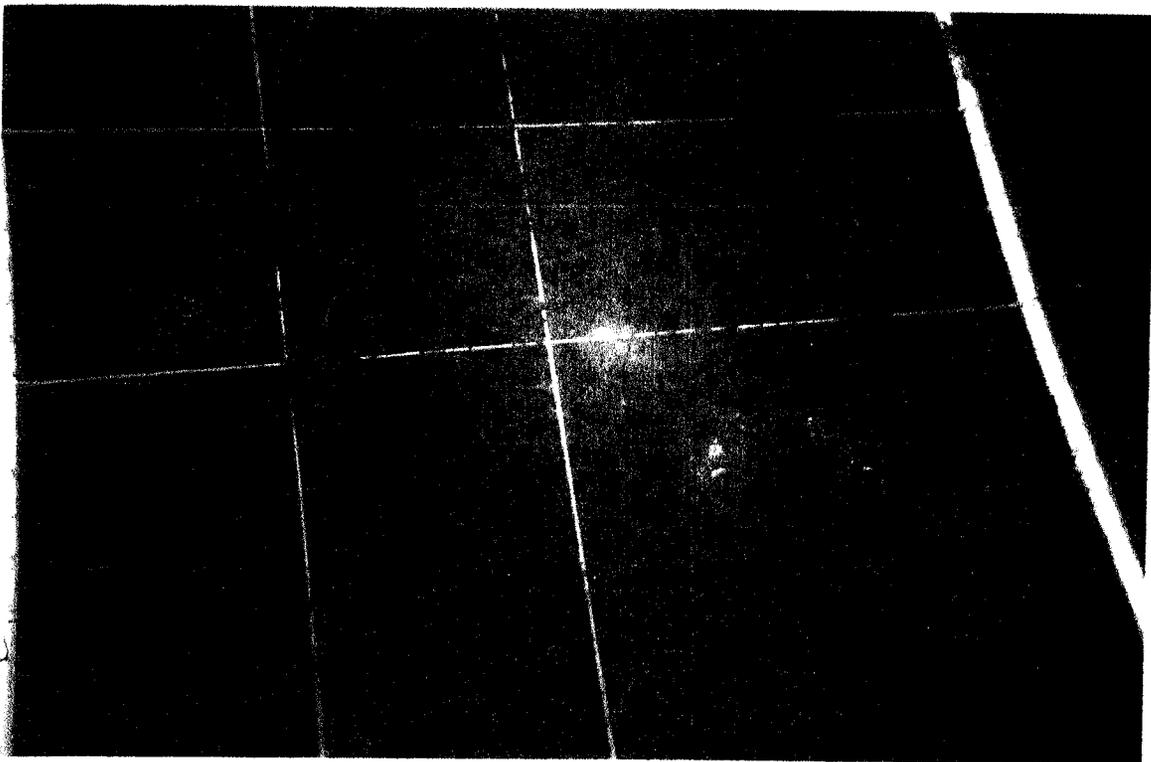


Photo-Figure 10. Below water photograph at Quad No. 1 (south side within channel),
Transect No. 4, Channel Group No. 11/12, Bayport Channel.

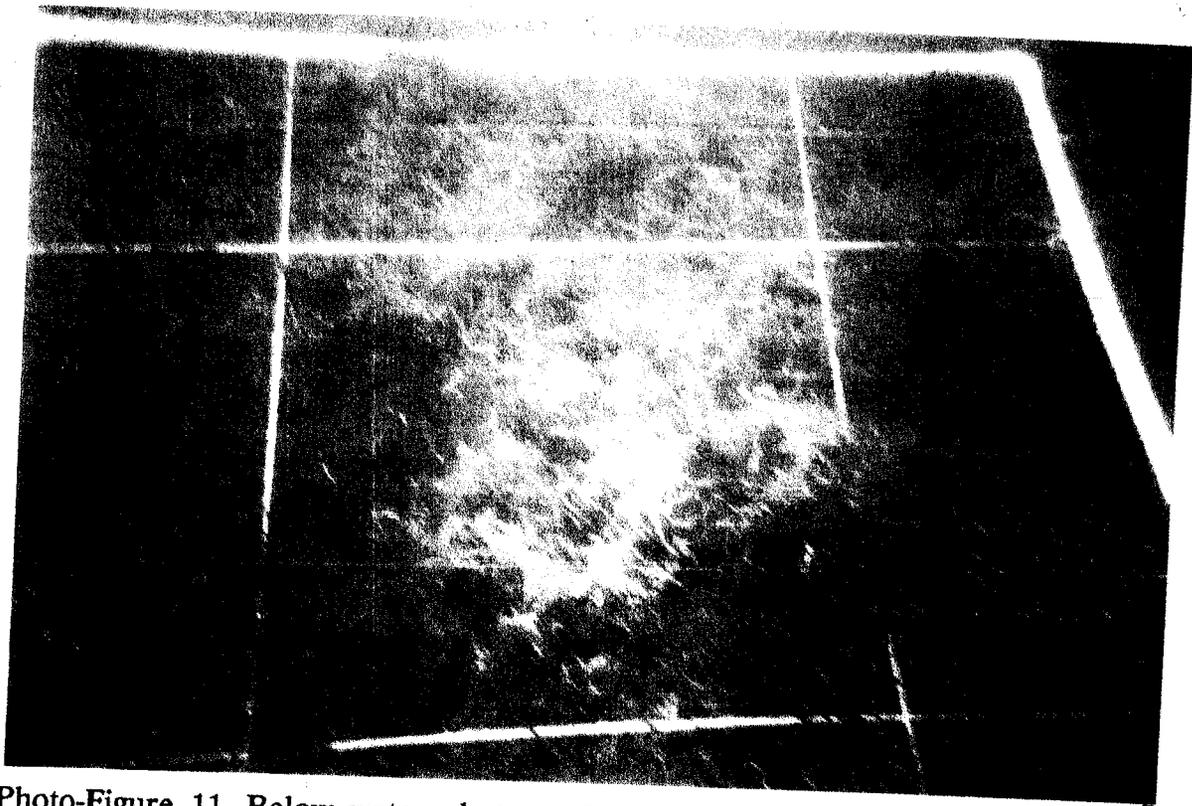


Photo-Figure 11. Below water photograph at Quad No. 2 (north side within channel),
Transect No. 4, Channel Group No. 11/12, Bayport Channel.

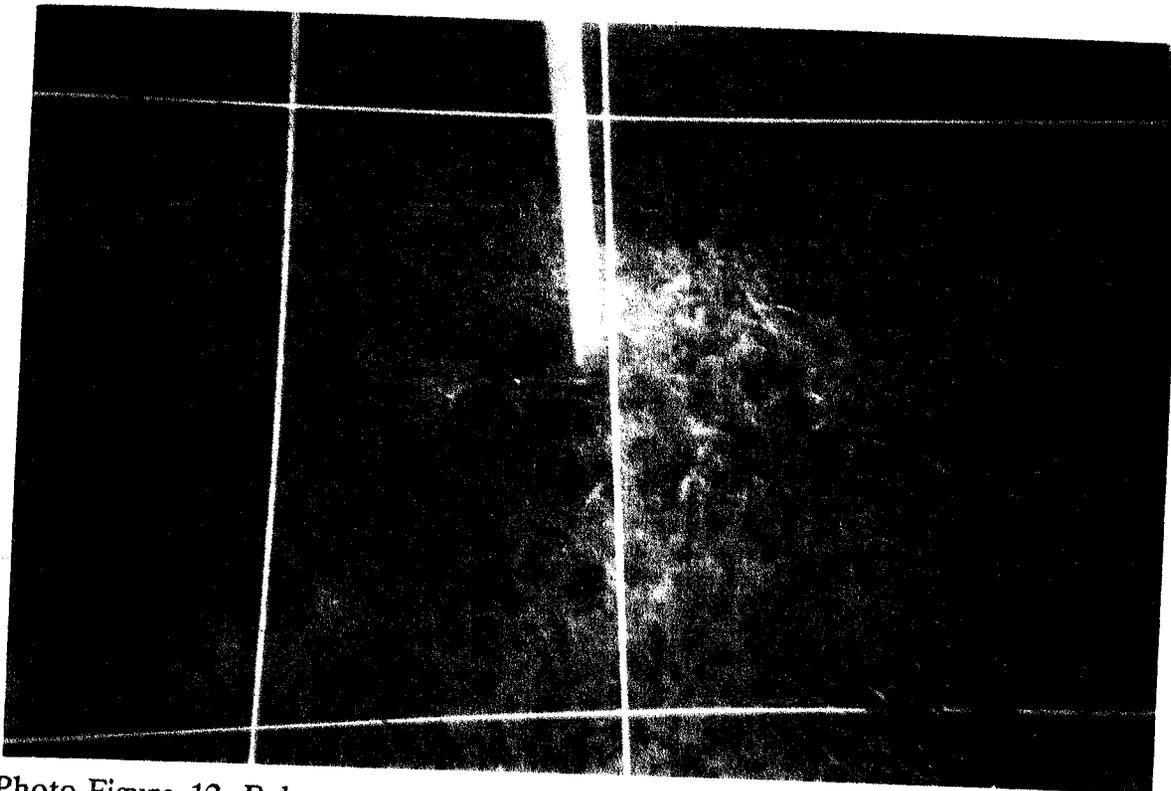


Photo-Figure 12. Below water photograph at Quad No. 3 (outside of channel to north),
Transect No. 4, Channel Group No. 11/12, Bayport Channel.

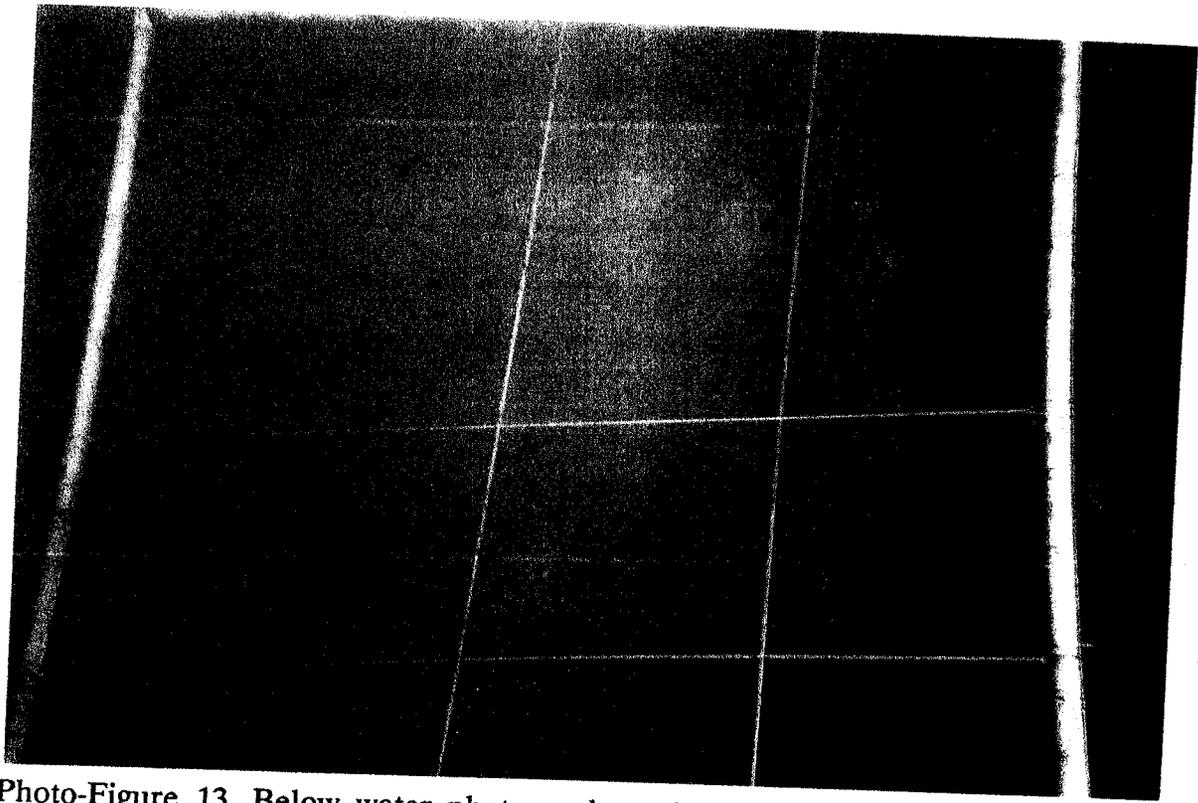


Photo-Figure 13. Below water photograph at Quad No. 1 (south side within channel),
Transect No. 5, Channel Group No. 15A/16A, Bayport Channel.

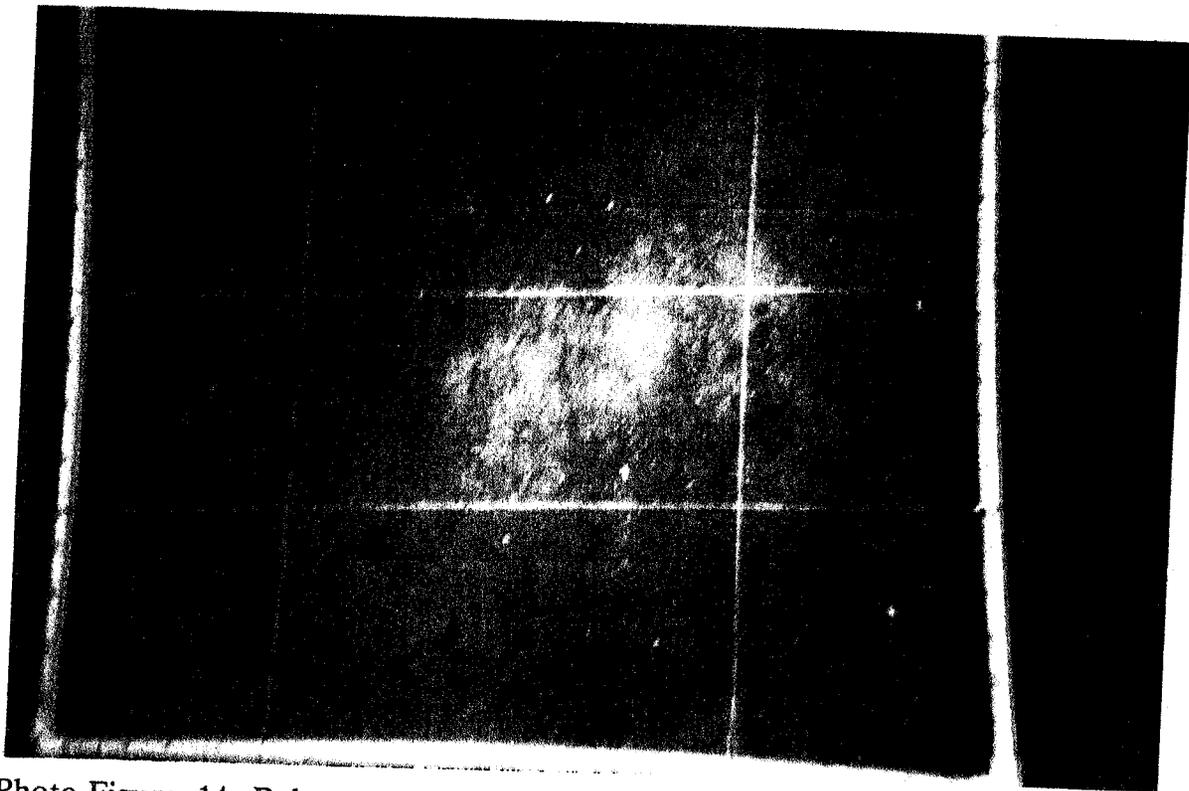


Photo-Figure 14. Below water photograph at Quad No. 2 (north side within channel),
Transect No. 5, Channel Group No. 15A/16A, Bayport Channel.

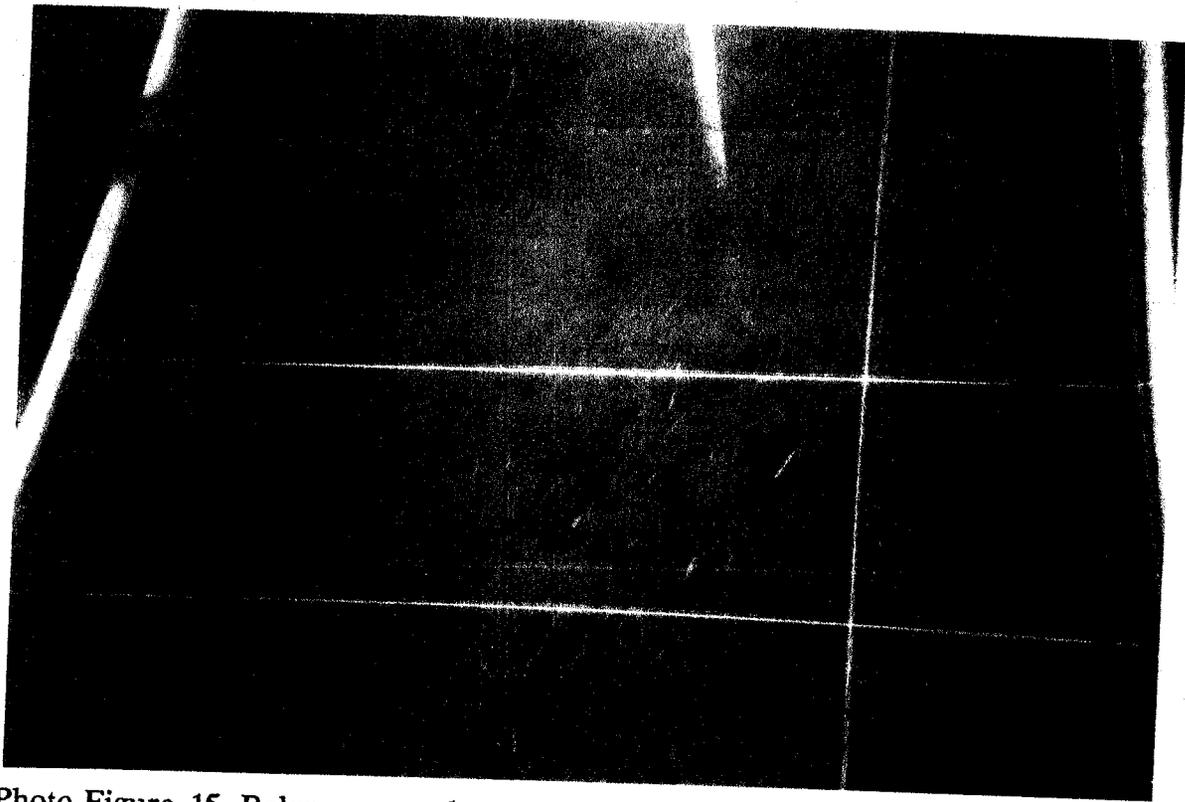


Photo-Figure 15. Below water photograph at Quad No. 3 (outside of channel to south),
Transect No. 5, Channel Group No. 15A/16A , Bayport Channel.

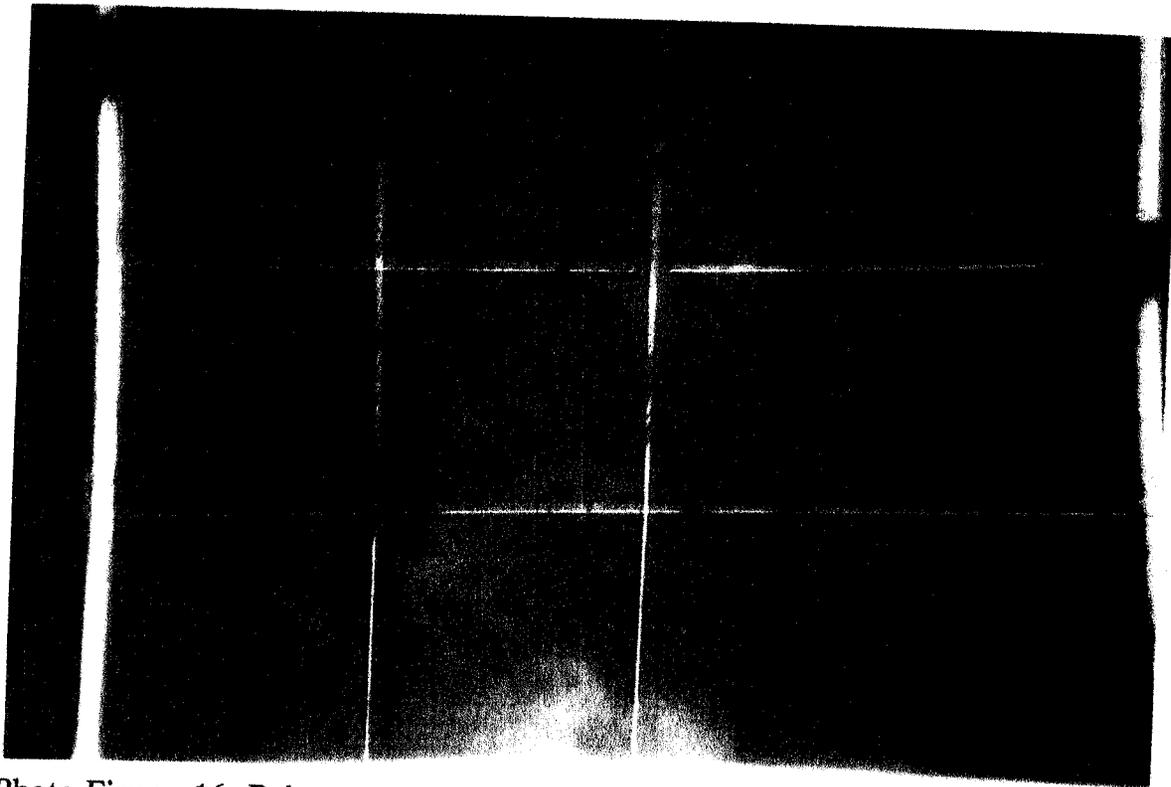


Photo-Figure 16. Below water photograph at Quad No. 1 (south side within channel),
Transect No. 6, Channel Group No. 21/22, Bayport Channel.

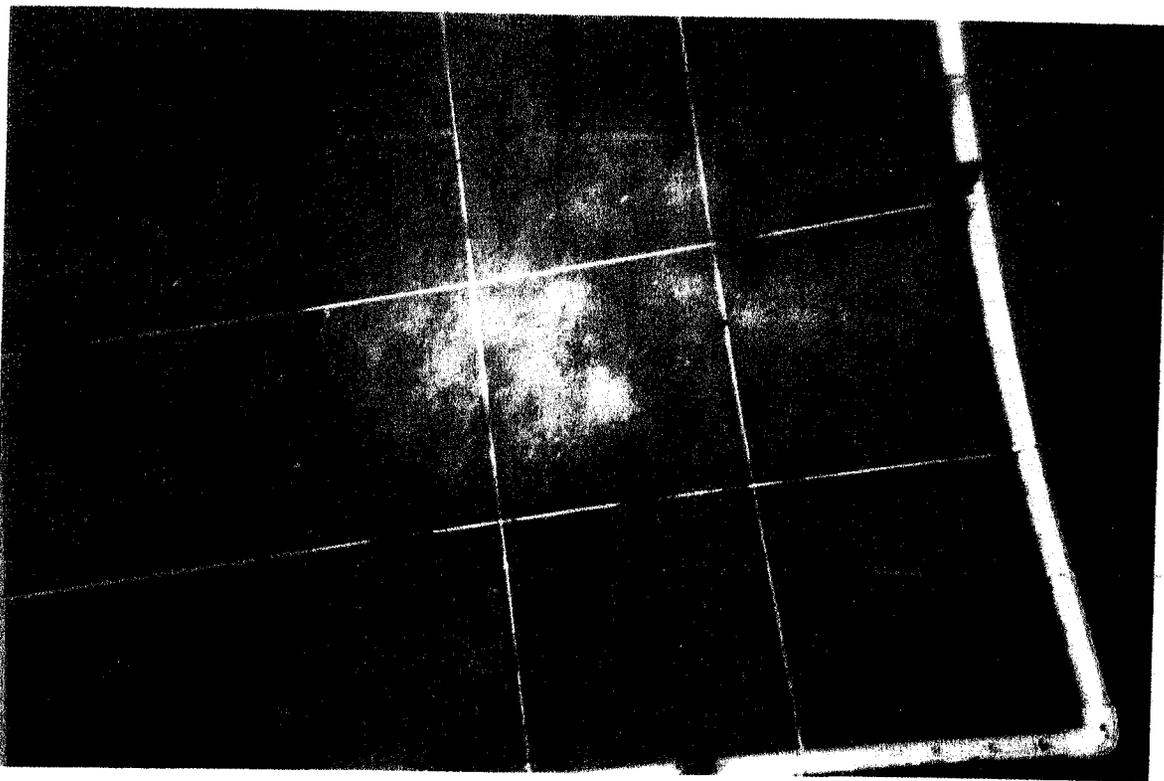


Photo-Figure 17. Below water photograph at Quad No. 2 (north side within channel),
Transect No. 6, Channel Group No. 21/22, Bayport Channel.

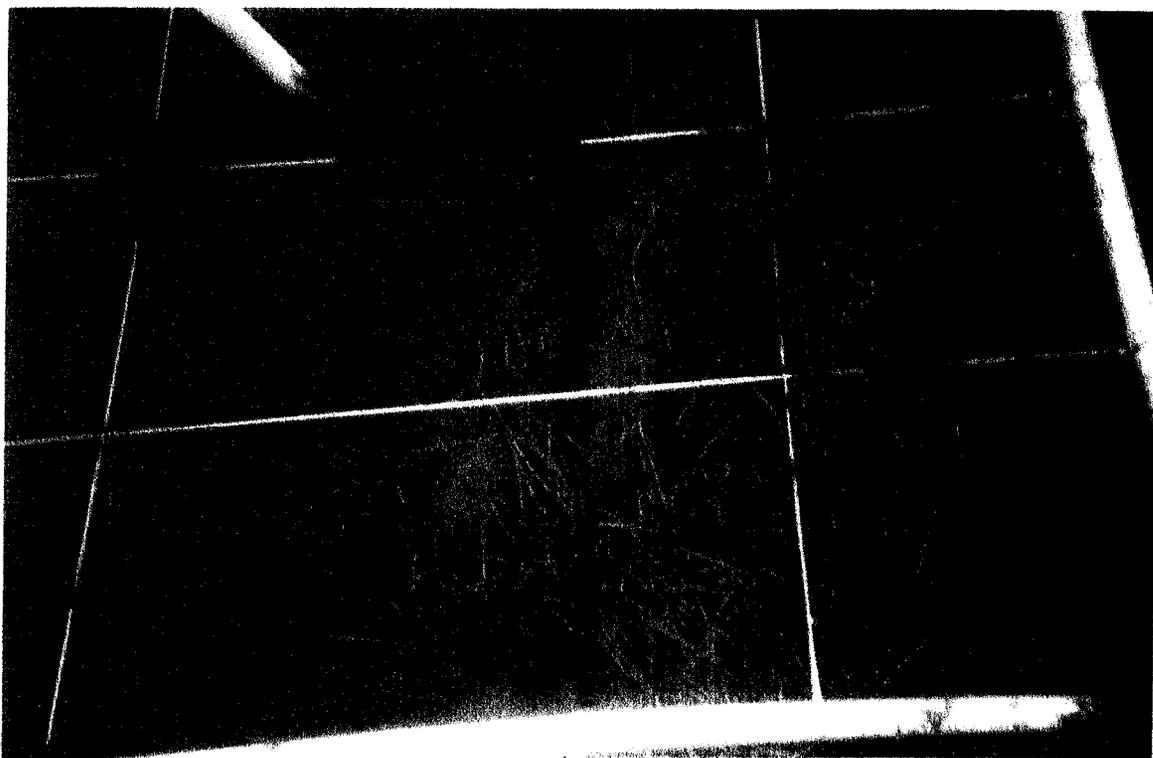


Photo-Figure 18. Below water photograph at Quad No. 3 (outside of channel to north),
Transect No. 6, Channel Group No. 21/22, Bayport Channel.