



HERNANDO COUNTY DEPARTMENT OF PUBLIC WORKS  
BAYPORT CHANNEL  
SEA GRASS MONITORING REPORT  
FDEP Permit No. 271422133

First Semiannual Report

Prepared For:

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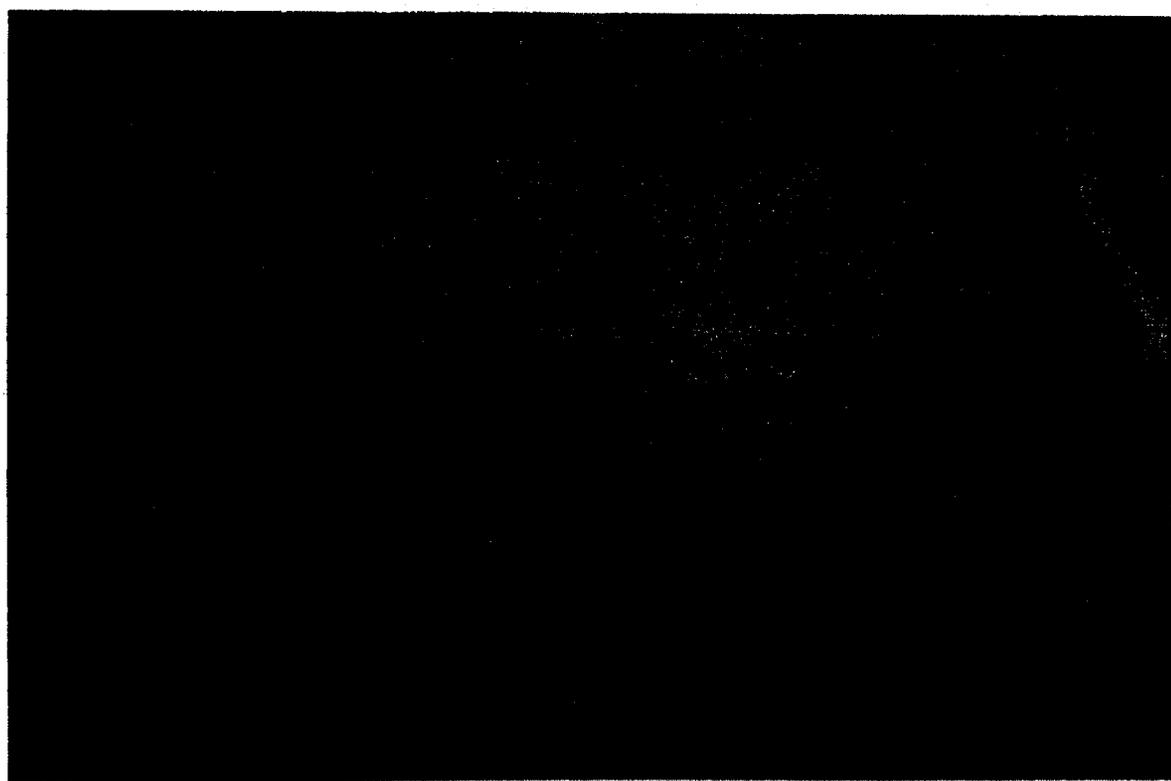
October 1997

Engineering • Planning • Environmental • Architecture

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**NO PHOTOGRAPH  
AVAILABLE**

**TRANSECT #6 Q1  
Photo Date: 10-21-97**



**TRANSECT #6 Q2  
Photo Date: 10-21-97**

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## 1.0 INTRODUCTION/PROJECT HISTORY

Coastal Engineering Associates, Inc. (Coastal) was contracted by the Hernando County Department of Public Works (HCDPW), on September 16, 1997, to perform sea grass monitoring and provide a monitoring report in accordance with Bayport Channel dredging Florida Department of Environmental Protection (FDEP) permit number 271422133 and U.S. Army Corps of Engineers (ACOE) permit number 90IPF-03355.

The project site is located in Sections 25 and 36, Township 22 South, Range 16 East, Hernando County, Florida, at the western terminus of CR 550 (Figure 1). The FDEP and ACOE permits are for a channel extension and maintenance dredging project. The permit conditions in the Sea Grass Monitoring Plan specified that permanent sampling stations be established at four groups of channel markers, 5/6, 7/8, 9/10, and 11/12, where the extension has occurred within the Bayport Channel. Two additional transects were established to monitor an existing section of the channel where only maintenance dredging occurred. Presented in Figure 2 is the general channel area map with locations of the channel marker groups and established vegetative quadrat transects utilized during monitoring of the channel

Pre-dredging baseline data on vegetative species and percent coverage for each station was collected by Berryman and Henigar on March 15, 1995. The channel extension was dredged and maintenance was completed in May of 1996. This report documents the results from the first post dredging sea grass monitoring event conducted at the Bayport Channel

### 1.1 OBJECTIVE

The channel will be monitored for five years following dredging as outlined below. According to the permits, the HCDPW can discontinue monitoring five years after dredging or sooner if monitoring in the extension portions of the channel indicates that sea grass percent coverage meets or exceeds the cover present prior to dredging.

The objective of this monitoring event was to perform an initial assessment of the site conditions after the channel dredging following the monitoring plan outlined in the permits. 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. Qualitative and quantitative monitoring activities summarized in this report were conducted on October 21, 1997 by Environmental Specialist Alexandria Dugan, of Coastal Engineering Associates, Inc.

## 2.0 METHODOLOGY

Field sampling methodologies generally followed permit criteria recommended in the Sea Grass Monitoring Plan to document the natural recovery of sea grass vegetation within the dredged channel.

Eighteen transects were established with three quadrats per channel marker group with two internal quadrats, Q1 and Q2, and one external quadrat, Q3. All Q1 quadrats are located 50 ft. to the south of the northern channel markers, visually estimated to be between the channel markers, all Q2 quadrats are 50 ft. to the north of the southern channel markers, visually estimated to be between the channel markers, and Q3 quadrats are located alternating 50 feet due south or north of one of the six channel group markers outside of the channel. The center points of all the quadrats are demarcated by 3/4" pvc pipe imbedded approximately 18" into the sea bottom with 6"± remaining above grade. These markers are to be used for future monitoring events in conjunction with a 1m<sup>2</sup> pvc sampling quad.

The composition and percent cover of the various marine vegetation species present were quantitatively assessed by visually estimating the aerial cover by individual species and community types of vegetative assemblages in each quadrat. Sea grass shoot densities were counted in 3 of the 16 subunits of each individual quadrat. The internal transect quads were averaged to estimate the percentage of aerial coverage and sea grass shoots for the dredged area.

### 2.1 VEGETATIVE GROUND COVER

The aerial coverage by sea grass and algal groundcover species, as well as bare ground, was visually estimated and recorded at each of the 18 quadrats using the 1m<sup>2</sup> sampling quad. In order to report

the vegetative percent cover for each transect as a community, the internal quadrats (Q1, Q2) were averaged.

## 2.2 SEA GRASS SHOOT DENSITY

Vegetative shoot counts were conducted for each of the 18 quadrats using a modified version of the 1m<sup>2</sup> sampling quad divided into sixteenths by string, then randomly selecting three one-sixteenth areas within the sampling quad. Sea grass shoot density (the number of shoots per 1m<sup>2</sup>) was calculated by counting and recording the number of sea grass shoots within each area (see Table 2). The number of sea grass shoots for the three one-sixteenth areas were averaged (Avg), then multiplied by 16 to estimate the number of sea grass shoots for each 1m<sup>2</sup> quad (total/m<sup>2</sup>). Averaging the Q1 and Q2 quads for each transect estimated a number of sea grass shoots per 1m<sup>2</sup> for the internal area of each transect (Q1/2 Avg/m<sup>2</sup>).

## 2.3 WATER DEPTH

Water depth and time of the sampling of the quadrat was measured and recorded at each quadrat. Water depths were visually estimated from Mean High Water (MHW) benchmarks at channel marker groups 5/6, 9/10, and 15a/16a. Depth data presented in Table 4 are the adjusted water elevations below the MHW benchmarks.

## 2.4 PHOTO DOCUMENTATION

Photo-stations were situated underwater along the east or west side of each quadrat with the bottom of each photograph being the east or west side of the quadrat. Eighteen photographs were taken with the 1m<sup>2</sup> sampling quad in place. The locations of photo-stations are provided in Figure 2. Photo documentation of the site taken during this monitoring event is provided in Photo-Figures in the Appendix of this report. Please note that in transect #5, Q2 and transect #6, Q1, photographs are not available due to under exposure caused by the distortion of freshwater and saltwater mixing.

## 3.0 RESULTS

For this monitoring event, four of the six original external quadrats were re-established, and two of the original six stations were recovered. The twelve internal quadrats were required to be re-

established (based on measurements taken between channel markers) due to the channel extension and maintenance dredging since the baseline study. Two different sea grasses which alternated dominance and four different algal species were noted in the transects. Dominant sea grass species within the channel monitoring area included *Halodule wrightii* and *Ruppia maritima*. Samples were keyed out in the field and in the office using An Illustrated Guide to the Sea Grasses of the Indian River Region of Florida, by N. J. Eiseman (1980). This guide illustrates all six sea grasses which are present in Florida and was provided by the Department of Environmental Protection, Florida Marine Research Institute. Coastal believes that during the baseline report by Berryman and Henigar, the sea grasses were misidentified. For the purpose of this report, *Thalassia testudinum* in the baseline report was considered *Halodule wrightii*, and *Halodule wrightii* in the baseline report was considered *Ruppia maritima*. Dominant algal species present included *Digenia simplex* and *Penicillus capitatus*. Algal species samples were identified by Dr. Clinton J. Dawes of the University of South Florida, Department of Biology. The species observed are listed in Table 4, which includes data on channel substrate, water depth and noted observations. The data in Table 1 summarizes information from combined averages for each transect. Table 2 displays the sea grass shoot density information. Table 3 represents the average percent channel coverage for the internal quadrats versus the external quadrats.

### 3.1 VEGETATIVE GROUNDCOVER

Collectively, sea grass average aerial coverage for the internal quads ranged from 0% to 35%, and algal species' aerial coverage ranged from 1% to 6.5%. Comparatively, sea grasses in the external quadrats represented 0% to 90% of coverage, while algae represented 0% to 100% coverage across the transects. T2 and T6 transects were vegetatively dominated by *Ruppia maritima*, transects T4 and T5 were dominated by *Halodule wrightii*, while transects T1 and T3 were dominated by *Digenia simplex*. A summary of groundcover is provided in Table 1.

### 3.2 NON-VEGETATIVE GROUNDCOVER

Bare ground and algal associations were recognized as an integral part of the Bayport Channel grassbeds. The amount of bare ground varied from transect to transect. The internal quad averages ranged from 58% to 99%, while external quad averages ranged from 0% to 68%.

### 3.3 SEA GRASS SHOOT DENSITY

*Halodule wrightii* represented a dominance in the number of sea grass shoots per 1m<sup>2</sup>. Internal transect averages for sea grass shoot density per 1m<sup>2</sup> ranged from 0 to 480 shoots/m<sup>2</sup>, while external transect averages per 1m<sup>2</sup> ranged from 0 to 826.7 shoots/m<sup>2</sup>. Individual transect results are presented in Table 2, with complete shoot counts by three one-sixteenth sections per quad.

### 4.0 WILDLIFE UTILIZATION / OCCURRENCE

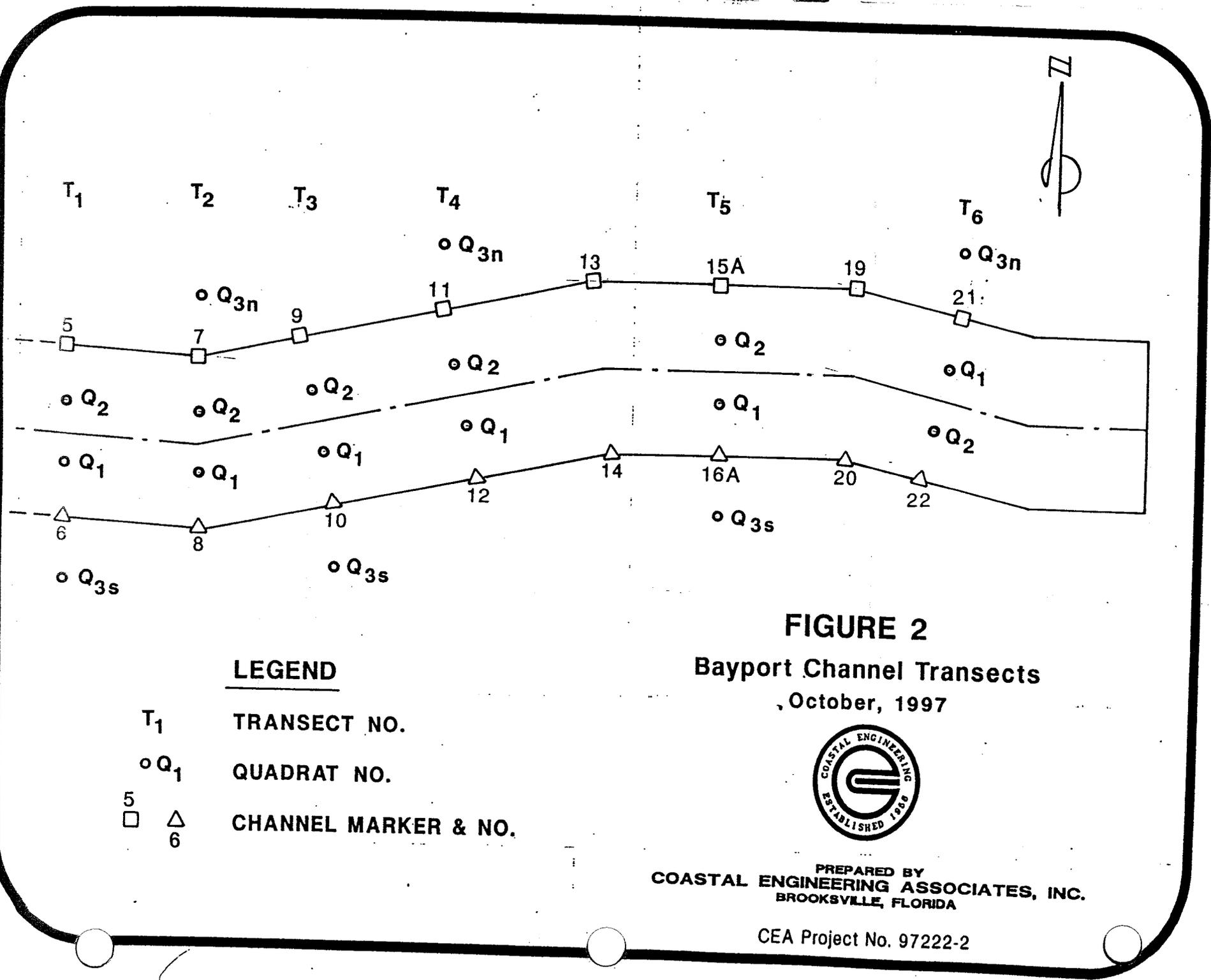
A wide variety of fauna is typically associated with marine sea grass areas. In the channel monitoring area, goby, grunt, pinfish, sting ray, horseshoe crab and oyster represent fauna observed during this monitoring event.

### 5.0 SUMMARY/CONCLUSIONS

There was a diversity of conditions and vegetative coverage between internal and external quadrats during this October 1997 monitoring event. The 1996 channel maintenance has increased the area of bare ground in all but one of the internal quads. Transect #1 had an increase in the recruitment of *Halodule w.* All the transects contained either *Halodule w.* or *Ruppia m.* with concentrations from as high as 90% to as low as 3.5%. In all six of the transects, the aerial coverage in Q3 (the control) closely resembled those values recorded in the baseline report  $\pm 5\%$ . Transect #2 had high concentrations of shell substrate, this may have an impact on the rate at which sea grass becomes established within this transect. The internal quads, Q1 and Q2, of transect #2 have minimal growth and the control, Q3, has a low coverage of sea grass at 30%. The control, Q3, in transect #3 was dominated by 50% algal coverage and only 13% *Halodule w.* Q1 and Q2 of transect #3 had sparse amounts of *Halodule w.* which should continue to increase in coverage. New shoots within the channel transects are established in transects #1, #4, #5, and #6. The average internal percent coverage for new shoot density is quarter of the average external percent coverage. The transects sampled generally were representative of the Bayport Channel area which has varying coverage and species composition throughout. Continued monitoring events will be useful in determining any trends in the diversity of conditions or coverages. The next semiannual event should be in April 1998.

# APPENDIX





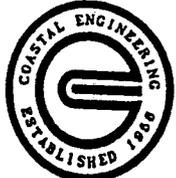
**FIGURE 2**

**Bayport Channel Transects**

October, 1997

**LEGEND**

- T<sub>1</sub>      TRANSECT NO.
- Q<sub>1</sub>    QUADRAT NO.
- 5      △
- 6      CHANNEL MARKER & NO.



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 BROOKSVILLE, FLORIDA

CEA Project No. 97222-2

# COMBINED AVERAGES TABLES

Table 1. Average Transect Coverage.

DATE October 21, 1997

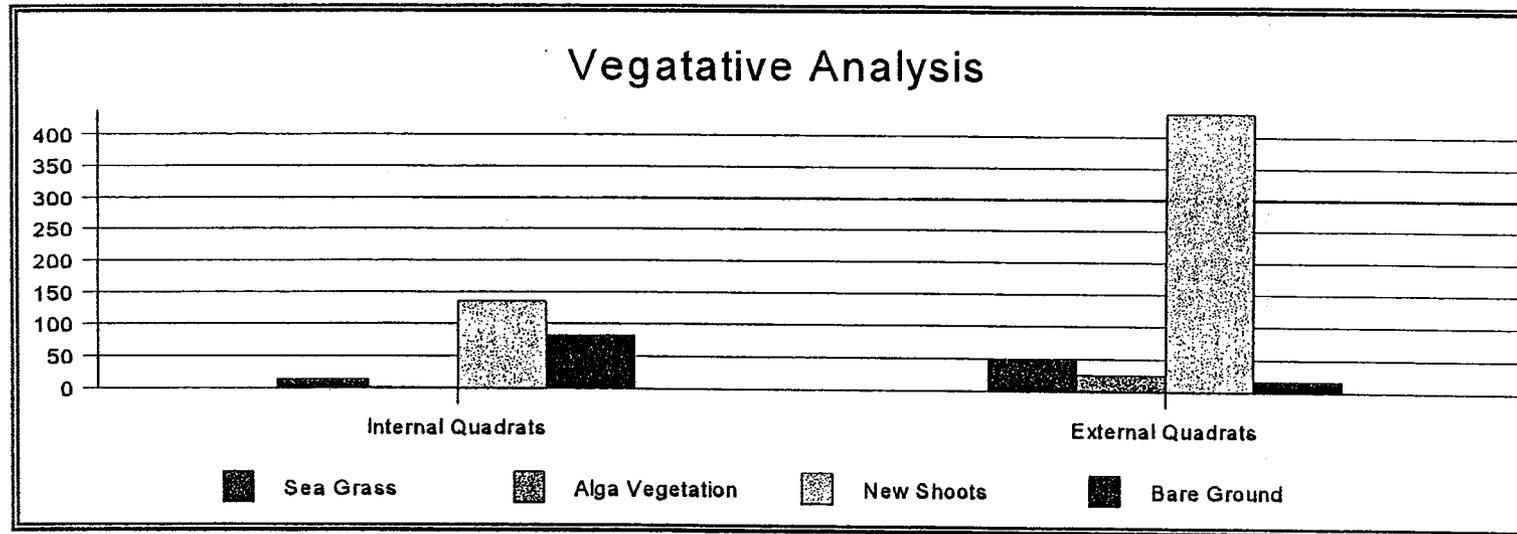
| REPETITIONS       |         |     |         |      |         |      |         |      |         |      |         |      |         |       |
|-------------------|---------|-----|---------|------|---------|------|---------|------|---------|------|---------|------|---------|-------|
| STRATUM           | T1 CHAN |     | T2 CHAN |      | T3 CHAN |      | T4 CHAN |      | T5 CHAN |      | T6 CHAN |      | summary |       |
| <u>Herbaceous</u> | Q1/2    | Q3s | Q1/2    | Q3n  | Q1/2    | Q3s  | Q1/2    | Q3n  | Q1/2    | Q3s  | Q1/2    | Q3n  | inter   | exter |
| Sea Grass Avg     | 35.0    | 0.0 | 0.0     | 30.0 | 3.5     | 13.0 | 5.5     | 80.0 | 27.0    | 90.0 | 20.0    | 90.0 | 15.2    | 50.5  |
| Algal Avg.        | 6.5     | 100 | 1       | 2    | 0       | 52   | 1       | 0    | 3       | 0    | 0       | 0    | 1.9     | 25.6  |
| Bare ground       | 58      | 0   | 99      | 68   | 96.5    | 0    | 93.5    | 20   | 70      | 10   | 80      | 10   | 82.8    | 18    |
| Total % Cover     | 42      | 100 | 1       | 32   | 4       | 65   | 7       | 80   | 30      | 90   | 20      | 90   | 17      | 76    |

Table 2. Results of Sea Grass Shoot Densities and Averages.

| REPETITIONS             |       |    |    |     |       |    |    |     |     |   |    |     |       |    |    |     |       |    |    |     |       |    |    |     |
|-------------------------|-------|----|----|-----|-------|----|----|-----|-----|---|----|-----|-------|----|----|-----|-------|----|----|-----|-------|----|----|-----|
| Section                 | T1    |    |    |     | T2    |    |    |     | T3  |   |    |     | T4    |    |    |     | T5    |    |    |     | T6    |    |    |     |
|                         | 4     | 6  | 13 | Avg | 4     | 6  | 13 | Avg | 4   | 6 | 13 | Avg | 4     | 6  | 13 | Avg | 4     | 6  | 13 | Avg | 4     | 6  | 13 | Avg |
| Q1                      | 18    | 35 | 50 | 34  | 0     | 0  | 0  | 0   | 0   | 0 | 0  | 0   | 7     | 4  | 3  | 5   | 35    | 20 | 4  | 20  | 5     | 2  | 6  | 4   |
| total/m <sup>2</sup>    | 549.3 |    |    |     | 0.0   |    |    |     | 0.0 |   |    |     | 74.7  |    |    |     | 314.7 |    |    |     | 69.3  |    |    |     |
| Q2                      | 27    | 20 | 30 | 26  | 0     | 0  | 0  | 0   | 0   | 0 | 0  | 0   | 0     | 0  | 0  | 0   | 8     | 12 | 20 | 13  | 0     | 0  | 0  | 0   |
| total/m <sup>2</sup>    | 410.7 |    |    |     | 0.0   |    |    |     | 0.0 |   |    |     | 0.0   |    |    |     | 213.3 |    |    |     | 0.0   |    |    |     |
| Q1/2 Ave/m <sup>2</sup> | 480.0 |    |    |     | 0.0   |    |    |     | 0.0 |   |    |     | 37.3  |    |    |     | 264.0 |    |    |     | 34.7  |    |    |     |
| Q3                      | 0     | 0  | 0  | 0   | 25    | 70 | 30 | 42  | 0   | 0 | 0  | 0   | 25    | 80 | 50 | 52  | 20    | 30 | 50 | 33  | 40    | 52 | 20 | 37  |
| total/m <sup>2</sup>    | 0.0   |    |    |     | 666.7 |    |    |     | 0.0 |   |    |     | 826.7 |    |    |     | 533.3 |    |    |     | 597.3 |    |    |     |

**Table 3: Average Percent Channel Coverage.**

| Average Percent Coverage | Internal Quadrats | External Quadrats |
|--------------------------|-------------------|-------------------|
| Sea Grass                | 15.2              | 50.5              |
| Alga Vegetation          | 2                 | 25.6              |
| New Shoots               | 136               | 437               |
| Bare Ground              | 83                | 18                |



# DATA SHEET

Table 4. Percent Coverage.

DATE October 21, 1997

| STRATUM                        | REPETITIONS   |           |            |             |          |           |  |          |           |                      |          |           |   |           |           |  |           |           |    |    |    |
|--------------------------------|---|-----------|------------|-------------|----------|-----------|--|----------|-----------|----------------------|----------|-----------|---|-----------|-----------|--|-----------|-----------|----|----|----|
|                                | T1 CHAN 5/6   |           |            | T2 CHAN 7/8 |          |           | T3 CHAN 9/10   |          |           | T4 CHAN 11/12        |          |           | T5 CHAN 15a/16a   |           |           | T6 CHAN 21/22  |           |           |    |    |    |
|                                | Q1  | Q2        | Q3s        | Q1          | Q2       | Q3n       | Q1   | Q2       | Q3s       | Q1                   | Q2       | Q3n       | Q1  | Q2        | Q3s       | Q1   | Q2        | Q3n       |    |    |    |
| <i>Ruppia maritima</i>         |   |           |            |             |          | 30        |  |          |           |                      |          |           |   |           |           | 35   | 20        |           | 31 | 10 | 90 |
| <i>Halodule wrightii</i>       | 40  | 30        |            |             |          |           | <1   | 6        | 13        | 10                   | 1        | 80        |   |           | 90        |  |           |           |    |    |    |
| <i>Digenia simplex</i>         |   |           | 100        |             |          |           |  |          | 50        |                      |          |           |   | 6         |           |  |           |           |    |    |    |
| <i>Penicillus capitatus</i>    |   | 1         |            |             |          |           |  |          |           |                      | 2        |           |   |           |           |  |           |           |    |    |    |
| <i>Batophora oerstedii</i>     | 2   | 10        |            | <1          |          | 1         |  |          | <1        |                      |          |           |   |           |           |  |           |           |    |    |    |
| mermaid cup                    |   |           |            |             | <1       | <1        |  |          | <1        |                      |          |           |   |           |           |  |           |           |    |    |    |
| Bare ground                    |   |           |            | 99          | 99       |           |  |          |           | 90                   | 97       | 20        | 65  | 74        | 10        | 69   | 90        | 10        |    |    |    |
| <b>Total % Cover</b>           | <b>42</b>   | <b>41</b> | <b>100</b> | <b>1</b>    | <b>1</b> | <b>32</b> | <b>1</b>   | <b>6</b> | <b>65</b> | <b>10</b>            | <b>3</b> | <b>80</b> | <b>35</b>   | <b>26</b> | <b>90</b> | <b>31</b>  | <b>10</b> | <b>90</b> |    |    |    |
| channel substrate <sup>1</sup> | SA  |           |            | SH/HD       |          | SA        | MIX SH/SA  |          |           | SM                   |          |           | SM  |           |           | HD   |           | SM        |    |    |    |
| Depth Below MHW                | 8'  | 8'        | 6.5'       | 6.5'        | 6.5'     | 6'        | 7'   | 7'       | 5'        | 6.5'                 | 6.5'     | 5'        | 6'  | 6'        | 5'        | 7.5'   | 6.5'      | 5'        |    |    |    |
| Notes:                         | <ul style="list-style-type: none"> <li>• located pre-established quad #Q3</li> <li>• -2' MHW<sup>2</sup> nail #5</li> </ul> |           |            |             |          |           | <ul style="list-style-type: none"> <li>• Oyster clusters in quad # Q3</li> <li>• located pre-established quad #Q3</li> <li>• -3' MHW nail #10</li> </ul> |          |           | Falling tide 11:30am |          |           | <ul style="list-style-type: none"> <li>• Falling tide 10:30am</li> <li>• -2' MHW nail #16A</li> </ul> |           |           | <ul style="list-style-type: none"> <li>• Sting ray 9am</li> <li>• Area surrounding quad appeared to have better cover</li> </ul> |           |           |    |    |    |

<sup>1</sup>substrate abbreviation: SA = sand, SH = shell, HD = hard bottom, SM = sandy mud.

<sup>2</sup>Mean High Water

# DATA SHEET

Table 4 Cont. Shoot Density.

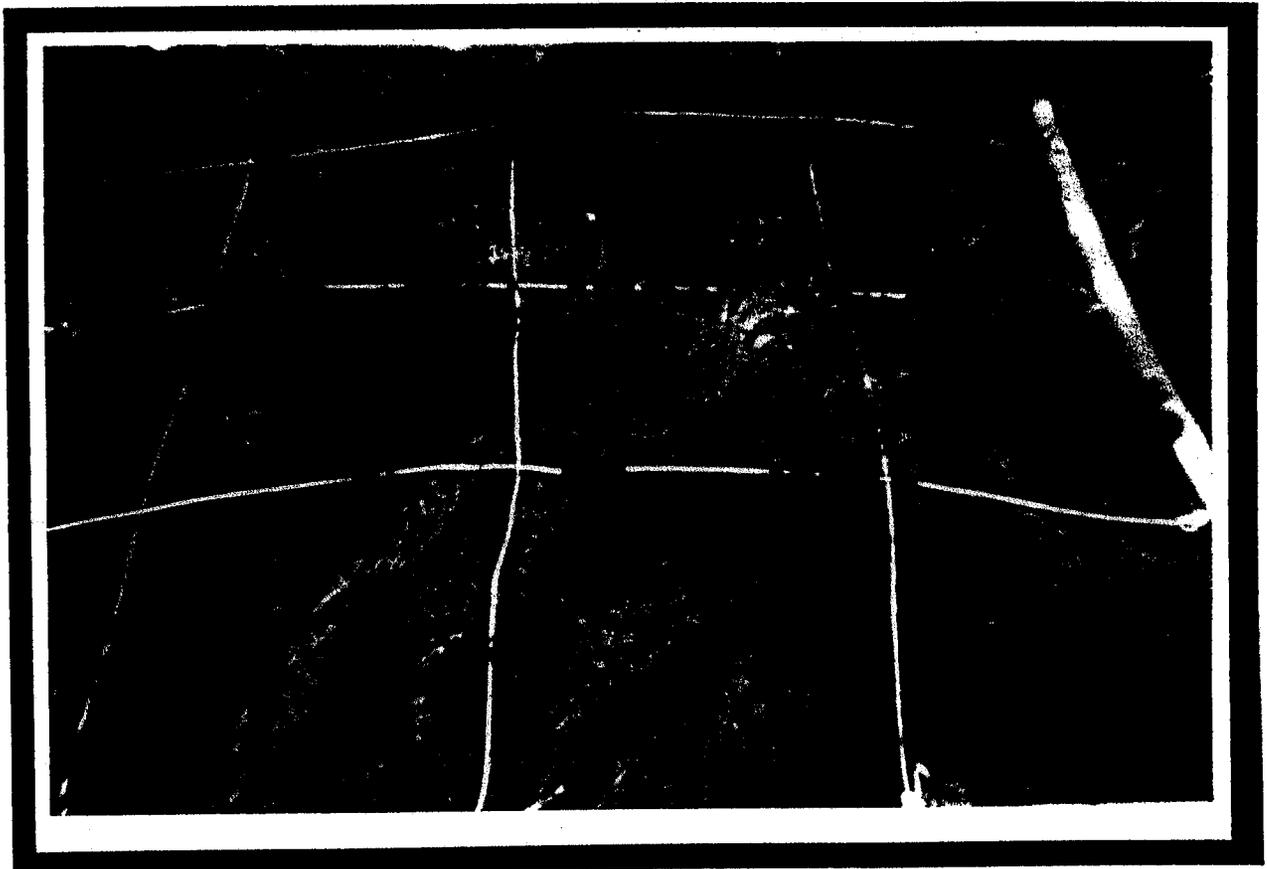
Date October 21, 1997

| REPETITIONS        |    |    |     |    |    |     |    |    |     |    |    |     |    |    |     |    |    |     |
|--------------------|----|----|-----|----|----|-----|----|----|-----|----|----|-----|----|----|-----|----|----|-----|
| STRATUM Herbaceous | T1 |    |     | T2 |    |     | T3 |    |     | T4 |    |     | T5 |    |     | T6 |    |     |
|                    | S4 | S6 | S13 |
| <i>Q1</i>          | 18 | 35 | 50  | 0  | 0  | 0   | 0  | 0  | 0   | 7  | 4  | 3   | 35 | 20 | 4   | 5  | 2  | 6   |
| <i>Q2</i>          | 27 | 20 | 30  | 0  | 0  | 0   | 0  | 0  | 0   | 0  | 0  | 0   | 8  | 12 | 20  | 0  | 0  | 0   |
| <i>Q3</i>          | 0  | 0  | 0   | 25 | 70 | 30  | 0  | 0  | 0   | 25 | 80 | 50  | 20 | 30 | 50  | 40 | 52 | 20  |

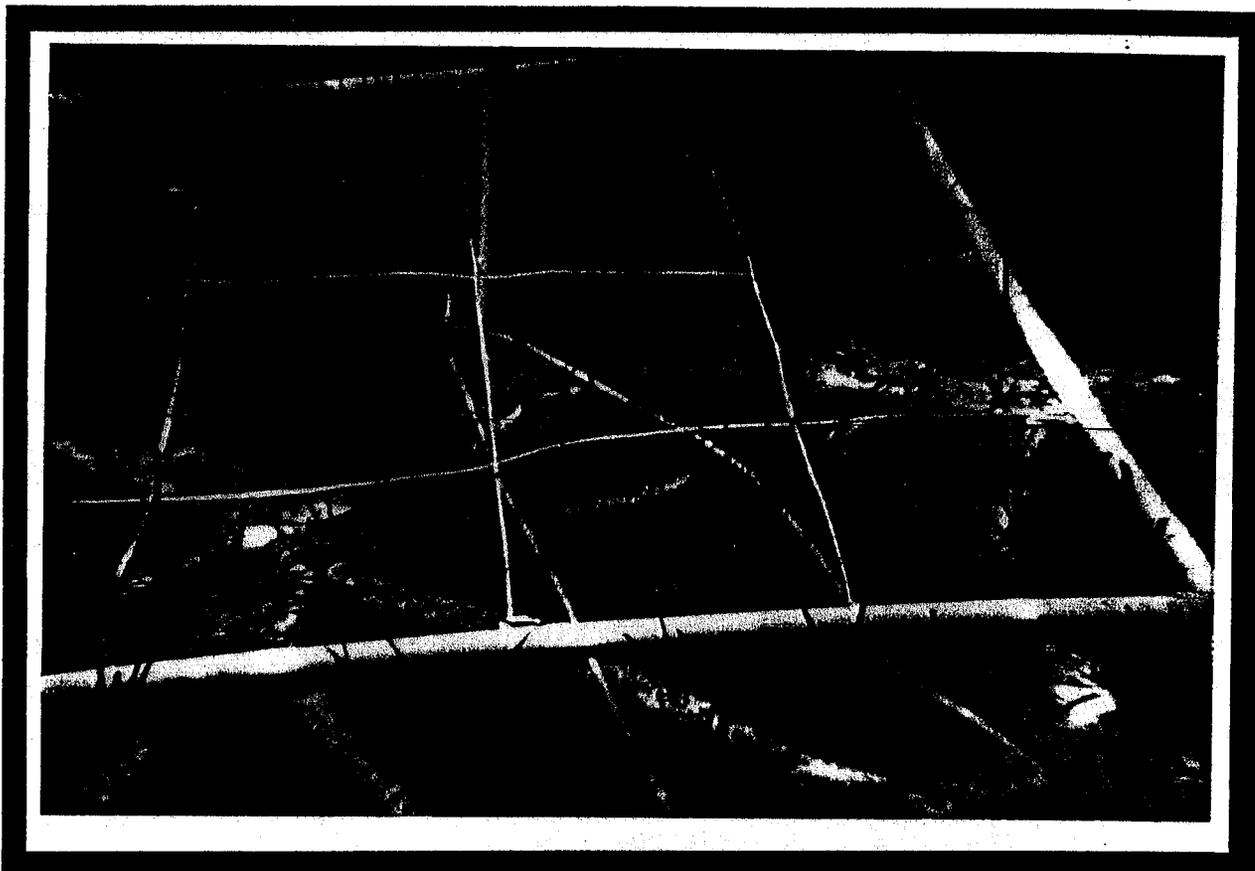
| STRATUM<br><u>Herbaceous</u> | T1 CHAN 5/6 |           |            |
|------------------------------|-------------|-----------|------------|
|                              | Q1          | Q2        | Q3s        |
| <i>Ruppia maritima</i>       |             |           |            |
| <i>Halodule wrightii</i>     | 40          | 30        |            |
|                              |             |           |            |
| <i>Digenia simplex</i>       |             |           | 100        |
| <i>Penicillus capitatus</i>  |             | 1         |            |
| <i>Batophora oerstedii</i>   | 2           | 10        |            |
| mermaid cup                  |             |           |            |
| Bare ground                  |             |           |            |
| <b>Total % Cover</b>         | <b>42</b>   | <b>41</b> | <b>100</b> |

| Shoot Density               | T1 CHAN 5/6  |    |    |     |
|-----------------------------|--------------|----|----|-----|
|                             | 4            | 6  | 13 | Ave |
| Section                     |              |    |    |     |
| Q1                          | 18           | 35 | 50 | 34  |
| total/m <sup>2</sup>        | 549.3        |    |    |     |
| Q2                          | 27           | 20 | 30 | 26  |
| total/m <sup>2</sup>        | 410.7        |    |    |     |
| Q3                          | 0            | 0  | 0  | 0   |
| total/m <sup>2</sup>        | 0.0          |    |    |     |
|                             |              |    |    |     |
| <b>T Ave /m<sup>2</sup></b> | <b>320.0</b> |    |    |     |

TRANSECT #1



TRANSECT #1 Q3  
Photo Date: 10-21-97



**TRANSECT #1 Q1**  
**Photo Date: 10-21-97**



**TRANSECT #1 Q2**  
**Photo Date: 10-21-97**

| STRATUM<br><u>Herbaceous</u> | T2 CHAN 7/8 |          |           |
|------------------------------|-------------|----------|-----------|
|                              | Q1          | Q2       | Q3s       |
| <i>Ruppia maritima</i>       |             |          | 30        |
| <i>Halodule wrightii</i>     |             |          |           |
| <i>Digenia simplex</i>       |             |          |           |
| <i>Penicillus capitatus</i>  |             |          |           |
| <i>Batophora oerstedii</i>   | <1          |          | 1         |
| mermaid cup                  |             | <1       | <1        |
| Bare ground                  | 99          | 99       | 68        |
| <b>Total % Cover</b>         | <b>1</b>    | <b>1</b> | <b>32</b> |

| Shoot Density         | T2 CHAN 7/8 |    |    |     |
|-----------------------|-------------|----|----|-----|
|                       | 4           | 6  | 13 | Ave |
| Q1                    | 0           | 0  | 0  | 0   |
| total/m <sup>2</sup>  | 0.0         |    |    |     |
| Q2                    | 0           | 0  | 0  | 0   |
| total/m <sup>2</sup>  | 0.0         |    |    |     |
| Q3                    | 25          | 70 | 30 | 42  |
| total/m <sup>2</sup>  | 666.7       |    |    |     |
| T Ave /m <sup>2</sup> | 222.2       |    |    |     |

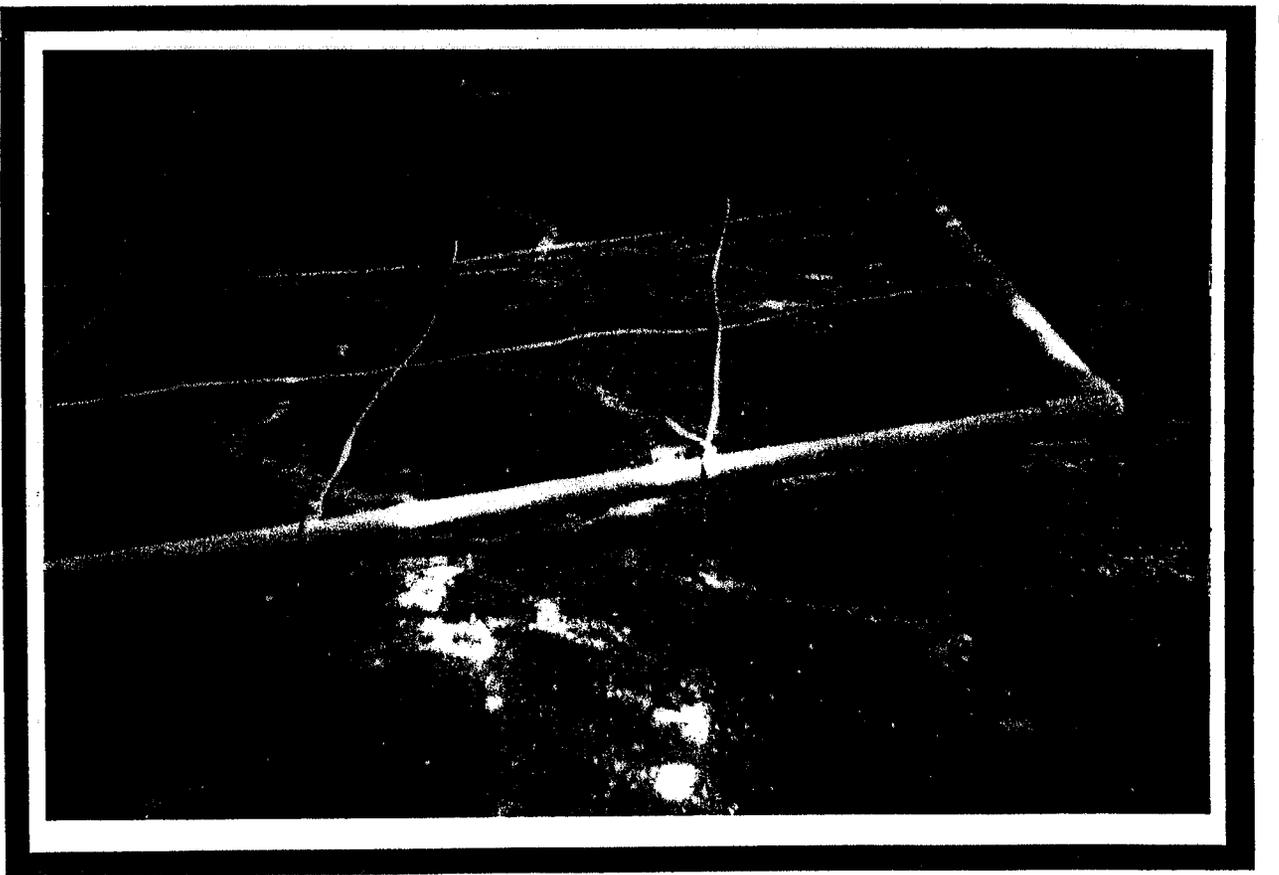
TRANSECT #2



TRANSECT #2 Q3  
Photo Date: 10-21-97



**TRANSECT #3 Q1**  
**Photo Date: 10-21-97**

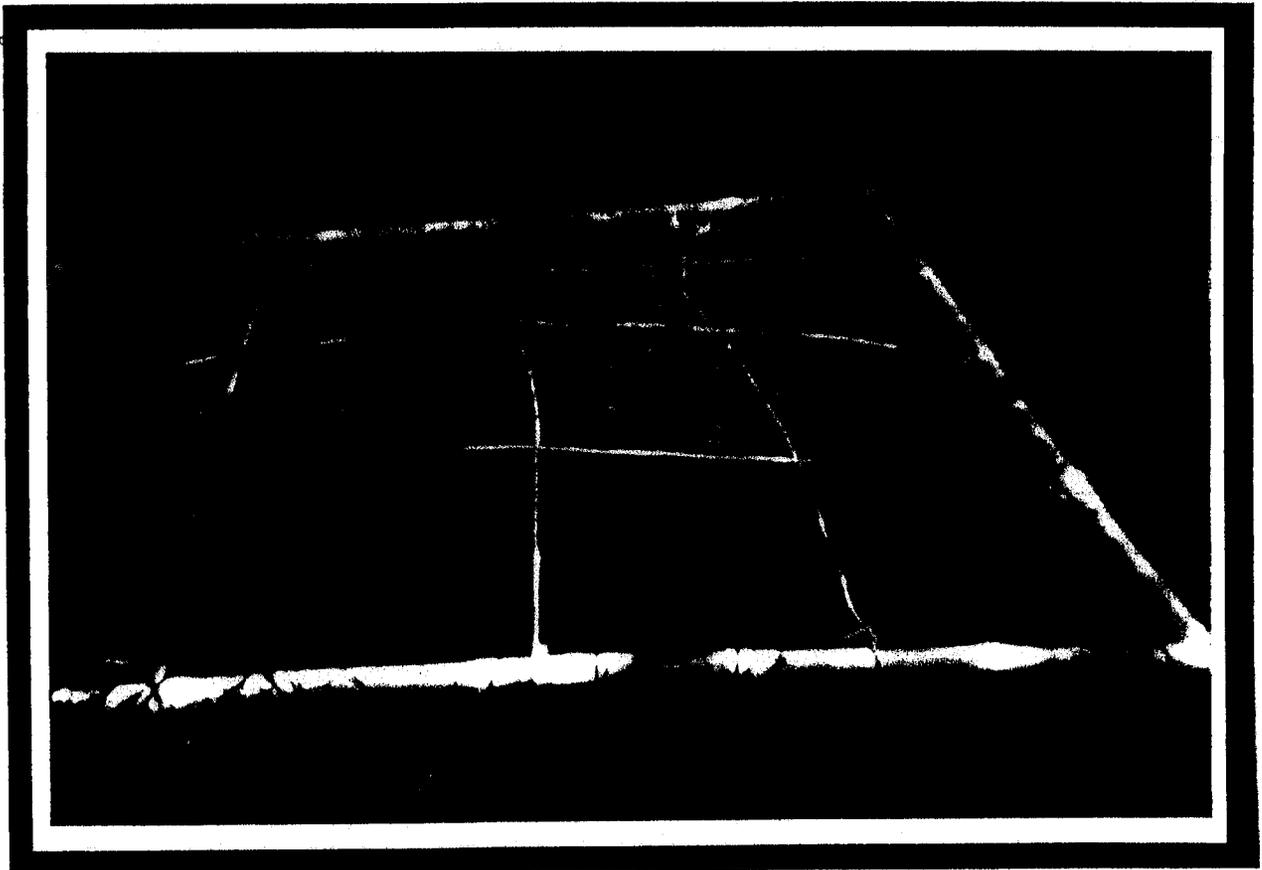


**TRANSECT #3 Q2**  
**Photo Date: 10-21-97**

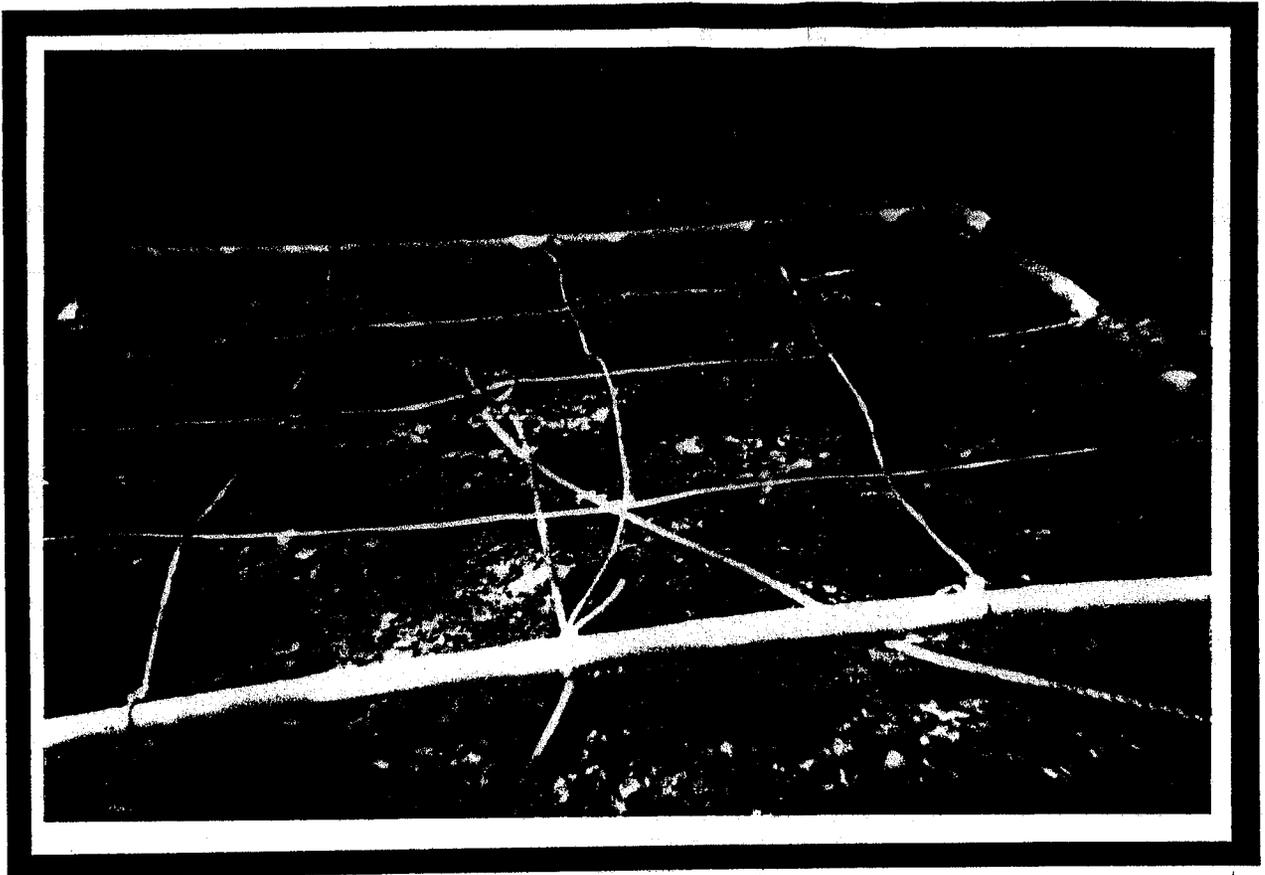
| STRATUM<br><u>Herbaceous</u> | T3 CHAN 9/10 |          |           |
|------------------------------|--------------|----------|-----------|
|                              | Q1           | Q2       | Q3s       |
| <i>Ruppia maritima</i>       |              |          |           |
| <i>Halodule wrightii</i>     | <1           | 6        | 13        |
|                              |              |          |           |
| <i>Digenia simplex</i>       |              |          | 50        |
| <i>Penicillus capitatus</i>  |              |          |           |
| <i>Batophora oerstedii</i>   |              |          | <1        |
| mermaid cup                  |              |          | <1        |
| Bare ground                  | 99           | 94       | 35        |
| <b>Total % Cover</b>         | <b>1</b>     | <b>6</b> | <b>65</b> |

| Shoot Density               | T3 CHAN 9/10 |   |    |     |
|-----------------------------|--------------|---|----|-----|
|                             | 4            | 6 | 13 | Ave |
| Section                     |              |   |    |     |
| Q1                          | 0            | 0 | 0  | 0   |
| total/m <sup>2</sup>        | 0.0          |   |    |     |
| Q2                          | 0            | 0 | 0  | 0   |
| total/m <sup>2</sup>        | 0.0          |   |    |     |
| Q3                          | 0            | 0 | 0  | 0   |
| total/m <sup>2</sup>        | 0.0          |   |    |     |
|                             |              |   |    |     |
| <b>T Ave /m<sup>2</sup></b> | <b>0.0</b>   |   |    |     |

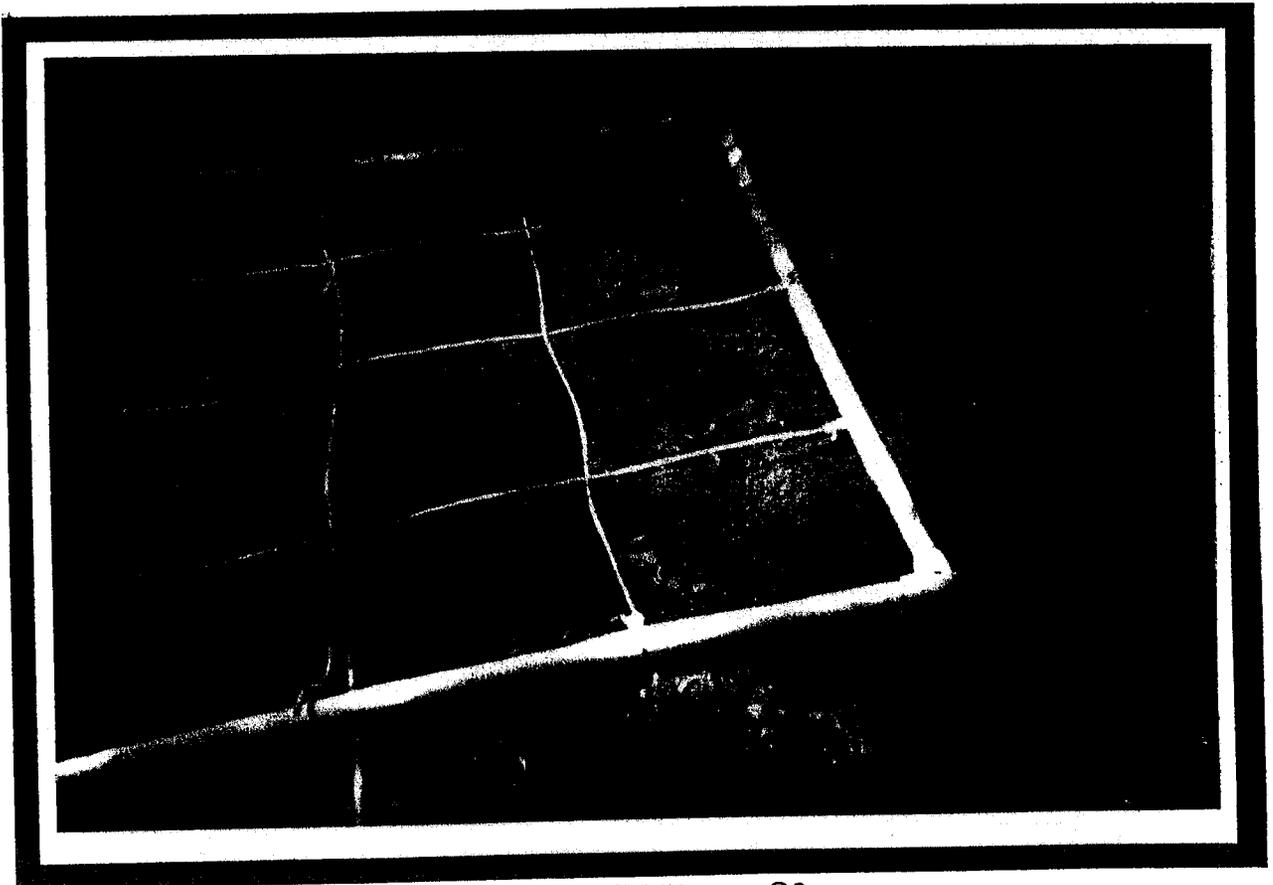
TRANSECT #3



TRANSECT #3 Q3  
Photo Date: 10-21-97



**TRANSECT#2 Q1**  
**Photo Date: 10-21-97**

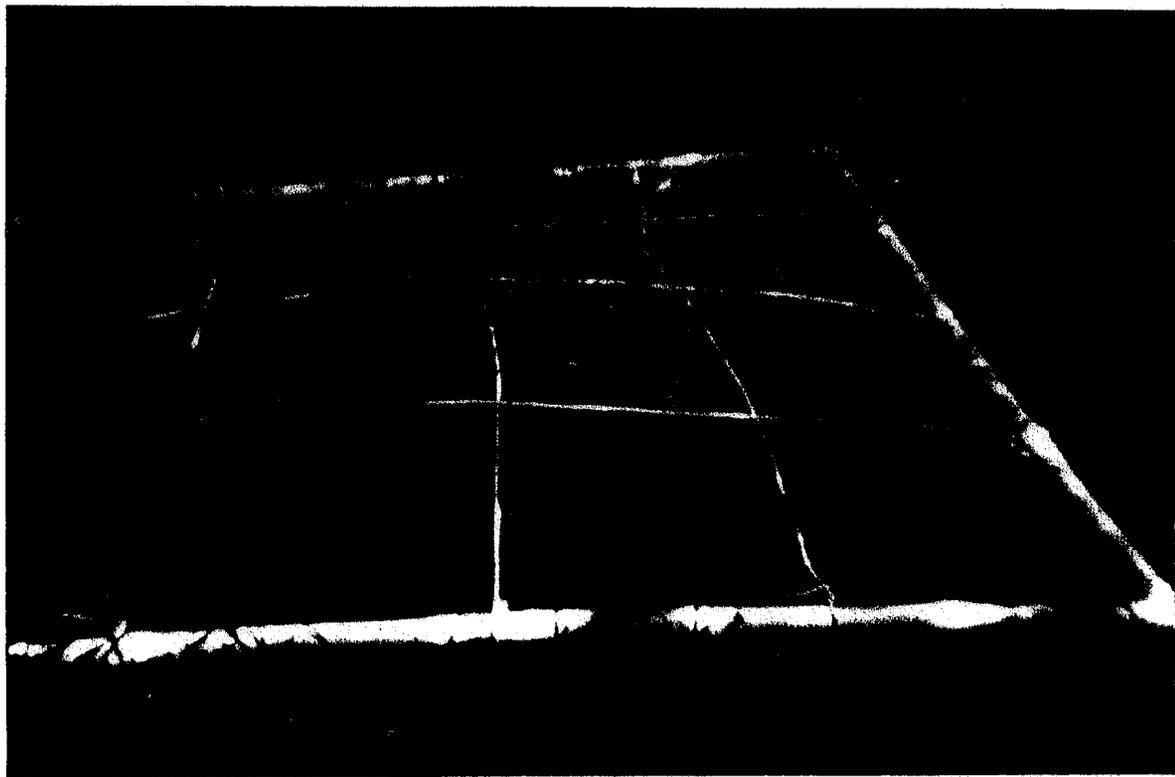


**TRANSECT #2 - Q2**  
**Photo Date: 10-21-97**

| STRATUM<br><u>Herbaceous</u> | T3 CHAN 9/10 |          |           |
|------------------------------|--------------|----------|-----------|
|                              | Q1           | Q2       | Q3s       |
| <i>Ruppia maritima</i>       |              |          |           |
| <i>Halodule wrightii</i>     | <1           | 6        | 13        |
|                              |              |          |           |
| <i>Digenia simplex</i>       |              |          | 50        |
| <i>Penicillus capitatus</i>  |              |          |           |
| <i>Batophora oerstedii</i>   |              |          | <1        |
| mermaid cup                  |              |          | <1        |
| Bare ground                  | 99           | 94       | 35        |
| <b>Total % Cover</b>         | <b>1</b>     | <b>6</b> | <b>65</b> |

| Shoot Density        | T3 CHAN 9/10 |   |    |     |
|----------------------|--------------|---|----|-----|
|                      | 4            | 6 | 13 | Ave |
| Section              |              |   |    |     |
| Q1                   | 0            | 0 | 0  | 0   |
| total/m <sup>2</sup> | 0.0          |   |    |     |
| Q2                   | 0            | 0 | 0  | 0   |
| total/m <sup>2</sup> | 0.0          |   |    |     |
| Q3                   | 0            | 0 | 0  | 0   |
| total/m <sup>2</sup> | 0.0          |   |    |     |
|                      |              |   |    |     |
| T Ave/m <sup>2</sup> | 0.0          |   |    |     |

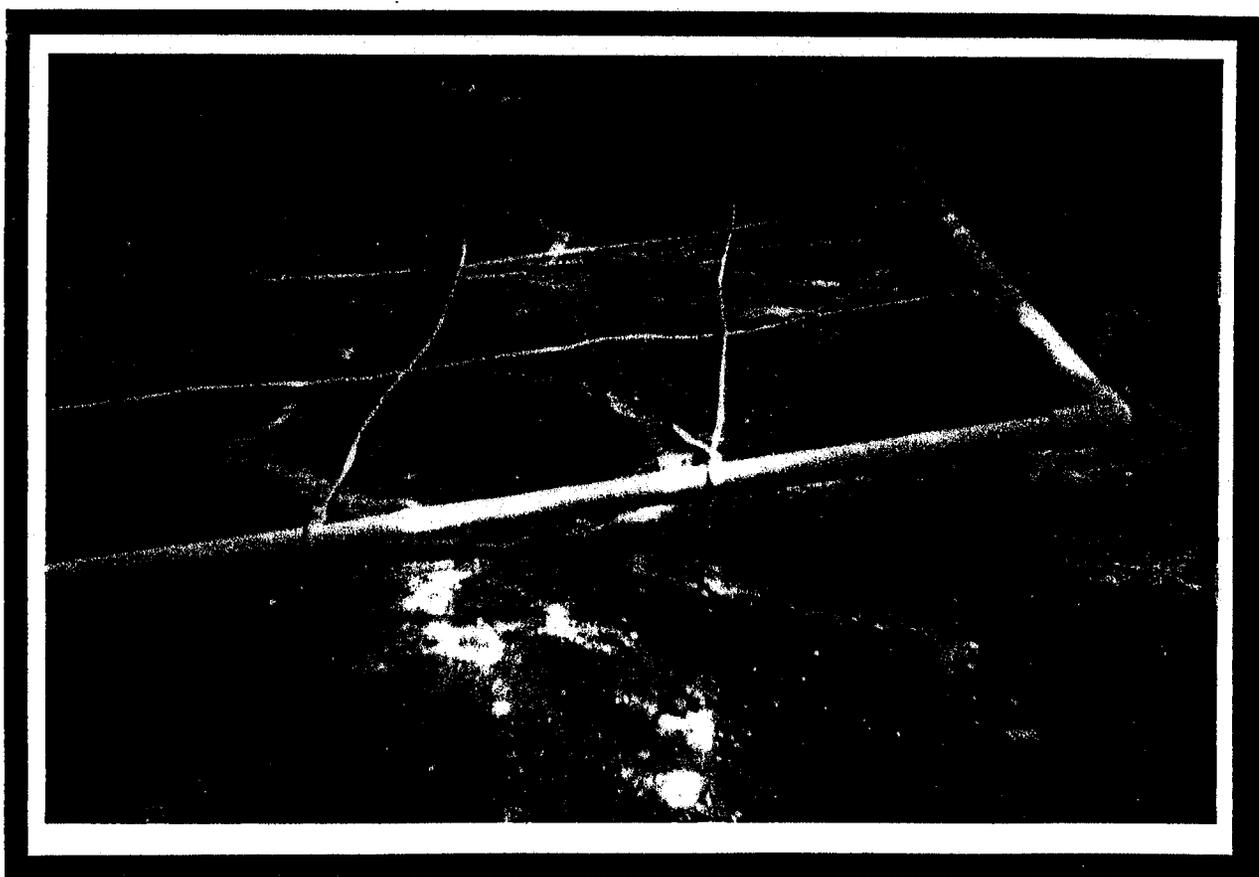
TRANSECT #3



TRANSECT #3 Q3  
Photo Date: 10-21-97



**TRANSECT #3 Q1**  
**Photo Date: 10-21-97**

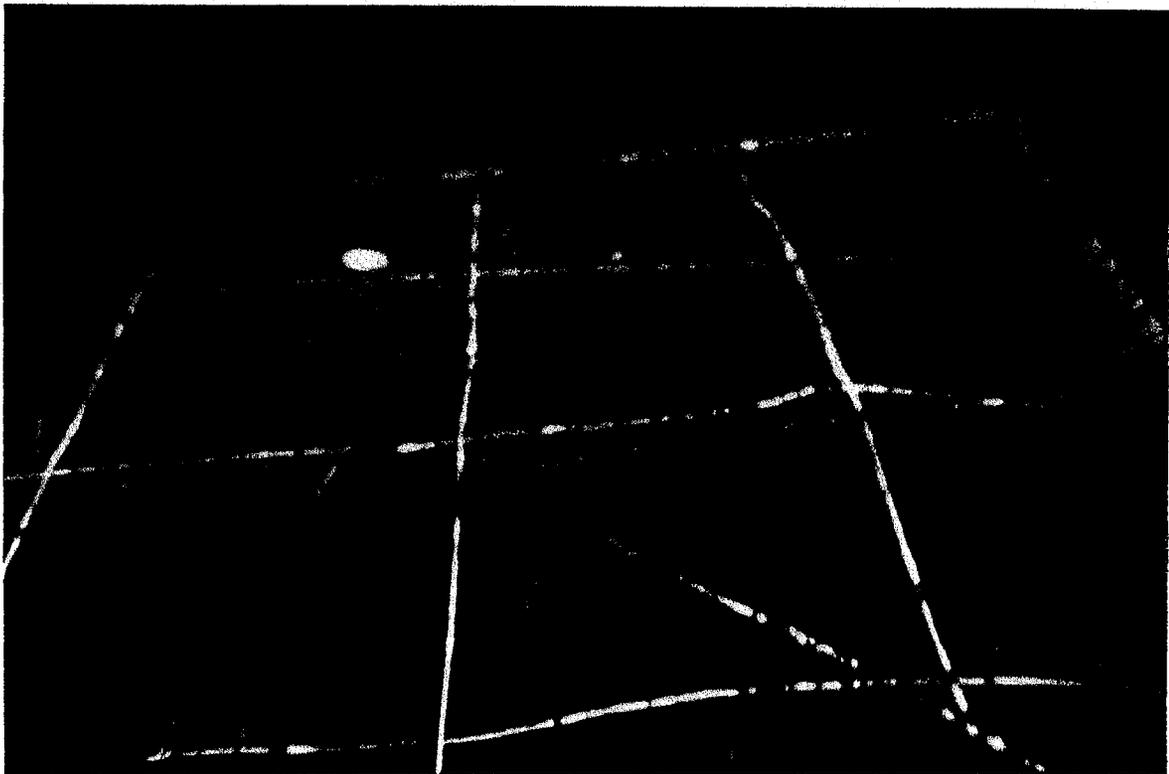


**TRANSECT #3 Q2**  
**Photo Date: 10-21-97**

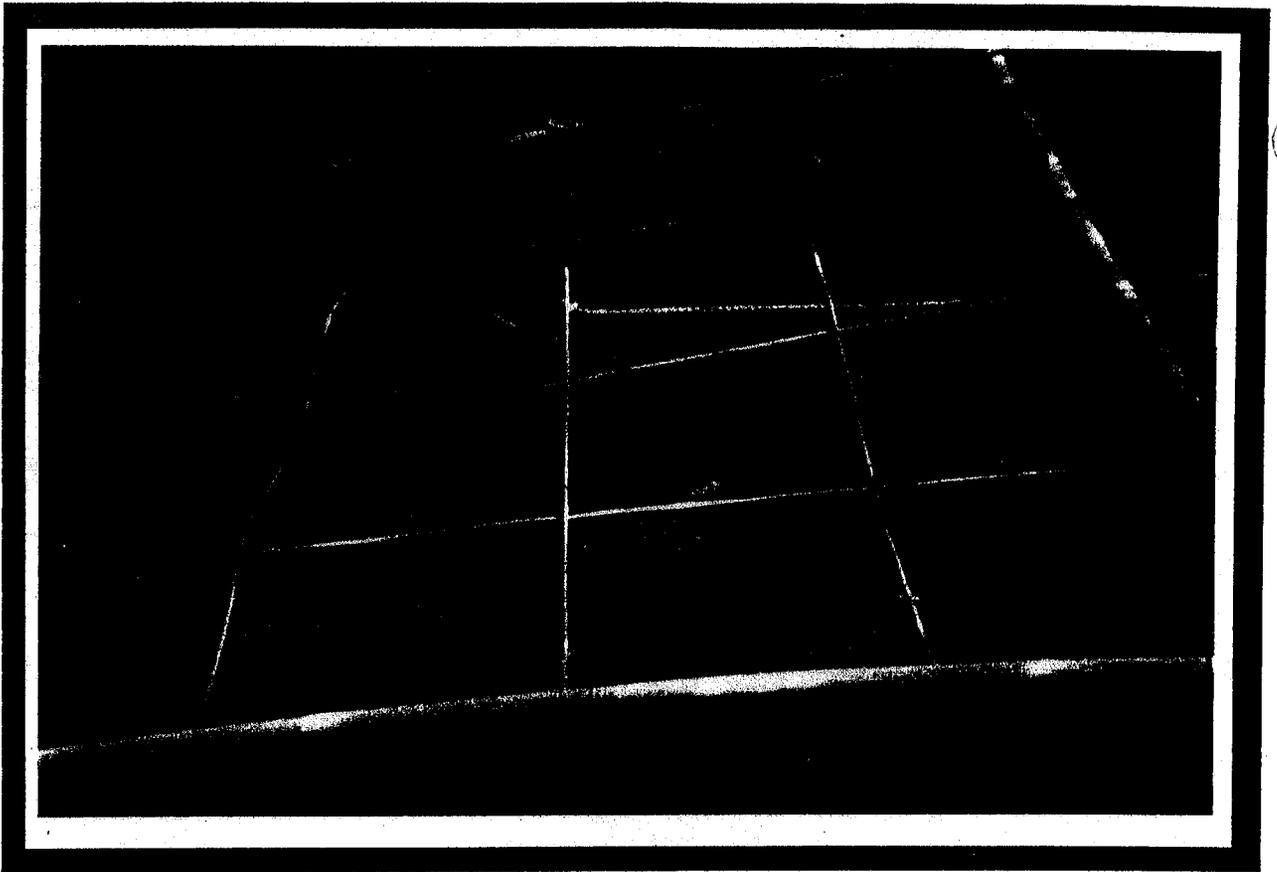
| STRATUM<br><u>Herbaceous</u> | T4 CHAN 11/12 |          |           |
|------------------------------|---------------|----------|-----------|
|                              | Q1            | Q2       | Q3s       |
| <i>Ruppia maritima</i>       |               |          |           |
| <i>Halodule wrightii</i>     | 10            | 1        | 80        |
|                              |               |          |           |
| <i>Digenia simplex</i>       |               |          |           |
| <i>Penicillus capitatus</i>  |               | 2        |           |
| <i>Batophora</i>             |               |          |           |
| mermaid cup                  |               |          |           |
| Bare ground                  | 90            | 97       | 20        |
| <b>Total % Cover</b>         | <b>10</b>     | <b>3</b> | <b>80</b> |

| Shoot Density              | T4 CHAN 11/12 |    |    |     |
|----------------------------|---------------|----|----|-----|
|                            | 4             | 6  | 13 | Ave |
| Q1                         | 7             | 4  | 3  | 4.7 |
| total/m <sup>2</sup>       | 74.7          |    |    |     |
| Q2                         | 0             | 0  | 0  | 0   |
| total/m <sup>2</sup>       | 0.0           |    |    |     |
| Q3                         | 25            | 80 | 50 | 52  |
| total/m <sup>2</sup>       | 826.7         |    |    |     |
|                            |               |    |    |     |
| <b>T Ave/m<sup>2</sup></b> | <b>300.4</b>  |    |    |     |

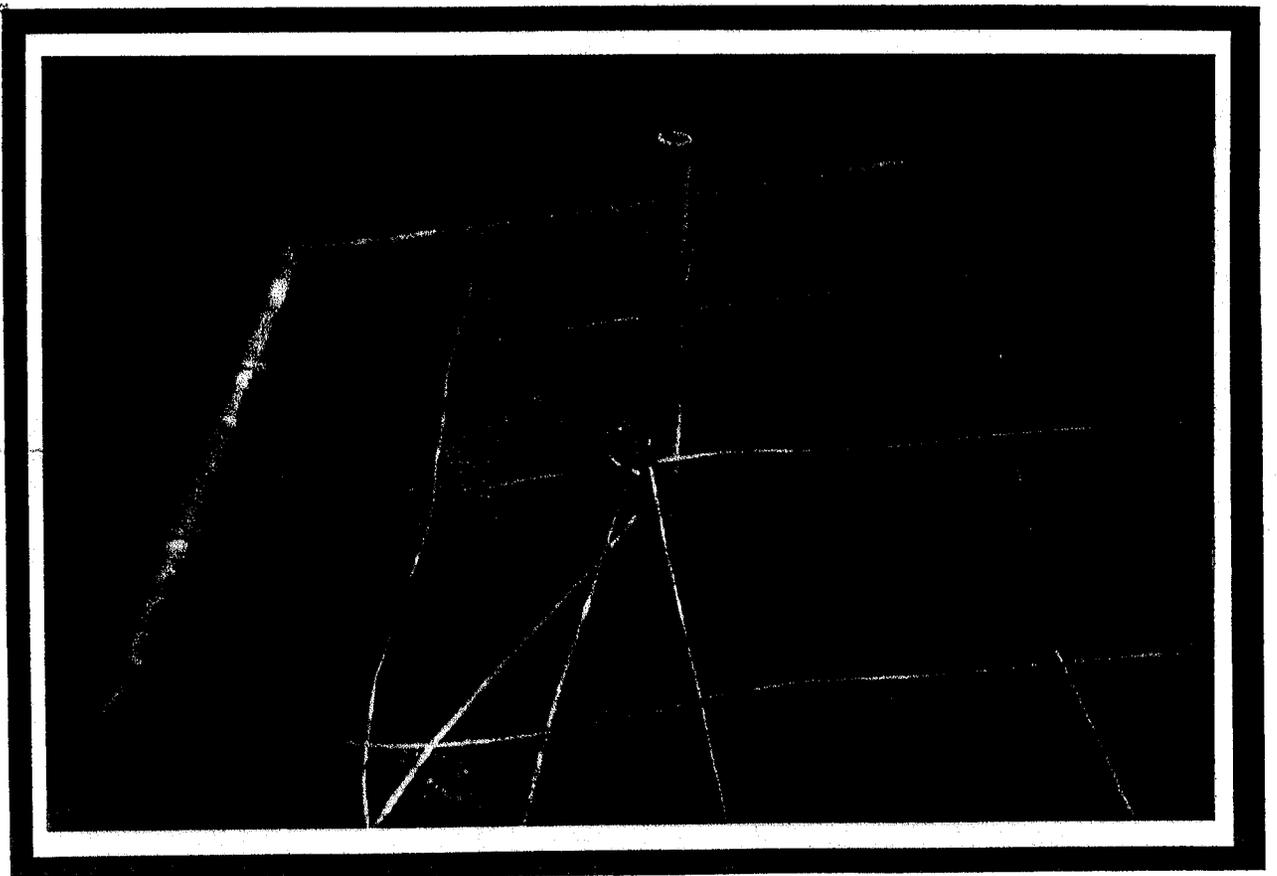
TRANSECT #4



TRANSECT #4 Q3  
Photo Date: 10-21-97



**TRANSECT#4 Q1**  
**Photo Date: 10-21-97**

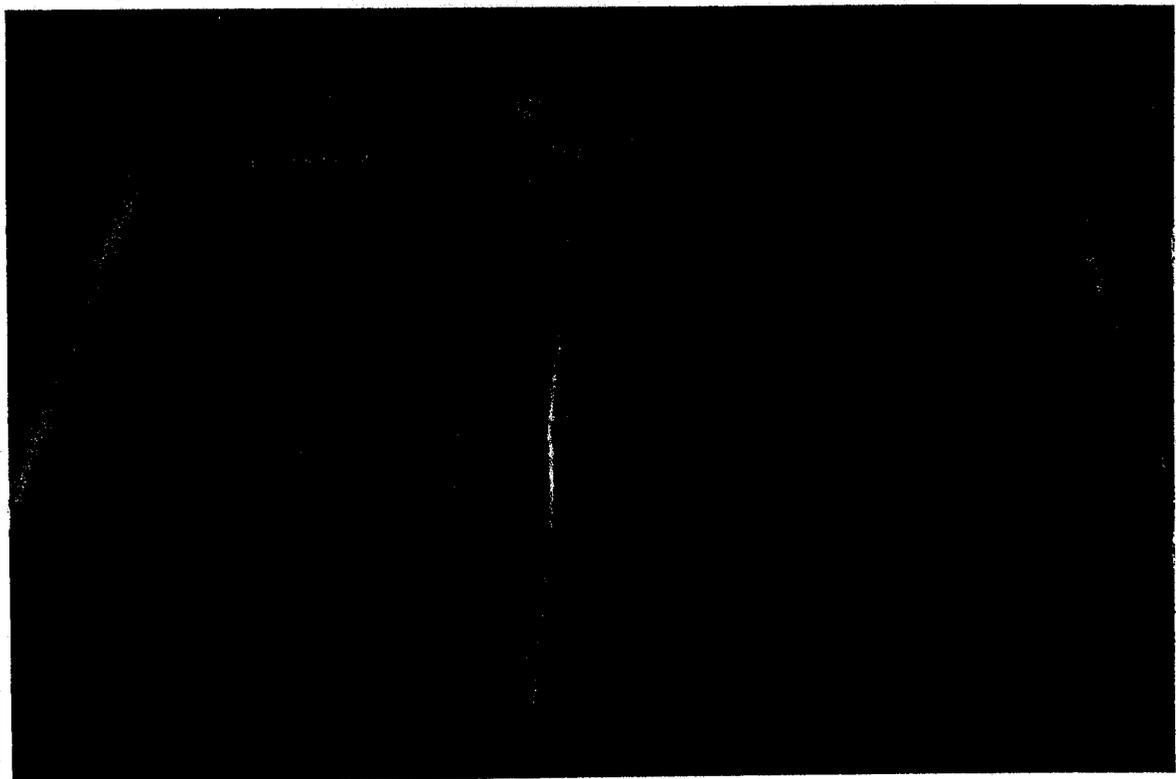


**TRANSECT#4 Q2**  
**Photo Date: 10-21-97**

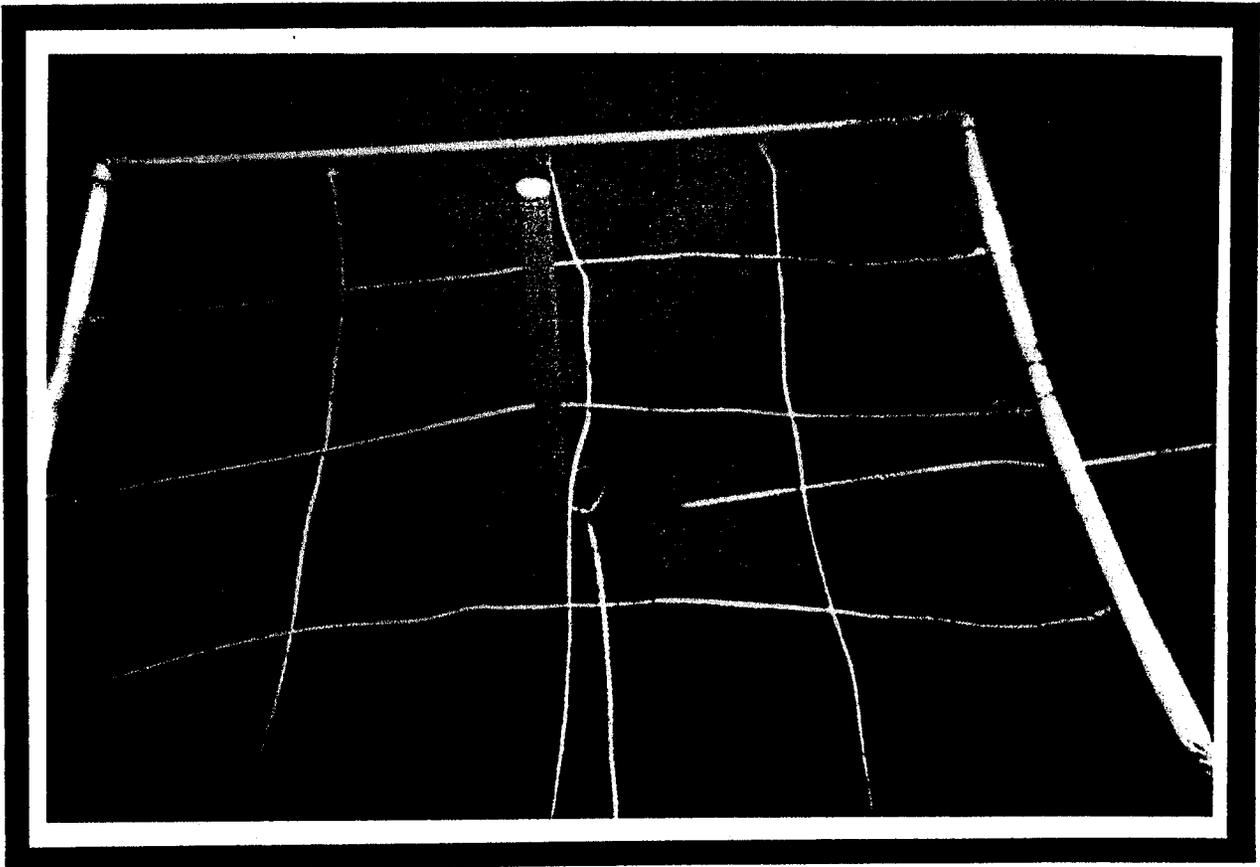
| STRATUM<br><u>Herbaceous</u> | T5 CHAN 15/16a |           |           |
|------------------------------|----------------|-----------|-----------|
|                              | Q1             | Q2        | Q3s       |
| <i>Ruppia maritima</i>       | 35             | 20        |           |
| <i>Halodule wrightii</i>     |                |           | 90        |
|                              |                |           |           |
| <i>Digenia simplex</i>       |                | 6         |           |
| <i>Penicillus capitatus</i>  |                |           |           |
| <i>Batophora</i>             |                |           |           |
| mermaid cup                  |                |           |           |
| Bare ground                  | 65             | 74        | 10        |
| <b>Total % Cover</b>         | <b>35</b>      | <b>26</b> | <b>90</b> |

| Shoot Density               |              | T5 CHAN 15a/16a |    |     |
|-----------------------------|--------------|-----------------|----|-----|
| Section                     | 4            | 6               | 13 | Ave |
| <i>Q1</i>                   | 35           | 20              | 4  | 20  |
| <i>total/m<sup>2</sup></i>  | 314.7        |                 |    |     |
| <i>Q2</i>                   | 8            | 12              | 20 | 13  |
| <i>total/m<sup>2</sup></i>  | 213.3        |                 |    |     |
| <i>Q3</i>                   | 20           | 30              | 50 | 33  |
| <i>total/m<sup>2</sup></i>  | 533.3        |                 |    |     |
|                             |              |                 |    |     |
| <b>T Ave /m<sup>2</sup></b> | <b>353.8</b> |                 |    |     |

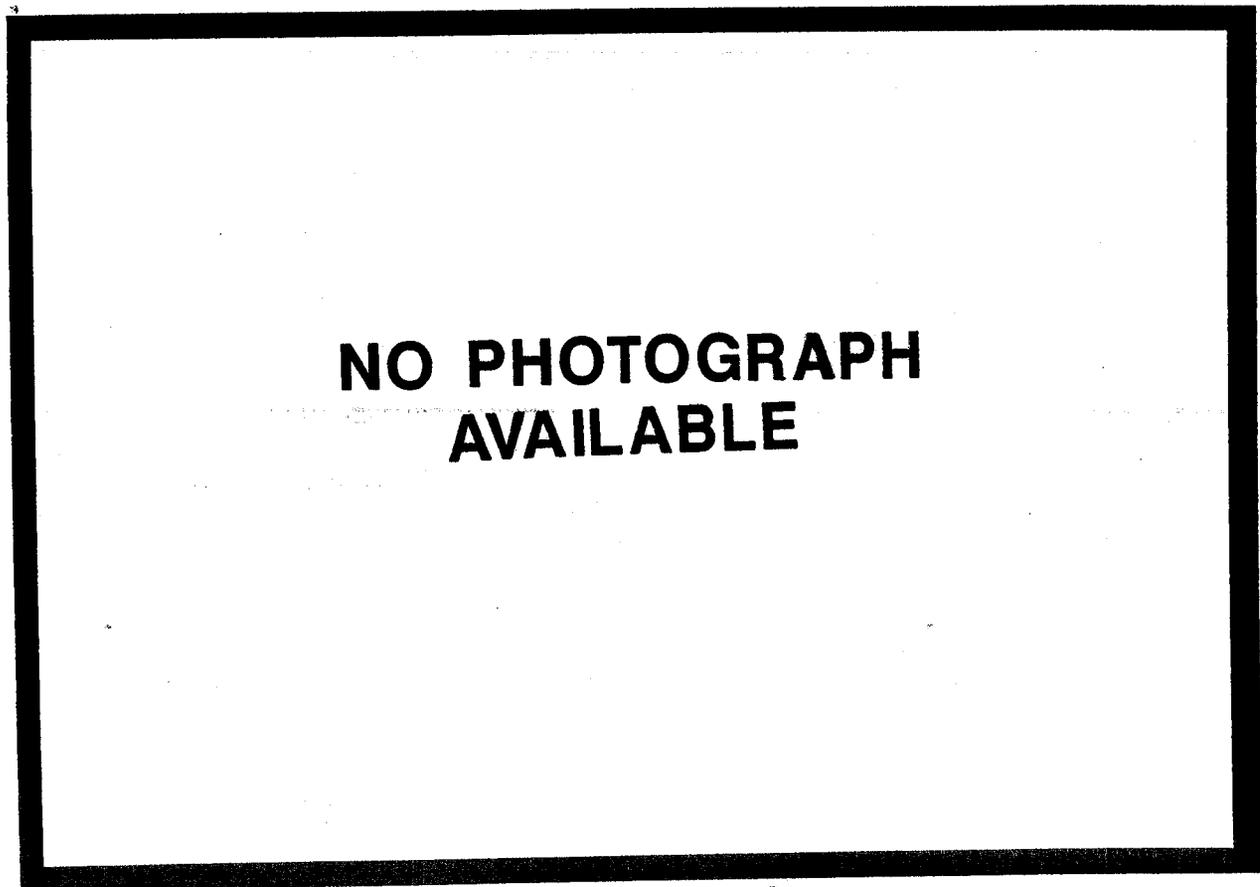
TRANSECT #5



TRANSECT #5 Q3  
Photo Date: 10-21-97



**TRANSECT #5 Q1**  
**Photo Date: 10-21-97**

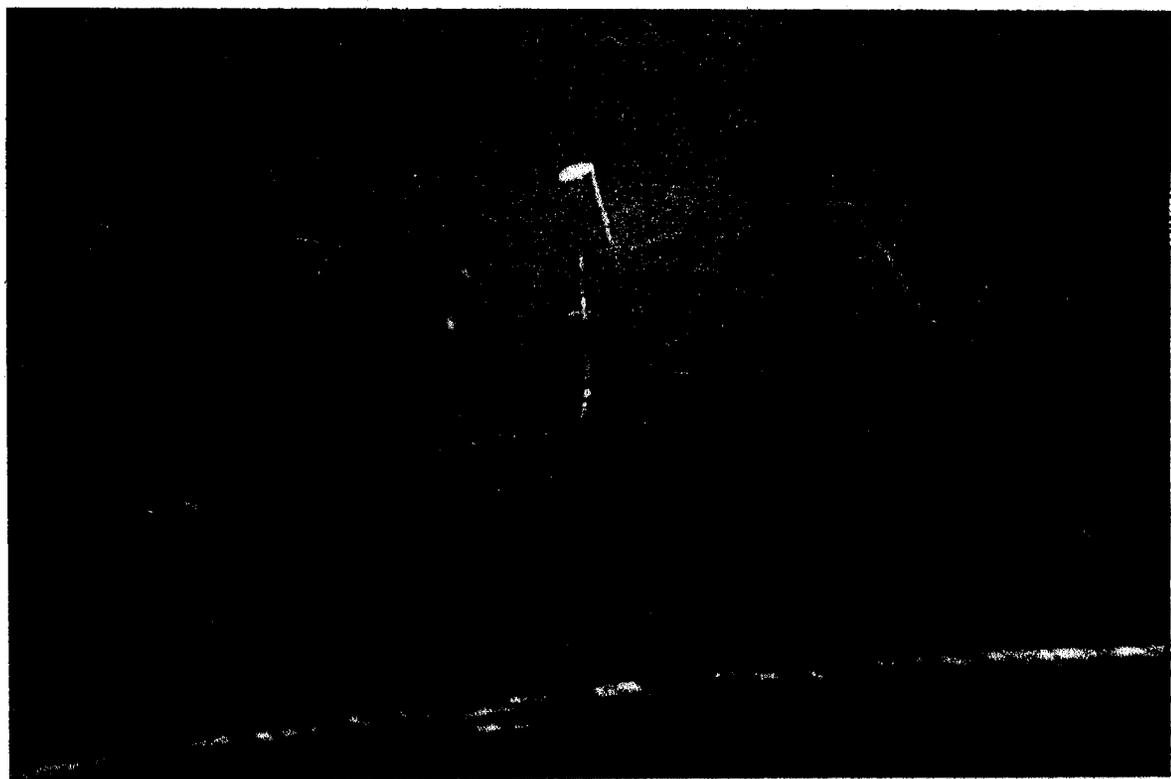


**TRANSECT #5 Q2**  
**Photo Date: 10-21-97**

| STRATUM<br><u>Herbaceous</u> | T6 CHAN 21/22 |           |           |
|------------------------------|---------------|-----------|-----------|
|                              | Q1            | Q2        | Q3s       |
| <i>Ruppia maritima</i>       | 31            | 10        | 90        |
| <i>Halodule wrightii</i>     |               |           |           |
| <i>Digenia simplex</i>       |               |           |           |
| <i>Penicillus capitatus</i>  |               |           |           |
| <i>Batophora</i>             |               |           |           |
| mermaid cup                  |               |           |           |
| Bare ground                  | 69            | 90        | 10        |
| <b>Total % Cover</b>         | <b>31</b>     | <b>10</b> | <b>90</b> |

| Shoot Density               |              | T1 CHAN 21/22 |    |     |
|-----------------------------|--------------|---------------|----|-----|
| Section                     | 4            | 6             | 13 | Ave |
| Q1                          | 5            | 2             | 6  | 4.3 |
| total/m <sup>2</sup>        | 69.3         |               |    |     |
| Q2                          | 0            | 0             | 0  | 0   |
| total/m <sup>2</sup>        | 0.0          |               |    |     |
| Q3                          | 40           | 52            | 20 | 37  |
| total/m <sup>2</sup>        | 597.3        |               |    |     |
| <b>T Ave /m<sup>2</sup></b> | <b>222.2</b> |               |    |     |

TRANSECT #6



TRANSECT #6 Q3  
Photo Date: 10-21-97