

**ENVIRONMENTAL PROTECTION COMMISSION
OF HILLSBOROUGH COUNTY
THURSDAY, SEPTEMBER 19, 1996
COMMISSIONERS BOARD ROOM
10 AM - 12 NOON**

AGENDA

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IV. WASTE MANAGEMENT DIVISION

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- A. Discussion - Executive Director's Evaluation (Comm. Berger)
- B. Update - Round Table Meetings (Comm. Berger)

VIII. CITIZEN'S WISHING TO APPEAR

Mary Lynne Duet - Attorney Representing Home Owner's Association Adjacent to Lopez Farm

Any person who might wish to appeal any decision made by the Environmental Protection Commission regarding any matter considered at the forthcoming public hearing or meeting is hereby advised that they will need a record of the proceedings, and for such purpose they may need to ensure that a verbatim record of the proceedings is made which will include the testimony and evidence upon which such appeal is to be based.

JUNE 13, 1996 - ENVIRONMENTAL PROTECTION COMMISSION - DRAFT MINUTES

The Hillsborough County Environmental Protection Commission (EPC) met in Regular Meeting, scheduled for Thursday, June 13, 1996, at 10:00 a.m., in the Boardroom, County Center, Tampa, Florida.

The following members were present: Chairman Dottie Berger and Commissioners Phyllis Busansky (arrived at 10:11 a.m.), Joe Chillura, Chris Hart, Jim Norman, and Ed Turanchik. The following member was absent: Commissioner Sandra Wilson (death in family).

Chairman Berger called the meeting to order at 10:09 a.m. Commissioner Hart led in the pledge of allegiance to the flag and gave the invocation.

EPC Chief Counsel Sara Fotopulos reported that Mr. Roger Stewart, EPC Executive Director, was out of town. An off-the-agenda item had been added to the agenda regarding the recent ozone exceedance.

PRESENTATION AND REPORTS

Martin Brothers Restoration Update - Time Certain 10:25 a.m. - Attorney Bill Humpheries, 442 West Kennedy Boulevard, representing Bobby and Patricia Martin, said that he had previously asked the Commissioners to assist the Martins in arriving at a cooperative agreement with Pinellas County to assist in the restoration and remediation of the Martins' property, which included fencing the north side of the property, filling and grading slopes, and filling in the debris material. A bid had been received for those items totaling \$578,000. Pinellas County had agreed to a cooperative settlement if Hillsborough County and the Martins agreed to work together to resolve the remediation issue. Attorney Humpheries requested the EPC to contribute \$353,000 toward the settlement, and he advised that negotiations would continue with Pinellas County. Discussion followed regarding the bid information previously forwarded to the EPC members.

Commissioner Turanchik said that an injustice had been done, but Hillsborough County had done nothing wrong; he questioned using money that was meant to be used for restoring environmental lands to pay for the misdeeds of another government. If the money was to come from the Pollution Recovery Fund (PRF), the request needed to be referred to the Citizens Environmental Advisory Committee (CEAC). Commissioner Busansky said there had been a miscarriage of justice on a Hillsborough County citizen's land and the Martins were asking for intervention for the safety of their land. She believed the County had a responsibility from a safety point of view and felt it was fair to use either the PRF or County funds as it was never proven that the Martins had polluted the land. Commissioner Hart supported fencing the Hillsborough County portion only, which would address the safety and security issues.

Attorney Humpheries advised that on August 5, 1996, a judge would decide who was responsible for total remediation of the land. Commissioner Norman questioned if the County had a potential long-range liability and requested the County Administrator's Office to look at the unique approach of using the State PRF for the remediation and to determine if the County would be reimbursed from the State PRF if the County agreed to the settlement.

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Commissioner Turanchik requested the County Attorney and Attorney Fotopulos to review the procedural history of the case, to determine if there was wrongdoing. There were processes under State law, in the State legislature, and other avenues to deal with that wrongdoing.

Commissioner Chillura felt the EPC needed to address the issue as the PRF could be used for educational purposes and to correct something someone else had done. Pinellas County was responsible and, from a policy standpoint, it was appropriate to use PRF money to restore the land and make it safe. It was clearly within the purview of EPC to resolve the problem; half was available through the PRF and the Board could fund the rest from the general fund. He suggested asking that the PRF monies be set aside.

Chairman Berger commented that the request needed to be reviewed by CEAC. Attorney Fotopulos advised that an application for the PRF was being prepared that should follow the normal review process, and EPC had requested staff to identify activities on the property that would address the safety concern.

Commissioner Norman suggested delaying action until after an application was made for the State PRF. Commissioner Busansky agreed to wait one month to look at every possibility. Commissioner Turanchik supported using the PRF to immediately secure the property, but objected to subsidizing the responsibility of Pinellas County. **Commissioner Turanchik moved to direct staff to work out a plan to secure the site so that it did not pose a danger to any person, proceed to do that immediately in conjunction with the Martins, and bring back all the other items within 30 days, seconded by Commissioner Norman.**

Following discussion regarding the proper process to be followed to address the safety aspect and the need to identify appropriate funding sources, **Commissioner Turanchik modified the motion to bring back a firm recommendation for EPC approval with CEAC recommendations, the contract, the vendor, and everything; ask for an expedited process on the bid for the securing of the property; and have that whole package brought together for the next EPC meeting. The motion carried six to zero.** (Commissioner Wilson was absent.) Commissioner Busansky understood that the item would be presented in July for final determination after looking at PRF, federal, State, County, and any other available funding.

Status Report on MacDill Air Force Base (AFB) Restoration Advisory Board (RAB) - Time Certain 10:05 a.m. - Ms. Kaaren Mullins, citizen co-chair, reviewed the history of the RAB, formed in 1995 with 16 members, which was a model RAB in the country, with 41 cleanup sites identified. RAB was the first effort by MacDill AFB to include the community in a cleanup effort, and RAB decisions were not budget driven, since the project budget was not public information.

Colonel Gene Hickman, military co-chair, said the RAB membership was constantly changing, required a military co-chair, and members from the Region IV Environmental Protection Administration (EPA) and the Florida Department of Environmental Protection (DEP). The intent of the RAB was to increase communication between government decision makers and the community;

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it had proven to increase community involvement and understanding, and it was cheaper and quicker. He reviewed the process followed to identify the cleanup sites that were in various phases of investigation, remediation, or monitoring. The cleanup priorities were determined through a risk analysis system. It had been determined that no contaminants had left the base property.

Discussion of Environmental Roundtable - Tom Dyer - Time Certain 10:45 a.m. - Chairman Berger said Commissioner Chillura had some concerns regarding the EPC citizens committee. Commissioner Chillura said his concerns had been answered. Chairman Berger said the environmental roundtable included representatives from Southwest Florida Waster Management District (SWFWMD), DEP, EPC, and the County, and the discussion about duplications and streamlining was progressing.

Commissioner Chillura said a citizen had questioned why EPC permits were required after the State had already issued approval. Chairman Berger said the roundtable was formulating a matrix of permits, which agencies were required, time frames, and the costs involved. Attorney Fotopulos said EPC staff would follow up on any specific instance if additional information were provided.

Pollution Recovery Fund (PRF)/Gardinier Settlement Trust Fund (GSTF) - Nature's Classroom Update - Attorney Fotopulos presented an update on the Nature's Classroom, which EPC had funded on an emergency basis. They were able to complete the school year and provide a second day to 15 schools.

Oakview Estates Request - Attorney Fotopulos said CEAC had reviewed the application for PRF assistance and was prepared to make a recommendation. A request was also made for the project to receive money from the GSTF; however, the State had not responded. EPC staff recommended the GSTF be considered as a possible source of funding and would support an effort by the EPC to also approve that recommendation. Mr. Russ Thomas, Suite 2600, One Tampa City Center, chairman of CEAC, reported that although Oakview Estates had requested \$375,000 from PRF and GSTF, CEAC had voted to give \$75,000 from the PRF toward the project. Attorney Fotopulos reported the available PRF balance on June 5, 1996, was \$344,709, and she reviewed pending requests. Chairman Berger asked for a clarification of the difference between the amounts reported in May and June. Mr. Hooshang Boostani, Director, Waste Management Division, reported additional contributions had been made to the fund, and he would provide that information. **Commissioner Hart moved to support staff and CEAC recommendations for \$75,000 to be allocated from the PRF in support of the Oakview Estates request, and the second part was to authorize the Chair to write a letter to Dr. Garrity to support the other funding as requested from the GSTF. The motion was seconded by Commissioner Chillura,** who asked if EPC staff had determined whether the money could be leveraged with other sources of revenue. Chairman Berger advised she wrote to the Florida Department of Environmental Protection (DEP) and asked that the \$100,000 fine pending from Mobil be directed to the Oakview Estates project.

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Chairman Berger called for public comment. Ms. Jeanne Johnson, 11002 Ekker Road, representing Concerned Citizens of Gibsonton, was opposed to using the GSTF for Oakview Estates as Gibsonton was the only area impacted by the Gardinier spill. Mr. Jeff Mathias was not sure the Oakview Estates request was an appropriate use of the PRF.

Commissioner Turanchik supported the first part of the motion to give \$75,000 from the PRF, but opposed using GSTF for that issue as it was beyond the scope of the intended use of those funds--mediation of damages caused by Gardinier to the Lower Alafia River.

Referencing the issue of leveraging dollars, Attorney Fotopulos said Ms. Beth Schinella, Public Utilities Department, had been looking at other funding sources. Commissioner Hart agreed to split the motion; he explained that Mr. Stewart and EPC staff supported using the GSTF because it met the requirements of the GSTF. He further explained the proposed funding methodology: one-third from the County, one-third from the residents, and one-third from various pollution recovery funds. **Commissioner Hart amended his motion to support \$75,000 from the PRF that staff and CEAC recommended, seconded by Commissioner Chillura, and carried six to zero.** (Commissioner Wilson was absent.) Commissioner Chillura asked if staff could find a way to leverage those funds. Attorney Fotopulos responded that staff would investigate.

Commissioner Hart moved for the Chair to write a letter from the EPC to Dr. Garrity encouraging him to support the use of GSTF for this regard in support of the application, seconded by Commissioner Chillura. Commissioner Turanchik explained that the County had taken the GSTF away from the State to ensure that the money was not used outside of the Lower Alafia River. Attorney Fotopulos said EPC Attorney Vernon Wagner had reviewed the application based on his understanding of the criteria for applicability of the GSTF and found the project was an applicable use of those funds. Discussion followed regarding the process for approving the use of GSTF. **The motion carried four to two; Commissioners Busansky and Turanchik voted no.** (Commissioner Wilson was absent.)

COMMISSIONERS' REQUESTS

Security Perimeter Fence at EPC Building - Mr. Thomas Koulianos, Director, Finance and Administration, presented the item and requested the EPC to authorize staff to work with the County staff to prepare a budget amendment to find the sources of funding to install the fence, conforming with the barrio Latino architectural requirements, not to exceed \$45,000. **Commissioner Norman moved staff recommendation, seconded by Commissioner Chillura.** Responding to a question, Mr. Koulianos described the proposed fence design. **Commissioner Chillura amended the motion to allow the architectural section of the Facilities Management Department to monitor this and make a recommendation to EPC.** Commissioner Norman accepted the amendment. **The motion carried four to zero.** (Commissioners Hart and Turanchik were out of the room; Commissioner Wilson was absent.)

PRESENTATION AND REPORTS - RESUMED

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Legislative Report - Attorney Fotopulos said a summary of the bills passed by the legislature had been provided in the backup material.

CONSENT AGENDA

Approval of Minutes: March 14, May 1, May 7, 1996

Report of the Executive Director

1. Acceptance of Monthly Activity Report
2. Legal Department Monthly Report
3. Acceptance of Contributions to Pollution Recovery Fund
4. Analysis of Gardinier Settlement Fund

Commissioner Chillura moved the Consent Agenda, seconded by Commissioner Norman, and carried five to zero. (Commissioner Hart was out of the room; Commissioner Wilson was absent.)

CEAC

Mr. Thomas advised that CEAC had reviewed the environmental awards program and was recommending that all recipients of awards from environmental agencies be recognized by the County, which would heighten the awareness of the existing environmental programs. **Commissioner Busansky moved to proceed with CEAC's idea of taking the environmental awards from the various groups, combining them, and giving it more publicity, and heightening the community's awareness of what those people had done, rather than going through an involved selection process.** The motion was seconded by Commissioner Turanchik and carried six to zero. (Commissioner Wilson was absent.)

Mr. Thomas reported on the rule review process by CEAC and stated that Rule 1-11, Wetlands Rule, would be discussed at the next CEAC meeting.

AIR MANAGEMENT DIVISION

United States Environmental Protection Agency (USEPA) Revisions to the State Implementation Plan (SIP) - Attorney Fotopulos requested authority to execute the amendments to the SIP. Mr. Terry Payton, Air Management Division staff, advised the USEPA revised the transportation conformity regulation that required a change to the memorandum of agreement, and he requested adoption of the amendments. **Commissioner Turanchik moved the amendments, seconded by Commissioner Hart, and carried six to zero.** (Commissioner Wilson was absent.)

WASTE MANAGEMENT DIVISION

Authorize Executive Director to Execute Small Quantity Generator (SQG) Contract - Mr. Boostani reported the contract with DEP for a \$50,000 grant was for the small quantity generator program. **Commissioner Turanchik so moved, seconded by Commissioner Busansky, and carried six to zero.** (Commissioner Wilson was absent.)

OFF-THE-AGENDA ITEM

Mr. Iwan Choronenko, Director, Air Division, announced that an ozone exceedance had occurred the previous week and also in June 1995 at Simmons Park. Two additional ozone exceedances could result in the County being reclassified by DEP. He was coordinating with DEP to address the problem. Mr. Choronenko explained that the evaluations were continuous through four

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sensors located in the County. Commissioner Hart asked for a report on the potential impacts of one occurrence compared to everyday exceedances. Commissioner Chillura asked about the health impact. Mr. Choronenko explained that a one-day occurrence would not have a significant impact. Commissioner Chillura said he wanted to make it clear that it was not an unsafe condition.

WASTE MANAGEMENT DIVISION - RESUMED

Quarterly Report - Superfund Sites

DEP Audit Report - Tanks Compliance

Attorney Fotopulos advised the quarterly report on the superfund sites and the DEP tanks compliance audit report were provided in the backup material.

COMMISSIONERS' REQUESTS - RESUMED

Modifications to Tree Ordinance (Commissioner Chillura)

Discussion Lazano Building (Commissioner Chillura)

Commissioner Norman moved to continue the above two items, seconded by Commissioner Chillura, and carried four to zero. (Commissioners Busansky and Hart had left the meeting; Commissioner Wilson was absent.)

CITIZENS WISHING TO APPEAR

Ms. Barbara Merritt distributed a policy for outdoor concerts at the Florida State Fairgrounds. Regarding the Oakview Estates Utility replacement, she suggested EPC and Public Utilities Department review the private package plants and franchises. Ms. Marilyn Smith commented about the air quality problems and the private package plants.

There being no further business, the meeting was adjourned at 12:10 p.m.

READ AND APPROVED: _____
CHAIRMAN

ATTEST:
RICHARD AKE, CLERK

By: _____
Deputy Clerk

gml

EPC Public Education Report
August 1996

	Adm.	Air	Wet.	Waste	Water	Legal	Total
Media Contacts/Releases	5	2	7	2	1	3	20
Material Distributed	891	275	162	429	100	32	1889
Talks Given	1	0	1	0	1	0	3
Displays/Demos/Tours	0	0	0	0	2	0	2
No. of people at talks, etc.	30	0	0	0	40	0	70

From January 1, 1996 to Date

Media Contacts/Releases	49	25	50	11	30	56	221
Materials Distributed	8724	1807	1376	3542	20760	2150	38359
Talks Given	8	9	23	20	17	6	83
Displays/Demos/Tours	7	3	6	1	2	1	20
No. of people at talks, etc.	390	372	1170	477	521	270	3200

Accomplishments

1. Provided public and employees with EPC information.
2. EPA/EPC/NEP Research Vessel Open House.
5. Provided media assistance.
6. Coordinated speakers and displays.
7. Joined Good Community Alliance.
8. Distribution of EPC quarterly, monthly and weekly internal and external publications.

Current Projects

1. Assistance with pre-planning CEAC awards program.
2. Coordination of division public service announcements for children.
3. EPC Online with Freenet.
4. Community outreach/networking.
5. Coordination with agricultural task force.
6. Survey of environmental education offices state-wide.
7. Office automation of information requests.
8. Information gathering/specific publics with each division.
9. Initiation of agricultural/EPC information sharing.
10. Assistance to Asian American community/crop.

Future Projects

1. Training Committee for public education and general employee information programs.
2. Implementation of regular EPC programming on GATV.
3. Coordination of industry/EPC information sharing.
4. Development of Pollution Prevention information for agency.
5. Development of In House Internet Committee.
6. EPC/Legislative Tour.
7. Annual Report
8. Future Farmers of America Outreach.

MONTHLY ACTIVITIES REPORT
AIR MANAGEMENT DIVISION
AUGUST

A.	Compliance Assistance Activities	
1.	Outreach Correspondence	<u>55</u>
2.	Workshops	<u>2</u>
B.	Public Outreach/Education Assistance:	<u>275</u>
C.	Industrial Air Pollution Permitting	
1.	Permit Applications Received (Counted by Number of Fees Received):	
a.	Operating:	<u>6</u>
b.	Construction:	<u>5</u>
c.	Amendments:	<u>2</u>
d.	Transfers/Extensions:	<u>2</u>
2.	Delegated Permits Issued by EPC and Non-delegated Permits Recommended to DEP for Approval (Counted by Number of Fees Collected):	
a.	Operating:	<u>8</u>
b.	Construction:	<u>22</u>
c.	Amendments:	<u>0</u>
d.	Transfers/Extensions:	<u>1</u>
3.	Intent to Deny Permit Issued	<u>0</u>
4.	General Permits	<u>0</u>
D.	Administrative Enforcement	
1.	Documents Issued:	
a.	Notice of Intent to Initiate Enforcement	<u>0</u>
b.	Citation	<u>0</u>
c.	Other_____	<u>0</u>
2.	Total Cases Initiated:	<u>2</u>
3.	Cases Resolved:	<u>0</u>
4.	Cases Referred to Legal Department:	<u>0</u>
5.	Consent Orders Signed:	<u>0</u>

6. Contributions to the Pollution Recovery Fund: \$ 100.00

<u>Organization Name</u>	<u>Violation</u>	<u>Amount</u>
a. Haliburton Motors	Mobile Source	\$100.00

E. Inspections:

1. Industrial Facilities:	<u>11</u>
2. Air Toxics Facilities:	
a. Asbestos Emitters	<u>1</u>
b. Area Sources (i.e. Drycleaners, Chrome Platers, etc...)	<u>18</u>
c. Major Sources	<u>0</u>
3. Asbestos Demolition/Renovation Projects:	<u>21</u>
4. Gasoline Retailers:	<u>19</u>
5. Auto Repair Facilities:	<u>40</u>
6. Retail Auto Dealers:	<u>1</u>
7. Automotive Parts Stores:	<u>0</u>
8. Fleet Operators:	<u>0</u>
9. CFC Facilities:	<u>41</u>
F. Open Burning Permits Issued:	<u>3</u>
G. Number of DOF Permits Monitored:	<u>97</u>
H. Total Citizen Complaints Received:	<u>42</u>
I. Total Citizen Complaints Investigated:	<u>45</u>
J. Noise Sources Monitored:	<u>3</u>
K. Air Program's Input to DRI's:	<u>1</u>
L. Test Reports Reviewed:	<u>0</u>
M. Compliance:	
1. Warning Notices Issued:	<u>13</u>
2. Warning Notices Resolved:	<u>20</u>
3. Advisory Letters Issued:	<u>5</u>

FEES COLLECTED FOR AIR MANAGEMENT DIVISION
AUGUST

	Total Revenue
1. Non-delegated construction permit for an air pollution source	
(a) New Source Review or Prevention of Significant Deterioration sources	<u>\$ -0-</u>
(b) all others	<u>\$ -0-</u>
2. Non-delegated operation permit for an air pollution source	
(a) class B or smaller facility - 5 year permit	<u>\$ -0-</u>
(b) class A2 facility - 5 year permit	<u>\$ -0-</u>
(c) class A1 facility - 5 year permit	<u>\$ -0-</u>
3. (a) Delegated Construction Permit for air pollution source (20% of the amount collected is forwarded to the DEP and not included here)	<u>\$3,080.00</u>
(b) Delegated operation permit for an air pollution source (20% of the amount collected is forwarded to the DEP and not included here)	<u>\$3,520.00</u>
4. Non-delegated permit revision for an air pollution source	<u>\$ 400.00</u>
5. Non-delegated permit transfer of ownership, name change or extension	<u>\$ -0-</u>
6. Notification for commercial demolition	
(a) for structure less than 50,000 sq ft	<u>\$ 570.00</u>
(b) for structure greater than 50,000 sq ft	<u>\$ -0-</u>
7. Notification for asbestos abatement	
(a) renovation 160 to 1000 sq ft or 260 to 1000 linear feet of asbestos	<u>\$ 480.00</u>
(b) renovation greater than 1000 linear feet or 1000 sq ft	<u>\$ 495.00</u>
8. Open burning authorization	<u>\$1,065.00</u>
9. Enforcement Costs	<u>\$ -0-</u>

COMMISSION

DOTTIE BERGER
PHYLLIS BUSANSKY
JOE CHILLURA
CHRIS HART
JIM NORMAN
ED TURANCHIK
SANDRA WILSON

EXECUTIVE DIRECTOR

ROGER P. STEWART



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WASTE MANAGEMENT DIVISION
TELEPHONE (813) 272-5788

WETLANDS MANAGEMENT DIVISION
TELEPHONE (813) 272-7104

MEMORANDUM

DATE: September 11, 1996

TO: Hooshang Boostani, Director, Waste Management

FROM: *MN* Mike Newman, Enforcement, Waste Management

SUBJECT: WASTE MANAGEMENT'S AUGUST AGENDA

The following is a summary of activities for the months of **August**, 1996. If you would like more information concerning any of these activities please let me know.

WASTE MANAGEMENT DIVISION

A. Administrative Enforcement

1.	New cases received	<u>3</u>
2.	Ongoing administrative cases	
	a. Pending	<u>24</u>
	b. Active	<u>30</u>
	c. Legal	<u>13</u>
	d. Tracking Compliance (Admin.)	<u>13</u>
	e. Inactive/Referred cases	<u>17</u>
	f. Criminal compliance tracking	<u>22</u>
3.	NOI's issued	<u>0</u>
4.	Citations issued	<u>3</u>
5.	Consent Orders signed	<u>1</u>
6.	Civil contrib. to the Pollution Rec. Fund	<u>\$3,000.00</u>
7.	Criminal contrib. to the Pollution Rec. Fund	<u>\$00.00</u>
8.	Enforcement costs collected	<u>\$665.00</u>
9.	Cases referred to legal	<u>0</u>
10.	Cases closed	<u>1</u>

B. Solid and Hazardous Waste

	Received/Reviewed
1. Permits	<u>0/0</u>
2. EPC Authorization For Facilities Not Requiring DEP Permit	<u>0/0</u>
3. SQG Surcharges Received	<u>\$</u>
4. Other permits and Reports	<u>80/66</u>
a. County Permits	<u>1/1</u>
b. *Other Reports	<u>79/65</u>
5. Inspections	<u>343</u>
a. Complaint	<u>112</u>
b. Compliance/reinspections	<u>56</u>
c. Facility Compliance	<u>20</u>
d. Small Quantity Generator	<u>155</u>
6. Enforcement	
a. Complaints Received/Closed	<u>62/91</u>
b. Warning Notice Issued/Closed	<u>6/3</u>
c. Compliance Letters	<u>51</u>
d. Letters of Agreement	<u>0</u>
e. DEP Referrals	<u>0</u>
7. Pamphlets, Rules and Material Distrib.	<u>411</u>

* Note, "other reports" includes: Lab analyses, CAPs/CARs, groundwater monitoring reports, MSDSs report reviews, etc.

C. Underground Storage Tank - Cleanup Department

1. Inspections:	<u>5</u>
a. Investigation	<u>5</u>
b. SUPER Act	<u>0</u>
2. Reports Received/Reviewed	<u>40/11</u>
a. Contamination Assessment (CARs)	<u>7/3</u>
b. Initial Remedial Action (IRA)	<u>4/0</u>
c. Remedial Action Plans (RAPs)	<u>2/0</u>
d. Site Rehabilitation Completion (SRCs)	<u>0/0</u>
e. Others	<u>27/8</u>

3.	Reimbursement Applications	
a.	Received	<u>24</u>
b.	Reviewed	<u>48</u>
4.	State Cleanup Site Activities	
a.	Active Sites	<u>12</u>
b.	Funds Disbursed	<u>≈ \$300,000</u>

D. Underground Storage Tank Compliance Department

1.	Inspections	<u>219</u>
a.	UST Compliance	<u>105 78</u>
b.	AST Compliance	<u>42</u>
c.	UST Installation	<u>2</u>
d.	AST Installation	<u>3</u>
e.	UST Closure	<u>16</u>
f.	AST Closure	<u>1</u>
g.	*Other Inspections	<u>50</u>

* Note, "others inspections" include: non-compliance reinspections, additional installation visits, and unregulated site inspections.

2	Installation Plans Reviewed	<u>7</u>
a.	USTs	<u>2</u>
b.	ASTs	<u>5</u>
3.	Closure Plans & Reports Received/Reviewed	<u>15/15</u>
a	Closure Plans Received/Reviewed	<u>10/10</u>
b	Closure Reports Received/Reviewed	<u>5/ 5</u>
4.	Enforcement	
a.	Noncompliance Letters	<u>27</u>
b.	Warning Notices	<u>5</u>
c.	Cases referred for Enforcement	<u>1</u>
d.	Complaints received/investigated	<u>0/0</u>
e.	Complaints referred	<u>0</u>
f.	Cases Referred to DEP	<u>0</u>
5.	FPLIRP Checklists Completed	<u>7</u>
6.	Cleanup Notification Letters Issued	<u>2</u>
7.	Public Assistance	<u>440+</u>

E.	<u>Record Reviews</u>	<u>64</u>
F.	<u>Public Information Projects</u>	<u>0</u>
1.	Sheila Luce discussed the enforcement status of GATX enforcement with Susan Green of the Tampa Tribune.	
2.	Mike Newman discussed the enforcement status of Truck Parts of Tampa, Inc. with Susan Green of the Tampa Tribune.	

**ACTIVITIES REPORT
WATER MANAGEMENT DIVISION**

AUGUST, 1996

A. ENFORCEMENT

1. New Enforcement Cases Received:	<u>1</u>
2. Enforcement Cases Closed:	<u>2</u>
3. Enforcement Cases Outstanding:	<u>35</u>
4. Enforcement Documents Issued:	<u>0</u>
5. Warning Notices:	<u>17</u>
a. Issued:	<u>8</u>
b. Resolved:	<u>9</u>
6. Recovered costs to the General Fund:	\$ <u>150.00</u>
7. Contributions to the Pollution Recovery Fund:	\$ <u>0</u>

B. PERMITTING - DOMESTIC

1. State Permit Applications Received:	<u>34</u>
a. Facility Permit:	<u>7</u>
(i) Types I and II	<u>0</u>
(ii) Type III	<u>7</u>
b. Collection Systems-General:	<u>19</u>
c. Collection Systems-Dry Line/Wet Line:	<u>8</u>
d. Residuals Disposal:	<u>0</u>
2. State Permit Applications Approved:	<u>41</u>
a. Facility Permit:	<u>16</u>
b. Collection Systems-General:	<u>9</u>
c. Collection Systems-Dry Line/Wet Line:	<u>6</u>
d. Residuals Disposal:	<u>0</u>
3. State Permit Applications Recommended for Disapproval:	<u>0</u>
a. Facility Permit:	<u>0</u>
b. Collection Systems-General:	<u>0</u>
c. Collection Systems-Dry Line/Wet Line:	<u>0</u>
d. Residuals Disposal:	<u>0</u>
4. State Permit Applications (Non-Delegated) Recommended for Approval:	<u>0</u>
5. State Permits Withdrawn:	<u>0</u>

6. State Permit Applications Outstanding:	<u>92</u>
a. Facility Permit:	<u>65</u>
b. Collection Systems-General:	<u>20</u>
c. Collection Systems-Dry Line/Wet Line:	<u>7</u>
d. Residuals Disposal:	<u>0</u>
C. INSPECTIONS - DOMESTIC	<u>92</u>
1. Compliance Evaluation:	<u>9</u>
a. Inspection (CEI):	<u>0</u>
b. Sampling inspection (CSI):	<u>9</u>
c. Toxics Sampling Inspection (XSI):	<u>0</u>
d. Performance Audit Inspection (PAI):	<u>0</u>
2. Reconnaissance:	<u>40</u>
a. Inspection (RI):	<u>18</u>
b. Sample Inspection (SRI):	<u>5</u>
c. Complaint Inspection (CRI):	<u>4</u>
d. Enforcement Inspection (ERI):	<u>13</u>
3. Special:	<u>43</u>
a. Diagnostic Inspection (DI):	<u>0</u>
b. Residual Site Inspection (RSI):	<u>0</u>
c. Preconstruction Inspection (PCI):	<u>15</u>
d. Post Construction Inspection (XCI):	<u>28</u>
D. PERMITTING - INDUSTRIAL	
1. State Permit Applications Received:	<u>0</u>
a. Facility Permit:	<u>0</u>
(i) Types I and II	<u>0</u>
(ii) Type III with groundwater monitoring	<u>0</u>
(iii) Type III w/o groundwater monitoring	<u>0</u>
b. General Permit:	<u>0</u>
c. Preliminary Design Report:	<u>0</u>
(i) Types I and II	<u>0</u>
(ii) Type III with groundwater monitoring	<u>0</u>
(iii) Type III w/o groundwater monitoring	<u>0</u>
2. Permits Recommended to DEP for Approval:	<u>1</u>
3. State Permit Applications Outstanding:	<u>22</u>
a. Facility Permits:	<u>22</u>
b. General Permits:	<u>0</u>

E. INSPECTIONS - INDUSTRIAL	<u>34</u>
1. Compliance Evaluation:	<u>8</u>
a. Inspection (CEI):	<u>7</u>
b. Sampling Inspection (CSI):	<u>1</u>
c. Toxics Sampling Inspection (XSI):	<u>0</u>
d. Performance Audit Inspection (PAI):	<u>0</u>
2. Reconnaissance:	<u>26</u>
a. Inspection (RI):	<u>18</u>
b. Sample inspection (SRI):	<u>0</u>
c. Complaint Inspection (CRI):	<u>8</u>
F. CITIZEN COMPLAINTS	
1. Domestic:	<u>21</u>
a. Received:	<u>12</u>
b. Closed:	<u>9</u>
2. Industrial:	<u>17</u>
a. Received:	<u>9</u>
b. Closed:	<u>8</u>
3. Water Pollution:	<u>16</u>
a. Received:	<u>8</u>
b. Closed:	<u>8</u>
G. RECORD REVIEWS	
1. Permitting:	<u>8</u>
2. Enforcement:	<u>0</u>
H. ENVIRONMENTAL SAMPLES ANALYSED FOR:	
1. Air Division:	<u>91</u>
2. Waste Division:	<u>0</u>
3. Water Division:	<u>124</u>
4. Wetlands Division:	<u>2</u>

I. SPECIAL PROJECT REVIEWS

1. DRI's:	<u>2</u>
2. Permitting:	<u>0</u>
3. Enforcement:	<u>4</u>
4. Other:	<u>2</u>

J. WATER QUALITY MONITORING SPECIAL PROJECTS

1. Data Review	<u>0</u>
2. Special Sampling	<u>1</u>
3. Biomonitoring/Toxicity Reviews (DW)	<u>0</u>
4. Biomonitoring/Toxicity Reviews (IW)	<u>0</u>
5. Other	<u>0</u>

K. TAMPA PORT AUTHORITY/DEP DREDGE & FILL 23

AR08.96

WETLANDS MANAGEMENT DIVISION
 EPC BOARD AGENDA BACKUP
 AUGUST, 1996

ASSESSMENT SECTION

A. EPC Wetlands Reviews	<u>Initial</u>	
1. Wetland Delineations (\$100)	<u>44</u>	
- FDEL Dispute	<u>0</u>	
2. Wetland Line Survey Reviews	<u>18</u>	
3. Additional Footage Fees		<u>\$2,262.84</u>
4. Misc. Activities in Wetlands (\$0, \$50 or \$80 as applicable)		
- Nuisance Vegetation	<u>4</u>	
- Other	<u>3</u>	
5. Impact Justification & Mitigation Proposal (\$645)	<u>6</u>	
6. Mitigation Agreements Recorded	<u>0</u>	
7. Mitigation As-Built Survey Review	<u>0</u>	
8. FDOT Reviews	<u>0</u>	
B. EPC Delegation/Reviews from State, Regional, or Federal Authorities		
1. Wastewater Treatment Plants (DEP)	<u>18</u>	
2. Tampa Port Authority Permit Apps. (\$50 or \$150 as applicable)	<u>33</u>	
3. FDEP/SWFWMD Wetland Resource Apps.	<u>1/0</u>	
4. FDEP Grandfathered Delineation	<u>0</u>	
5. Army Corps of Engineers	<u>0</u>	
6. Interagency Clearinghouse Reviews	<u>0</u>	
7. Development of Regional Impact	<u>0</u>	

C. Hillsborough County Permit Application Reviews

1.	Land Alteration/Landscaping (\$80)	<u>2</u>
2.	Land Excavation (\$785 or \$650 as applicable)	<u>0</u>
3.	Phosphate Mining	
	a. Unit Review/Reclamation	<u>0</u>
	b. Annual Review/Inspection	<u>0</u>
4.	Rezoning	
	a. Reviews (\$70)	<u>8</u>
	b. Hearings	<u>0</u>
	c. Hearing Prep (hours)	<u>5</u>
5.	Site Development/Commercial (\$300)	
	a. Preliminary	<u>4</u>
	b. Construction	<u>6</u>
6.	Subdivision	
	a. Preliminary Plat (\$140)	<u>5</u>
	b. Master Plan (\$550)	<u>0</u>
	c. Construction Plans (\$250)	<u>4</u>
	d. Final Plat (\$90)	<u>5</u>
	e. Waiver of Regulations (\$100)	<u>0</u>
	f. Minor--Survey Subd. (\$100)	<u>7</u>
	g. Minor--Certified Parcel (\$100)	<u>2</u>
7.	Miscellaneous Reviews (no fees)	
	a. LAL Variance/ Setback Encroachment	<u>3</u>
	b. Easement Vacating	<u>1</u>
	c. NRCS Review	<u>2</u>
8.	Preapplications (no fees)	
	a. Review preparation (hours)	<u>11</u>
	b. Meetings/Reports	<u>0</u>

9.	Development Review Committee (no fees)	
	a. Review preparation (hours)	<u>0</u>
	b. Meetings	<u>0</u>

D. Other Activities

1.	Unscheduled meetings with members of the public (walk-ins)	<u>67</u>
2.	Other Meetings	<u>71</u>
3.	Telephone conferences	<u>817</u>
4.	Presentation	<u>1</u>
5.	Correspondence	<u>173</u>
6.	Correspondence Review (hours)	<u>22.25</u>
7.	Special Projects (hrs.)	<u>72.75</u>
8.	On-site visits	<u>74</u>
9.	Appeals	<u>0</u>

INVESTIGATIONS/COMPLIANCE SECTION

A. Complaints

1.	Received	<u>30</u>
2.	Inspected	<u>50</u>
3.	Closed	<u>38</u>

B. Warning Notices

1		
1.	Issued	<u>10</u>
2.	Return Inspections	<u>74</u>
3.	Closed	<u>7</u>

C. Mitigation

1.	Compliance/Monitoring Reviews	<u>23</u>
2.	Compliance Inspections	<u>34</u>

D. Other Activities

1.	Case Meetings	<u>2</u>
2.	Other Meetings	<u>39</u>
3.	Telephone conferences	<u>372</u>
4.	File Reviews	<u>33</u>
5.	Cases Referred to Enforcement Coordinator	<u>0</u>
6.	Letters	<u>45</u>

ADMINISTRATIVE ENFORCEMENT/ENFORCEMENT COORDINATOR

A. New Cases Received	<u>1</u>
B. Activities	
1. Ongoing Cases	
a. Active	<u>29</u>
b. Legal	<u>3</u>
c. Tracking	<u>24</u>
2. Number of "Notice of Intent to Initiate Enforcement" Issued	<u>1</u>
3. Number of Citations Issued	<u>0</u>
4. Number of "Emergency Order of the Director" Issued	<u>0</u>
5. Number of Consent Orders Signed	<u>0</u>
C. Cases Closed	
1. Administrative/Civil Cases Closed	<u>0</u>
2. Criminal Cases Closed	<u>0</u>
3. Cases Referred to Legal Dept.	<u>0</u>
D. Contributions to Pollution Recovery Fund	<u>\$160.00</u>
E. Enforcement Costs Collected	<u>\$322.18</u>

OTHER SECTIONS

A. Engineer/Hydrologist Staff

1. Meetings	<u>20</u>
2. Reviews	<u>22</u>
3. Aerials Reviews	<u>20</u>
4. Telephone Calls (Aerials)	<u>59</u>
5. Special Projects	

Attended Seminar on Aquifer Protection
in Gainsville - 8/1/96

B. Soil Scientist

1. Case Reviews	<u>5</u>
2. Field Soil Investigation	<u>5</u>
3. Soil Investigation Notes/Reports	<u>5</u>
4. Meetings	<u>1</u>
5. Special Projects	

- (1) Hydric Soil Study
- (2) Division SOP Writing

C. Administrative Support Staff

1. Public Record/File Reviews	<u>11</u>
2. Unscheduled Reviews	<u>3</u>
3. Telephone Assistance	<u>1,583</u>
4. Incoming Projects/Information	<u>55/150</u>
5. Additional Information logged	<u>15</u>

LEGAL DEPARTMENT MONTHLY REPORT
September 11, 1996

A. ADMINISTRATIVE APPEALS

NEW CASES [0]

EXISTING CASES [7]

Marks: Appealed EPC Citation for wetland destruction; settlement negotiations reached impasse. Authority to take appropriate legal action granted in 1995 (See Marks - litigation cases).

Truck Parts of Tampa: EPC cited the owner, California Property, Inc. and lessee Truck Parts, Inc., for violations including the discharge of acid and hydraulic fluid, and the accumulation of solid waste. The owner of the property appealed the Citation and asserted that he is unable to gain access to the property. The lessee did not appeal. Authority to take appropriate legal action granted in 1995 (See Truck Parts - litigation cases).

EPC v. DEP: (Florida Power & Light, Orimulsion conversion project.) EPC requested an administrative hearing, objecting to DEP's proposed permit upon Florida Power & Light's failure to provide the required assurances that environmental regulations would be met. EPC's Executive Director entered a stipulation with FP&L by which EPC objections to the permitting be withdrawn if certain conditions were added to the permit. The Hearing Officer recommended that the conversion project be permitted subject to conditions, including those agreed to in our stipulation. The Governor and Cabinet, sitting as the Power Plant Siting Board entered an order denying the power plant certification. FP&L appealed and DEP Secretary Wetherall is withholding her decision as to the separate PSD (air) permit pending the outcome of FP&L's appeal of the certification denial.

FIBA/Bridge Realty: EPC issued a Citation to the owner, Bridge Realty, and former tenant, FIBA Corp., for various unlawful waste management practices, and ordered that a contamination assessment be conducted, that a report be submitted and contaminated material appropriately handled. Bridge Realty and FIBA appealed. Bridge Realty initiated a limited assessment, and provided staff with a copy of the report which is currently being reviewed.

Tampa Scrap Processors, Inc.: Appealed EPC Citation for violations relating to the management of solid waste, used oil and hazardous waste. Respondent agreed to proceed with development of an Preliminary Contamination Assessment Plan (PCAP) and implement that plan after EPC staff review and approval. Respondent is reviewing a draft Consent Order.

Central Florida Pipeline Corp.: Appealed EPC Citation for excessive turbidity, inadequate erosion controls during the installation of a pipeline within wetlands near the Alafia River, and wetland impacts outside of the areas authorized. Violations have ceased and a majority of the initial restoration activities have been completed. Respondent is reviewing a draft Settlement Agreement which includes reimbursement of costs.

Metro Recycling & Disposal, Inc. Et al.: Appeal of an EPC citation for operating a Materials Recovery Facility without the proper permits. We have received DEP's confirmation as to the proper application of their rules, and Respondent has agreed to submit additional information in the application for the required DEP permit prior to mid-September.

CASES RESOLVED [0]

B. LITIGATION CASES

NEW CASES []

EXISTING CASES [16]

Hughes Hard Chrome, Inc.: Authority granted in 1993 regarding water violations. The company, which signed a Consent Order is out of business on the affected site, but does still exist in the county. Staff is pursuing use of Pollution Recovery Funds to conduct a Preliminary Contamination Assessment, which will cost about \$5,000.

Holley, Raymond, et al: Suit filed against owners for improperly abandoning Underground Storage Tank and to compel proper closure, assessment of contamination, remediation, civil penalties and costs. Default entered; Defendants filed bankruptcy. Property has been auctioned to a third party purchaser who has not yet followed through with the purchase, and is waiting on results of his investigation as to the condition of the site.

Marks: Authority granted to take appropriate legal action for restoration of wetlands disturbed by the Mark's activities, penalties and costs. Discovery in process.

Balm Grocery: Received authority on 3/95 to proceed against owners/operators for improperly abandoning underground storage tanks, and for operational problems with 3 active tank systems. The abandoned tanks appear to be on County property. Inquiry has been made of County as to what interest they may claim. County has also been advised of existing cleanup programs for which the site may be eligible.

Eastwood Estates Mobile Home Park: Complaint and Motion for Temporary Injunction filed to compel proper wastewater permitting, operation and treatment, and effluent disposal, to recover penalties and enforcement costs. Defendant has moved to dismiss EPC's complaint. Hearing has been scheduled for Defendant's Motion to Dismiss and EPC's Motion for Temporary Injunction.

Baity v. BOCC/EPC: Passenger sued both the BOCC and EPC for injuries in car accident (case filed by driver has been settled). The County Attorney's Office is representing both defendants. Mediation is scheduled for September 23.

Causeway Station: Authority granted 10/95, to compel upgrades or closure of underground storage tanks (UST), to enforce the applicable operating requirements, and to recover penalties and EPC's enforcement costs. Staff has been working with property owner to remedy violations. Removal of the five previously existing UST's has been completed. We are awaiting the required closure assessment.

Moore Properties of Tampa, Inc.: Filed suit to compel proper closure and removal of abandoned underground storage tanks, recover penalties and EPC's enforcement costs. Default was entered and Final Judgment is being prepared. In a separate action, receiver has been appointed and is authorized to investigate and bring site into compliance with environmental regulations.

Truck Parts of Tampa: Suit filed against multiple defendants to abate pollution and obtain soil and groundwater assessment, soil and waste tire cleanup, proper disposal, proper management of incoming waste products, costs, and applicable penalties. All defendants have been served. Awaiting answers.

Dibbs v. EPC: Dibbs filed a Declaratory Judgment action seeking a declaration that EPC's wetland rule is unconstitutional. EPC moved to dismiss the complaint. The Court granted Dibbs' Motion, supported by the County, to consolidate this case with Dibbs' 1991 suit against Hillsborough County. Hearing on EPC's Motion to Dismiss has been set for early December.

GATX Terminals Corp.: Authority granted 4/96 to compel compliance with standards of the EPC and DEP pertaining to construction and operation of two above ground storage tanks. Staff provided notice to the Port Authority, as requested, and settlement negotiations continue. Commissioner Norman has requested that this matter be brought before the Commission if not settled prior to the September meeting.

Billings Amoco: Authority granted 4/96 to compel compliance with underground storage tank rules. The facility does not appear to have the required release detection nor has the cathodic protection system been adequately tested. The UST system has now been taken out of service and a settlement agreement is being reviewed to resolve the remaining issues.

Optimum Petroleum v. Emad Qasem, EPC, et.al: In pursuing the foreclosure of a construction lien, Plaintiff named EPC as a Defendant because of our recorded judgment and injunction regarding an UST on the site. EPC has responded to the Complaint.

Slusmeyer: Slusmeyer has failed to comply with a prior judgment and injunction pertaining to proper closure of underground storage tanks. Discovery as to assets has been initiated so that injunctive relief might be pursued.

Nix v. EPC: An employee released because of budget cuts filed suit against the agency and individuals within the agency alleging, under the Whistle-blowers Act, that her discharge was retaliatory. EPC filed a Motion to Dismiss.

Larrett Mobile Home Park: Proceeding against owner of Mobile Home Park Wastewater Treatment System for breach of Settlement Agreement, seeking payment of penalties.

RESOLVED CASES [0]

(agenda\sept.96)

COMMISSION

DOTTIE BERGER
PHYLIS BUSANSKY
JOE CHILLURA
CHRIS HART
JIM NORMAN
ED TURANCHIK
SANDRA WILSON

EXECUTIVE DIRECTOR

ROGER P. STEWART



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WETLANDS MANAGEMENT DIVISION
TELEPHONE (813) 272-7104

September 11, 1996

ENVIRONMENTAL PROTECTION COMMISSION
OF HILLSBOROUGH COUNTY
POLLUTION RECOVERY TRUST FUND

Fund Balance September 11, 1996 \$758,221.00

Encumbrances Against Fund Balance:

Cypress Head Swamp	16,747.00
Carmichael Dump	30,000.00
Wetland Surveys	1,771.00
Lake Chapman Sea.	2,000.00
Seagrass Study/Sheriff	22,876.00
HCC/USF	18,070.00
Public Ed.	- 0 -
Art. Reef FY96	103,802.00
Art. Reef FY97	61,064.00
Nature's Class.	459.00
Clayton Lake	129,000.00
Mosi Restoration	55,500.00
Oakview Utilities	75,000.00

Total of Encumbrances 516,289.00

Fund Balance Available September 11, 1996 \$241,932.00

COMMISSION

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ENVIRONMENTAL PROTECTION COMMISSION
OF HILLSBOROUGH COUNTY
ANALYSIS OF GARDINIER SETTLEMENT TRUST FUND
AS OF SEPTEMBER 11, 1996

Fund Balance as of 10/01/95	\$1,317,447.00
Interest Accrued FY96	67,888.00
Disbursements FY96	(35,611.00)
	<hr/>
Fund Balance	\$1,349,724.00

Encumbrances Against Fund Balance:

Alafia River, Add.(SWIM/DEP)	9,566.00
McKay Bay Restoration (COT)	50,000.00
Cockroach Bay Exotic Con.(HCC)	8,618.00
Delany Creek Enhance. (H.C. Stormwater)	150,000.00
Hillsborough School /Nurserys	27,307.00
Alafia River/Wolf Branch	300,000.00
Ballast Point Seawall Phase II	25,000.00
Audubon Society Riverview CC	50,000.00

Total of Encumbrances	<hr/>	620,491.00
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Fund Balance Available September 11, 1996	\$ 729,233.00
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ENVIRONMENTAL PROTECTION COMMISSION
OF HILLSBOROUGH COUNTY

AGENDA: REQUEST FOR AUTHORITY

FROM: Waste Management Division, Sheila Luce, Sr. Env. Enf. Spec.

ENFORCEMENT CASE: Skrypek, Mercedes Castillo; and Timothy Davis and Charles Blanchard Properties - Solid/Hazardous Waste Enforcement Case #3994

RECOMMENDATION: Staff recommends that the EPC Board grant authority to take appropriate legal action, as necessary to obtain environmental assessment of potential contamination.

BACKGROUND AND NATURE OF VIOLATION: The properties are located at 6804 1/2 New York Drive near the deadend of 68th Street. The properties were formerly used by various parties as an illegal landfill. Dumping was stopped in 1986. Code Enforcement case and lien closed in 1989. In 1990, EPC received a complaint through EPC that battery casings had been buried on the property between 1975 - 1980. Owner admitted excavation in 1991 for septic tank revealed auto parts and battery casings were present. Staff has exhausted all administrative procedures to have the properties assessed for possible contamination and potential on-going pollution source.

Alleged violations of Chapters 1-1 and 1-7, Rules of the Commission and Chapter 62-701, Florida Administrative Code.

ACTION TAKEN BY THE COMMISSION

MEETING DATE September 19, 1996

Approved Disapproved Deferred Until _____

SPECIAL INSTRUCTIONS: _____

ENVIRONMENTAL PROTECTION COMMISSION
OF HILLSBOROUGH COUNTY

AGENDA: REQUEST FOR AUTHORITY

FROM: Waste Management Division, Michael Newman, Env. Enf. Spec. I

MN

ENFORCEMENT CASE: Kings Food Market

RECOMMENDATION: Staff recommends that the EPC grant authority to take appropriate legal action, as necessary.

BACKGROUND AND NATURE OF VIOLATION: Kings Food Market, a retail gasoline business located at 509 West Columbus Drive, Tampa, currently has two underground storage tank systems (USTs) regulated under Ch. 62-761, F.A.C, and Ch. 1-12, Rules of the Commission.

In 1990 and 1991, the facility owner/operator discovered petroleum groundwater contamination at the facility and reported it as required by Rule. However, corrective actions were not initiated in accordance with Chapters 17-761 and 17-770, (now 62-XXX) F.A.C.

In April, 1991, four USTs were properly closed and two double-walled USTs and piping were installed.

On October 20, 1992, Commission staff issued the facility a Non-Compliance Letter for failing to: a) tightness test two new USTs prior to placing them in service b) initiate a contamination assessment, and c) monitor release detection on a monthly basis for evidence of new a discharge.

On May 14, 1993, the Department of Environmental Protection (DEP) declared the facility ineligible for the Abandoned Tank Restoration Program (ATRP).

Commissions staff issued the facility Warning Notice #11349 on January 27, 1995, for the above-mentioned violations and for failure to, d) provide proof of financial responsibility, and e) equip two piping lines with in-line leak detectors.

Facility inspection on April 29, 1996, revealed violations a and d were corrected, violations b, c, e, continued, and, f) dirt covered the two UST's submerged pumps, rendering double-wall line leak detection impossible, and; g) both vacuum gauges were inoperative, rendering tank leak detection impossible.

On July 2, 1996, Commission staff issued the facility owner and operator Citations to Cease and Order to Correct for b, c, e - g. The Commission did not receive a timely appeal from the cited parties within 20 days, thus the Citation became a final agency Order.

Currently, the violations continue.

ACTION TAKEN BY THE COMMISSION

MEETING DATE _____

Approved Disapproved Deferred Until _____

SPECIAL INSTRUCTIONS: _____

COMMISSION

DOTTIE BERGER
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WETLANDS MANAGEMENT DIVISION
TELEPHONE (813) 272-7104

M E M O R A N D U M

DATE: September 5, 1996

TO: Tom Koulianas

FROM: Bob Upcavage

THROUGH: Darrell Howton *DFH*

SUBJECT: ADAM PAINE ACADEMY REQUEST TO IMPACT WETLANDS/ UPLAND MITIGATION PROPOSAL PURSUANT TO CHAPTER 1-11.09(7)/ PROPERTY FOLIO #'s 32819.0000, 32835.0000, 32835.0100, 32818.0000/ STR 25,26-32-18

The proposed school is located east of US Hwy 41 just south of Stephens Road and is situated on 359 acres. The facility is to be built in two phases and will ultimately house over 500 students and staff. The project is funded by a non-profit organization created by the Florida Department of Education.

The submittal is to impact 0.44 acres of disturbed hardwood swamp and preserve 3.12 acres of upland oak hammock at a 7:1 ratio. The applicant is also proposing a maintenance plan to control nuisance species in the upland preserve, plus a 30 foot buffer, for a period of 3 years.

Staff is recommending approval of this project.

COMMISSION

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TELEPHONE (813) 272-7104

M E M O R A N D U M

DATE: September 10, 1996

TO: Comm. Dottie Berger, Chairman, Environmental Protection Commission

FROM: Darrell Howton, Director, Wetlands Managment, EPC *DFH*

SUBJECT: FINAL REPORT - RECOVERY OF BOAT PROPELLER SCARS IN COCKROACH BAY, FLORIDA

Dear Commissioner Berger,

Please find enclosed a copy of the final report detailing results from the past year's study on the extent of and recovery from boat propeller scarring within the Cockroach Bay Aquatic Preserve. Included with the report is a brief synopsis of the history of the program. If you have any questions, please do not hesitate to contact me or other involved staff at 272-7104.

cc: EPC Board

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Beginning late in 1991 the Environmental Protection Commission designated Commissioner Ed Turanchik to head up a Task Force whose focus was to look into problems with the water quality and seagrass destruction in Cockroach Bay. The Task Force was initially comprised of representatives from the Planning Commission, the Florida Department of Natural Resources, the Southwest Florida Water Management District, the Agency on Bay Management, the County Attorney's Office, EPC staff, Gus Muench (an active and interested fisherman of the area), and Robin Lewis. Mr. Lewis is a scientist and environmental consultant whose work has focused, in part, on seagrass destruction in Tampa Bay. As the task force met a number of times over the period of January- July, 1992, public input was invited during a series of workshops and the task force drew new members from among the recreational and commercial fishing community. As a consequence the Task Force continually expanded ultimately consisting of 24 individuals.

One of the first actions of the Task Force was a survey of existing protection mechanisms. It was concluded that none had been effective and that the most likely chance for successfully protecting seagrasses would be by amendment to Ch 1-11 of the Rules of the EPC. A revision to the Rule was drafted to include: the listing of seagrasses as marine wetland species, the creation of the concept and mechanism for establishing Seagrass Recovery Areas and a Management Plan to help recovery, as well as the provision of specific prohibitions for the knowing destruction of marine wetlands or Recovery Areas. With some minor changes in Public Hearing, Ch 1-11 was amended on June 16, 1992.

During this same time period (March 1992) the City County Planning Commission created "The Cockroach Bay Aquatic Preserve Planning Area" as an Area of Special Concern under the Future Land Use Element. This amendment contains many policies and objectives which are designed to "...assist the State in protecting and managing this important natural resource...". By Policy C-37.5 the amendment calls for the BOCC to establish by the end of 1992 a "Cockroach Bay Aquatic Preserve Management Advisory Team" (CAPMAT) which shall serve as an ongoing means of better managing the resources of the Aquatic Preserve for thirteen specific purposes, one of which is "to document the extent and relative health of seagrasses and identify sources of seagrass damage before recommending actions to ban boating or identify exclusionary areas in the Preserve".

Four areas within the Cockroach Bay Aquatic Preserve were designated by the EPC Board as qualifying Recovery Areas (Figure 1) after public hearing on September 23, 1992 with an effective date of December 7, 1992.

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All boat traffic, except for research vessels, were prohibited in Recovery Areas 1, 3 and 4. This was to facilitate enforcement and provide a measure of the speed of the seagrass recovery where all sources of physical damage are eliminated. The 4 Recovery Areas were posted with 39 signs and aides to navigation and marked on flier maps of the area approximately 975 of which were distributed to boaters passively (at a receptacle at the boat ramp) and actively (by the sheriff's patrol boat and the Aquatic Preserve Manager).

Within Recovery Area 2, use of propeller driven watercraft were prohibited at tidal stages below 18 inches above mean lower low water elevation in Recovery Area 2. When water levels were above this depth, there were no restrictions on use. It should be noted that the precise depth and tidal staging limits were subject to modification if experience shows that the depth limits are too restrictive or underprotective.

With recommendation from the Hillsborough County Sheriff's Department due to enforcement limitations, and continued scarring within Recovery Area 2, Chapter 1-11 was again amended on September 28, 1994 to prohibit any watercraft containing an internal combustion engine from Recovery Area 2.

In response to an increase in prop scarring within certain areas of the Aquatic Preserve, as well as new evidence indicating a slow recovery rate for these scars, at its February 16, 1995 meeting, CAPMAT made a recommendation to the BOCC that additional areas within the Aquatic Preserve be restricted to watercraft operating with internal combustion engines.

This recommendation prompted the formation of the Cockroach Bay Users Group (CBUG). This group, mostly comprised of local citizens, organized in response to concerns over the increased level of scarring being observed within the Aquatic Preserve, as well as the threat of additional governmental restrictions over an area of traditional use.

Recommendations were made to the EPC at the June 20, 1995 meeting. At this meeting, the Commission voted to expand aerial surveillance of grassbeds within the Preserve (to include areas outside of the Recovery Areas) and to allow the newly formed CBUG time to implement their own plan to reduce scarring within the Aquatic Preserve. Results were to be assessed one year later (at the end of the August study period) to determine effectiveness and to re-assess the need for further restrictions.

March 1992 - The Cockroach Bay Aquatic Preserve was designated an "Area of Special Concern" under Unincorporated Hillsborough County's Comprehensive Plan.

June 16, 1992 - Chapter 1-11, the EPC's Wetland Rule was amended to offer a protective mechanism for seagrass beds ("marine wetlands") within Hillsborough County.

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- September 23, 1992** - Chapter 1-11 was amended to designate four specific areas within the Cockroach Bay Aquatic Preserve as Recovery Areas with specific prohibitions.
- December 8, 1992** - Signs were installed at the perimeter of the Recovery Areas, and the actual prohibitions went into effect.
- September 28, 1994** - Chapter 1-11 was amended again to increase the level of protection within one of the original Recovery Area, Area 2.
- February 16, 1995** - CAPMAT recommended to the BOCC that additional areas within the Aquatic Preserve be designated as Recovery Areas, with specific prohibitions.
- April, 1995** - CBUG organizes as a group to address specific concerns within the Aquatic Preserve.
- June 20, 1995** - EPC votes to expand surveillance of the Aquatic Preserve, and to allow CBUG one year to implement their own plan to reduce scarring.

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M E M O R A N D U M

DATE: March 5, 1996

TO: Darrell Howton, Director, Wetlands Management, EPC

FROM: Danny Alberdi, Wetlands Management, EPC

SUBJECT: FUND ALLOCATIONS FOR HILLSBOROUGH COUNTY'S SEAGRASS RECOVERY PROGRAM IN COCKROACH BAY

The Hillsborough County Sheriff's Department has been contracted to receive:

FY 1992-1993	\$108,427	(includes initial capital equipment outlay)
FY 1993-1994	\$59,956	
FY 1994-1995	\$59,662	
TOTAL (3 YEARS)	<u>\$228,045</u>	

For FY 1995-1996, the total amount required by the Sheriff's Department to retain this position was \$68,628. The EPC Board agreed to pay for the first 4 months of this contract (\$22,876) while instructing the staff to search for outside funding to continue this position. This contract (for the \$22,876) has not been signed to date. The Board has apparently agreed to pay for half of the remainder of this amount (with the remainder being \$45752).

The Florida Department of Environmental Protection (known at the time as the DNR) received (for the position of Aquatic Preserve Manager):

FY 1992-1993	\$27,330
FY 1993-1994	\$31,009
TOTAL (2 YEARS)	<u>\$58,339</u>

Mr. Darrell Howton
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A portion of this amount was allotted to the EPC for equipment and supplies. This position was vacated in March 1994, with the unspent funds (\$10,548.77) transferred from the FDEP to the Hillsborough County Parks Department for an equivalent position (Aquatic Preserve Manager).

Funds were approved by the Commission on October 28, 1992 for a two year joint study by the University of South Florida and Hillsborough Community College to assess aerial extent of propeller damage and to assess recovery rates of seagrasses within prop scars. This study ran from January, 1993 to December, 1994, for a cost of:

1993 and 1994 - USF	\$40,880
- HCC	\$72,672
TOTAL (2 YEARS)	<u>\$113,552</u>

A contract extension to cover the spring seagrass growth period was additionally funded (from January 1, 1995 to July 1, 1995) for:

1995 - USF	\$9,600
- HCC	\$3,800
TOTAL	<u>\$13,400</u>

The monitoring of an extended area was approved by the Commission for an additional 14 month period on June 20, 1995. The funds approved for this most recent extension are:

1995 and 1996 - USF	\$38,085
- HCC	\$41,665
TOTAL	<u>\$79,750</u>

The most recent expenditure is an effort to determine whether proposed voluntary protections are sufficient to make further regulatory restrictions unnecessary to protect the seagrasses within Cockroach Bay.

Thalassia testudinum Recovery in Boat Propeller Scars in Cockroach Bay, Florida.

Final Report: July 1, 1995 through
31 August, 1996.

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INTRODUCTION.

The present report covers the thirteen month grant extension from Hillsborough E.P.C. for 1 July 1995 to 31 August 1996. Detailed descriptions and studies of Cockroach Bay on the recovery of Thalassia testudinum (turtle grass) in propeller scars, begun in December 1992, are given in the Annual reports for 1993 and 1994, and the Extension report of 30 June 1995. This report includes information from the six month report (1 July through 31 December 1995) and summarizes the studies carried out by the University of South Florida and Hillsborough Community College based on our proposal of June, 1995.

A. Seagrass Community Assessment.

Proposed Study Sites: Two of the original 6 Recovery Area (RA) sites selected were 2C and 4. A third, new site (EXT) was established in Tampa Bay exterior to site 2C. Field work began in July but due to intense summer storms, the first growth studies could not be completed at the three sites until October. General sampling and growth studies were also carried out in December 1995 and February, April and June 1996. To aid in

comparisons, data obtained in February and May, 1995 are also included in some of the tables.

1. Seagrass development studies

Above Ground: abiotic factors. The temperature and salinity graph (Fig. 1) demonstrates two important features of Cockroach Bay during the past three years. First, there is a strong seasonal cycle in both salinity and temperature. From September 1992 through June 1996 the lowest and highest water temperature observed was 12 °C (Feb. 1996) and 33 °C (Aug 1994, June 1995). The lowest and highest salinities observed were 16 ppt (July 1995) and 34 ppt (Apr. 1995). Second, salinities in the fall months of 1994 and 1995 were lower than measured in the previous 2 years (1992: 27 to 30 ppt; 1993: 31 to 33 ppt) because of a return to average rain fall in the Tampa Bay area. In spite of the low salinities in the fall of 1995, the spring regrowth of *Thalassia testudinum* in 1996 was as high as in previous springs.

Above Ground: short shoot density. The differences in ramet densities (Table 1; short shoot density) showed no pattern when the three sites are compared and Site 4 continued to show the highest short shoot densities. There was a general increase in biomass at all sites with spring growth and the increase was highly significant on a seasonal basis at Site 4. Again, we find no effect of the depressed salinities that occurred in the fall of 1995.

2. High altitude photographs

Above Ground: ground and aerial photographs. High altitude aerial photographs were taken in October, February and July of Cockroach Bay, Little Cockroach Bay and adjacent waters of Tampa Bay at a 1 to 2,400 scale. Enlargements were made of these images. The images were scanned into the computer and digitized. Scaling was accomplished by using known ground distances. Mangroves and seagrasses were outlined on the computer images in order to give us a computer map but also square footage of the grasses and mangroves. The following data were computed for the entire area:

<u>Area</u>	<u>Square feet</u>	<u>Acreage</u>
Seagrasses	35,700,000	819.56
Mangroves	57,800,000	1,326.91

3. Detailed photographs:

Aerial images of the site were taken in December, April, June and July at a scale of approximately 1 to 600. Of particular interest in the aerial photographs were the passes where boat traffic was most heavy. Our charge here was to determine if new prop scarring had occurred in any of the sites studied prior to July of 1995 and to make maps of prop scars in Little Cockroach Bay and in adjacent waters of Tampa Bay. The photographs were displayed on a poster board for viewing by the EPC staff.

The early photographs are very difficult to interpret. The images were taken at a low tide and at a low sun angle. The images are excellent, however, interpretation problems occur because the seagrasses have been "burned" back to mere stubs of their usual size. This creates images on the film that appear to be sand but are actually sparse and burned grasses. Some prop scars are clearly in sand but others may be through sparse seagrasses. Ground truthing has not helped much in this regard. In later photographs more details have emerged for interpretation.

One observation on the photographs is worth noting. In the "Hole-in-the-wall" area the sand has shifted to cover more seagrasses than previously noted. There appear to be new (or more powerful) currents moving through the area pushing sand and sediment up onto the grass beds. This observation is consistent with the increases in rainfall noted for 1995. In addition, some of the grasses along the "hole-in-the-wall" pass may have died due to cold temperatures and low salinities.

Seagrasses in Tampa Bay show numerous sites where sand embankments exist where seagrasses should be growing. These are probably caused by boats moving from the deeper waters of Tampa Bay at a high speed toward the shallows. The boats run aground and damage seagrasses. This is especially prevalent in the seagrass beds in Tampa Bay in front of the entrances to Little Cockroach Bay. Over time nothing is left in these areas but sand. We believe that proper marking of the grass beds with buoys would prevent a lot of this type of scarring. In addition, boaters could be encouraged to enter Little Cockroach Bay from the northern side via the Little Manatee River on the east side of Sand Key. This entrance already has a channel. If boaters would routinely enter Little Cockroach Bay from this site, less damage would occur in the seagrasses in Tampa Bay in front of Little Cockroach bay.

One important site is area number 1. This site is located south of the channel leading from the Cockroach Bay boat ramp out to Tampa Bay. This site has had very sparse populations of Halodule wrightii, drifting sand and a few scattered shoots of Thalassia testudinum. During the three year study period little change has been noted in this area until 1996. In the spring months of 1996 an explosive growth of Halodule wrightii took place. The grass grew to cover the entire site in just a few months. The estimated amount of new growth of seagrasses is about 3.4 acres. This will be a prime site to follow in the next few years to see if succession takes place with Thalassia taking over for Halodule as successional theory would indicate.

The recovery sites 2, 3, and 4 sustained very little damage during the past twelve months. Only one prop scar was noted in area 4. The seagrasses in these protected zones have not yet shown dramatic recovery as did the seagrasses in area #1. Of particular

interest are the seagrasses inside of entrances C, D and E. These are the three entrances to Cockroach Bay from Tampa Bay. In the years 1993 to 1995 these entrances sustained continuous prop scar damage which was especially heavy inside of entrance E, the southern most entrance. We reported in 1993 that 145,488 square feet of seagrasses had been destroyed in entrances D and E. Not enough time has elapsed for the seagrasses to recover. Perhaps, if these sites are left alone for a few more years, the seagrasses could recover much like those in site #1.

Prop scar damage: a detailed analysis of prop scar damage at Cockroach Bay, Little Cockroach Bay and Tampa Bay was conducted during the time period of this project. Very little new prop scar damage was noted during this time period. During the first three years of observations in Cockroach Bay, prop scar damage had occurred on a regular basis, declining somewhat in 1994 from previous years. However, in the time period of July 1995 to August of 1996 very little scarring was observed. The following data were compiled from aerial photographs and ground truthing (some of the linear feet data of new scars are estimates based upon field observations of scars that appeared to be new):

<u>Location</u>	<u>Linear feet of old scars</u>	<u>Linear feet of new scars</u>
Cockroach Bay	48,747	6
Little Cockroach Bay Plus Tampa Bay	21,682	2,000
Tampa Bay in front of C.R.B.	4,029	700

The total linear feet of prop scars in the aquatic preserve is 77,164 linear feet or about 1.8 acres.

The data clearly indicate that the rate of prop scar damage has dramatically declined, especially in Cockroach Bay where most of the signs are posted to warn boaters of the presence of seagrasses. This decline in prop scar damage to the seagrasses may be attributed to:

1. The Cockroach Bay Users Group (CBUG): This group has been very active in posting signs and educating boaters of the need to protect seagrasses. Apparently their educational efforts have been paying off.
2. The commercial fishing net ban that went into effect in 1994 may have reduced the number of fishing boats using the bay. We have noted in several aerial photographs in prior years, circular prop scar damage in the shallows of Cockroach Bay. This damage was most likely done by commercial net fishermen as they

encircled a school of fish. No damage of this type has been seen since the net ban went into place.

The next step in protecting seagrasses must come with the placement of markers in Tampa Bay to warn boaters that they are approaching shallow water and seagrass beds. With the placement of these markers, less damage should occur in Tampa Bay.

4. Seagrass blade studies

Above Ground: blade characteristics. Blade number, width, and length of Thalassia testudinum are compared for February, May, October and December 1995 in Table 2A and for February, April and June in Table 2B. Leaf areas are compared in Tables 3A and 3B. Significant differences in blade width and length were present but there was no real pattern within a site indicating that a prop cut does not affect blade development. What is evident is the much longer blades at all sites in June 1996 (Table 2B).

Leaf areas were significantly different ($P < 0.001$) within the Ext site in October (Table 3A), at 2C and 4 in February, and at Exterior and 2C in April (Table 3B). However there was no pattern and in June leaf areas were not significantly different within any site when samples from two prop cuts and reference areas are compared. Again, this indicates that a prop cut does not affect blade development.

Above Ground: blade growth. Blade production, expressed as percent new blade d^{-1} were surprisingly high throughout the winter (October through April) and then showed a major drop in June 1996 (Table 4A, 4B) for all three sites. The lower growth response in June is due to the large amount of old blade material that remained on the plant (growth = new/old blade tissue). What is most interesting is that the exterior site showed no greater response than the interior ones indicating that Cockroach Bay environment supports healthy seagrass communities similar to Tampa Bay.

A second method of studying blade growth is shown in Table 5 where the amount of blade produced per day per plant or per m^2 is given. This data takes into account only the amount of new blade growth and does not rely on old blade material. These data show high growth rates in June because the old blade material is not considered. What is also interesting is that the Ext plants showed higher dry wt production d^{-1} than plants at 2C and 4 in all periods except April. This suggests that there may be less stress in the Tampa Bay (Ext) site than in the Cockroach Bay sites. However Thalassia testudinum within Cockroach Bay also showed high production at site 2C and moderate growth at site 4 in June.

Below Ground. As proposed, quarterly core sampling were taken at the three

sites in October and December 1995 and February, April and June 1996 (Tables 6A, 6B). The above and below ground biomass did not differ significantly between sites at any date due to the large standard deviations. This reflects the self-imposed limit of 3 samples per site to reduce damage to the beds. What is important in this data is the lack of any pattern in biomass differences between sites showing that the communities within and outside of Cockroach Bay are similar. The effect of depressed salinities in the fall of 1995 was not evident at site 4 in the spring.

Tables 6A and 6B also show the importance that short shoots and rhizomes play in the below ground biomass and that the ratio of above to below is about 1 to 3 or 1 to 4. There were no major differences in rhizome growth in the three sites in this last year of study.

A. Seagrass epiphyte load.

The epiphyte load on blades of turtle grass did not show a higher biomass in February of 1996 when compared to previous winters of 1993, 1994 and 1995 (Table 7A, 7B). Normally the epiphyte biomass increases with a drop in turbidity, rain fall, and increase in water column nutrients in the winter. We did not see this in 1996 and this might reflect the increased rainfall during the winter months but we do not know. In general, epiphyte load was low throughout the spring of 1996. Also, there was no pattern in epiphyte load between blades collected along prop cuts and within seagrass beds.

B. Macroalgal biomass.

Drift Macroalgal biomass was also much lower in February 1996 than in previous years (1993, 1994, 1995) and remained low at all three sites into June. The winter rise in Macroalgal biomass occurred earlier (December 1995) this winter and then declined. It does appear that the macroalgae replace the phytoplankton as nutrient "scrubbers" in the ecosystem. Because of the patchy nature of the drift algal biomass the percent cover was deleted from Table 8. Organic content of the macroalgae ranged from 10 to 17% and showed no seasonal pattern.

6. Restoration Experiments

This part of the study is divided into three components: stimulation of in situ rhizomes, tank and field nurseries, and transplantation into propeller cuts.

1. Stimulation of in situ rhizomes. In addition to the studies carried out at HCC, the USF group is using combinations of nutrients and plant growth regulators in the Field Nursery studies and the Transplantation studies described below.

Tank nurseries. The first problem to overcome in the laboratory experiments was to establish stable marine aquaria. In the past we had difficulty keeping environmental conditions constant, therefore, the experiments were not successful. We

set up four 90 gallon salt water aquaria with a 250 watt halogen light sources. Heaters were placed in the water to stabilize the temperature and timers were placed on the lights for 14 hour days. The filtration system was a simple "bio-ball" filter with filter media superimposed in a 20 gallon aquarium. This system proved inadequate. We designed an "algae" filtration system in line with the other filter so that water trickled through the algae prior to going into the bio-ball filter. This worked very well. Next we added more light to each aquarium. The new lights were 40 watt fluorescent lights designed for marine aquaria plant growth. A water pump was added to each aquarium to create water movement in the tanks. Salinity has been kept fairly constant at 27 to 28 ppt. Temperature has been kept at 24 degrees C.

Experiment #1: The procedure involved procuring seagrasses from the bay and treating them with hormones and nutrients to attempt to stimulate growth. In paper cups we placed the following:

- a. Nutrient agar.
- b. Six drops of each hormone (Cytokinin, Auxin, and a gibberellin)
- c. Three drops of DMSO
- d. Five granules of ammonia

Plants were prepared by having their rhizomes cut so that each plant maintained its rhizome. The plants were placed in the solution and the agar was allowed to solidify around the rhizomes. After solidification, the cups were cut away from the plants and the plants were gently placed in the aquaria. The plants were left in the aquaria for 6 weeks. No new growth was noted. Speculation is that the agar solution held up the molecules from getting to the rhizomes. The plants, therefore, starved to death.

Experiment #2: In this experiment the seagrasses were soaked in solutions instead of using the agar. After soaking for two hours the plants were placed in the aquaria. In aquarium #2 the plants were left alone to grow. In aquarium #1 the plants have been injected with nutrients and hormones each week. Injections were as follows:

- a. A dilute solution of Miracle Grow (15-30-15) in seawater.
- b. Three granules of ammonia.
- c. Three drops of hormone.

This experiment was begun in mid December. Results show that most of the plants in both aquaria sustained minimal life with little growth. No new apical meristems were noted. This experiment probably failed because of a lack of light in the system.

2. Tank and field nurseries.

2a. Tank nurseries.

Outdoor experiments: We obtained permission from the DEP marine fisheries lab located in the northern most portion of Manatee County near Cockroach Bay to set up outdoor experiments. The following were purchased:

- a. Four crypts to grow plants in.
- b. Water heaters
- c. PVC pipes to connect the DEP. water system to our tanks.
- d. Thermometers.
- e. Heater regulators.

The tanks were set up with flow through water averaging salinity of 29 ppt. Thalassia testudinum was collected from Cockroach Bay and Tampa Bay at sites where the grass beds had been disturbed. The collected grasses were exposed above the surface and may not have remained alive if they were not collected. Experiments were conducted to determine if apical meristems could be stimulated in tanks with hormones. The plants were soaked in 1 % solutions of hormones in sea water with urea added as a nutrient source. Hormones used were an Auxin, a Gibberellin, and a Cytokinin. Combinations of hormones were also used. The following are the results of a two month study:

Control: 10 plants added with no survivors

Gibberellin: 15 plants started, 9 plants survived with 3 growing apical meristems

Cytokinin: 27 plants survived with 12 showing apical meristems

Auxin: 12 plants were added only 2 survived with no apical meristems

Gibberellin and Cytokinin: 10 plants with 2 apical meristems.

A later experiment was added to determine if a double shoot would more readily show a growth of an apical meristem. The following is the result of a 1 month experiment:

Gibberellin and Cytokinin: 5 double shoots with 4 growing apical meristems.

Conclusion: Cytokinin shows promise as a hormone that can stimulate apical meristem growth. In addition, when two shoots are used instead of one, the potential for apical meristem growth is accelerated.

2b. Field Nursery. A Thalassia testudinum field nursery was established in November 1995 in greater Cockroach Bay using single short shoots that were exposed to nutrients and growth regulators by placing paired agar blocks every 2 weeks next to each plant. The procedures have been described in our Six Month report with four treatments using controls (agar block only) nutrients (ammonia) and two hormones (NAA and, or kinetin). Two agar blocks were placed, one on each side of each short shoot every two weeks since 4 November. There were 12 replicates of each treatment resulting in a nursery of 48 single short shoots (Fig. 2, layout of nursery).

By the end of July (23 July 1996) 27% of the 48 short shoots remained regardless of treatment (Table 9). The 13 surviving plants were still single short shoots and equally distributed over the four treatments. There were two rhizome apices that developed from the short shoots, one from the NAA and the other from the NAA + Kinetin treatments. All of the survivors showed a development of long, fleshy roots from the short shoots, with no growth from the rhizome proper. The experiment demonstrated that the apical meristem of the short shoot is the site of new roots and rhizome meristems and that our plant growth regulator techniques are not correct.

3. Prop Cut Restorations.

Three experiments were carried out using existing propeller cuts and each will be described separately.

3a. Prop cut Restoration in Site 4 using Thalassia testudinum. This experiment began in February 1996 (Table 9). Single short shoots were used with the same treatments described for the nursery (Fig. 2 with four lines run continuously along prop cut) and the 48 plants were established along a propeller cut in Site 4.

By the end of July (23 July 1996) only 27% of the single short shoots remained regardless of treatment with about half of the survivors having only ammonium fertilization (Table 9). Again there were two rhizome meristems that had developed from the short shoots with the original rhizome being non-functional. Again the choice of plant growth regulators was not correct.

3b. Prop cut Restoration in greater Cockroach Bay using Thalassia testudinum. This experiment began in March 1996. Double short shoots were used in this experiment using the same treatments as described for the nursery (Fig. 2, with four lines run continuously along prop cut) and the 48 plants established in a propeller cut in greater Cockroach Bay. On 25 July 1996 all 48 double short shoot transplants were present and showing blade growth. The transplant studies (Nursery and Prop Cut Restorations 3a, 3b) support the earlier studies (Tomasko *et al.*, 1989) in which we showed that survival of T. testudinum transplants increased to almost 100% if 2 or more short shoots are present. The experiment has not been disturbed so that it can be monitored through 1996-97.

3c. Prop cut restoration in greater Cockroach Bay using Halodule wrightii. This experiment began in April 1996 and used 10 plugs (15.2 cm diameter) placed in a propeller cut. No treatments were used and as of 31 July 9 of the 10 plugs have doubled their size. We will continue to monitor this experiment as well.

7. Prop scar nutrient enrichment experiments:

Experiments were conducted in prop scars to determine if Thalassia testudinum could be re-grown into prop scars with the use of nutrients. Two nutrients were used: fast-release urea in pellets and slow-release urea encapsulated with sulfur. Prop scars were selected in area 4 and in Tampa Bay in front of Little Cockroach Bay. Nutrients were added by hand every 7 to 10 days for a three month period (May through July). Each meter of a prop scar was marked with PVC pipe. One meter was enriched with urea, the next with sulphur coated urea, the third with both forms, and the fourth was a control. Each experiment was repeated four times at four locations. Once a month new shoots found in the scars were counted. The final summary counts are as follows:

Control: 13 new shoots, averaging 2.6 new shoots per meter.

Fast release Urea: 51 new shoots, averaging 10.2 new shoots per meter.

Sulphur coated slow release urea: 43 new shoots, averaging 8.6 new shoots per meter.

Combination: 40 new shoots, averaging 8.0 new shoots per meter.

Conclusion: nutrient enrichment of prop scars does stimulate new growth of shoots of Turtle grass into prop scars. Turtle grass has a growth period that begins sometime in the spring months. These experiments were begun several weeks after the initial growth spurt of the grasses. It is entirely possible that the results would be greater if enrichment was timed to coincide with the initial growth spurt. In addition, very little new growth of shoots was noted the further into the summer months the experiments were conducted. Therefore, further experiments of this type should be conducted earlier, perhaps in the months of April to June.

Summary

Growth of Thalassia testudinum in Cockroach Bay during the spring of 1995 followed the same pattern as reported in the 1993 and 1994 Annual Reports in the interior RA (4) and exterior RA (2C). What is interesting is that the plants of the exterior site in Tampa Bay showed the same results. This demonstrates that the Cockroach Bay seagrass communities are as productive as are Tampa Bay populations. Further, the depressed salinities (11 ppt being common) again occurred as in 1994 yet there were no measurable effects when the turtle grass communities were compared (Ext vs 2C and 4). Establishment of the external site now has demonstrated that the Cockroach Bay plants do as well as those in the exterior site.

Throughout our studies we have determined that there are no differences in turtle grass plants growing along a propeller cut with those in an undisturbed seagrass bed. In the 1993-1994 reports we found sediment, nutrients and other abiotic factors were not critically different and in 1995 and now 1996 we reported that seagrass growth, biomass, standing stock, and blade features do not differ between plants of prop cuts and reference beds.

Our attempts at creating a field nursery were not effective. We used single short shoots of Thalassia testudinum because we knew the survival of a single ramet is low (ca 20%; Tomasko et al., 1989) and thus we could experiment with use of nutrients and plant growth regulators. Using 2 or more ramets per rhizome results in discarding at least three of every four plants dug up from a donor bed. This means severe destruction of donor beds to achieve high rates of survival (as in Restoration experiment 3b).

If restoration, mitigation, or creation of turtle grass beds are to succeed, techniques inducing growth of the short shoot (not the severed rhizome) must be developed. These techniques must include plant growth regulators. This is an area that is very critical and should be studied in the next few years. The experiments (Nursery, Prop restoration 3a, 3b) indicate that the short shoot is the site of root and rhizome meristem initiation. Thus, this portion of the plant should be exposed to combinations of growth regulators. This is an area of study that should prove valuable in the development of nursery techniques to produce transplants for mitigation of Thalassia testudinum beds.

Tank and field experiments using urea and hormones have shown two positive results:

1. Some Thalassia can be re-grown into prop scars using urea (ammonia).
2. Cytokinins and Gibberellins used in combination with double shoots of Turtle grass can initiate apical meristem growth in a one month period.

These results are encouraging for future experimentation of seagrass growth. The next step should be to inject urea and hormones into large sections of prop scars in the field to see if new growth can be further enhanced.

Prop scar damage to the seagrass beds has been reduced. Very little new scarring has been observed during the time period of this study in all of the Cockroach Bay aquatic preserve. Approximately 3.4 new acres of Halodule wrightii have grown into area #1, while some seagrasses have been lost in areas 3 and 4 due to cold temperatures, lowered salinities and shifting currents. Seagrasses are being lost to boats in the shallows of Tampa Bay as boats motor from deep waters into shallow waters. They simply run aground in the seagrass beds because the shallow waters are not marked with warning signs or buoys.

Recommendations

As a result of this study we are making the following recommendations:

1. That all of the present markers be kept in place with the same restrictions.
2. That the Cockroach Bay Users Group (CBUG) continue their active role in educating the boaters of Cockroach Bay on safe boating practices and methods to protect the seagrasses.
3. That numerous markers be placed in front of the seagrass beds in Tampa Bay to warn boaters of the shallow conditions and the presence of seagrasses.
4. That aerial photography be continued for three more years to monitor the status of the grass beds. Future monitoring of the seagrasses will only need to be done once a year.
5. That more research be conducted on seagrass re-growth in prop scars and hormone stimulation of rhizomes. Some progress was noted during this study. Perhaps it is time to stimulate re-growth on a grander scale.

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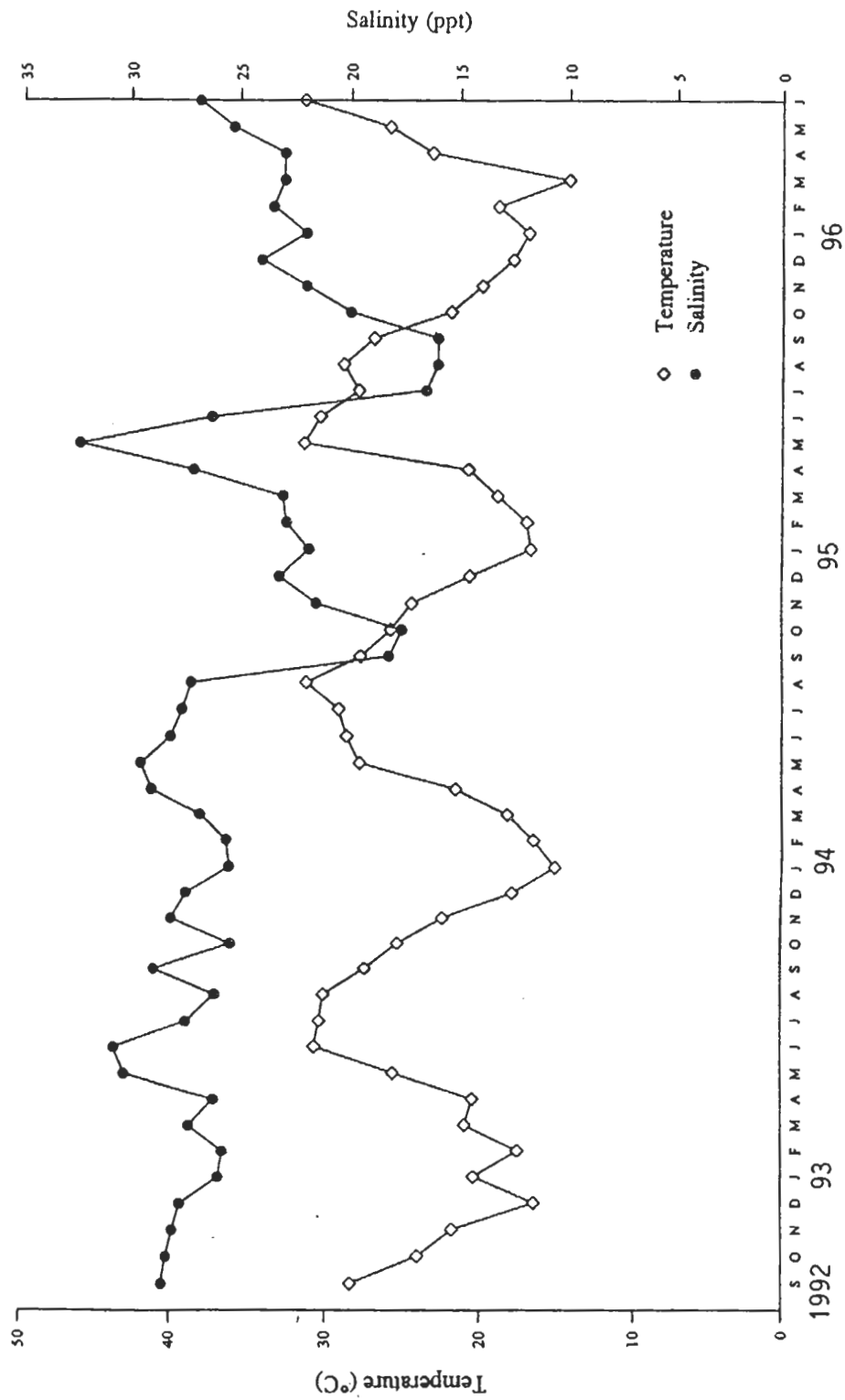


Figure 1. Temperature and Salinity graph of Cockroach Bay beginning in September 1992 and ending in June 1996.

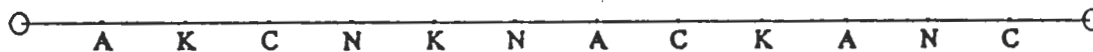
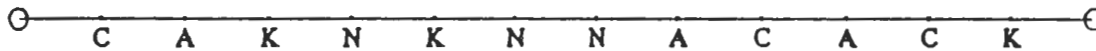
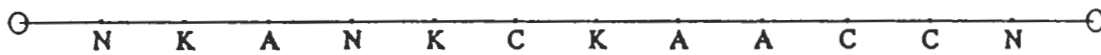


Figure 2. Experimental design of the *Thalassia testudinum* nursery in Greater Cockroach Bay, Tampa Bay, Florida

KEY

C = CONTROL

A = NH_4^+

N = NH_4^+ & NAA

K = NH_4^+ , NAA, & KINETIN

BAR = 20 cm ———

Table 1. Ramet densities in 1m² of a *Thalassia testudinum* bed from 3 sites in Cockroach Bay, estimated from 15 haphazard chosen 25cm quadrats. Values are means \pm S.D.'s.

Date	Ramet Density		
	Exterior site	Site 2c	Site 4
Oct. 95	139.73 \pm 61.22	114.13 \pm 40.96	152.53 \pm 39.59
Dec. 95	176.00 \pm 50.98	80.00 \pm 33.12	231.47 \pm 57.65
Feb. 96	141.87 \pm 61.63*	108.80 \pm 44.93*	190.93 \pm 56.88 ^b
Apr. 96	166.40 \pm 65.64*	109.87 \pm 37.70 ^b	115.20 \pm 51.38 ^b
Jun. 96	150.40 \pm 70.21*	113.07 \pm 23.78 ^b	278.40 \pm 45.58*

Table 2A. Blade characteristics of *Thalassia testudinum* sampled from within and along the edges of boat propeller cuts (Prop cut), and within adjacent *T. testudinum* grassbeds (Seagrass) from 3 sites in Cockroach Bay, 1995. Values are means (\pm S.D.); sample sizes vary between 14 and 15. Superscripts denote significant differences between sampling areas, within each site ($P < 0.05$; Student's t-test and Mann Whitney Rank Sum Test).

	February			May			October			December		
	No.	Width (cm)	Length (cm)	No.	Width (cm)	Length (cm)	No.	Width (cm)	Length (cm)	No.	Width (cm)	Length (cm)
Exterior	-	-	-	-	-	-	-	-	-	-	-	-
Seagrass												
Prop cut 1												
Prop cut 2												
Site 2c												
Seagrass	2.27 (0.47)	0.62 (0.11)	11.70 (2.45)	3.83 (0.72)	0.70 (0.07)	15.72 (3.41)	3.67 (0.72)	0.67 (0.08)	14.95 (4.68)	3.13 (0.64)	0.63 (0.07)	10.43 (1.94)
Prop cut 1	2.69 (0.85)	0.66 (0.09)	10.52 (2.33)	4.67 (1.11)	0.71 (0.10)	15.12 (4.15)	3.14 (0.86)	0.59 (0.09)	14.45 (2.85)	3.00 (0.58)	0.56 (0.07)	7.17 (1.21)
Prop cut 2	-	-	-	-	-	-	3.73 (0.70)	0.63 (0.11)	13.74 (3.47)	2.71 (0.61)	0.59 (0.08)	8.87 (1.92)
Site 4												
Seagrass	2.67 (0.71)	0.63 (0.10)	7.81 (1.93)	4.50 (0.92)	0.68 (0.10)	15.08 (2.99)	3.4 (0.83)	0.56 (0.09)	8.22 (1.19)	2.93 (0.59)	0.49 (0.08)	7.32 (1.22)
Prop cut 1	2.93 (0.47)	0.61 (0.14)	7.63 (1.13)	4.73 (0.88)	0.68 (0.09)	15.33 (3.58)	3.79 (1.12)	0.56 (0.08)	6.96 (1.52)	2.80 (0.68)	0.52 (0.08)	6.27 (1.30)
Prop cut 2	-	-	-	-	-	-	3.20 (0.94)	0.59 (0.09)	7.67 (2.18)	3.00 (0.53)	0.51 (0.07)	5.20 (1.08)

Table 2B. Blade characteristics of *Thalassia testudinum* sampled from within and along the edges of boat propeller cuts (Prop cut), and within adjacent *T. testudinum* grassbeds (Seagrass) from 3 sites in Cockroach Bay, 1996. Values are means (\pm S.D.); sample sizes vary between 14 and 15. Superscripts denote significant differences between sampling areas, within each site ($P < 0.05$; Student's t-test and Mann Whitney Rank Sum Test).

	February			April			June		
	No.	Width (cm)	Length (cm)	No.	Width (cm)	Length (cm)	No.	Width (cm)	Length (cm)
Exterior									
Seagrass	3.00 (0.47)	0.77 (0.08)	2.34 (0.55)	3.00* (0.67)	0.66* (0.07)	7.95* (1.51)	4.33 (0.52)	0.81* (0.07)	19.74 (3.16)
Prop cut 1	2.70 (0.48)	0.72 (0.06)	1.85 (0.47)	2.90* (0.57)	0.61* (0.05)	10.38* (2.22)	3.57 (0.79)	0.72* (0.06)	18.51 (3.48)
Prop cut 2	3.3 (0.67)	0.77 (0.08)	1.80 (0.60)	5.00* (0.76)	0.70* (0.05)	8.50* (2.11)	4.00 (1.00)	0.85* (0.06)	17.69 (3.03)
Site 2c									
Seagrass	2.40 (0.52)	0.61 (0.05)	2.28* (0.75)	2.90 (0.63)	0.52 (0.05)	8.53 (2.1)	4.87 (1.13)	0.77 (0.09)	20.48* (3.05)
Prop cut 1	2.60 (0.52)	0.59 (0.10)	2.36* (0.78)	3.80 (0.63)	0.59 (0.07)	9.11 (1.65)	5.43 (0.98)	0.68 (0.05)	16.58* (3.00)
Prop cut 2	2.78 (0.97)	0.59 (0.07)	5.71* (2.68)	3.70 (0.95)	0.55 (0.05)	10.30 (1.99)	5.50 (1.05)	0.68 (0.09)	15.36* (2.73)
Site 4									
Seagrass	1.80 (0.42)	0.54 (0.07)	0.79* (0.21)	2.78 (0.67)	0.63* (0.03)	8.36* (1.33)	4.50 (0.84)	0.56 (0.08)	15.49 (2.31)
Prop cut 1	2.22 (0.44)	0.53 (0.04)	1.63* (0.54)	3.20 (0.84)	0.57* (0.06)	9.70* (2.46)	4.86 (0.69)	0.64 (0.04)	17.48 (2.35)
Prop cut 2	2.00 (0.71)	0.51 (0.07)	1.31* (0.21)	3.60 (0.55)	0.55* (0.06)	5.95* (0.84)	4.20 (0.45)	0.56 (0.07)	16.04 (2.99)

Table 3A. Leaf areas of individual *Thalassia testudinum* ramets sampled from within and along the edges of boat propeller cuts (Prop cut), and within adjacent *T. testudinum* grassbeds (Seagrass) from 3 sites in Cockroach Bay, 1995. Values are means \pm S.D.; sample sizes vary between 14 and 15. Superscripts denote significant differences between sampling areas, within each site ($P < 0.05$; Student's t-test and Mann Whitney Rank Sum Test).

	February	May	October	December
Exterior				
Seagrass			47.51 \pm 11.65 ^A	18.90 \pm 4.33
Prop cut 1			49.71 \pm 15.74 ^A	25.00 \pm 7.87
Prop cut 2			64.39 \pm 20.18 ^B	24.75 \pm 8.69
Site 2c				
Seagrass	16.49 \pm 6.85	41.61 \pm 15.90	30.32 \pm 12.84	20.23 \pm 4.63
Prop cut 1	18.37 \pm 7.24	50.58 \pm 20.94	27.36 \pm 10.54	12.39 \pm 4.20
Prop cut 2			32.36 \pm 12.24	14.73 \pm 6.13
Site 4				
Seagrass	12.77 \pm 5.40	48.58 \pm 20.26	15.52 \pm 4.61	10.39 \pm 2.91
Prop cut 1	13.95 \pm 5.22	50.46 \pm 22.26	14.74 \pm 5.42	9.27 \pm 3.51
Prop cut 2			14.34 \pm 5.90	7.93 \pm 2.73

Table 3B. Leaf areas of individual *Thalassia testudinum* ramets sampled from within and along the edges of boat propeller cuts (Prop cut), and within adjacent *T. testudinum* grassbeds (Seagrass) from 3 sites in Cockroach Bay, 1996. Values are means \pm S.D.; sample sizes vary between 14 and 15. Superscripts denote significant differences between sampling areas, within each site ($P < 0.05$; Student's t-test and Mann Whitney Rank Sum Test).

	February	April	June
Exterior			
Seagrass	5.27 \pm 1.71	16.61 \pm 4.69 ^A	69.74 \pm 15.93
Prop cut 1	3.57 \pm 1.18	18.12 \pm 2.81 ^A	47.63 \pm 13.40
Prop cut 2	4.33 \pm 1.48	29.87 \pm 6.84 ^B	61.37 \pm 22.99
Site 2c			
Seagrass	3.34 \pm 1.52 ^A	12.96 \pm 3.80 ^A	74.92 \pm 17.51
Prop cut 1	3.41 \pm 0.95 ^A	21.18 \pm 7.54 ^B	57.51 \pm 6.60
Prop cut 2	8.65 \pm 3.31 ^B	21.51 \pm 3.66 ^B	58.33 \pm 19.23
Site 4			
Seagrass	0.83 \pm 0.40 ^A	15.25 \pm 4.02	40.02 \pm 15.05
Prop cut 1	2.04 \pm 0.86 ^B	17.26 \pm 3.71	55.11 \pm 15.53
Prop cut 2	1.26 \pm 0.85 ^A	12.03 \pm 2.24	37.74 \pm 10.62

Table 4A. Blade production (% d⁻¹) of *Thalassia testudinum* sampled from within and along the edges of boat propeller cuts (Prop cut), and within adjacent *T. testudinum* grassbeds (Seagrass) from 3 sites in Cockroach Bay, 1995. Values are means \pm S.D.; sample sizes vary between 14 and 15. Superscripts denote significant differences between study areas within each site ($P < 0.05$; Student's *t*-test and the Mann Whitney Rank Sum Test).

	February	May	October	December
Exterior	-	-	-	-
Seagrass	-	-	3.18 \pm 1.53	4.65 \pm 2.51
Prop cut 1	-	-	2.72 \pm 1.08	4.57 \pm 2.68
Prop cut 2	-	-	3.12 \pm 1.31	4.26 \pm 1.44
Site 2c				
Seagrass	2.12 \pm 1.60	4.44 \pm 2.19	5.55 \pm 1.59 ^a	4.94 \pm 1.49
Prop cut 1	1.58 \pm 0.85	3.98 \pm 2.20	7.95 \pm 2.70 ^b	6.01 \pm 2.36
Prop cut 2	-	-	8.32 \pm 3.89 ^b	5.89 \pm 2.38
Site 4				
Seagrass	2.41 \pm 1.18	3.87 \pm 1.33	7.84 \pm 3.52	5.11 \pm 0.99
Prop cut 1	1.90 \pm 0.76	3.54 \pm 1.26	7.46 \pm 3.60	4.36 \pm 1.68
Prop cut 2	-	-	7.79 \pm 3.25	6.73 \pm 2.73

Table 4B.. Blade production (% d¹) of *Thalassia testudinum* sampled from within and along the edges of boat propeller cuts (Prop cut), and within adjacent *T. testudinum* grassbeds (Seagrass) from 3 sites in Cockroach Bay, 1996. Values are means \pm S.D.; sample sizes vary between 6 and 10. Superscripts denote significant differences between study areas within each site ($P < 0.05$; Student's t-test and the Mann Whitney Rank Sum Test).

	February	April	June
Exterioir			
Seagrass	4.51 \pm 1.44 ^a	7.36 \pm 2.42	1.39 \pm 0.29
Prop cut 1	2.54 \pm 0.79 ^b	5.95 \pm 2.41	1.69 \pm 0.48
Prop cut 2	2.83 \pm 1.53 ^b	4.81 \pm 1.33	1.62 \pm 0.57
Site 2c			
Seagrass	5.29 \pm 1.47 ^a	5.95 \pm 2.41	1.27 \pm 0.65
Prop cut 1	4.99 \pm 1.75 ^a	5.55 \pm 1.56	1.36 \pm 0.28
Prop cut 2	3.32 \pm 1.35 ^b	6.35 \pm 1.72	1.17 \pm 0.24
Site 4			
Seagrass	5.63 \pm 3.97	5.29 \pm 1.57	1.12 \pm 0.23
Prop cut 1	6.65 \pm 1.19	5.19 \pm 1.71	1.07 \pm 0.18
Prop cut 2	5.60 \pm 2.35	6.13 \pm 1.48	0.91 \pm 0.56

Table 5. The amount of plant material produced per day (gdwt) for individual plants and for 1m² of a *Thalassia testudinum* bed from 3 sites in Cockroach Bay. Values are means \pm S.D.'s; (n=15).

Date	Site	g/day/plant	g/day/1m ²
Oct. 95	Ext	0.006 \pm 0.003 ^a	0.787 \pm 0.493 ^a
	2c	0.003 \pm 0.001 ^b	0.378 \pm 0.108 ^b
	4	0.002 \pm 0.001 ^c	0.312 \pm 0.171 ^c
Dec. 95	Ext	0.006 \pm 0.016 ^a	1.112 \pm 2.810 ^a
	2c	0.002 \pm 0.001 ^a	0.188 \pm 0.084 ^b
	4	0.001 \pm 0.000 ^b	0.339 \pm 0.101 ^a
Feb. 96	Ext	0.0011 \pm 0.0005 ^a	0.156 \pm 0.071 ^a
	2c	0.0007 \pm 0.0003 ^a	0.076 \pm 0.033 ^b
	4	0.0002 \pm 0.0003 ^b	0.038 \pm 0.057 ^b
Apr. 96	Ext	0.0032 \pm 0.0016	0.532 \pm 0.269
	2c	0.0030 \pm 0.0012	0.507 \pm 0.195
	4	0.0019 \pm 0.0007	0.324 \pm 0.117
Jun. 96	Ext	0.0084 \pm 0.0015 ^a	1.268 \pm 0.227
	2c	0.0085 \pm 0.0055 ^a	0.957 \pm 0.618
	4	0.0033 \pm 0.0017 ^b	0.923 \pm 0.467

Table 6A. Dry weight biomass allocation (g) and above and below ground biomasses in 1m² of a *Thalassia testudinum* bed from 3 sites in Cockroach Bay. Values are means ± S.D.'s; (n=3). The percent of the total biomass for each plant part is given in the O.

Date	Site	Dry Weight Biomass Allocations (g)						Biomass (g)	
		Blades	Short Shoots	Rhizomes	Roots	Above-ground	Below-ground		
Oct. 95	Ext	103.27±27.18 (34.58)	105.95±38.32 (34.75)	66.24±4.77 (22.40)	24.89±5.32 (8.27)	103.27±27.18	197.08±46.93		
	2c	75.88±24.39 (18.43)	128.50±17.81 (32.57)	171.79±75.23 (41.03)	33.01±15.17 (7.97)	75.88±24.39	333.31±97.28		
	4	70.54±36.69 (16.72)	171.61±97.36 (39.61)	116.43±84.37 (24.13)	100.70±97.65 (19.55)	70.54±36.69	388.73±275.6		
Dec. 95	Ext	81.39±14.31 (37.88)	51.51±6.49 (20.90)	66.88±25.11 (30.85)	15.79±6.43 (7.40)	81.39±14.31	200.05±31.27		
	2c	73.81±35.48 (31.92)	53.14±43.76 (23.86)	88.80±25.74 (40.37)	14.82±3.59 (6.80)	73.81±35.48	156.77±67.59		
	4	83.29±15.34 (24.23)	100.59±32.02 (28.85)	107.82±46.00 (30.82)	51.64±37.95 (16.10)	83.29±15.34	134.19±23.60		
Feb. 96	Ext	32.33±19.06 (21.97)	38.43±36.04 (26.11)	54.98±20.83 (37.36)	21.41±8.04 (14.55)	32.33±19.06	114.82±53.25		
	2c	38.80±10.10 (20.37)	47.38±25.93 (52.49)	87.22±28.96 (45.78)	17.10±7.37 (8.98)	38.80±10.10	151.70±30.77		
	4	47.81±8.37 (15.13)	84.33±15.97 (26.69)	147.04±16.21 (46.53)	36.81±5.00 (11.65)	47.81±8.37	268.18±30.36		

Table 6B . Dry weight biomass allocation (g) and above and below ground biomasses in 1m² of a *Thalassia testudinum* bed from 3 sites in Cockroach Bay. Values are means \pm S.D.'s; (n=3). The percent of the total biomass for each plant part is given in the O.

Date	Site	Dry Weight Biomass Allocations (g)						Biomass (g)	
		Blades	Short Shoots	Rhizomes	Roots	Above-ground	Below-ground		
Apr. 96	Ext	65.55 \pm 48.55 (13.91)	218.50 \pm 139.59 (46.37)	134.71 \pm 83.91 (28.59)	52.43 \pm 43.97 (11.13)	65.55 \pm 48.55	405.64 \pm 263.6		
	2c	42.03 \pm 16.66 (18.14)	74.71 \pm 40.00 (32.25)	98.52 \pm 43.50 (42.52)	16.42 \pm 8.08 (7.09)	42.03 \pm 16.66	189.65 \pm 84.19		
	4	58.58 \pm 12.40 (14.61)	124.63 \pm 38.73 (31.07)	129.63 \pm 34.55 (32.32)	88.81 \pm 2.13 (22.14)	58.58 \pm 12.40	342.49 \pm 70.29		
Jun. 96	Ext	79.54 \pm 60.07 (28.95)	64.11 \pm 50.00 (23.34)	87.99 \pm 70.51 (32.03)	42.43 \pm 17.32 (15.45)	79.54 \pm 60.07	194.53 \pm 134.7		
	2c	82.66 \pm 34.31 (24.42)	90.75 \pm 25.60 (26.80)	83.21 \pm 14.61 (24.58)	81.93 \pm 49.33 (24.20)	82.66 \pm 34.31	255.89 \pm 79.14		
	4	185.72 \pm 73.55 (41.15)	110.23 \pm 78.31 (24.42)	82.11 \pm 9.92 (18.19)	73.29 \pm 65.24 (16.24)	185.72 \pm 73.55	265.62 \pm 148.7		

Table 7A. Epiphyte load on short shoots of *Thalassia testudinum* sampled from within and along the edges of boat propeller cuts (Prop cut), and within adjacent *T. testudinum* grassbeds (Seagrass) from 3 sites in Cockroach Bay, 1995. Values are means \pm S.D.; sample sizes vary between 14 and 15. Superscripts denote significant differences between study areas within each site ($P < 0.05$; Student's t-test and the Mann Whitney Rank Sum Test).

	February	May	October	December
Exterior	-	-	-	-
Seagrass	-	-	0.07 \pm 0.03 ^a	0.07 \pm 0.06
Prop cut 1	-	-	0.06 \pm 0.02 ^a	0.04 \pm 0.03
Prop cut 2	-	-	0.16 \pm 0.10 ^b	0.01 \pm 0.01
Site 2c	-	-	-	-
Seagrass	0.67 \pm 0.54	0.10 \pm 0.06	0.06 \pm 0.03	0.02 \pm 0.02
Prop cut 1	0.30 \pm 0.18	0.14 \pm 0.09	0.02 \pm 0.02	0.04 \pm 0.03
Prop cut 2	-	-	0.06 \pm 0.04	0.03 \pm 0.03
Site 4	-	-	-	-
Seagrass	0.09 \pm 0.26	0.06 \pm 0.04	0.04 \pm 0.03 ^a	0.03 \pm 0.03
Prop cut 1	0.08 \pm 0.06	0.11 \pm 0.06	0.04 \pm 0.02 ^a	0.01 \pm 0.01
Prop cut 2	-	-	0.10 \pm 0.04 ^b	0.04 \pm 0.03

Table 7B. Epiphyte load on short shoots of *Thalassia testudinum* sampled from within and along the edges of boat propeller cuts (Prop cut), and within adjacent *T. testudinum* grassbeds (Seagrass) from 3 sites in Cockroach Bay, 1996. Values are means \pm S.D.; sample sizes vary between 6 and 10. Superscripts denote significant differences between study areas within each site ($P < 0.05$; Student's t-test and the Mann Whitney Rank Sum Test).

	February	April	June
Exterior			
Seagrass			0.05 \pm 0.03
Prop cut 1	0.005 \pm 0.002	0.005 \pm 0.008 ^a	0.06 \pm 0.05
Prop cut 2	0.006 \pm 0.007	0.001 \pm 0.002 ^a	0.07 \pm 0.06
	0.008 \pm 0.012	0.012 \pm 0.016 ^b	
Site 2c			
Seagrass	0.006 \pm 0.006 ^a	0.001 \pm 0.002 ^a	0.07 \pm 0.04
Prop cut 1	0.009 \pm 0.009 ^a	0.057 \pm 0.036 ^b	0.08 \pm 0.06
Prop cut 2	0.023 \pm 0.011 ^b	0.066 \pm 0.029 ^b	0.11 \pm 0.06
Site 4			
Seagrass	none	0.104 \pm 0.060	0.06 \pm 0.03
Prop cut 1	0.006 \pm 0.002	0.131 \pm 0.077	0.25 \pm 0.09
Prop cut 2	0.001 \pm 0.001	0.056 \pm 0.078	0.13 \pm 0.10

Table 8. Biomass of macroalgae (gdwt m⁻²) and species diversity at 3 sites in Cockroach Bay. Values are means ± S.D., n = 15.

Date	Site	Biomass (gdwt m ²)	Species Present
Feb. 95	2c	39.02 ± 32.29	8,10,11,17,19
	4	29.74 ± 38.40	8,11,17,19,21
May 95	NO MACRO ALGAE BIOMASS FOUND		
Oct. 95	Ext	13.16 ± 12.64 ^a	1,10,18,19
	2c	2.99 ± 3.66 ^b	1,10,19
	4	0	
Dec. 95	Ext	46.96 ± 27.38	1,5,6,7,11,20
	2c	13.48 ± 11.99	1,5,6,7,11,20
	4	1.75 ± 3.34	1,5,6,7,11,20
Feb. 96	Ext	0.36 ± 0.39	5,6,12,16,20
	2c	0.44 ± 0.46	5,6,12,16,20
	4	0	NA
Apr. 96	Ext	0.82 ± 0.84 ^a	1,6,7,17
	2c	0.63 ± 0.53 ^a	1,6,7,17
	4	1.89 ± 1.61 ^b	1,6,7,17
Jun. 96	Ext	3.58 ± 1.71 ^a	1,5,6,7,10,11
	2c	1.05 ± 1.24 ^b	1,5,6,7,10,11
	4	2.05 ± 1.93 ^b	1,5,6,7,10,11

Legend to Table 8

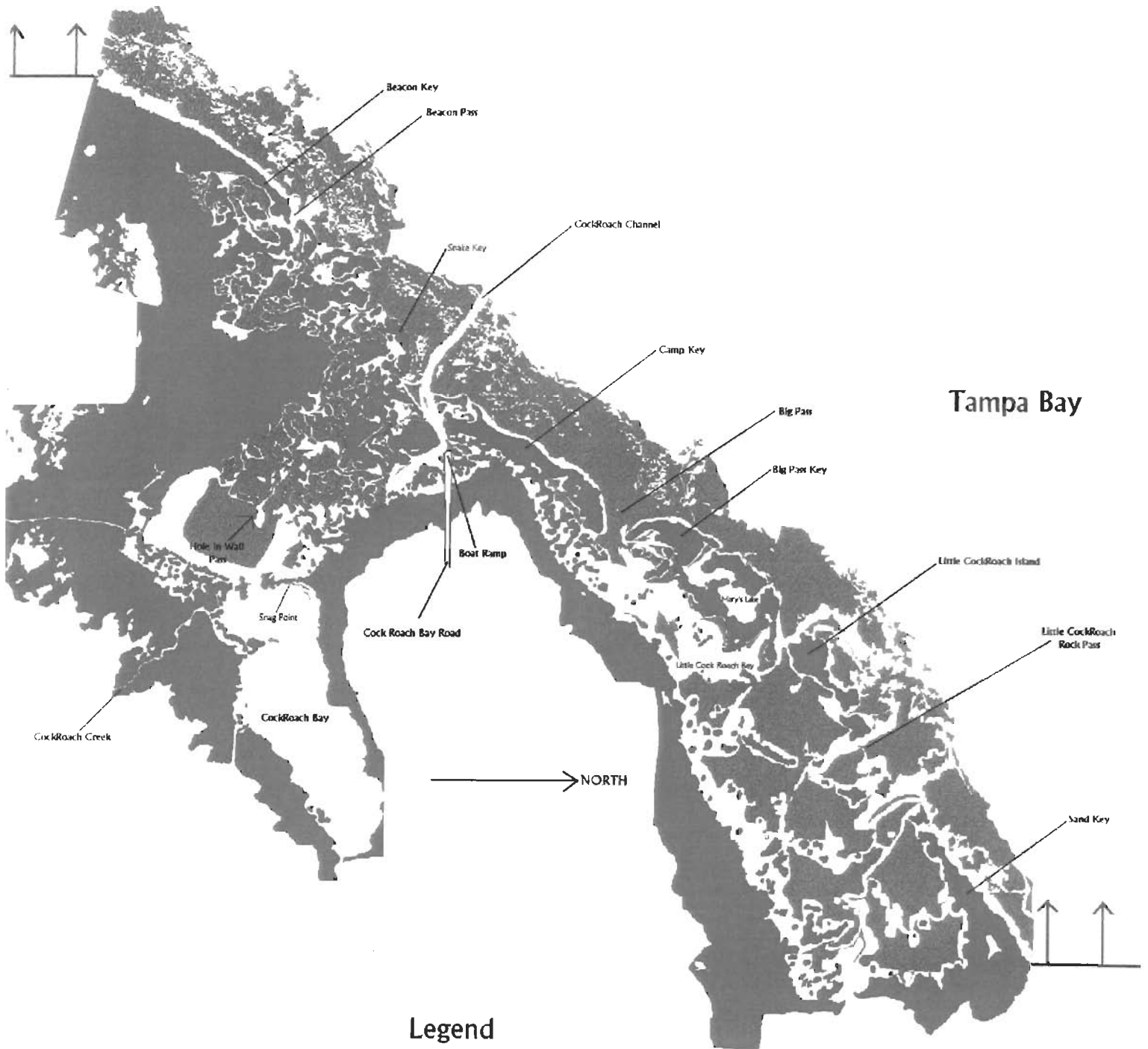
1. *Acanthophora spicifera*
2. *Centroceras clavulatum*
3. *Chondria enicophylla*
4. *Gracilaria sjoestedtii*
5. *G. tikvahiae*
6. *G. verrucosa*
7. *Hypnea musciformis*
8. *Laurencia poitei*
9. *Lyngbya majescula*
10. *Spyridia filamentosa*
11. *Ulva lactuca*
12. *Solaria filiformis*
13. *Lomentaria baileyana*
14. *Chondria sedifolia*
15. *Caulerpa sertularioides*
16. *C. prolifera*
17. *Enteromorpha intestinalis*
18. *Agardhiella tenera*
19. *Gracilaria foliifera var angustissima*
20. *Champia parvula*
21. *Chondria tenuissima*

Table 9. Biomass and productivity of *Thalassia testudinum* transplants harvested July, 1996. Single short shoots were transplanted into the nursery site in Oct. 1995, the prop scar site was established in Feb. 1996. 48 plants were placed in each site and assigned to 1 of 4 treatments. C = control, A = Ammonium, N = Napthalene acetic acid, K = Kinetin.

Type	Treatment	Blades	Short Shoots	Rhizomes	Roots	Survival	g/plant/day	# Apicals
Prop scar	C	0.29 ± 0.07	0.35 ± 0.08	0.06 ± 0.08	0.05 ± 0.03	3/12	0.007 ± 0.003	0
	A	0.28 ± 0.15	0.28 ± 0.17	0.08 ± 0.08	0.07 ± 0.04	4/12	0.005 ± 0.003	0
	N	0.27 ± 0.20	0.25 ± 0.17	0.21 ± 0.09	0.06 ± 0.05	4/12	0.006 ± 0.005	1
	K	0.34 ± 0.23	0.14 ± 0.016	0.14 ± 0.06	0.10 ± 0.13	3/12	0.006 ± 0.001	1
Nursery	C	0.43 ± 0.09	0.28 ± 0.03	0.17 ± 0.06	0.06 ± 0.02	3/12	0.004 ± 0.002	0
	A	0.35 ± 0.09	0.34 ± 0.19	0.15 ± 0.14	0.09 ± 0.02	6/12	0.006 ± 0.001	1
	N	0.43	0.31	0.22	0.05	1/12	0.005	0
	K	0.21 ± 0.05	0.23 ± 0.12	0.12 ± 0.04	0.04 ± 0.01	3/12	0.004 ± 0.001	1

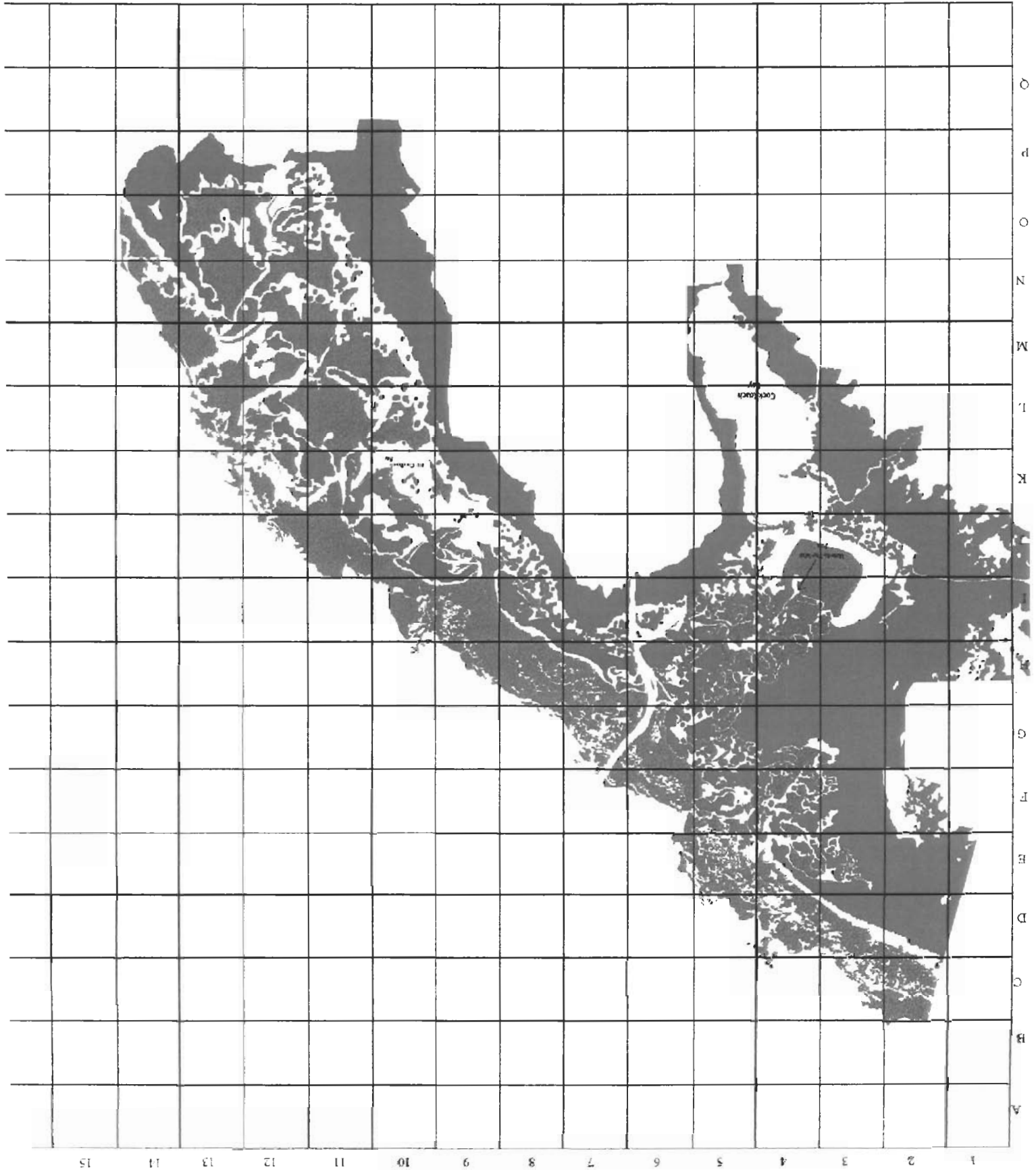
Computer Drawings

The computer drawings on the following pages are representative sites where prop scar damage was most extensive. To locate a particular site, use the first drawing. Find the grid coordinates across the top and along the vertical scale. Use the coordinates to show the location of the drawing.

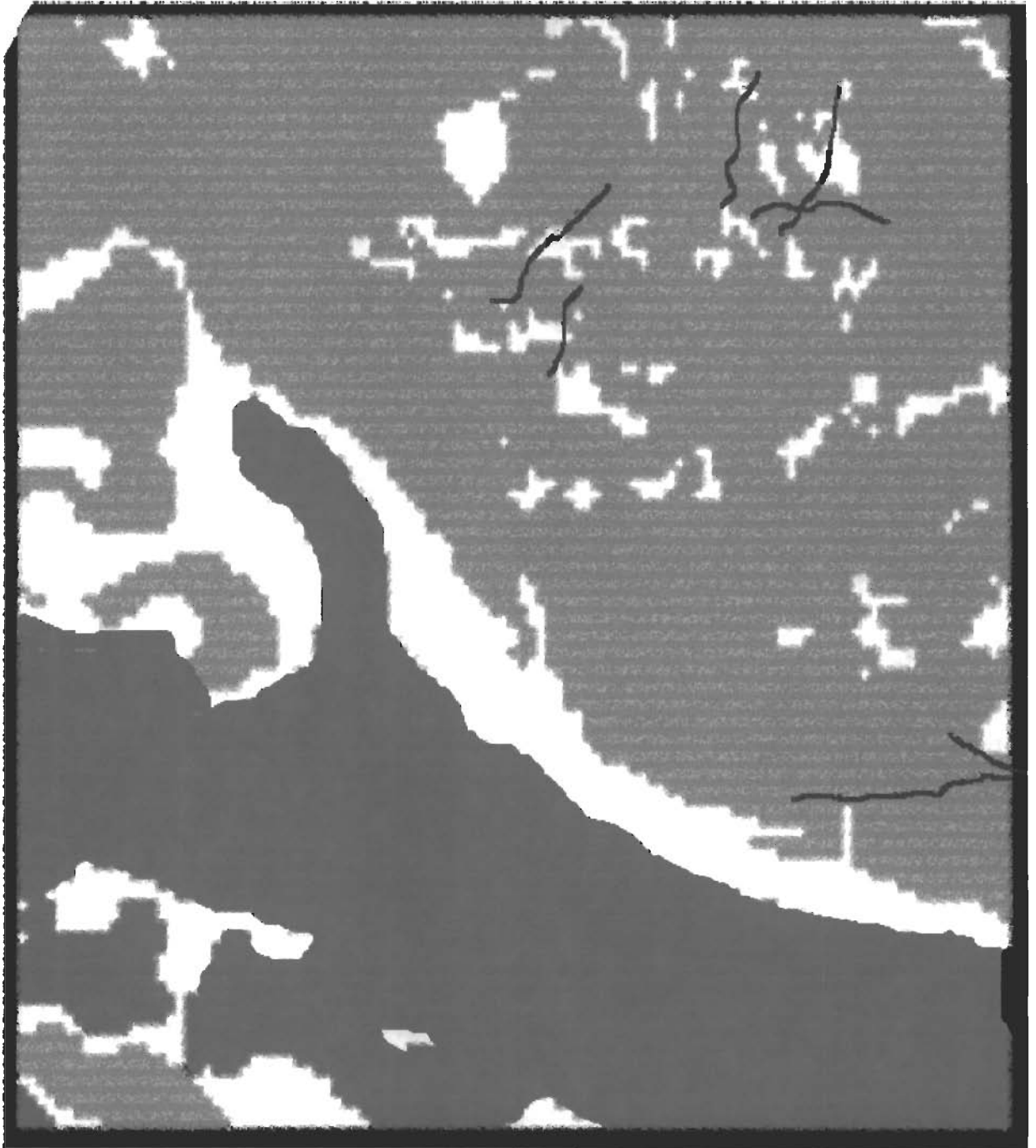


Legend

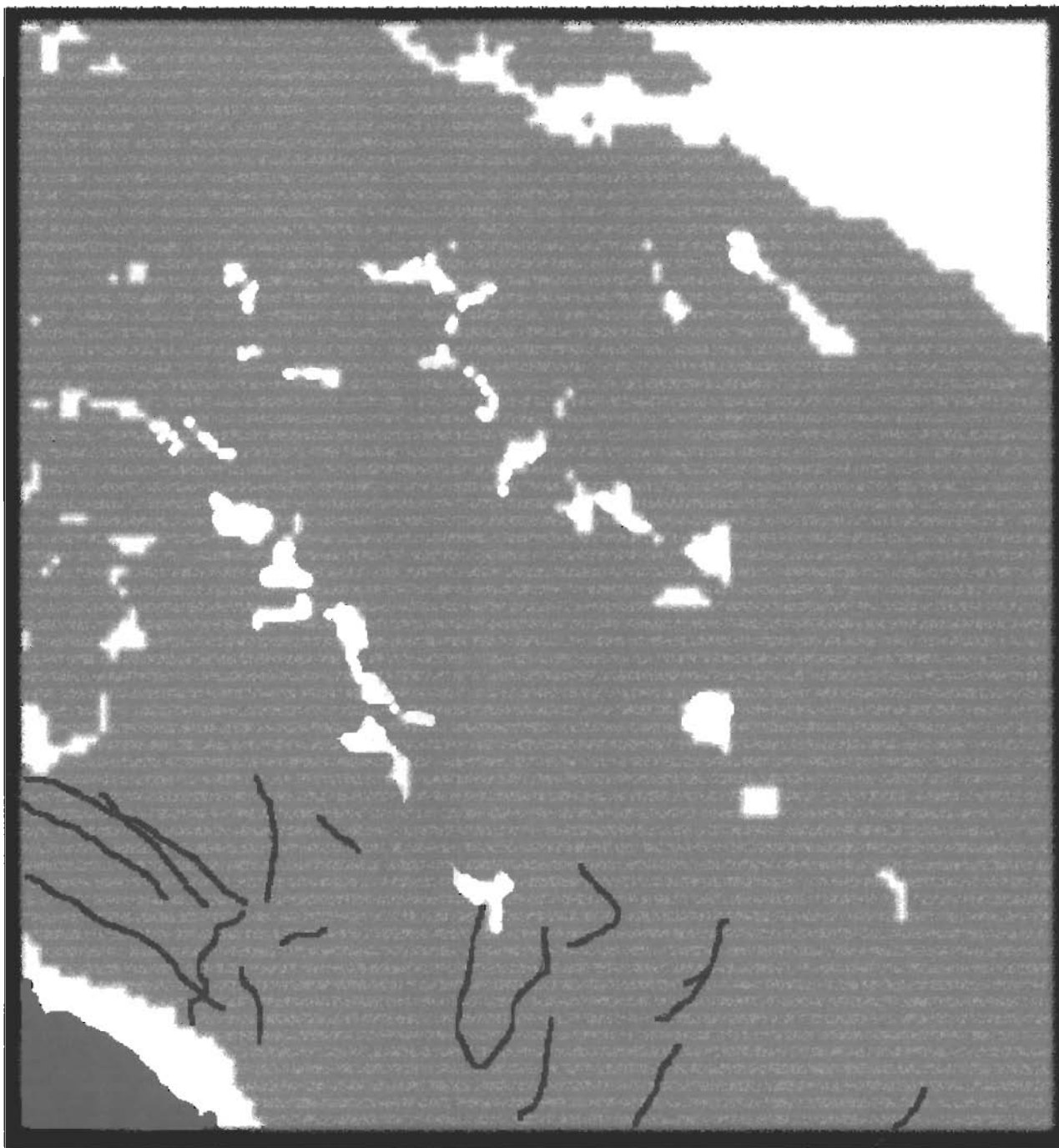
- Sea Grass — [light gray box]
- Mangroves — [dark gray box]
- Ocean Front — [box with four upward arrows]

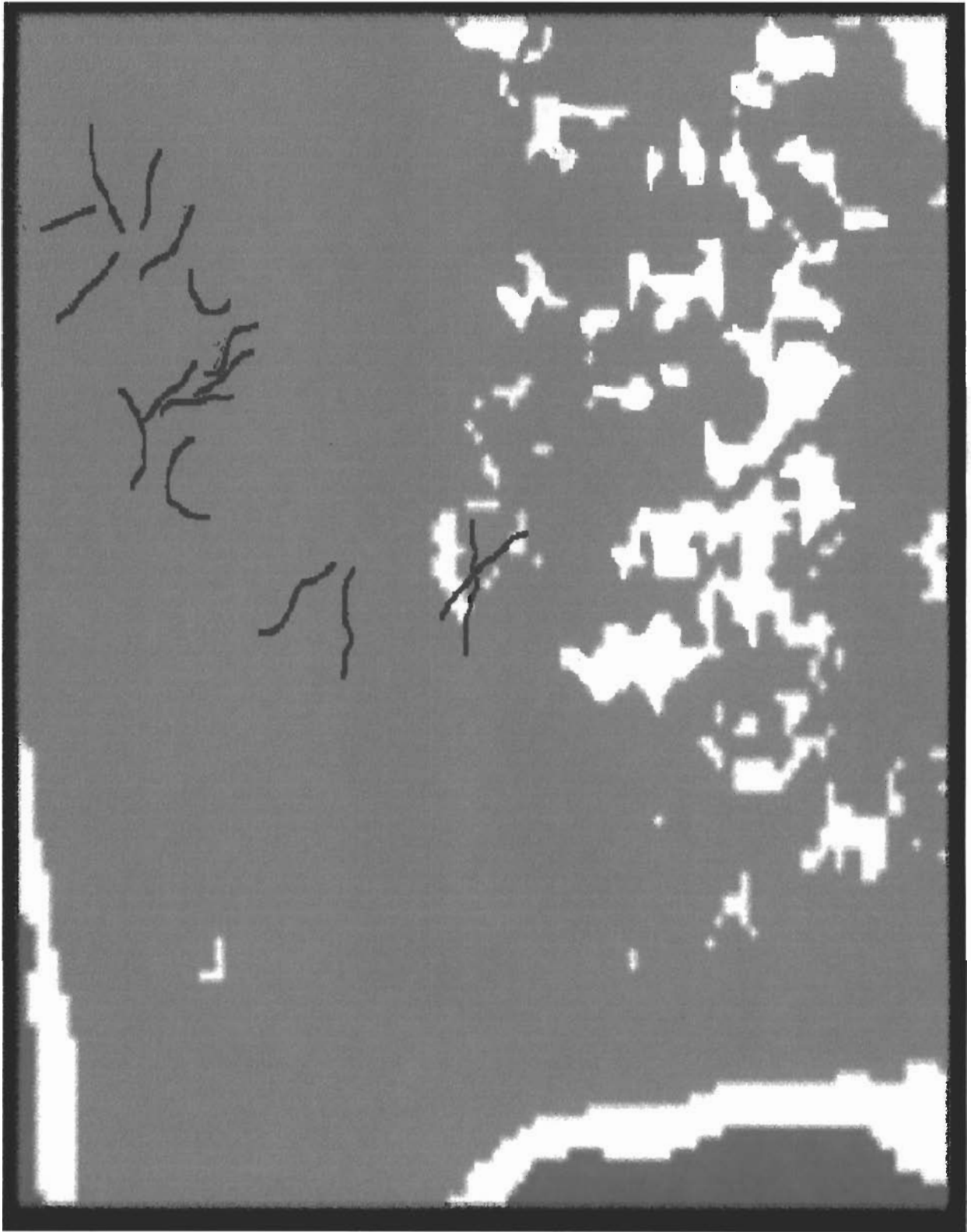


H7

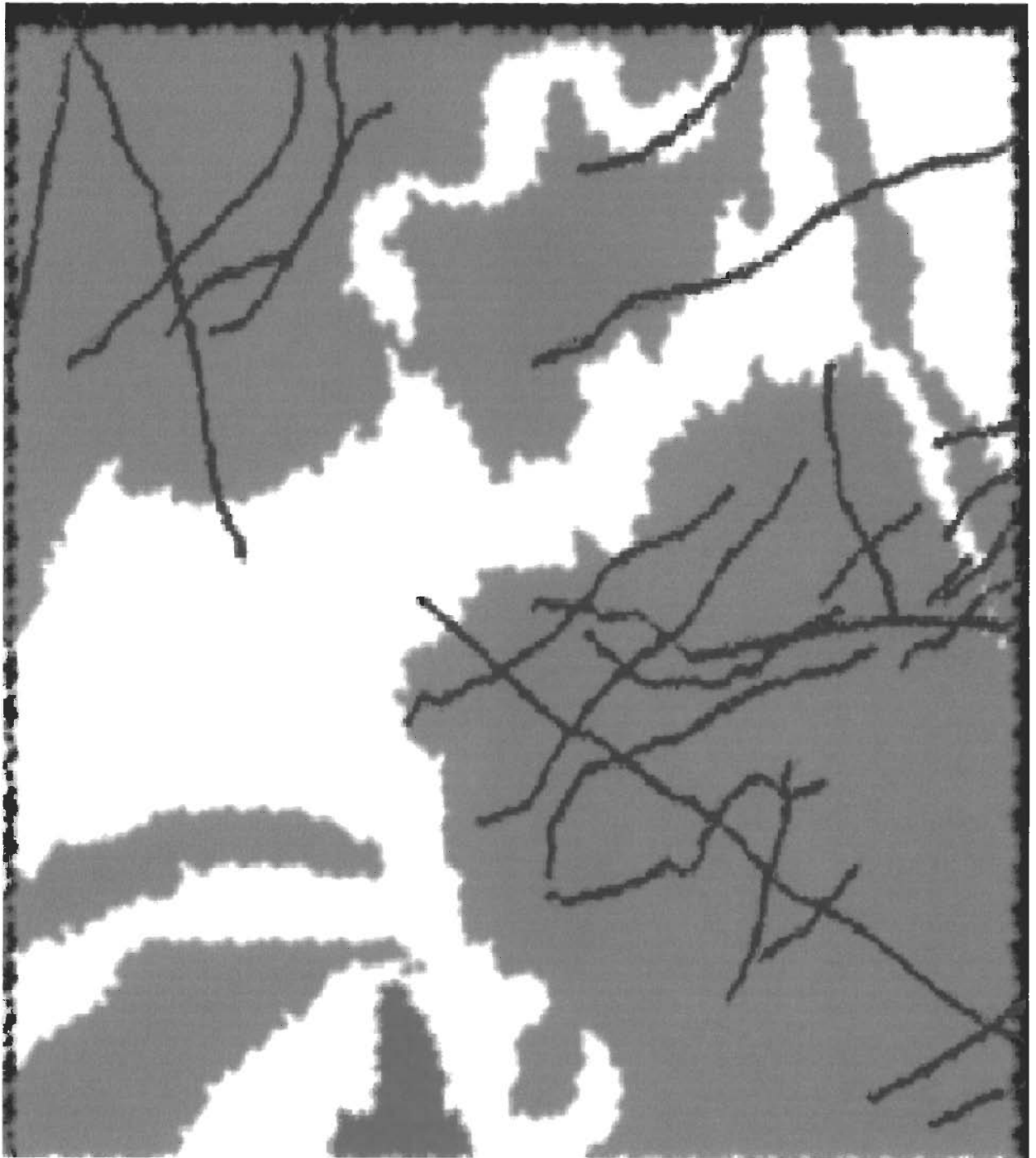


H 8

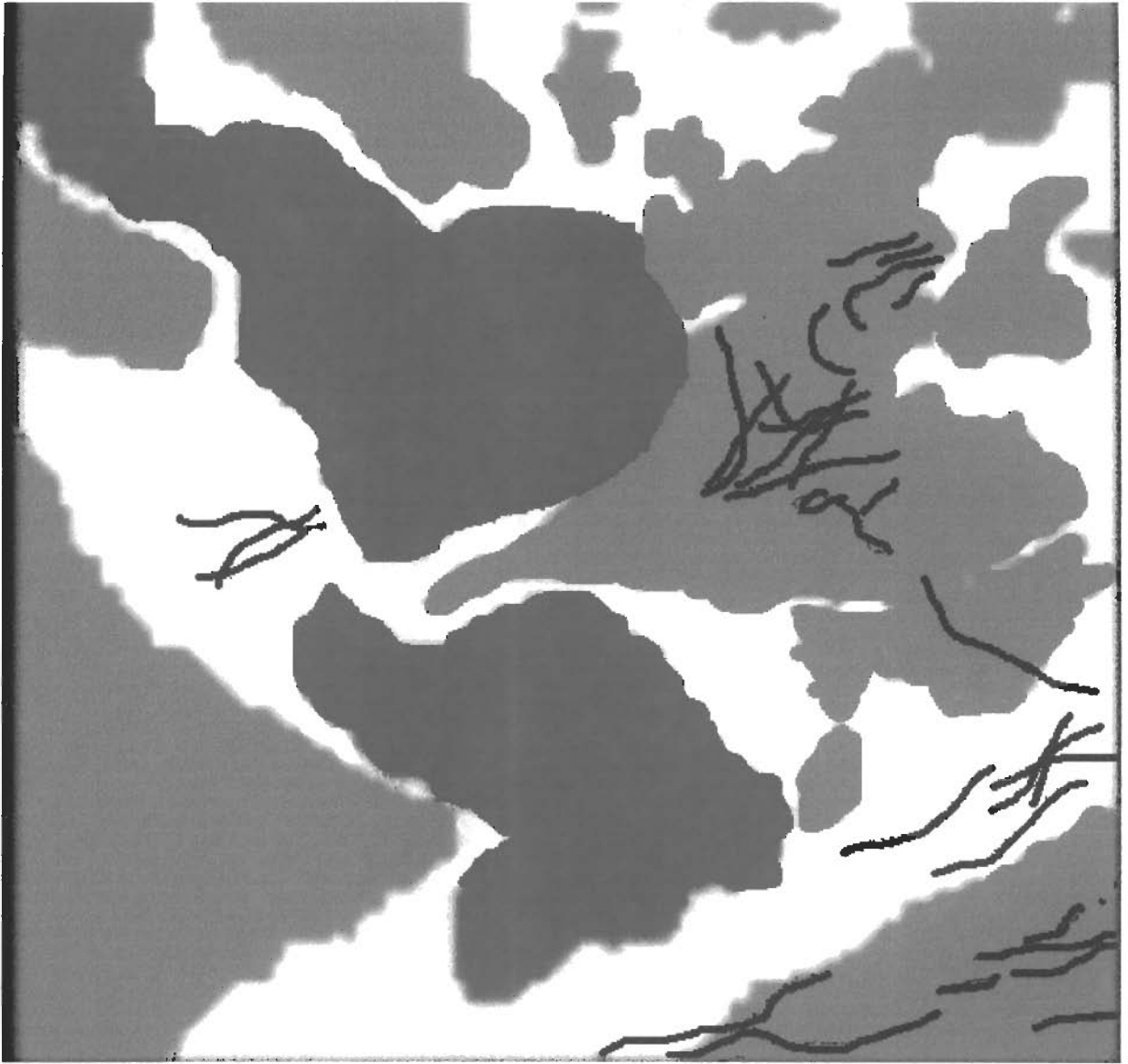




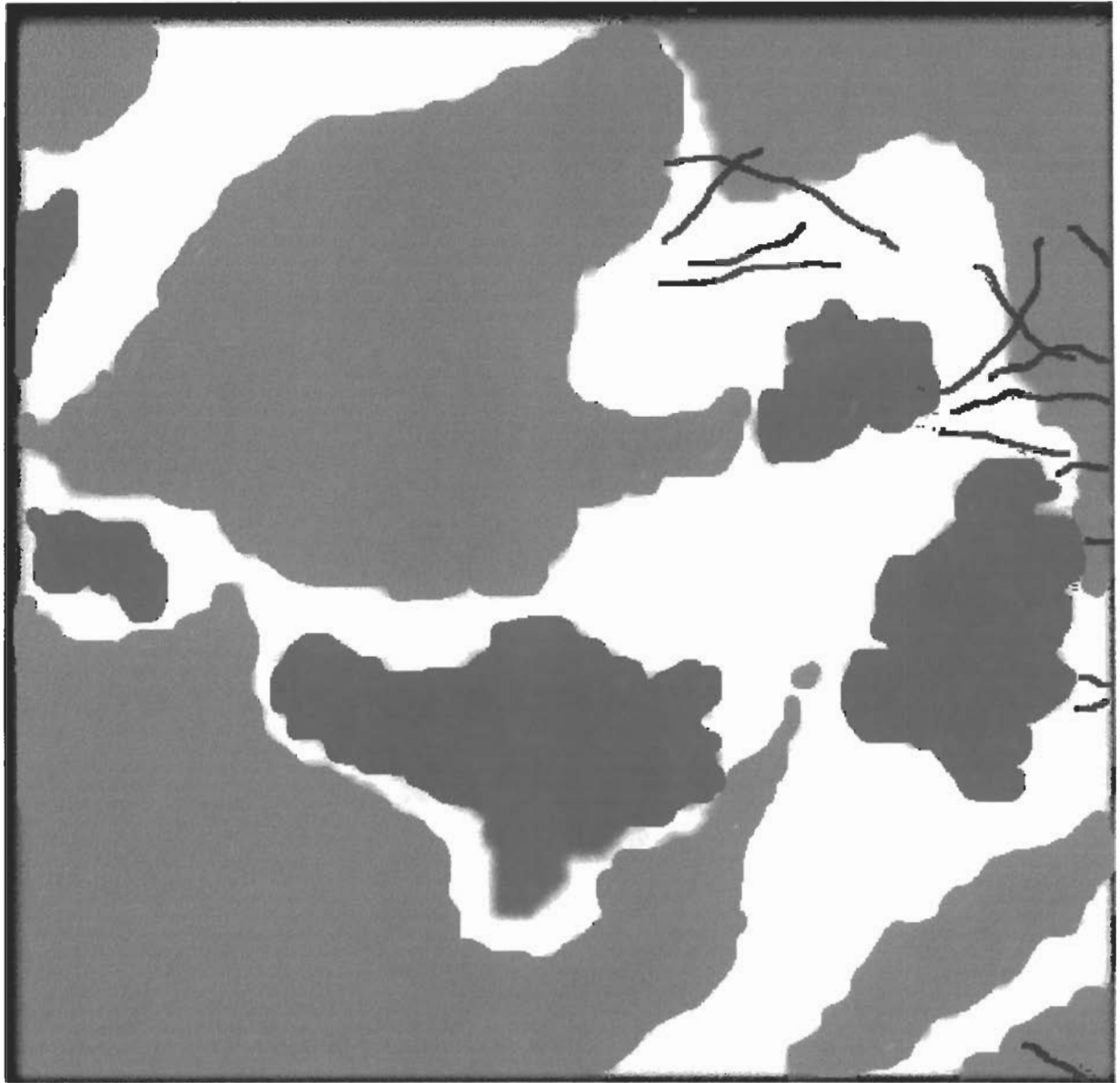
L 13



L 12



M 12



M 13



N 13

