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# Pollution Recovery Fund Application

## Application Form

For

Oyster Reef Shoreline Stabilization and Enhancement

MacDill AFB, Florida

**REC'D**

APR 24 2006

ENV. PROT. COMM  
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## APPLICATION FOR POLLUTION RECOVERY FUND ASSISTANCE

DATE OF APPLICATION: 12 Apr 06

### A. BASIC ASSISTANCE

1. Applicant: The legal name of the applicant/organization, the organizational unit and the complete mailing address of the applicant.

Name: Jason Kirkpatrick  
Organization: MacDill Air Force Base  
Address: 2610 Pink Flamingo Avenue, MacDill AFB, 33621-5207

2. Project Manager Information: Give name and title of the representative of the applicant who will be the Environmental Protection Commission's principle contact concerning this application

Name Jason Kirkpatrick  
Title Conservation Program Manager  
Address 2610 Pink Flamingo Avenue, MacDill AFB, 33621-5207  
Phone Number 813-828-0459  
Project Title Oyster Reef Shoreline Stabilization and Enhancement  
Project Time Start: March 2006 End: March 2010  
Total Cost of Project \$ \$60K/annual  
Total EPC share requested \$ \$30K

3. Assistance Type: **New or Renewal** (check one)

New - Award of funds for initial request within the project period.

Renewal - Award of funds for a project beyond the current project period.

4. Project Location: The specific location(s) of the project. (Attach Site Map)

Southeastern corner of Interbay Peninsula (Gadsden Point)

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5. Is the Project for:

Restoration of a polluted area

Mitigation of the effects of pollution

Pollution Control Activity to prevent or minimize pollution

Educational

6. Is the Project directed toward restoring an identified "polluted area" (a geographic area destroyed or altered by dredging or filling or contaminated by an emission or discharge), or toward terminating an identified pollution source? Identify and explain:

Historic channel dredging near MacDill has created a large 'void' where shifting sediments are accumulated (trapped). The main shipping channel through Tampa Bay cuts very near Gadsden Point. Other smaller dredging activities (undocumented but apparent on aerial photographs) may also be 'collecting' shoreline sediments as the erode.

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7. Is the harm or potential harm to health, safety or welfare of the public or wildlife actual or potential? Does the project seek to alleviate actual or potential harm and what is the severity of the harm and the causal relationship between the "pollution" and the harm?

Identify and explain:

There is no actual or potential harm to public safety. Wildlife may be harmed by the loss of habitat resulting from shoreline erosion.

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8. How long has the pollution existed or how long before any harm will be evident?

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Shoreline erosion along MacDill has been occurring for years but appears to be increasing. Recent hurricane seasons have exacerbated the situation.

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9. Identify and describe how the project proposes to alleviate the pollution (addressing technical, practical, and cost effectiveness issues):

Earlier phases of the project have demonstrated that shoreline erosion can be halted through the installation of concrete oyster domes to create an off-shore oyster reef (to reduce wave energy). The off-shore reef allow the accumulation of sediment behind the reef. As sediment builds up, the area can be planted with *Spartina alterniflora* (marsh grass) which aid in shoreline stabilization. Over time, through succession, the marsh area will be replaced by mangroves which further stabilize the shoreline. The oyster reefs also improve marine habitat and water quality. Oysters can filter up to 9.8 gallons of water an hour. The filtering process removes both algae and pollutants from the water. A typical oyster reef will have several thousand oysters.

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10. Is the polluted area one which has previously been subject to commission enforcement and, if so, when and what was the result?

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There has been no commission enforcement on the site or the dredged areas.

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11. If no actual pollution exists and no prior commission enforcement action has occurred, does the project otherwise enhance pollution control activities within the County?

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Yes, the project will improve water quality in the bay.

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12. Can this Project be divided into separate and independent parts, and if so,

a) what are they? Yes, it is a phased project, each year involves new oyster reef construction and in 2007 we will begin shoreline enhancement/restoration activities at the Phase I and Phase II sites. These activities will include replanting stabilized areas with high marsh and low marsh vegetation. In addition, some of the

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previously constructed oyster reef zones may be augmented with additional oyster domes.

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b) how would the costs be allocated between them? \_\_\_\_\_

Funds would be allocated on a priority basis. All the proposed tasks for a phase will be prioritized and accomplished in order as funding is available

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c) would the applicant be willing to accept only partial funding? Yes

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13. Are other funding sources committed to the project? Yes (DOD and USFWS)

How much and for what? \_\_\_\_\_

DoD provides \$30K annually, USFWS provides \$30K annually – both for oyster reef construction

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14. What other funding sources may be available and how much? Potentially NOAA, unknown amount.

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15. Why do you believe that this Project is of sufficient importance to justify the expenditure of Pollution Recovery Funds? \_\_\_\_\_

Shoreline erosion is a problem throughout the base, particularly in areas where mangroves have been lost or removed. Developing an alternative solution (to rip-rap or seawalls) for shoreline stabilization could be an enormous benefit to the bay since channel dredging and ship traffic will continue to occur long into the future.

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16. Will the project enhance the value of private property, and if so, whose? \_\_\_\_\_

No, the project will be completed on Federal land.

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## B. ATTACHMENTS

**All applicants must submit responses to the following as attachments corresponding to the indicated numbers:**

1. Please provide a detailed map of the project site.
2. Principal Investigator and Key Personnel - Present a biographical sketch of the principal Investigator incorporating the following information: Name, Address,

Phone Number, Education, Background and other qualifying experience for the project.

3. Project Narrative - Please provide a narrative statement describing the project that includes the following:
  - a) Objectives of this Project - Describe the principal and subordinate environmental objectives of the project. Pinpoint any relevant physical, economic, social, financial, institutional or other problems requiring solution.
  - b) Results and/or Benefits Expected - Identify specific environmental results and/or benefits to be derived from the project. Include all primary and secondary benefits accruing to the grantee, to the pollution served, and in general, to the public and environment.
  - c) General Project Information - Discuss the criteria that will be used to evaluate the results and successes of the project as well its relationship to other work planned, anticipated or underway.
4. Scope of Work – Provide a detailed scope of work for the proposed project. List in chronological order a schedule of accomplishments, progress, or milestones that are anticipated over the length of the project.
5. Budget Information – Please itemize expenditures necessary to perform project using the following format:

***BUDGET CATEGORIES***

	<b>PRF Funds</b>	<b>Federal</b>	<b>Applicant</b>	<b>State</b>	<b>Other</b>
<b>a. Personnel</b>		\$0			
<b>1.</b>					
<b>2.</b>					
<b>b. Administrative</b>		\$2,500	\$2,500		
<b>c. Materials</b>	\$30,000 (requested)	\$25,000	\$20,000		
<b>d. Contractual</b>					
<b>e. Construction</b>		\$0			

<b>f. Other (Design)</b>		\$5,000	\$5,000		
<b>g. Total Direct Charges (Sum of a. to f.)</b>	\$30,000 (requested)	\$32,500 (funded)	\$27,500 (funded)		

**C. SUBMITTAL OF APPLICATION**

Please submit a total of five (5) applications (one original and four (4) copies / one of which must be in electronic format as a CD) to:

Environmental Protection Commission of Hillsborough County  
 Environmental Resources Management Division  
 Attn: Tom Ash / Pollution Recovery Fund  
 3629 Queen Palm Dr., Tampa, Florida 33619

***Completed applications must be received at the above address by 5:00pm (EDT), May 1, 2006.***

***Late applications and email applications will not be considered.***

[www.epchc.org](http://www.epchc.org)

E-Mail: [epcinfo@epchc.org](mailto:epcinfo@epchc.org)

AN AFFIRMATIVE ACTION – EQUAL OPPORTUNITY EMPLOYER

# **Pollution Prevention Fund Application**

*Attachments*

## Pollution Recover Fund Application Attachments

1. Detailed Map of Project site – A figure showing the Phase III project site is provide in attached Figure 1 (or electronic file labeled ‘Fig1sitelocation.ppt’). I have also included the Phase IV project location in the figure (programmed for FY07), which is a future funding need.
2. Principle Investigator and Key Personnel

### Principle Investigator:

Jason W. Kirkpatrick  
2610 Pink Flamingo Avenue  
MacDill AFB, FL 33621-5207

B.S. in Geology from Allegheny College, PA  
M.S. in Hydrogeology from USF, FL  
Registered Professional Geologist, Florida

Conservation Program Manager, MacDill AFB

Mr. Kirkpatrick has worked in the Environmental Flight at MacDill AFB since 1999. He is responsible for ensuring MacDill maintains environmental compliance with local, state, Federal and Air Force regulations. Management of Natural and Cultural resources involves invasive species eradication program, habitat restoration projects, wetlands and T&E species issues and permitting, historical building and archeological resources consultation, and project funding/programming.

Mr. Kirkpatrick, in conjunction with Tampa Baywatch, has been responsible for the development and implementation of the first three phases of oyster reef shoreline stabilization work. The Phase I demonstration site, completed at MacDill in 2004, is still the largest oyster reef shoreline stabilization site in Tampa Bay and has been tremendously successful. The Phase II and III sites, although only recently constructed, are also showing initial signs of success.

### Key Personnel:

Tampa BayWatch, a non-profit local organization dedicated to restoration of Tampa Bay, has been instrumental in the success of the oyster reef shoreline stabilization project. Mr. Peter Clark, founder of Tampa BayWatch, has been hands-on with the project from its inception. Mr. Clarks staff at BayWatch have all assisted with the various phases of the project.

3. Project Narrative

### **Constructing Oyster Reef for Shoreline Stabilization and Restoration MacDill Air Force Base, Florida**

*Pollution Recover Fund Application Attachment*  
*MacDill AFB Application*

MacDill's shoreline stabilization project is a five-year, five-phase project initiated by the Air Force and supported by Federal and local partners including the USFWS, NOAA, Tampa BayWatch, and community volunteers (both young and old). MacDill's eastern shoreline has experienced rapid erosion over the past decade. As the sand erodes, native plant species such as black mangroves, palms and 100-year old live oaks are being lost. This innovative, cost effective project was initiated in January 2004 and has had follow-on phases in 2005 and 2006 (being planned). Completion of all five phases will result in the creation of a series of oyster reefs along a 1/2-mile of undeveloped shoreline at the southeast tip of the Interbay Peninsula.

Phase I, completed in early 2004, securely installed more than 900 marine-friendly, concrete oyster domes and nearly 36 tons of oyster shell to form an 800-foot long, multi-section "reef". Phase II, constructed in early 2005, created a 400-foot reef using oyster shell bags. Both structures are designed to reduce wave energy and encourage sediment accumulation landward of the oyster reef structures. Additionally, the oyster dome and oyster shell bag structures encourage the establishment of oyster and mussel colonies, which filter the water and provide valuable habitat for fish and other aquatic resources. The reduction of wave energy and the accumulation of sediment also encourage establishment of native marsh grasses which further assist shoreline stabilization efforts. When conditions are right the grasses fill in quickly and set the stage for succession by mangroves and other coastal hardwood species. The demonstration phase (I) is already showing significant signs of success.

Military and civilian volunteers are used exclusively to install the oyster domes and oyster shell bags during community 'reef building events'. Students from local middle schools and high schools have planted the area behind the oyster reef structures with marsh grass (*spartina alterniflora*) as part of the Bay Grasses for Classes program through Tampa Baywatch.

Phase III began construction in March 2006 and will install 1,500 concrete oyster domes and 1,700 oyster shell bags to protect Gadsden Point. *Due to funding constraints only 600 oyster domes and 400 shell bags were installed for Phase III in 2006.* As additional funds become available, the remainder of the domes and shell bags will be installed. The Phase III project will be largest oyster dome project completed in Tampa Bay.

A Phase IV project is also programmed for FY07 (budgeted for \$30K DoD funds and \$30K USFWS funds). The Phase IV project will begin stabilization of the long stretch of unprotected, sandy shoreline between the Phase I and the Phase III sites.

4. Detailed Scope of Work – hard copy of the scope of work for the Phase III project is attached separately and also provided in two electronic file labeled: 'PhaseIII scope.doc' and 'PhaseIII fig.doc'.

*Pollution Recover Fund Application Attachment*  
*MacDill AFB Application*

A figure showing the location of the proposed Phase IV project site has also been attached. The SOW for the Phase IV work has not yet been prepared but will be very similar to the SOW provide for Phase III.

5. Budget Information – see Pollution Recovery Fund application

*Attachment 1*

*Figure showing project locations*

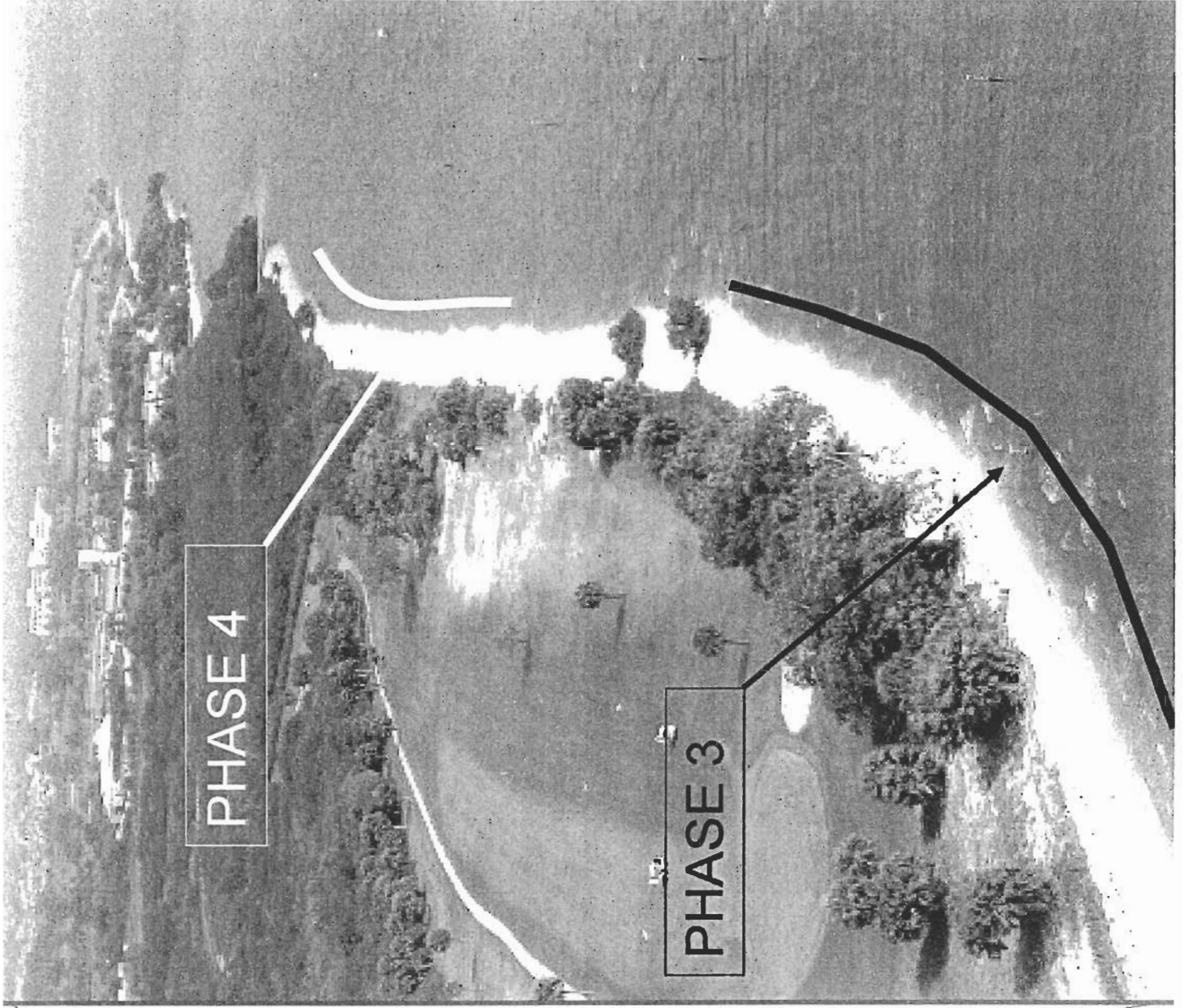
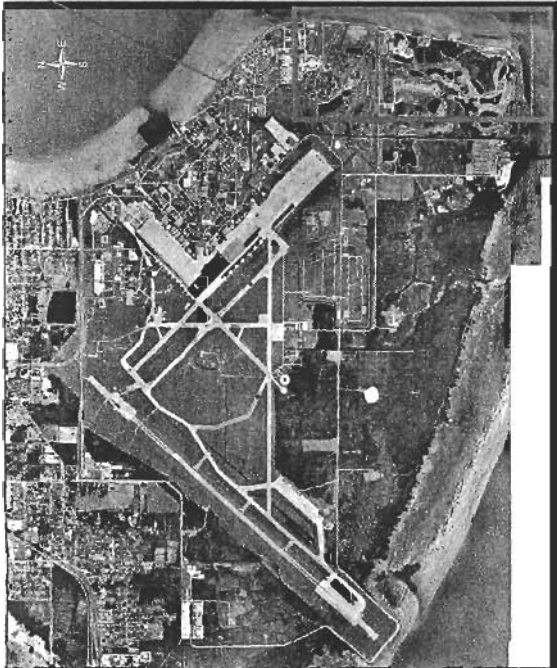


Figure 1 – Location of Phase 3 and Phase 4 Oyster Reef Shoreline Stabilization Projects at MacDill AFB

*Attachment 4*

*Detailed Scope of Work*

# Shoreline Enhancement for MacDill AFB; Phase III

## I. Summary

MacDill Air Force Base (AFB), Tampa Bay Watch, Inc. and the United States Fish & Wildlife Service (USFWS) are working to continue restoration of the Interbay Peninsula shoreline. The partnership between MacDill and Tampa Bay Watch to install oyster habitats along the shoreline is a continuation of a community-based restoration project that began in 2003, known as Phase I (ACOE permit no. 200300186LP-MLS). Phase II, completed in March 2005, was designed to protect an eroding stand of mangroves and to accrete sediment to stabilize the salt marsh habitat adjacent to and behind the mangroves. In March 2005, 395 linear feet of oyster shell bars were installed, protecting both the mangroves and the adjoining 150' stretch of shoreline (ACOE permit no. SAJ-2004-11285 NW13, Figure 3).

The proposed Phase III will provide protection along ~970 linear feet of shoreline, including and adjacent to (north) of Phase II. MacDill AFB is located at the southern tip of the Interbay Peninsula (Figure 1) and receives substantial wave energy from large vessels navigating the channels as well as natural storm-driven waves.

The Phase III community-based enhancement project involves the placement of 1,569 Lo-Pro Reef Ball™ units and 340 linear feet of oyster shell bars along the southeast corner of the Interbay peninsula, at Gadsden Point. These Lo-Pro reef balls are marine-friendly, hollow, concrete oyster domes that will provide shoreline stabilization for the currently eroding coastline and habitat for marine life. Sediment accretion landward of the domes will eventually provide the substrate for *Spartina alterniflora* and other native coastal vegetation to further stabilize this eroding shoreline. This area contains large black mangroves, *Spartina* spp., palms and live oaks that are washing away due to continuous wave action. Future enhancement and restoration plans include community-based plantings of the salt marsh along the southeast coastline of MacDill AFB.



Phase II included bolstering the eroding stand of black mangroves with oyster shell bags.

## **II. Background**

Phase I of this multi-stage project commenced in early 2004 with the installation of 910 Lo-Pro Reef Ball™ units protecting 800 linear feet of MacDill AFB shoreline. Along with two 100' oyster shell bars, the oyster domes protect the southeastern shoreline midway between Catfish and Gadsden Points (Figure 2) from continuous wave action. Monitoring of this project is currently underway and will continue through 2006. Monitoring data have demonstrated excellent sediment accretion behind the domes and



bars, a positive sign of shoreline reestablishment. The photo on the left shows the substantial oyster growth after four months on both the domes and the oyster shell bars constructed in Phase I. Besides helping to stabilize the shoreline, oyster dome communities provide environmental enhancement in the form of hard-bottom habitats for fish and wildlife resources.

Expansion of hard bottom surfaces will create a greater surface area for settling spat (oyster larvae), and create habitat niches for other benthic organisms. In addition to wave relief, these domes promote the following community benefits:

- The oyster communities improve our local water bodies; as oysters are filter feeders, capable of surviving in a variety of water quality conditions and are found throughout the estuarine portion of the Tampa Bay ecosystem. Oysters can potentially filter up to 37 liters (9.8 gallons) of seawater every hour (Friese, 1973) providing a natural filter; primarily for algae, in the nutrient laden waters of the Bay.
- Oyster communities provide diverse food sources or foraging areas for a variety of important fish species, birds and other wildlife. The constructed oyster communities provide recreational opportunities related to these species.
- Initially, the oyster domes provide increased surface area for the attachment of sessile organisms and provide protective habitats for larger invertebrates and fishes. Oyster communities also help stabilize bottom sediments, which reduces turbidity levels and lowers erosions rates of shoreline areas.

Plans for Phase III provide protection of approximately 970 linear feet of shoreline at Gadsden Point, which includes further reinforcement of the Phase II efforts using Lo-

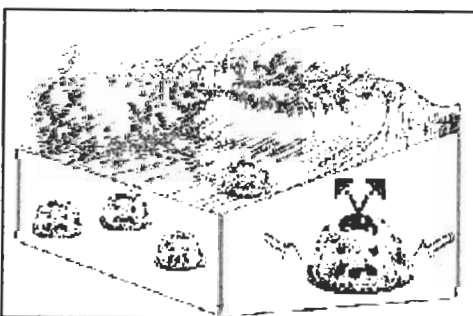
Pro™ domes just waterward of the mangrove stabilization project (Figure 3). Once the shoreline stabilizes, restoration efforts along this area will include planting native salt marsh grass to further protect the shoreline from constant wave energy.

Figure One illustrates the Hillsborough Channel Cut A, the large vessel access to Tampa Bay that lies approximately 2000 yards (approx. 1.25 nautical miles) off Gadsden Point. According to Port Operations at the Tampa Port Authority, 3,313 vessels utilized this channel from September 2002 to October 2003. This equates to one large vessel (tugs, barges, cargo or cruise ships) passing by Gadsden Point every 2.6 hours. These ships cause substantial and constant wave energy; effectively moving sediment along the shorelines of the peninsula, as the short distance from the ship channel does not allow the waves to dissipate.

### **III. Shoreline Restoration Materials and CORE Description**

The goal of Tampa Bay Watch's Community Oyster Reef Enhancement (CORE) program is to increase the oyster population in Tampa Bay and at the same time, provide habitats for small organisms, prevent shoreline erosion, improve water quality and promote fish and wildlife habitats. In addition, this project benefits the Tampa Bay community by promoting environmental awareness and offering hands-on experience in habitat restoration.

Placed Lo-Pro Reef Ball™ units will provide wave attenuation to assist with erosion control and to provide habitat for marine life. The oyster dome units are half-round in shape and are made from marine-friendly concrete (additives are used to neutralize the pH of the concrete, resulting in a more ideal substrate). The oyster domes are 24" in diameter and 18" tall and weigh approximately 75 lbs. These reef balls are well suited for the establishment of oysters that are common along MacDill AFB shoreline and throughout Tampa Bay. Placing the Lo-Pro's in approximately two feet of water will allow the units to be mostly exposed during low tide and totally submerged at high tide; conditions which are optimum for oysters in Tampa Bay. Reef ball units will create habitat by encouraging oysters and other filter feeders to attach.

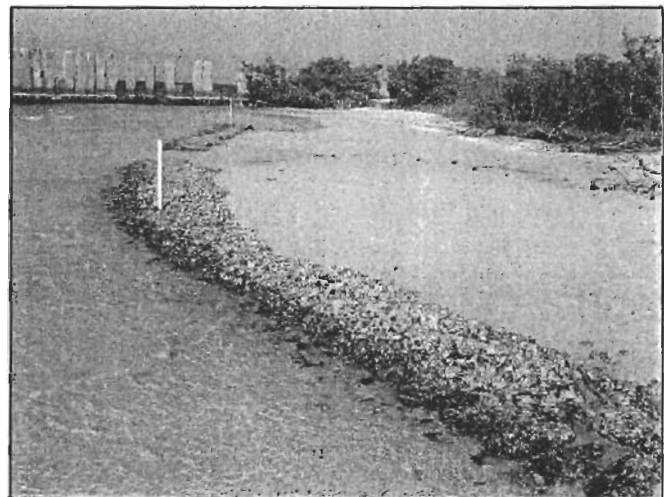


The submerged oyster domes are covered with large openings on the perimeter with a large hole in the middle, extending to the top of the dome. These holes enable waves to penetrate the unit and allow an easy flow of wave energy. Water enters the holes on the sides of the reef balls and then is dispelled out the top. The diagram at left illustrates how the water exits out the top of each unit. This movement of water will keep the unit stable and immobile. The waves, in essence, will not reflect backwards; but in all directions, more effectively reducing the waves.

Oyster shell bars will be constructed similar to natural oyster communities found along shoreline areas throughout Tampa Bay. Fossilized oyster shell from local shell mines provides a hard surface for oyster larvae to settle upon and grow, eventually forming a natural reef. Mesh bags filled with fossilized shells will be used to create the oyster bar habitats. Each oyster shell bag is 20 inches long by nine inches in diameter and made of diamond oriented tubular mesh filled entirely with fossilized (oyster) shell. The design has been used extensively by the South Carolina Department of Natural Resources (SCDNR) to reduce movement of deployed shell for many of their oyster restoration projects. This type of mesh does not unravel and has not been shown to adversely affect fish and wildlife resources.

No oyster shell, bags or domes will be placed in seagrass areas or in any areas containing any significant benthic infauna. Typically, natural oyster beds are located in the tidal flats from +1.5 mean low water (MLW) and lower, which is periodically exposed and limits seagrass growth. All new oyster bars (and domes) will be constructed landward of MacDill AFB "Do Not Enter/Boater Exclusion Zone" signs posted approximately 100 feet offshore.

Over the last four years, Tampa Bay Watch has created multiple oyster shell bars at six locations in and around Tampa Bay. The picture on the right depicts a one layer, two- bag wide oyster bar constructed at Palonis Park, a City of Tampa Park adjacent to the Gandy Bridge on the eastern shore of Old Tampa Bay. These shell bars have been successful at both sediment accretion as well as new oyster recruitment.



#### **IV. MacDill AFB Phase III Shoreline Enhancement Description**

##### Reef Ball Units

A total of 1,569 Lo-Pro Reef Ball™ units will help protect 970' of shoreline at the southeast corner (Gadsden Point) of the Interbay Peninsula. This particular 'corner' of the Base receives constant wave energy from the two ship channels (Hillsborough Cuts A and C, Figure 1) that run parallel to the east and south coastline of the peninsula.

The proposed plan is to purchase the oyster domes from Reef Innovations in Sarasota and have them delivered the day of each event. The domes will be placed along the shoreline by community volunteers and staff in the following manner:

- The reef balls will be placed on the sandy bottom along the most southeast shoreline of the Interbay Peninsula. There are no signs of seagrass beds, intertidal

vegetation or other significant natural resources in the project area. The domes will be placed where the water is typically 2' – 2.5' deep at mean high water (MHW).

- One 150' dome line will consist of 225 domes, placed waterward of the mangrove stand, to further protect the Phase II restoration (Figure 5).
- Figure 5 illustrates oyster domes placement. Four serpentine lines of domes will be installed from the 150' dome line, following the coastline north.
  - Each serpentine line will overlap the next by 20' and will feature a 10' gap to allow marine animal species to access shallower and calmer waters (Figures 5 and 7). This extended overlap will prevent sediments from washing out, but allow for marine animal access. The oyster shell reefs landward of these reinforced dome lines will provide additional defense from wave action and allow for sediment accretion.
  - Each 150' line consists of ~195 domes in two or three rows and will protect 120' of shoreline. Figure 7 depicts the layout of a serpentine oyster dome line. Two and three rows of Lo-Pro Reef Balls™ touching at the base will measure 4' and 6' wide (1 row = 2') and 1.5' high.
- A 375' dome line will extend north adjacent to the northernmost serpentine line. This line will consist of three rows of domes (564 domes, Figure 5).

#### Oyster Shell Bars

The 2004 hurricane season had a severe effect upon the mangroves and the adjacent salt marsh habitat. In March 2005, 395' of oyster shell bars were permitted and constructed to protect a stand of mangroves and 150' of eroded shoreline at the tip of the Interbay Peninsula (Phase II, Figure 3 and 4). For the Phase III effort, Tampa Bay Watch staff, MacDill AFB staff and volunteers will construct a 340 linear foot oyster shell bar, along the southeastern corner of MacDill AFB in the following manner:

- A 340' oyster shell bar will be added to the 150' bar built in March 2005 at Gadsden Point. This 340' oyster shell bar will be constructed landward of the Reef Ball™ communities using approximately 1,724 shell bags. The shell bar will encompass existing marine debris—a tangle of old towing cable—in its design and construction (Figure 4).
- The oyster shell bar will be built in shallow water using oyster bags placed approximately 50' from



*Installation of Oyster Domes for Phase I at MacDill*

the shoreline. Figure 6 illustrates the bar measuring 5' wide (three rows of bags = 5' width) and 1.3' tall. Typically, natural oyster beds are located in the tidal flats from +1.5 mean low water (MLW) and lower. All new oyster bars (and domes) will be constructed landward of MacDill AFB "Do Not Enter/Boater Exclusion Zone" signs posted approximately 100 feet offshore.

## **V. Materials:**

- 1,569 Lo-Pro Reef Balls™
- 28.5 tons of cleaned, local, 3" fossilized shell
- to assemble 1,724 shell bags

## **VI. Task Description:**

The project is designed to be accomplished in the following manner:

### **Task 1. Permitting and Interagency Coordination**

Permit application will be prepared by MacDill AFB and submitted to the Florida Department of Environmental Protection and the US Army Corps of Engineers. Permit applications will also be submitted to the Tampa Port Authority and the Environmental Protection Commission of Hillsborough County.

### **Task 2. Schedule Project Dates**

Based upon receipt of the appropriate permits, the project dates will be scheduled. The project is anticipated to commence in January 2006 and be completed late spring 2008.

### **Task 3. Arrival of Materials / Area Preparation**

Marine-friendly Lo-Pro Reef Ball™ units will be constructed by Reef Innovations of Sarasota and Tampa Bay Watch staff and then delivered to the site at MacDill AFB the day of the event. The oyster reef material of choice is clean, washed 3" fossilized oyster shell that is mined locally and can be delivered to each oyster shell bagging site the day prior to the event. Tampa Bay Watch will coordinate with MacDill AFB for delivery to an appropriate area.



### **Task 4. Event Coordination**

Lo-Pro Reef Ball™ units will be unloaded from the delivery vehicles and carried to the water by volunteers, Tampa Bay Watch and MacDill AFB staff then positioned into place. Domes may also be delivered by a shallow water barge, then deployed by staff.

Oyster shell bags will be constructed by shoveling the fossilized shell into pre-cut PVC pipes "sleeved" with the mesh. The PVC form is removed; creating an oyster shell bag that is tied at both ends. These "bags" are then loaded onto an ATV and delivered to the shoreline. Staff from Tampa Bay Watch and MacDill AFB will be on-site to ensure proper placement of the oyster shell bags, and to minimize human impact on shoreline vegetation.

#### Task 5. Follow-up Monitoring and Reporting

Tampa Bay Watch will monitor the newly deployed oyster reef units and constructed oyster shell reefs every six months for two years for the following parameters: oyster shell migration, new oyster colonization, changes in erosion patterns, sediment accretion and wildlife usage of the new oyster communities. Tampa Bay Watch and MacDill AFB will publish the results of the effort and distribute to program participants, permitting agencies, program sponsors and environmental organizations.



*150' oyster shell bar installed during Phase II*

### **VII. Timeline**

MacDill AFB and Tampa Bay Watch will begin the process of applying for permits in early summer 2005. Volunteer coordination and equipment accumulation will take place two months prior to each event. The construction of these shallow water oyster bars and dome deployment will be scheduled between January and May 2006 to coincide with natural oyster recruitment in Tampa Bay. The newly created oyster communities will be monitored every six months for a two-year period. A final report will be prepared at the end of the two-year period.

Figure 1

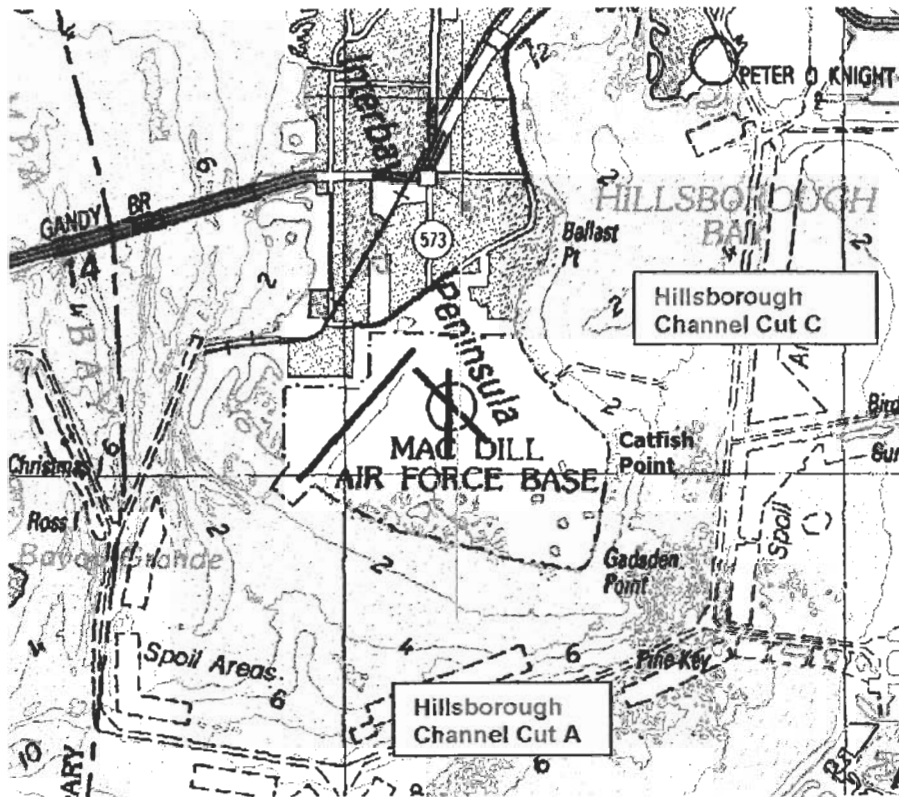
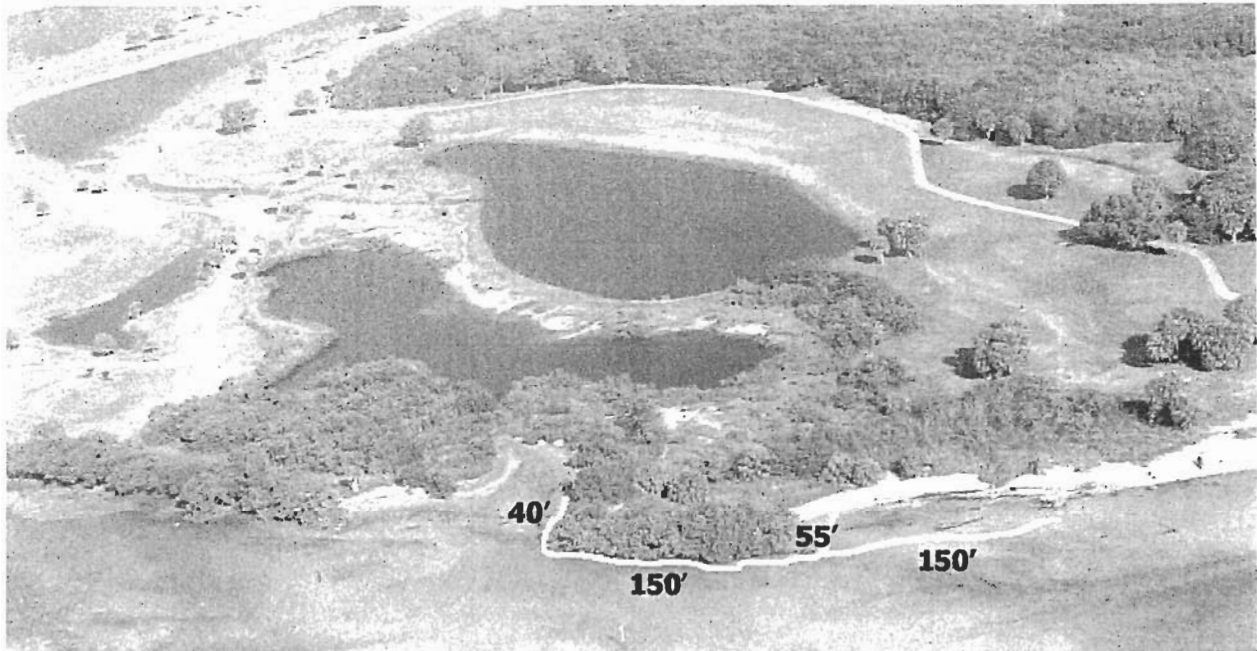


Figure 2



**Figure 3**



In March 2005, under ACOE permit number SAJ-2004-11285-NW-CAS, 395' of oyster shell bars were installed to protect a rapidly eroding stand of mangroves at the tip of the Interbay Peninsula. Of the 395' installed, 150' feet of shell bars will protect the salt marsh habitat north/behind the mangroves at Gadsden Point from further erosion while providing habitat for marine organisms.

**Figure 4**

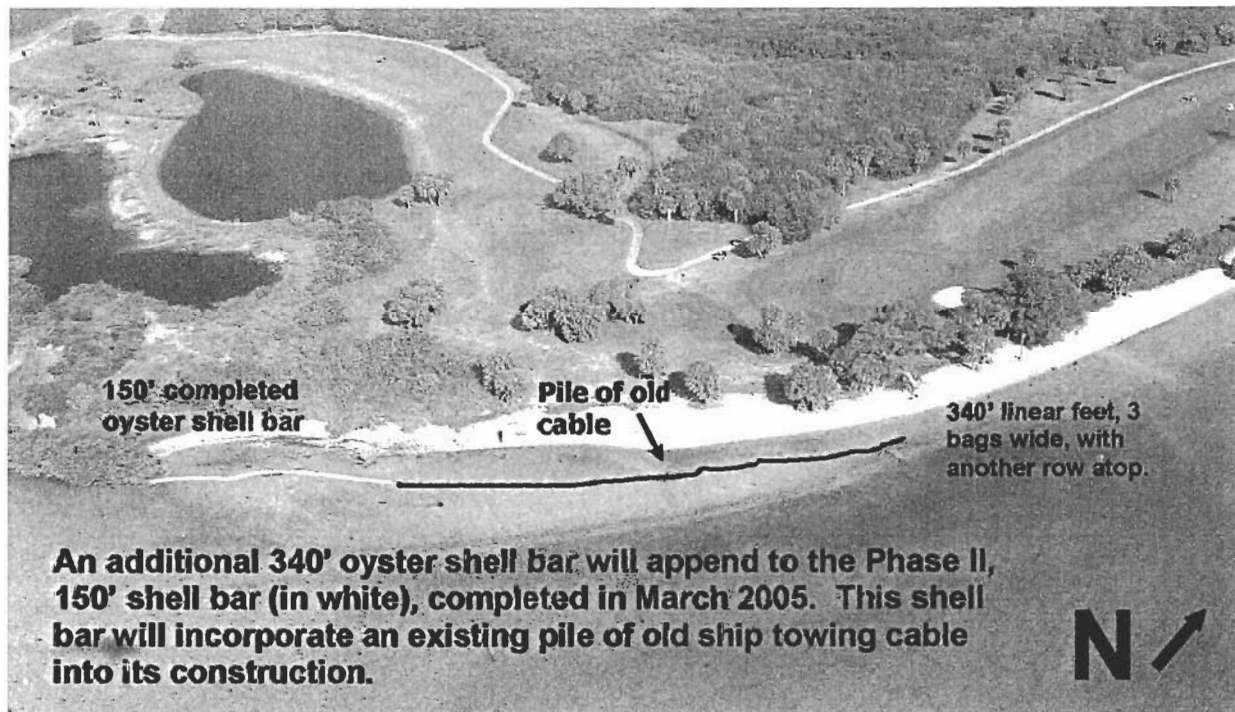
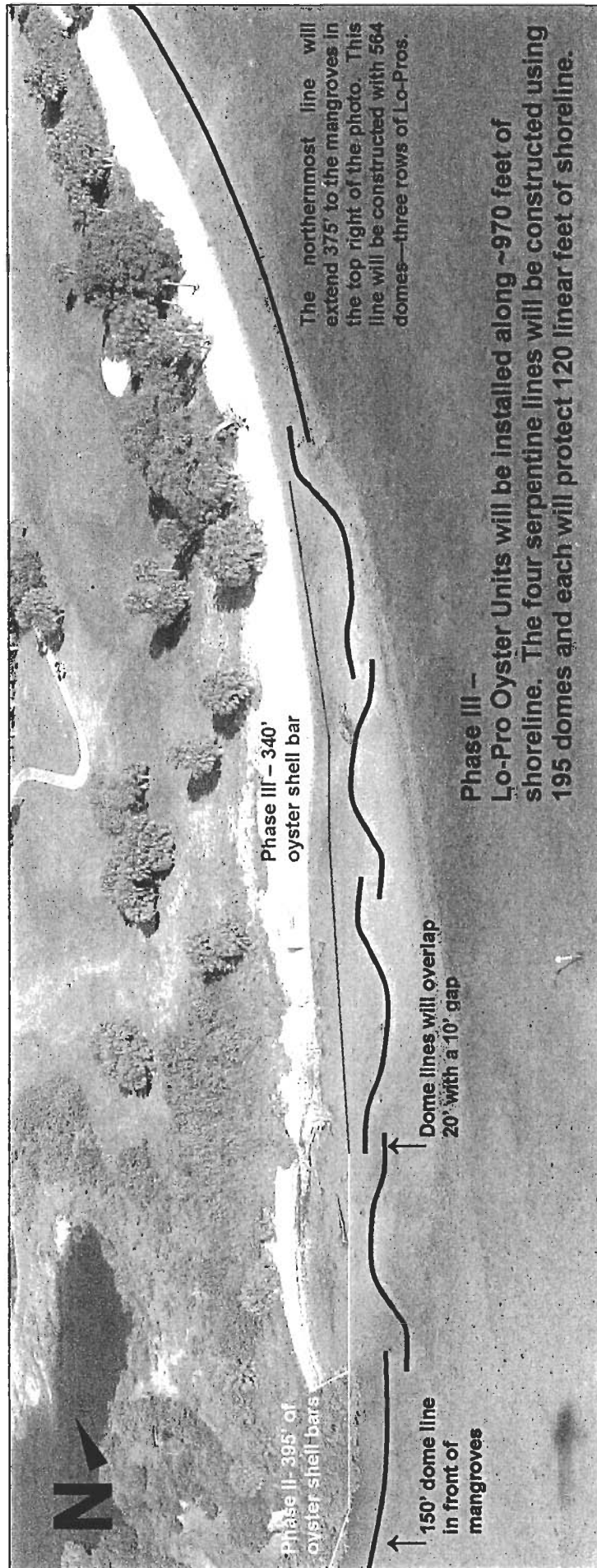


Figure 5



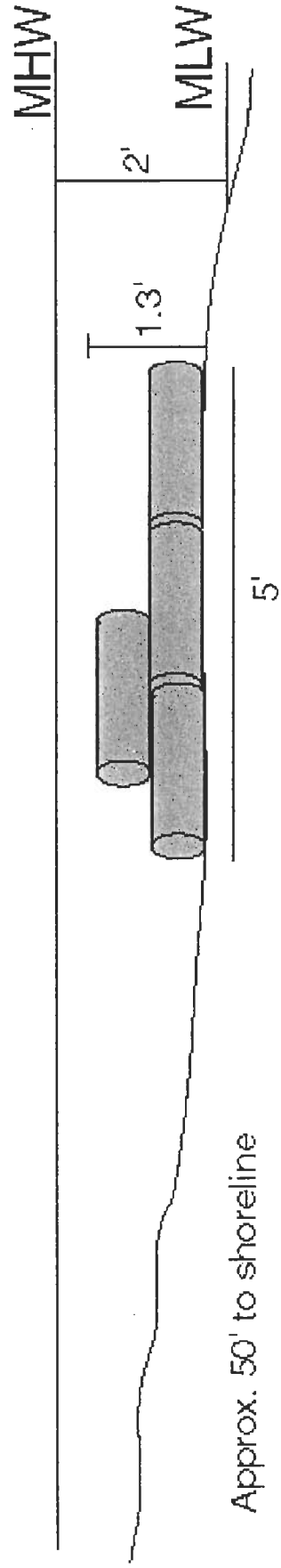
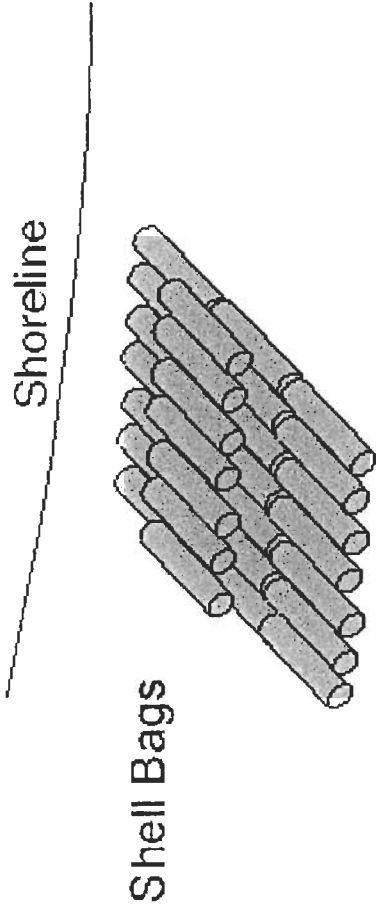
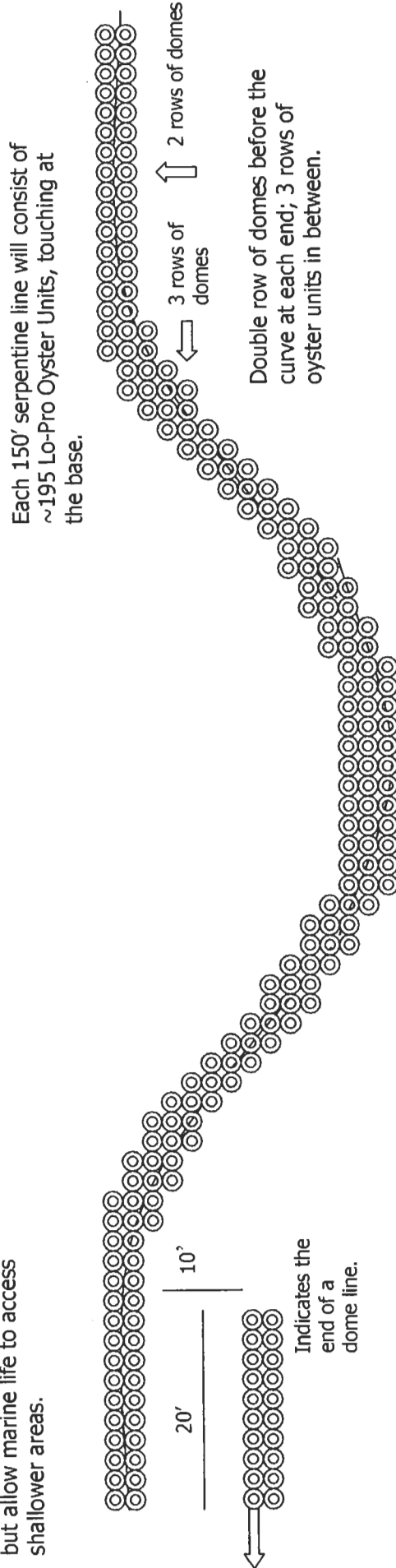


Figure 7

# Figure 7: Bird's-eye View of 150' Lo-Pro Oyster Unit Line

In between dome lines, there will be a 10' gap and a 20' overlap to reduce 'washing out' but allow marine life to access shallower areas.



20'

10'

Indicates the end of a dome line.

Each 150' serpentine line will consist of ~195 Lo-Pro Oyster Units, touching at the base.

3 rows of domes

2 rows of domes

Double row of domes before the curve at each end; 3 rows of oyster units in between.